

# Chapter 15

## MPLS Monitoring and Troubleshooting

Table 51 summarizes the command-line interface (CLI) commands you can use to monitor MPLS. In the table, the commands are grouped by functionality. In the remainder of this chapter, they are explained alphabetically.

**Table 51: Commands for Monitoring MPLS**

Task Category	Task or Information to Monitor	Command
<b>MPLS Interfaces</b>	Status of interfaces on which MPLS is running.	show mpls interface on page 490
<b>Named Paths</b>	Configured named paths that are used in dynamic MPLS.	show mpls path on page 496
<b>LSPs</b>	Configured LSPs on this router, as well as all ingress, transit, and egress LSPs.	show mpls lsp on page 490
	Disconnect and restart dynamic LSPs that originate from this router.	clear mpls lsp on page 486
<b>MPLS Administrative Groups</b>	MPLS administrative groups.	show mpls admin-groups on page 488
<b>CSPF Statistics</b>	CSPF statistics.	show mpls cspf on page 489
<b>Traffic Engineering Database</b>	Entries in the TED database.	show ted database on page 497
	Protocols contributing to the TED.	show ted protocol on page 502
	Current TED links.	show ted link on page 500
<b>Circuit Cross-Connects</b>	Information about configured cross-connects.	show connections on page 486

## clear mpls lsp

**Syntax** clear mpls lsp <lsp-name>

**Description** Disconnect and restart LSPs. This operation disconnects existing RSVP sessions on the ingress router, releases the routes and states associated with the LSPs, and then starts new LSPs. Issuing this command might impact traffic travelling along the LSPs, because there might be a time lag between the old path being torn down and the new path being set up.

**Options** none—Reset and restart *all* LSPs that originated from this router; that is, all LSPs for which this router is the ingress router. Depending on the number of LSPs involved, it might take a while to restart all the LSPs.

*lsp-name*—(Optional) Reset and restart the specified LSP.

**Required Privilege Level** clear

**See Also** show rsvp session on page 508

**Sample Output**

```
user@host> clear mpls lsp
user@host>
```

## show connections

**Syntax** show connections <all | interface-switch | lsp-switch | remote-interface-switch>  
<up | down | up-down> <brief | extensive | history | labels | status> <name>

**Description** Display information about the configured CCC connections.

**Options** all—(Optional) Display all connections.

brief—(Optional) Display brief connection status information.

down—(Optional) Display connections that are not operational.

extensive—(Optional) Display very detailed connection, labels, and history information.

history—(Optional) Display connection history.

interface-switch—(Optional) Display interface switch connections.

labels—(Optional) Display labels used for transmit and receive LSPs.

lsp-switch—(Optional) Display LSP switch connections.

name—(Optional) Display information about the named connection.

remote-interface-switch—(Optional) Display remote interface switch connections.

status—(Optional) Display connection and circuit status.

up—(Optional) Display connections that are operational.

up-down—(Optional) Display both operational and non-operational connections.

**Default:** brief, status

**Required Privilege Level** view

**Output Fields** Connection/Circuit—Name of the configured CCC connection.

Type—Type of connection or circuit:

intf—Interface circuit.

if-sw—Layer 2 switching cross-connect.

lsp-sw—LSP stitching cross-connect.

rlsp—Receive LSP circuit.

rmt-if—Remote interface cross-connect.

tlsp—Transmit LSP circuit.

Stat—Connection or circuit status. Refer to the output's legend for an explanation of the status field values.

Time last up—Time that the connection or circuit last transitioned to the Up (operational) state.

# Up trans—Number of times that the connection or circuit has transitioned to the Up (operational) state.

**Sample Output** user@host> **show connections all**

```

CCC connections
Legend for status (St)
UN -- uninitialized
NP -- not present
WE -- wrong encapsulation
DS -- disabled
Dn -- down
-> -- only outbound conn is up
<- -- only inbound conn is up
Up -- operational

Legend for connection types
if-sw: interface switching
rmt-if: remote interface switching
lsp-sw: LSP switching

Legend for circuit types
intf -- interface
tlsp -- transmit LSP
rlsp -- receive LSP

Connection/Circuit      Type  St  Time last up  # Up trans
intf-sw
  at-1/2/3.4             intf  NP
  at-3/2/1.0             intf  NP
pr-pr                   lsp-sw Dn
  from-proz              rlsp  NP
  to-proz                 tlsp  Dn
rmt-intf-sw             rmt-if Dn
  so-5/3/1.0             intf  NP
  here-catch!            tlsp  Dn
  gimme-gimme-gimme     rlsp  NP

```

• show mpls admin-groups

• **Syntax** show mpls admin-groups

• **Description** Display information about the configured MPLS administrative groups.

• **Required Privilege Level** view

• **Output Fields** Group—Name of the administrative group.

• Bit index—Value assigned to the administrative group.

• **Sample Output**

```
[edit]
user@host# show
mpls {
  admin-groups {
    green 0;
    gold 1;
    blue 2;
    black 3;
  }
}
...
[edit]
user@host# exit
user@host> show mpls admin-groups
Group      Bit index
black      3
blue       2
gold       1
green      0
```

## show mpls cspf

<b>Syntax</b>	show mpls cspf
<b>Description</b>	Display CSPF statistics.
<b>Required Privilege Level</b>	view
<b>Output Fields</b>	<p>Queue length—Number of LSPs queue for automatic path computation.</p> <p>Current—Current queue length.</p> <p>Maximum—Maximum queue length (high-water mark).</p> <p>Dequeued—Number of aborted computation attempts.</p> <p>Paths—Counters for label-switched path computations.</p> <p>Total—Sum of the next four fields.</p> <p>Successful—Number of path computations that completed successfully.</p> <p>No Route—Number of path computations that failed because the destination is unreachable.</p> <p>Sys Error—Number of path computations that failed because of lack of memory.</p> <p>CSPFs—Total number of CSPF computations. A single path might require multiple CSPF computations.</p> <p>Time—Time required to perform the label-switched path computation, in sections.</p> <p>Total—Total amount of time consumed by the CSPF path computation algorithm.</p> <p>CSPFs—Total number of CSPF computations.</p> <p>Avg per CSPF—Average amount of time required for each CSPF computation.</p> <p>% of rpd—Percentage of routing process CPU used in the CSPF computation.</p>

**Sample Output**

```

user@host> show mpls cspf
CSPF statistics
Queue length  current      maximum      dequeued
                0                0                0

Paths          total      successful      no route      sys error      CSPFs
                0                0                0                0                0

Time (secs)    total      CSPFs  avg per CSPF      % of rpd
                0.000000    0.000000    0.000000    0.0000
```

## show mpls interface

**Syntax** show mpls interface

**Description** Display information about interfaces on which MPLS is enabled. MPLS is enabled on an interface when the interface is configured in both the mpls and interface sections of the configuration hierarchy (with the set protocol mpls interface *interface-name* and set interface *interface-name* unit 0 family mpls statements, respectively).

**Required Privilege Level** view

**Output Fields** Interface—Name of the interface.

State—State of the interface. It can be Up or Down.

Administrative groups—The administratively assigned colors of the link.

**Sample Output**

```
user@host> show mpls interface
Interface      State      Administrative groups
so-1/0/0.0    Up         Blue Yellow Red
```

## show mpls lsp

**Syntax** show mpls lsp <name *lsp-name*> <*lsp-type*> <statistics> <brief | terse | detail | extensive> <up | down>

**Description** Display information about configured and active dynamic LSPs in which this router participates.

**Options** brief—(Optional) Display brief LSP information.

detail—(Optional) Display detailed LSP information, including all current state information and all parameters and counters that are part of the LSP.

down—(Optional) Display only LSPs that are inactive.

extensive—(Optional) Display all information about LSPs, including all past state history and the reasons why an LSP failed. The show mpls lsp extensive command displays the same information as the show mpls lsp detail command but covers the most recent fifty events.



**Note**

CSPF always results in a strictly routed LSP, even if the configuration specifies a loose route, or no route at all.

*lsp-type*—(Optional) Display information about a particular LSP type:

egress—Sessions that terminate on this router.

ingress—Sessions that originate from this router.

transit—Sessions that transit through this router.

The output is displayed in the brief format by default.

The output of the show mpls lsp egress and show mpls lsp transit commands are identical to that of the show rsvp session egress lsp and show rsvp session transit lsp commands, respectively, because RSVP is the signaling protocol that is used to set up LSPs.

*name lsp-name*—(Optional) Display information about the named LSP.

*statistics*—(Optional) Display accounting information about LSPs. This option is valid only on the ingress and on transit routers, because only these routers can maintain statistics. No statistics are available for LSPs on the egress router, because the penultimate router in the LSP sets the label to 0. Also, as the packet arrives at the egress router, the hardware removes its MPLS header and the packet reverts to being an IPv4 packet. Therefore, it is counted as an IPv4 packet, not an MPLS packet.

*terse*—(Optional) Display only a count of the number of sessions and the number of up and down LSPs. Specifying this option is useful when there are a large number of sessions.

*up*—(Optional) Display only LSPs that are active.

**Default:** brief; display active and inactive LSPs

**Required Privilege Level** view

**Sample Output** Sample Output: show mpls lsp brief on page 494  
 Sample Output: show mpls lsp terse on page 494  
 Sample Output: show mpls lsp detail on page 494  
 Sample Output: show mpls lsp extensive on page 495

**Options at a Glance** Table 52 summarizes which information is included in each of the show mpls lsp command options. In this table, output fields are listed in alphabetical order. In the Output Fields section, the output fields are listed in the order in which they are displayed.

Table 52: Show MPLS LSP Output Field Summary

Options	Field Description
Detail Extensive	Active Route—Number of active routes (prefixes) that have been installed in the forwarding table to follow this LSP.
Detail Extensive	address—(First line of each section) Destination (egress router) of the LSP.
Brief Detail Extensive	Egress RSVP—Information about the LSPs on the egress router. MPLS learns this information by querying RSVP, which holds all the transit and egress session information. Each session has one line of output.
Terse	Egress RSVP—Number of LSPs on the egress router and the state of these paths. MPLS learns this information by querying RSVP, which holds all the transit and egress session information.
Brief Detail Extensive	From—Source (ingress router) of the session.
Extensive	Details of most recent fifty events.
All	Ingress LSP—Information about LSPs on the ingress router. Each session has one line of output.
Brief Detail Extensive	Label in—Incoming label for this LSP.
Brief Detail Extensive	Label out—Outgoing label for this LSP.
Brief Detail Extensive	LSP name—Name of the LSP.
Brief Detail Extensive	LSP state—State of the LSP that is being handled by this RSVP session. It can be either Up or Dn (down).
Detail Extensive	PATH rcvfrom—Previous-hop router or local client.
Detail Extensive	PATH sentto—Next-hop router or local client.
Detail Extensive	Port number—Protocol ID and sender/receiver port used in this RSVP session.
Detail Extensive	Record route—Recorded route for the session as taken from the Record Route Object.
Detail Extensive	RESV rcv from—Next-hop router or local client.
Brief Detail Extensive	Resv style—RSVP reservation style.
Brief	Rt—Number of active routes (prefixes) that have been installed in the routing table to follow this RSVP session.
Detail Extensive	Since—Date and time when the RSVP session was initiated.
Detail Extensive	Time left—Number of seconds remaining in the lifetime of the reservation.
Brief	To—Destination (egress router) of the session.
Detail Extensive	Tspec—Sender's traffic specification, which describes the sender's traffic parameters.
Brief Detail Extensive	Transit RSVP—Information about the LSPs on the transit routers.
Terse	Transit RSVP—Number of LSPs on the transit routers and the state of these paths.

<b>Output Fields</b>	<p>Ingress LSP—Information about LSPs on the ingress router. Each session has one line of output.</p> <p>Egress RSVP—(Brief and Detail output only) Information about the LSPs on the egress router. MPLS learns this information by querying RSVP, which holds all the transit and egress session information. Each session has one line of output.</p> <p>Egress RSVP—(Terse output only) Number of LSPs on the egress router and the state of these paths. MPLS learns this information by querying RSVP, which holds all the transit and egress session information.</p> <p>Transit RSVP—(Brief and Detail output only) Information about the LSPs on the transit routers. MPLS learns this information by querying RSVP, which holds all the transit and egress session information. Each session has one line of output.</p> <p>Transit RSVP—(Terse output only) Number of LSPs on the transit routers and the state of these paths. MPLS learns this information by querying RSVP, which holds all the transit and egress session information.</p> <p><i>address</i>—(Detail output only; first line of each section) Destination (egress router) of the LSP.</p> <p><i>To</i>—(Brief output only) Destination (egress router) of the session.</p> <p><i>From</i>—(Brief and Detail output only) Source (ingress router) of the session.</p> <p>LSP state—(Brief and Detail output only) State of the LSP that is being handled by this RSVP session. It can be either Up or Dn (down).</p> <p>Active Route—(Detail and Extensive output only) Number of active routes (prefixes) that have been installed in the forwarding table to follow this LSP. For ingress LSPs, the forwarding table is the primary IPv4 table (inet.0). For transit and egress RSVP sessions, the forwarding table is the primary MPLS table (mpls.0).</p> <p><i>Rt</i>—(Brief output only) Number of active routes (prefixes) that have been installed in the routing table to follow this RSVP session. For ingress RSVP sessions, the routing table is the primary IPv4 table (inet.0). For transit and egress RSVP sessions, the routing table is the primary MPLS table (mpls.0).</p> <p><i>Resv style</i>—(Brief and Detail output only) RSVP reservation style. This field consists of two parts. The first is the number of active reservations. The second is the reservation style, which can be FF (fixed filter), SE (shared explicit), or WF (wildcard filter).</p> <p><i>Label in</i>—(Brief and Detail output only) Incoming label for this LSP.</p> <p><i>Label out</i>—(Brief and Detail output only) Outgoing label for this LSP.</p> <p><i>LSP name</i>—(Brief and Detail output only) Name of the LSP.</p> <p><i>Time left</i>—(Detail output only.) Number of seconds remaining in the lifetime of the reservation.</p> <p><i>Since</i>—(Detail output only.) Date and time when the RSVP session was initiated.</p> <p><i>Tspec</i>—(Detail output only.) Sender's traffic specification, which describes the sender's traffic parameters.</p>
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- Port number—(Detail output only.) Protocol ID and sender/receiver port used in this RSVP session.
- 
- PATH rcvfrom—(Detail output only.) Previous-hop router or local client.
- 
- PATH sentto—(Detail output only.) Next-hop router or local client.
- 
- RESV rcv from—(Detail output only.) Next-hop router or local client.
- 
- Record route—(Detail output only.) Recorded route for the session as taken from the Record Route Object.

**Sample Output: show mpls lsp brief**

```

user@host> show mpls lsp
user@host> show mpls lsp brief
Ingress LSP: 0 label-switched paths
Total 0 displayed, Up 0, Down 0

Egress RSVP: 0 sessions
Total 0 displayed, Up 0, Down 0

Transit RSVP: 1 sessions
To           From           State Rt Style Labelin Labelout LSPname
123.456.2.34 101.0.0.1      Up    1  1 FF   1024      0 sfol
Total 1 displayed, Up 1, Down 0
    
```

**Sample Output: show mpls lsp terse**

```

user@host> show mpls lsp terse
Ingress LSP: 0 label-switched paths
Total 0 displayed, Up 0, Down 0

Egress RSVP: 0 sessions
Total 0 displayed, Up 0, Down 0

Transit RSVP: 1 sessions
Total 1 displayed, Up 1, Down 0
    
```

**Sample Output: show mpls lsp detail**

```

user@host> show mpls lsp detail
Ingress LSP: 0 label-switched paths
Total 0 displayed, Up 0, Down 0

Egress RSVP: 0 sessions
Total 0 displayed, Up 0, Down 0

Transit RSVP: 1 sessions
123.456.2.34
  From: 101.0.0.1, LSPstate: Up, ActiveRoute: 1, LSPname: sfol
  Resv style: 1 FF, Label in: 1024, Label out: 0
  Time left: 144, Since: Sat Feb 13 12:45:42 1999
  Tspec: rate 0bps size 0bps peak 320Tbps m 20 M 1500
  Port number: sender 1 receiver 18 protocol 255
  PATH rcvfrom: 123.456.2.17 (ed2.0) 1571 pkts
  PATH sentto: 123.456.2.34 (ed0.0) 1571 pkts
  RESV rcvfrom: 123.456.2.34 (ed0.0) 1571 pkts
  Record route: 123.456.2.17 <self> 123.456.2.34
Total 1 displayed, Up 1, Down 0s
    
```

**Sample Output: show mpls  
lsp extensive**

```

user@host> show mpls lsp extensive
Ingress LSP: 2 label-switched paths

10.456.1.224
  From: 10.456.1.221, State: Up, ActiveRoute: 5, LSPname: dhg2.1
  ActivePath: (primary)
  LoadBalance: Random
  *Primary                               State: Up
    Bandwidth: 2Mbps
    Computed ERO (S [L] denotes strict [loose] hops): (CSPF metric: 10)
      123.456.200.25 S
    25 Apr 21 00:43:45 CSPF: computation result accepted
    24 Apr 21 00:43:29 Selected as active path
    23 Apr 21 00:43:29 Record Route: 123.456.200.25 S
    22 Apr 21 00:43:29 Up
    21 Apr 21 00:43:15 CSPF failed: no route toward 10.456.1.224[2 times]
    20 Apr 21 00:42:35 Deselected as active
    19 Apr 21 00:42:35 123.456.200.25: RSVP error, subcode 4: protocol shutdown
    18 Apr 21 00:42:35 Down
    17 Apr 21 00:39:48 Selected as active path
    16 Apr 21 00:39:48 Record Route: 123.456.200.25 S
    15 Apr 21 00:39:48 Up
    14 Apr 21 00:39:48 Originate Call
    13 Apr 21 00:39:48 CSPF: computation result accepted
    12 Apr 21 00:39:48 Clear Call
    11 Apr 21 00:39:48 Deselected as active
    10 Apr 21 00:37:49 Record Route: 123.456.200.118 S 123.456.200.34 S 123.456.2
00.17 S
    9 Apr 21 00:37:49 Up
    8 Apr 21 00:37:49 CSPF: computation result accepted
    7 Apr 21 00:37:49 CSPF: link down/deleted
    6 Apr 21 00:37:24 Selected as active path
    5 Apr 21 00:37:24 Record Route: 123.456.200.122 S 123.456.200.34 S 123.456.2
00.17 S
    4 Apr 21 00:37:24 Up
    3 Apr 21 00:37:24 Originate Call
    2 Apr 21 00:37:24 CSPF: computation result accepted
    1 Apr 21 00:36:55 CSPF: could not determine self
    Created: Fri Apr 21 00:36:53 2000

10.456.1.224
  From: 10.456.1.221, State: Up, ActiveRoute: 4, LSPname: dhg2.2
  ActivePath: (primary)
  LoadBalance: Random
  *Primary                               State: Up
    Computed ERO (S [L] denotes strict [loose] hops): (CSPF metric: 10)
      123.456.200.25 S
    26 Apr 21 00:43:42 CSPF: computation result accepted
    25 Apr 21 00:43:39 Selected as active path
    24 Apr 21 00:43:39 Record Route: 123.456.200.25 S
    23 Apr 21 00:43:39 Up
    22 Apr 21 00:43:12 CSPF failed: no route toward 10.456.1.224[2 times]
    21 Apr 21 00:42:35 Deselected as active
    20 Apr 21 00:42:35 123.456.200.25: RSVP error, subcode 4: protocol shutdown
    19 Apr 21 00:42:35 Down
    18 Apr 21 00:39:48 Selected as active path
    17 Apr 21 00:39:48 Record Route: 123.456.200.25 S
    16 Apr 21 00:39:48 Up
    15 Apr 21 00:39:48 Originate Call
    14 Apr 21 00:39:48 CSPF: computation result accepted
    13 Apr 21 00:39:48 Clear Call
    12 Apr 21 00:39:48 Deselected as active

```

```

    11 Apr 21 00:37:49 Record Route: 123.456.200.118 S 123.456.200.34 S 123.456.2
00.17 S
    10 Apr 21 00:37:49 Up
    9 Apr 21 00:37:49 Clear Call
    8 Apr 21 00:37:49 CSPF: computation result accepted
    7 Apr 21 00:37:49 CSPF: link down/deleted
    6 Apr 21 00:37:25 Selected as active path
    5 Apr 21 00:37:25 Record Route: 123.456.200.122 S 123.456.200.34 S 123.456.2
00.17 S
    4 Apr 21 00:37:25 Up
    3 Apr 21 00:37:25 Originate Call
    2 Apr 21 00:37:25 CSPF: computation result accepted
    1 Apr 21 00:36:55 CSPF: could not determine self
    Created: Fri Apr 21 00:36:53 2000
    Total 2 displayed, Up 2, Down 0

Egress RSVP: 1 sessions

123.456.200.109
    From: 10.456.1.222, LSPstate: Up, ActiveRoute: 0, LSPname: dhg3.1
    Resv style: 1 FF, Label in: 3, Label out: -
    Time left: 140, Since: Fri Apr 21 00:37:13 2000
    Tspec: rate 0bps size 0bps peak Infbps m 20 M 1500
    Port number: sender 1 receiver 19 protocol 0
    PATH rcvfrom: 123.456.200.110 (sr2.0) 1445 pkts
    PATH sentto: localclient
    RESV rcvfrom: localclient
    Record route: 123.456.200.110 <self>
    Total 1 displayed, Up 1, Down 0

Transit RSVP: 0 sessions
    Total 0 displayed, Up 0, Down 0

```

## show mpls path

**Syntax** show mpls path <path-name>

**Description** Display the named paths used in dynamic MPLS that have been configured on this router.

**Options** none—Display all configured LSPs.

*path-name*—(Optional) Display the specified LSP.

**Required Privilege Level** view

**Output Fields** Path name—Information about ingress LSPs. Each path has one line of output.

Address—Addresses of the routers that form the LSP.

Strict/loose address—Whether the address is a configured as a strict or loose address.

```

user@host> show mpls path
Path name      Address          Strict/loose address
p1             123.456.55.6    Strict
              123.456.1.6     Loose
p2             191.456.1.4     Strict

```

## show ted database

**Syntax** show ted database <system-name> <brief | detail | extensive>

**Description** Display the entries in the Traffic Engineering Database (TED).

**Options** brief—(Optional) Display brief TED information.

detail—(Optional) Display detailed TED information.

extensive—(Optional) Display all information about the TED.

system-name—(Optional) Display TED information for a particular system.

**Default:** brief

**Required Privilege Level** view

**Sample Output** Sample Output: show ted database brief on page 499  
Sample Output: show ted database detail on page 499  
Sample Output: show ted database extensive on page 499

**Options at a Glance** Table 53 summarizes which information is included in each of the show ted database command options. In this table, output fields are listed in alphabetical order. In the Output Fields section, the output fields are listed in the order in which they are displayed.

**Table 53: Show TED Database Output Fields**

Options	Field Description
All	Age (s)—How long since the node was last refreshed, in seconds.
Extensive	Available BW—Amount of bandwidth actually reserved by RSVP for each priority level.
Extensive	Color—Administrative group assigned to this link.
Brief Detail	ID—Host name and address of the node.
Detail Extensive	Local—Address of the local interface being used to reach remote node.
All	LnkIn—Number of nodes pointing towards this node.
All	LnkOut—Number of nodes that this node is point to.
Extensive	Metric—Configured traffic engineering metric. The default setting is 1.
Extensive	NodeID—Host name and address of the node.
All	Protocol—Protocol that reported the node information.
Detail Extensive	Remote—Address of the interface on the remote node.
Extensive	Reservable bandwidth—Subscription factor for the interface.
Extensive	Static BW—Bandwidth available on the interface.
All	TED database—Number of nodes and pseudonodes participating in IS-IS and OSPF domain routing.
Detail Extensive	To—Remote node to which this node points.
All	Type—Type of node. It can be either Rtr (router) or Net (pseudonode).

- **Output Fields** TED database—Number of nodes and pseudonodes participating in IS-IS and OSPF domain routing.
- 
- ID—Host name and address of the node. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode. If the node contains a router ID, it is displayed in parentheses.
- 
- ID—(Brief and Detail output only) Host name and address of the node. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.
- 
- NodeID—(Extensive output only) Host name and address of the node. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.
- 
- Type—Type of node. It can be either Rtr (router) or Net (pseudonode).
- 
- Age(s)—How long since the node was last refreshed, in seconds.
- 
- LnkIn—Number of nodes pointing towards this node.
- 
- LnkOut—Number of nodes to which this node points.
- 
- Protocol—Protocol that reported the node information. It can be one or more of the following:
  - IS-IS(1)—IS-IS Level 1.
  - IS-IS(2)—IS-IS Level 2.
  - OSPF (*area-number*)—OSPF from the specified area.
- 
- To—(Detail and Extensive output only) Remote node to which this node points.
- 
- Local—(Detail and Extensive output only) Address of the local interface being used to reach remote node.
- 
- Remote—(Detail and Extensive output only) Address of the interface on the remote node.
- 
- Color—(Extensive output only) Administrative group assigned to this link.
- 
- Metric—(Extensive output only) Configured traffic engineering metric. The default setting is 1.
- 
- Static BW—(Extensive output only) Bandwidth available on the interface.
- 
- Reservable bandwidth—(Extensive output only) Subscription factor for the interface, which is the percentage of the link bandwidth that can be used for the RSVP reservation process. You configure this by including the subscription statement when configuring RSVP.
- 
- Available BW—(Extensive output only) Amount of bandwidth actually reserved by RSVP for each priority level. You can configure this by including the priority statement when configuring LSPs. The bandwidth shown is for the entire interface, not for each individual LSP.

**Sample Output: show ted database brief**

```

user@host> show ted database brief
TED database: 6 ISIS nodes 6 INET nodes
ID                               Type Age(s) LnkIn LnkOut Protocol
cheviot.00(123.456.1.10)         Rtr  383    1     1 IS-IS(2) IS-IS(1)
corriedale.00(123.456.1.11)      Rtr   36    2     0 IS-IS(2) IS-IS(1)
wolff.00(123.456.1.12)          Rtr  399    0     0 IS-IS(2) IS-IS(1)
perendale.00(123.456.1.13)       Rtr  385    2     0 IS-IS(2) IS-IS(1)
merino.00(123.456.1.14)         Rtr  379    1     3 IS-IS(2) IS-IS(1)
romney.00(123.456.1.15)         Rtr  427    0     2 IS-IS(2) IS-IS(1)

```

**Sample Output: show ted database detail**

```

user@host> show ted database detail merino
TED database: 6 ISIS nodes 6 INET nodes
NodeID: merino.00(123.456.1.14)
  Type: Rtr, Age: 507 secs, LinkIn: 1, LinkOut: 3
  Protocol: IS-IS(2)
    To: corriedale.00(123.456.1.11), Local: 123.456.8.206, Remote: 123.456.8.207
    To: perendale.00(123.456.1.13), Local: 123.456.8.204, Remote: 123.456.8.205
    To: cheviot.00(123.456.1.10), Local: 123.456.10.65, Remote: 123.456.10.66
  Protocol: IS-IS(1)
    To: corriedale.00(123.456.1.11), Local: 123.456.8.206, Remote: 123.456.8.207
    To: perendale.00(123.456.1.13), Local: 123.456.8.204, Remote: 123.456.8.205
    To: cheviot.00(123.456.1.10), Local: 123.456.10.65, Remote: 123.456.10.66

```

**Sample Output: show ted database extensive**

```

user@host> show ted database extensive
TED database: 4 ISIS nodes 4 INET nodes
NodeID: strawberry.00(10.255.245.87)
  Type: Rtr, Age: 247 secs, LinkIn: 0, LinkOut: 0
  Protocol: IS-IS(2)
NodeID: orange.00(10.1.1.77)
  Type: Rtr, Age: 46 secs, LinkIn: 1, LinkOut: 1
  Protocol: IS-IS(2)
    To: banana.00(10.255.245.34), Local: 10.0.0.2, Remote: 10.0.0.1
      Color: 0 <none>
      Metric: 10
      Static BW: 622Mbps
      Reservable BW: 622Mbps
      Available BW [priority] bps:
        [0] 622Mbps    [1] 622Mbps    [2] 622Mbps    [3] 622Mbps
        [4] 622Mbps    [5] 622Mbps    [6] 622Mbps    [7] 622Mbps
NodeID: apple.00(123.456.4.21)
  Type: Rtr, Age: 235 secs, LinkIn: 1, LinkOut: 1
  Protocol: IS-IS(2)
    To: banana.00(10.255.245.34), Local: 123.456.8.209, Remote: 123.456.8.208
      Color: 0 <none>
      Metric: 10
      Static BW: 155Mbps
      Reservable BW: 155Mbps
      Available BW [priority] bps:
        [0] 155Mbps    [1] 155Mbps    [2] 155Mbps    [3] 155Mbps
        [4] 155Mbps    [5] 155Mbps    [6] 155Mbps    [7] 155Mbps
  Protocol: IS-IS(1)
NodeID: banana.00(10.255.245.34)
  Type: Rtr, Age: 247 secs, LinkIn: 2, LinkOut: 2
  Protocol: IS-IS(2)
    To: apple.00(123.456.4.21), Local: 123.456.8.208, Remote: 123.456.8.209
      Color: 0 <none>
      Metric: 10
      Static BW: 155Mbps
      Reservable BW: 155Mbps
      Available BW [priority] bps:
        [0] 155Mbps    [1] 155Mbps    [2] 155Mbps    [3] 155Mbps
        [4] 155Mbps    [5] 155Mbps    [6] 155Mbps    [7] 155Mbps

```

```
To: orange.00(10.1.1.77), Local: 10.0.0.1, Remote: 10.0.0.2
Color: 0 <none>
Metric: 10
Static BW: 622Mbps
Reservable BW: 622Mbps
Available BW [priority] bps:
  [0] 622Mbps    [1] 622Mbps    [2] 622Mbps    [3] 622Mbps
  [4] 622Mbps    [5] 622Mbps    [6] 622Mbps    [7] 622Mbps
```

## show ted link

**Syntax** show ted link <brief | detail>

**Description** Display traffic engineering database (TED) link information.

**Options** brief—(Optional) Display brief TED link information.

detail—(Optional) Display detailed TED link information.

**Default:** brief

**Required Privilege Level** view

**Sample Output** Sample Output: show ted link brief on page 501  
 Sample Output: show ted link detail on page 501

**Options at a Glance** Table 52 summarizes which information is included in each of the show ted link command options. In this table, output fields are listed in alphabetical order. In the Output Fields section, the output fields are listed in the order in which they are displayed.

**Table 54: Show TED Link Output Field Summary**

Options	Field Description
Detail	host-name—Host name and address of the node that the link is coming from.
Detail	->host-name—Host name and address of the node that the link is going to.
Brief	ID—Host name and address of the node that the link is coming from.
Brief	->ID—Host name and address of the node that the link is going to.
All	Local BW—How much bandwidth the local router has placed on the link.
All	Local Path—How many paths CSPF on the local router has placed on the link.

**Output Fields** ID—(Brief output only) Host name and address of the node that the link is coming from. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.

->ID—(Brief output only) Host name and address of the node that the link is going to. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.

*host-name*—(Detail output only) Host name and address of the node that the link is coming from. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.

->*host-name*—(Detail output only) Host name and address of the node that the link is going to. An address of .00 indicates that the node is the router itself. An address in the range 0.01 through 0.FF indicates that the node is a pseudonode.

Local Path—How many paths CSPF on the local router has placed on the link.

Local BW—How much bandwidth the local router has placed on the link.

**Sample Output: show ted link brief**

```
user@host> show ted link brief
TED link:
ID                               ->ID                               LocalPath LocalBW
cheviot.00(123.456.1.10)         merino.00(123.456.1.14)             0 0bps
merino.00(123.456.1.14)         corriedale.00(123.456.1.11)         0 0bps
merino.00(123.456.1.14)         perendale.00(123.456.1.13)         0 0bps
merino.00(123.456.1.14)         cheviot.00(123.456.1.10)           0 0bps
romney.00(123.456.1.15)         corriedale.00(123.456.1.11)         0 0bps
romney.00(123.456.1.15)         perendale.00(123.456.1.13)         0 0bps
```

**Sample Output: show ted link detail**

```
user@host> show ted link detail
TED link:
cheviot.00(123.456.1.10)->merino.00(123.456.1.14), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
merino.00(123.456.1.14)->corriedale.00(123.456.1.11), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
merino.00(123.456.1.14)->perendale.00(123.456.1.13), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
merino.00(123.456.1.14)->cheviot.00(123.456.1.10), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
romney.00(123.456.1.15)->corriedale.00(123.456.1.11), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
romney.00(123.456.1.15)->perendale.00(123.456.1.13), LocalPath 0
  localBW [0] 0bps [1] 0bps [2] 0bps [3] 0bps
  localBW [4] 0bps [5] 0bps [6] 0bps [7] 0bps
```

• show ted protocol

• **Syntax** show ted protocol <brief | detail>

• **Description** Display information about the protocols from which the traffic engineering database (TED) learned about its nodes.

• **Options** brief—(Optional) Display brief protocol information.

• detail—(Optional) Display detailed protocol information.

• **Default:** brief

• **Required Privilege Level** view

• **Output Fields** Protocol name—Protocol that reported the node information. It can be one of the following:

• IS-IS(1)—IS-IS Level 1.

• IS-IS(2)—IS-IS Level 2.

• OSPF (*area-number*)—OSPF from the specified area.

• **Credibility**—If there is conflicting information about a node, rank the protocols by credibility. The protocol with the highest credibility value is the one that the TED uses.

• **Self node**—Address the protocol uses as the local address.

• **Sample Output**

```

user@host> show ted protocol
Protocol name      Credibility  Self node
IS-IS(2)           2 (highest) corriedale.00(123.456.1.11)
IS-IS(1)           1            corriedale.00(123.456.1.11)
    
```