show ip traffic-engineering routes

To display information about the requested filters configured for traffic engineering, use the **show ip traffic-engineering routes** command in privileged EXEC mode.

show ip traffic-engineering routes [*filter-number*] [**detail**]

Syntax Description

filter-number	(Optional) A decimal value representing the number of the filter to display.
detail	(Optional) Display of command output in long form.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1CT	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Requests can be limited to a specific filter.

Examples

The following is sample output from the **show ip traffic-engineering routes** command:

```
Router# show ip traffic-engineering routes

Installed traffic engineering routes:
Codes: T - traffic engineered route
T    43.0.0.1/32 (not override of routing table entry)
                is directly connected, 00:06:35, Tunnel7
T    44.0.0.0/8 (override of routing table entry)
               is directly connected, 01:12:39, Tunnel5
```

Table 63 describes the significant fields shown in the display.

Table 63 show ip traffic-engineering routes Field Descriptions

Field	Description
T	Traffic engineering route.
43.0.0.1/32 (not override of routing table entry) is directly connected	Prefix/mask being routed. The routing table does not contain an entry for this prefix/mask.
00:06:35	The time since the route was installed (hours:minutes:seconds).
Tunnel7	The LSP tunnel for the route.

Related Commands

Command	Description
show ip traffic-engineering configuration	Displays information about configured traffic engineering filters and routes.

show ip vrf

To display the set of defined Virtual Private Network (VPN) routing and forwarding (VRF) instances and associated interfaces, use the **show ip vrf** command in privileged EXEC mode.

show ip vrf [**brief** | **detail** | **interfaces** | **id**] [*vrf-name*] [*output-modifiers*]

Syntax Description

brief	(Optional) Displays concise information on the VRFs and associated interfaces.
detail	(Optional) Displays detailed information on the VRFs and associated interfaces.
interfaces	(Optional) Displays detailed information about all interfaces bound to a particular VRF or any VRF.
id	(Optional) Displays the VPN IDs that are configured in a PE router for different VPNs.
vrf-name	(Optional) Name assigned to a VRF.
output-modifiers	(Optional) For a list of associated keywords and arguments, use context-sensitive help.

Defaults

When no keywords or arguments are specified, the command shows concise information about all configured VRFs.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(17)ST	This command was modified to include the **id** keyword, and VPN ID information was added to the output of the **show ip vrf detail** command.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.3(6)	This command was integrated into Cisco IOS Release 12.3(6). The command shows the downstream VRF for each associated Virtual access interface (VAI).
12.0(22)S	Enhanced Interior Gateway Routing Protocol (EIGRP) VRF support was added.
12.2(15)T	EIGRP VRF support was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	EIGRP VRF support was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command to display information about VRFs. Two levels of detail are available:

- The **brief** keyword (or no keyword) displays concise information.
- The **detail** keyword displays all information.

To display information about all interfaces bound to a particular VRF, or to any VRF, use the **interfaces** keyword. To display information about VPN IDs assigned to a PE router, use the **id** keyword.

Examples

The following example displays information about all the VRFs configured on the router, including the downstream VRF for each associated VAI. The lines that are highlighted (for documentation purposes only) indicate the downstream VRF.

```
Router# show ip vrf

  Name   Default RD   Interface
  D      2:0          Loopback2
                      Virtual-Access3 [D]
                      Virtual-Access4 [D]

  U      2:1          Virtual-Access3
                      Virtual-Access4
```

Table 64 describes the significant fields shown in the display.

Table 64 show ip vrf Field Descriptions

Field	Description
Name	Specifies the VRF name.
Default RD	Specifies the default route distinguisher.
Interface	Specifies the network interface.

The following example displays detailed information about all of the VRFs configured on the router, including all of the VAIs associated with each VRF:

```
Router# show ip vrf detail

VRF D; default RD 2:0; default VPNID <not set>
  Interfaces:
         Loopback2           Virtual-Access3 [D]  Virtual-Access4 [D]
  Connected addresses are not in global routing table
  Export VPN route-target communities
    RT:2:0
  Import VPN route-target communities
    RT:2:1
  No import route-map
  No export route-map
VRF U; default RD 2:1; default VPNID <not set>
  Interfaces:
    Virtual-Access3          Virtual-Access4
  Connected addresses are not in global routing table
  No Export VPN route-target communities
  Import VPN route-target communities
    RT:2:1
  No import route-map
  No export route-map
```

Table 65 describes the significant fields shown in the display.

Table 65 show ip vrf detail Field Descriptions

Field	Description
VPNID	Specifies the VPN ID assigned to the VRF.
Interfaces	Specifies the network interfaces.
Virtual-Access*n* [D]	Specifies the downstream VRF.
Export	Specifies VPN route-target export communities.
Import	Specifies VPN route-target import communities.

The following example shows the interfaces bound to a particular VRF:

```
Router# show ip vrf interfaces

InterfaceIP-AddressVRFProtocol
Ethernet210.22.0.33vrf1up
Ethernet410.77.0.33hubup
Router#
```

Table 66 describes the significant fields shown in the display.

Table 66 show ip vrf interfaces Field Descriptions

Field	Description
Interface	Specifies the network interfaces for a VRF.
IP-Address	Specifies the IP address of a VRF interface.
VRF	Specifies the VRF name.
Protocol	Displays the state of the protocol (up or down) for each VRF interface.

The following is sample output that shows all the VPN IDs that are configured in the router and their associated VRF names and VRF route distinguishers (RDs):

```
Router# show ip vrf id

VPN Id          Name                            RD
2:3             vpn2                            <not set>
A1:3F6C         vpn1                            100:1
```

Table 67 describes the significant fields shown in the display.

Table 67 show ip vrf id Field Descriptions

Field	Description
VPN Id	Specifies the VPN ID assigned to the VRF.
Name	Specifies the VRF name.
RD	Specifies the route distinguisher.

Related Commands

Command	Description
import map	Configures an import route map for a VRF.
ip vrf	Configures a VRF routing table.
ip vrf forwarding (interface configuration)	Associates a VRF with an interface or subinterface.
rd	Creates routing and forwarding tables for a VRF.
route-target	Creates a route-target extended community for a VRF.
vpn id	Assigns a VPN ID to a VRF.

show isis database verbose

To display additional information about the Intermediate System-to-Intermediate System (IS-IS) database, use the **show isis database verbose** command in user EXEC or privileged EXEC mode.

show isis database verbose

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(5)S	This command was introduced.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show isis database verbose** command:

```
Router# show isis database verbose

IS-IS Level-1 Link State Database
LSPID                 LSP Seq Num  LSP Checksum  LSP Holdtime      ATT/P/OL
dtp-5.00-00         * 0x000000E6   0xC9BB        1042              0/0/0
  Area Address:49.0001
  NLPID:       0xCC
  Hostname:dtp-5
  Router ID:   10.5.5.5
  IP Address:  172.16.39.5
  Metric:10         IP 172.16.39.0/24
dtp-5.00-01         * 0x000000E7   0xAB36        1065              0/0/0
  Metric:10         IS-Extended dtp-5.01
    Affinity:0x00000000
    Interface IP Address:172.21.39.5
    Physical BW:10000000 bits/sec
    Reservable BW:1166000 bits/sec
    BW Unreserved[0]: 1166000 bits/sec, BW Unreserved[1]: 1166000 bits/sec
    BW Unreserved[2]: 1166000 bits/sec, BW Unreserved[3]: 1166000 bits/sec
    BW Unreserved[4]: 1166000 bits/sec, BW Unreserved[5]: 1166000 bits/sec
    BW Unreserved[6]: 1166000 bits/sec, BW Unreserved[7]: 1153000 bits/sec
  Metric:0          ES dtp-5
```

Table 68 describes the significant fields shown in the display.

Table 68 show isis database verbose Field Descriptions

Field	Description
LSPID	Link-state packet (LSP) identifier. The first six octets form the System ID of the router that originated the LSP. The next octet is the pseudonode ID. When this byte is zero, the LSP describes links from the system. When it is nonzero, the LSP is a pseudonode LSP. This is similar to a router LSA in Open Shortest Path First (OSPF); the LSP describes the state of the originating router. For each LAN, the designated router for that LAN creates and floods a pseudonode LSP that describes all systems attached to that LAN. The last octet is the LSP number. If all the data cannot fit into a single LSP, the LSP is divided into multiple LSP fragments. Each fragment has a different LSP number. An asterisk (*) indicates that the system issuing this command originated the LSP.
LSP Seq Num	LSP sequence number that allows other systems to determine if they received the latest information from the source.
LSP Checksum	Checksum of the entire LSP packet.
LSP Holdtime	Amount of time that the LSP remains valid (in seconds). An LSP hold time of zero indicates that this LSP was purged and is being removed from all routers' link-state databases (LSDBs). The value indicates how long the purged LSP will stay in the LSDB before it is completely removed.
ATT	Attach bit. This bit indicates that the router is also a Level 2 router, and it can reach other areas. Level 1 routers use the Attach bit to find the closest Level 2 router. They install a default route to the closest Level 2 router.
P	P bit. This bit detects if the IS can repair area partitions. Cisco and other vendors do not support area partition repair.
OL	Overload bit. This bit determines if the IS is congested. If the overload bit is set, other routers do not use this system as a transit router when they calculate routes. Only packets for destinations directly connected to the overloaded router are sent to this router.
Area Address	Reachable area addresses from the router. For Level 1 LSPs, these are the area addresses configured manually on the originating router. For Level 2 LSPs, these are all the area addresses for the area to which this router belongs.
NLPID	Network Layer Protocol identifier.
Hostname	Hostname of the node.
Router ID	Traffic engineering router identifier for the node.
IP Address	IPv4 address for the interface.
Metric	IS-IS metric for the cost of the adjacency between the originating router and the advertised neighbor, or the metric of the cost to get from the advertising router to the advertised destination (which can be an IP address, an end system (ES), or a connectionless network service [CLNS] prefix).
Affinity	Link attribute flags that are being flooded.

Table 68 show isis database verbose Field Descriptions (continued)

Field	Description
Physical BW	Link bandwidth capacity (in bits per second).
Reservable BW	Amount of reservable bandwidth on this link.
BW Unreserved	Amount of bandwidth that is available for reservation.

The following example includes a route tag:

```
Router# show isis database verbose

IS-IS Level-1 Link State Database:
LSPID                 LSP Seq Num    LSP Checksum    LSP Holdtime    ATT/P/OL
dasher.00-00          0x000000F8     0xE57B          518             1/0/0
  Area Address: 49.0002
  NSPID:        0xCC
  Hostname: dasher
  IP Address: 10.3.0.1
  Metric: 10     IP 172.16.170.0/24
  Metric: 10     IP 10.0.3.0/24
  Metric: 10     IP 10.0.3.3/30
  Metric: 10     IS-Extended dasher.02172.19.170.0/24
  Metric: 20     IP-Interarea 10.1.1.1/32
    Route Admin Tag: 60
  Metric: 20     IP-Interarea 192.168.0.6/32
    Route Admin Tag: 50
```

Related Commands

Command	Description
show isis mpls traffic-eng adjacency-log	Displays a log of 20 entries of MPLS traffic engineering IS-IS adjacency changes.
show isis mpls traffic-eng advertisements	Displays the last flooded record from MPLS traffic engineering.
show isis mpls traffic-eng tunnel	Displays information about tunnels considered in the IS-IS next hop calculation.

show isis mpls ldp

To display synchronization and autoconfiguration information about interfaces belonging to Intermediate System-to-Intermediate System (IS-IS) processes, use the **show isis mpls ldp** command in privileged EXEC mode.

show isis [*process-tag*] **mpls ldp** [**interface** *interface*]

Syntax Description

process-tag	(Optional) Process ID. Displays information only for the specified routing process.
interface *interface*	(Optional) Defines the interface for which Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP) synchronization and LDP autoconfiguration information will be displayed.

Command Modes

Privileged EXEC

Command History

Release	Modifications
12.0(32)SY	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

This command shows Multiprotocol Label Switching (MPLS) LDP synchronization and autoconfiguration information for interfaces that are running IS-IS processes. If you do not specify a keyword or argument, information appears for each interface that is configured for MPLS LDP synchronization and autoconfiguration. MPLS LDP synchronization and autoconfiguration for IS-IS is supported only in Cisco IOS Release 12.0(32)SY.

Examples

In the following example, interface POS0/2 is running IS-IS. Autoconfiguration is enabled. Synchronization is configured.

```
Router# show isis mpls ldp

Interface: POS0/2; ISIS tag null enabled
 ISIS is UP on interface
 AUTOCONFIG Information :
   LDP enabled: YES
 SYNC Information :
   Required: YES
   Achieved: YES
   IGP Delay: NO
   Holddown time: Infinite
   State: SYNC achieved
```

This command returns information for interfaces that are configured for IS-IS, which are indicated by the message “ISIS is UP” on the interface.

Table 69 describes the significant fields shown in the display.

Table 69 show isis mpls ldp Field Descriptions

Field	Description
AUTOCONFIG Information	LDP enabled—Indicates whether LDP autoconfiguration is enabled on this interface. Value is YES or NO.
SYNC Information	Provides synchronization information. • Required—Indicates whether synchronization is required on the interface. • Achieved—Indicates whether synchronization was achieved with LDP. If IS-IS was configured on an interface but synchronization is not achieved, the Achieved field indicates NO. The Required field still indicates YES. • IGP Delay—Indicates whether the IS-IS process must wait for synchronization with LDP before bringing up the interface adjacency. • Holddown time—Valid values are Finite or Infinite. The finite value is equal to the hold-down delay that you configured using the **mpls ldp igp sync holddown** command. If this field indicates Infinite, hold-down time was not configured. Therefore, IS-IS waits until synchronization is achieved before bringing adjacency UP. The Holddown time field is significant only if the IGP Delay field indicates YES. • State—Indicates information about the state of synchronization on the interface. If synchronization is achieved, the output shows the following: – SYNC achieved—Synchronization was required and has been achieved. If synchronization is not achieved, the output shows one of the following: – Holding down until SYNC—No hold-down timer was configured, so IS-IS continues to hold down adjacency until synchronization is achieved. – Holding down with timer—A hold-down timer was configured and IS-IS is holding down adjacency until the timer, indicated in the IGP Delay field, expires. – Maximum metric in effect—Although synchronization was not achieved, the IGP brought up adjacency with the maximum metric.

Related Commands

Command	Description
mpls ldp autoconfig	Globally enables LDP autoconfiguration on all interfaces that belong to an OSPF or IS-IS process.
mpls ldp sync	Enables MPLS LDP-IGP synchronization on interfaces for an OSPF process or an IS-IS process.

show isis mpls traffic-eng adjacency-log

To display a log of 20 entries of Multiprotocol Label Switching (MPLS) traffic engineering Intermediate System-to-Intermediate System (IS-IS) adjacency changes, use the **show isis mpls traffic-eng adjacency-log** command in user EXEC or privileged EXEC mode.

show isis mpls traffic-eng adjacency-log

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(5)S	This command was introduced.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

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

```
Router# show isis mpls traffic-eng adjacency-log

IS-IS RRR log
When      Neighbor ID        IP Address       Interface Status Level
04:52:52  0000.0024.0004.02  0.0.0.0          Et0/2     Up     level-1
04:52:50  0000.0026.0001.00  172.16.1.2        PO1/0/0   Up     level-1
04:52:37  0000.0024.0004.02  10.0.0.0          Et0/2     Up     level-1
```

Table 70 describes the significant fields shown in the display.

Table 70 show isis mpls traffic-eng adjacency-log Field Descriptions

Field	Description
When	Amount of time since the entry was recorded in the log.
Neighbor ID	Identification value of the neighbor.
IP Address	Neighbor IPv4 address.
Interface	Interface from which a neighbor is learned.
Status	Up (active) or Down (disconnected).
Level	Routing level.

Related Commands

Command	Description
show isis mpls traffic-eng advertisements	Displays the last flooded record from MPLS traffic engineering.

show isis mpls traffic-eng advertisements

To display the last flooded record from Multiprotocol Label Switching (MPLS) traffic engineering, use the **show isis mpls traffic-eng advertisements** command in user EXEC or privileged EXEC mode.

show isis mpls traffic-eng advertisements

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(5)S	This command was introduced.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show isis mpls traffic-eng advertisements** command:

```
Router# show isis mpls traffic-eng advertisements

System ID:dtp-5.00
  Router ID:10.5.5.5
  Link Count:1
    Link[1]
      Neighbor System ID:dtp-5.01 (broadcast link)
      Interface IP address:172.21.39.5
      Neighbor IP Address:0.0.0.0
      Admin. Weight:10
      Physical BW:10000000 bits/sec
      Reservable BW:1166000 bits/sec
      BW unreserved[0]:1166000 bits/sec, BW unreserved[1]:1166000 bits/sec
      BW unreserved[2]:1166000 bits/sec, BW unreserved[3]:1166000 bits/sec
      BW unreserved[
4]:1166000 bits/sec, BW unreserved[5]:1166000 bits/sec
      BW unreserved[6]:1166000 bits/sec, BW unreserved[7]:1153000 bits/sec
      Affinity Bits:0x00000000
```

Table 71 describes the significant fields shown in the display.

Table 71 show isis mpls traffic-eng advertisements Field Descriptions

Field	Description
System ID	Identification value for the local system in the area.
Router ID	MPLS traffic engineering router ID.
Link Count	Number of links that MPLS traffic engineering advertised.
Neighbor System ID	Identification value for the remote system in an area.
Interface IP address	IPv4 address of the interface.
Neighbor IP Address	IPv4 address of the neighbor.
Admin. Weight	Administrative weight associated with this link.
Physical BW	Link bandwidth capacity (in bits per second).
Reservable BW	Amount of reservable bandwidth on this link.
BW unreserved	Amount of bandwidth that is available for reservation.
Affinity Bits	Link attribute flags being flooded.

Related Commands

Command	Description
show isis mpls traffic-eng adjacency-log	Displays a log of 20 entries of MPLS traffic engineering IS-IS adjacency changes.

show isis mpls traffic-eng downstream-tree

To display the Multiprotocol Label Switching (MPLS) traffic engineering Intermediate System-to-Intermediate System (IS-IS) children list for a specific node, use the **show isis mpls traffic-eng downstream-tree** command in privileged EXEC mode.

show isis mpls traffic-eng downstream-tree *system-id* [**level-1** | **level-2**]

Syntax Description

system-id	Displays the traffic engineering downstream tree information for the specified system ID as either a hostname or in the MAC address format.
level-1	(Optional) Displays the traffic engineering downstream tree information for the Level 1 database.
level-2	(Optional) Displays the traffic engineering downstream tree information for the Level 2 database.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(24)S	This command was introduced in a release earlier than Cisco IOS Release 12.0(24)S.
12.3(7)T	This command was integrated into Cisco IOS Release 12.3(7)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
Cisco IOS 2.1 XE	This command was integrated into Cisco IOS XE Release 2.1.

Examples

The following is sample output from the **show isis mpls traffic-eng downstream-tree** command. The fields are self-explanatory.

```
Router# show isis mpls traffic-eng downstream-tree cr2.amsterdam1

System cr2.amsterdam1.00  with metric 5
   MPLS TE-tunnel Children List
        15   ar5.hilversum1.00
        15   ar5.zwolle1.00
        15   ar5.tilburg1.00
        15   ar5.wageningen.00
        15   ar5.groningen1.00
        15   ar5.enschede1.00
        15   ar5.nijmegen1.00
        15   cr1.amsterdam1.00
         1   cr1.amsterdam1.00
        25   ar5.denhaag1.00
        25   ar5.delft1.00
        25   ar5.leiden1.00
        25   ar5.rotterdam1.00
        25   ar5.amsterdam1.00
        25   ar5.eindhoven1.00
```

```
25   ar5.maastricht.00
```

Related Commands

Command	Description
show isis mpls traffic-eng adjacency-log	Displays a log of 20 entries of MPLS traffic engineering IS-IS adjacency changes.
show isis mpls traffic-eng advertisements	Displays the last flooded record from MPLS traffic engineering.
show isis mpls traffic-eng tunnel	Displays information about tunnels considered in the IS-IS next hop calculation.

show isis mpls traffic-eng tunnel

To display information about tunnels considered in the Intermediate System-to-Intermediate System (IS-IS) next hop calculation, use the **show isis mpls traffic-eng tunnel** command in privileged EXEC mode.

show isis mpls traffic-eng tunnel

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)S	This command was introduced.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

The following is sample output from the **show isis mpls traffic-eng tunnel** command:

```
Router# show isis mpls traffic-eng tunnel

Station Id          Tunnel Name   Bandwidth    Nexthop       Metric   Mode
kangpa-router1.00   Tunnel1022    3333         10.2.2.2       -3       Relative
                    Tunnel1021    10000        10.2.2.2       11       Absolute
tomklong-route.00   Tunnel1031    10000        172.17.3.3       -1       Relative
                    Tunnel1032    10000        172.17.3.3
```

Table 72 describes the significant fields shown in the display.

Table 72 show isis mpls traffic-eng tunnel Field Descriptions

Field	Description
Station Id	Name or system ID of the MPLS traffic engineering tailend router.
Tunnel Name	Name of the MPLS traffic engineering tunnel interface.
Bandwidth	MPLS traffic engineering specified bandwidth of the tunnel.
Nexthop	MPLS traffic engineering destination IP address of the tunnel.
Metric	MPLS traffic engineering metric of the tunnel.
Mode	MPLS traffic engineering metric mode of the tunnel. It can be relative or absolute.

Related Commands

Command	Description
show mpls traffic-eng autoroute	Displays tunnels that are announced to IGP, including interface, destination, and bandwidth.

show issu clients

To display a list of the current In Service Software Upgrade (ISSU) clients—that is, the network applications and protocols supported by ISSU—use the **show issu clients** command in user EXEC or privileged EXEC mode.

show issu clients

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRB1	ISSU is supported on the Cisco 7600 series routers in Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

This command lists all ISSU clients currently operating in the network, along with their Client ID numbers and the number of entities each client contains.

You should enter this command before you enter the **issu runversion** command, because if a client (application or protocol) that needs to continue operating in the network does not appear in the displayed list, you will know not to continue the software upgrade (because proceeding further with ISSU would then halt the operation of that application or protocol).

Examples

The following example shows a client list displayed by entering this command:

```
Router# show issu clients

Client_ID = 2,  Client_Name = ISSU Proto client,  Entity_Count = 1
Client_ID = 3,  Client_Name = ISSU RF,  Entity_Count = 1
Client_ID = 4,  Client_Name = ISSU CF client,  Entity_Count = 1
Client_ID = 5,  Client_Name = ISSU Network RF client,  Entity_Count = 1
Client_ID = 7,  Client_Name = ISSU CONFIG SYNC,  Entity_Count = 1
Client_ID = 8,  Client_Name = ISSU ifIndex sync,  Entity_Count = 1
Client_ID = 9,  Client_Name = ISSU IPC client,  Entity_Count = 1
Client_ID = 10,  Client_Name = ISSU IPC Server client,  Entity_Count = 1
Client_ID = 11,  Client_Name = ISSU Red Mode Client,  Entity_Count = 1
Client_ID = 12,  Client_Name = ISSU EHSA services client,  Entity_Count = 1
Client_ID = 100,  Client_Name = ISSU rfs client,  Entity_Count = 1
Client_ID = 110,  Client_Name = ISSU ifs client,  Entity_Count = 1
Client_ID = 1001,  Client_Name = OC3POS-6,  Entity_Count = 4
Client_ID = 1002,  Client_Name = C10K ATM,  Entity_Count = 1
Client_ID = 1003,  Client_Name = C10K CHSTM1,  Entity_Count = 1
Client_ID = 1004,  Client_Name = C10K CT3,  Entity_Count = 1
Client_ID = 1005,  Client_Name = C10K GE,  Entity_Count = 1
Client_ID = 1006,  Client_Name = C10K ET,  Entity_Count = 1
Client_ID = 1007,  Client_Name = C10K CHE1T1,  Entity_Count = 1
```

```
Client_ID = 1009,  Client_Name = C10K MFE,  Entity_Count = 1
Client_ID = 1010,  Client_Name = C10K APS,  Entity_Count = 1
Client_ID = 1013,  Client_Name = C10K CARD OIR,  Entity_Count = 1
Client_ID = 2002,  Client_Name = CEF Push ISSU client,  Entity_Count = 1
Client_ID = 2003,  Client_Name = ISSU XDR client,  Entity_Count = 1
Client_ID = 2004,  Client_Name = ISSU SNMP client,  Entity_Count = 1
Client_ID = 2005,  Client_Name = ISSU HDLC Client,  Entity_Count = 1
Client_ID = 2006,  Client_Name = ISSU QoS client,  Entity_Count = 1
Client_ID = 2007,  Client_Name = ISSU LSD Label Mgr HA Client,  Entity_Count = 1
Client_ID = 2008,  Client_Name = ISSU Tableid Client,  Entity_Count = 1
Client_ID = 2009,  Client_Name = ISSU MPLS VPN Client,  Entity_Count = 1
Client_ID = 2010,  Client_Name = ARP HA,  Entity_Count = 1
Client_ID = 2011,  Client_Name = ISSU LDP Client,  Entity_Count = 1
Client_ID = 2012,  Client_Name = ISSU HSRP Client,  Entity_Count = 1
Client_ID = 2013,  Client_Name = ISSU ATM Client,  Entity_Count = 1
Client_ID = 2014,  Client_Name = ISSU FR Client,  Entity_Count = 1
Client_ID = 2015,  Client_Name = ISSU REDSSOC client,  Entity_Count = 1
Client_ID = 2019,  Client_Name = ISSU TCP client,  Entity_Count = 1
Client_ID = 2020,  Client_Name = ISSU BGP client,  Entity_Count = 1
Client_ID = 2021,  Client_Name = XDR Int Priority ISSU client,  Entity_Count = 1
Client_ID = 2022,  Client_Name = XDR Proc Priority ISSU client,  Entity_Count = 1
Client_ID = 2023,  Client_Name = FIB HWIDB ISSU client,  Entity_Count = 1
Client_ID = 2024,  Client_Name = FIB IDB ISSU client,  Entity_Count = 1
Client_ID = 2025,  Client_Name = FIB HW subblock ISSU client,  Entity_Count = 1
Client_ID = 2026,  Client_Name = FIB SW subblock ISSU client,  Entity_Count = 1
Client_ID = 2027,  Client_Name = Adjacency ISSU client,  Entity_Count = 1
Client_ID = 2028,  Client_Name = FIB IPV4 ISSU client,  Entity_Count = 1
Client_ID = 2030,  Client_Name = MFI Pull ISSU client,  Entity_Count = 1
Client_ID = 2031,  Client_Name = MFI Push ISSU client,  Entity_Count = 1
Client_ID = 2051,  Client_Name = ISSU CCM Client,  Entity_Count = 1
Client_ID = 2052,  Client_Name = ISSU PPP SIP CCM Client,  Entity_Count = 1
Client_ID = 2054,  Client_Name = ISSU process client,  Entity_Count = 1

Base Clients:
 Client_Name = ISSU Proto client
 Client_Name = ISSU RF
 Client_Name = ISSU CF client
 Client_Name = ISSU Network RF client
 Client_Name = ISSU CONFIG SYNC
 Client_Name = ISSU ifIndex sync
 Client_Name = ISSU IPC client
 Client_Name = ISSU IPC Server client
 Client_Name = ISSU Red Mode Client
 Client_Name = ISSU EHSA services client
```

Table 73 describes the significant fields shown in the display.

Table 73 show issu clients Field Descriptions

Field	Description
Client_ID	The identification number used by ISSU for that client.
Client_Name	A character string describing the client. "Base Clients" are a subset, which includes: • Inter-Process Communications (IPC) • Redundancy Framework (RF) • Checkpoint Facility (CF) • Cisco Express Forwarding • Network RF (for IDB stateful switchover) • EHSA Services (including ifIndex) • Configuration Synchronization.
Entity_Count	The number of entities within this client. An entity is a logical group of sessions with some common attributes.

Related Commands

Command	Description
show issu message types	Displays the formats, versions, and size of ISSU messages supported by a particular client.
show issu negotiated	Displays results of a negotiation that occurred concerning message versions or client capabilities.
show issu sessions	Displays detailed information about a particular ISSU client, including whether the client status is compatible for the impending software upgrade.

show issu entities

To display information about entities within one or more In Service Software Upgrade (ISSU) clients, use the **show issu entities** command in user EXEC or privileged EXEC mode.

show issu entities [*client_id*]

Note An entity is a logical group of sessions that possess some common attributes.

Syntax Description

client_id	(Optional) The identification number of a single ISSU client.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRB1	ISSU is supported on the Cisco 7600 series routers in Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

Enter a Client_ID if you are interested in seeing information only about one client's entities. If a Client_ID is not specified, the command will display all ISSU clients' entities known to the device.

If you are not sure of the precise Client_ID number to enter for the client you are interested in, use the **show issu clients** command to display the current list of clients with their names and ID numbers.

Examples

The following example shows detailed information about the entities within the virtual routing and forwarding (VRF) ("Table ID") client:

```
Router# show issu entities 2008

Client_ID = 2008 :
      Entity_ID = 1,  Entity_Name = Tableid Entity :
         MsgType MsgGroup CapType CapEntry CapGroup
          Count    Count   Count   count    Count
            2       2       1       2        2
```

Table 74 show issu entities Field Descriptions

Field	Description
Client_ID	The identification number used by ISSU for the specified client.
Entity_ID	The identification number used by ISSU for each entity within this client.
Entity_Name	A character string describing the entity.

Table 74 show issu entities Field Descriptions (continued)

Field	Description
MsgType Count	The number of message types within the identified entity.
MsgGroup Count	The number of message groups within the identified entity. A message group is a list of message types.
CapType Count	The number of capability types within the identified entity.
CapEntry Count	The number of capability entries within the identified entity. A capability entry is a list of all mutually dependent capability types within a particular client session and, optionally, other capability types belonging to that client session.
CapGroup Count	The number of capability groups within the identified entity. A capability group is a list of capability entries given in priority sequence.

Related Commands

Command	Description
show issu clients	Lists the current ISSU clients—that is, the applications and protocols on this network supported by ISSU.
show issu sessions	Displays detailed information about a particular ISSU client—including whether the client status for the impending software upgrade is COMPATIBLE.

show issu message types

To display formats (“types”), versions, and maximum packet size of the In Service Software Upgrade (ISSU) messages supported by a particular client, use the **show issu message types** command in user EXEC or privileged EXEC mode.

show issu message types *client-id*

Syntax Description

client-id	The identification number used by ISSU for a client application.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRB1	ISSU is supported on the Cisco 7600 series routers in Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

If you are not sure of the Client_ID number to enter into this command, use the **show issu clients** command. It displays the current list of clients, along with their names and ID numbers.

Examples

The following example displays the message type, version, and maximum message size supported by the Multiprotocol Label Switching (MPLS) Virtual Private Network (VPN) client:

```
Router# show issu message types 2009

Client_ID = 2009,  Entity_ID = 1 :
   Message_Type = 1,  Version_Range = 1 ~ 1
         Message_Ver = 1,    Message_Mtu = 32
```

Table 75 describes the significant fields shown in the display.

Table 75 show issu message types Field Descriptions

Field	Description
Client_ID	The identification number used by ISSU for this client.
Entity_ID	The identification number used by ISSU for this entity.
Message_Type	An identification number that uniquely identifies the format used in the ISSU messages conveyed between the two endpoints.
Version_Range	The lowest and highest message-version numbers contained in the client application.

Table 75 show issu message types Field Descriptions (continued)

Field	Description
Message_Ver	Message version. Because each client application contains one or more versions of its messages, ISSU needs to discover these versions and negotiate between the new and old system software which version to use in its preparatory communications.
Message_Mtu	Maximum size (in bytes) of the transmitted message. A value of 0 means there is no restriction on size; fragmentation and reassembly are therefore being handled in a manner transparent to the ISSU infrastructure.

Related Commands

Command	Description
show issu clients	Lists the current ISSU clients—that is, the applications on this network supported by ISSU.
show issu negotiated	Displays results of a negotiation that occurred concerning message versions or client capabilities.
show issu sessions	Displays detailed information about a particular ISSU client, including whether the client status is compatible for the impending software upgrade.

show issu negotiated

To display details of the session's negotiation about message version or client capabilities, use the **show issu negotiated** command in user EXEC or privileged EXEC mode.

show issu negotiated {**version** | **capability**} *session-id*

Syntax Description

version	Displays results of a negotiation about versions of the messages exchanged during the specified session, between the active and standby endpoints.
capability	Displays results of a negotiation about the client application's capabilities for the specified session.
session-id	The number used by In Service Software Upgrade (ISSU) to identify a particular communication session between the active and the standby devices.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRB1	ISSU is supported on the Cisco 7600 series routers in Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

If you are not sure of the session_ID number to enter into this command, enter the **show issu sessions** command. It will display the session_ID.

Examples

The following example displays the results of a negotiation about message versions:

```
router# show issu negotiated version 39

Session_ID = 39 :
    Message_Type = 1,  Negotiated_Version = 1,  Message_MTU = 32
```

Table 76 describes the significant fields shown in the display.

Table 76 show issu negotiated version Field Descriptions

Field	Description
Session_ID	The identification number of the session being reported on.
Message_Type	An identification number that uniquely identifies the format that was used by the ISSU messages conveyed between the two endpoints.

Table 76 show issu negotiated version Field Descriptions (continued)

Field	Description
Negotiated_Version	The message version that was decided upon, for use during the software upgrade process.
Message_Mtu	Maximum size (in bytes) of the transmitted message. A value of 0 means there is no restriction on size. In that case, fragmentation and reassembly are handled in a manner transparent to the ISSU infrastructure.

The following example displays the results of a negotiation about the client application's capabilities:

```
router# show issu negotiated capability 39

Session_ID = 39 :
     Negotiated_Cap_Entry = 1
```

Table 77 describes the significant fields shown in the display.

Table 77 show issu negotiated capability Field Descriptions

Field	Description
Session_ID	The identification number of the session being reported on.
Negotiated_Cap_Entry	A numeral that stands for a list of the negotiated capabilities in the specified client session.

Related Commands

Command	Description
show issu clients	Lists the current ISSU clients—that is, the applications on this network supported by ISSU.
show issu message types	Displays the formats, versions, and maximum packet size of ISSU messages supported by a particular client.
show issu sessions	Displays detailed information about a particular ISSU client, including whether the client status is compatible for the impending software upgrade.

show issu sessions

To display detailed information about a particular In Service Software Upgrade (ISSU) client—including whether the client status for the impending software upgrade is compatible—use the **show issu sessions** command in user EXEC or privileged EXEC mode.

show issu sessions *client-id*

Syntax Description

client-id	The identification number used by ISSU for the client.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRB1	ISSU is supported on the Cisco 7600 series routers in Cisco IOS Release 12.2(33)SRB.

Usage Guidelines

If you are not sure of the Client_ID number to enter into this command, use the **show issu clients** command to display the current list of clients with their names and ID numbers.

Examples

The following example shows detailed information about the LDP Client:

```
Router# show issu sessions 2011

 Client_ID = 2011,  Entity_ID = 1 :

 *** Session_ID = 46,  Session_Name = LDP Session :

    Peer    Peer  Negotiate  Negotiated   Cap      Msg     Session
  UniqueID  Sid    Role       Result    GroupID  GroupID  Signature
     4       34   PRIMARY   COMPATIBLE    1        1         0
                           (no policy)

    Negotiation Session Info for This Message Session:
         Nego_Session_ID = 46
         Nego_Session_Name = LDP Session
         Transport_Mtu = 3948
```

Table 78 describes the significant fields shown in the display.

Table 78 show issu sessions Field Descriptions

Field	Description
Client_ID	The identification number used by ISSU for that client.
Entity_ID	The identification number used by ISSU for each entity within this client.
Session_ID	The identification number used by ISSU for this session.
Session_Name	A character string describing the session.
Peer UniqueID	An identification number used by ISSU for a particular endpoint, such as a Route Processor or line card (could be a value based on slot number, for example). The peer that has the smaller unique_ID becomes the Primary (initiating) side in the capability and message version negotiations.
Peer Sid	Peer session ID.
Negotiate Role	Negotiation role of the endpoint: either PRIMARY (in which case the device initiates the negotiation) or PASSIVE (in which case the device responds to a negotiation initiated by the other device).
Negotiated Result	The features (“capabilities”) of this client’s new software were found to be either COMPATIBLE or INCOMPATIBLE with the intended upgrade process. (“Policy” means that an override of the negotiation result has been allowed by the software. Likewise, “no policy” means that no such override is present to be invoked).
Cap GroupID	Capability group ID: the identification number used for a list of distinct functionalities that the client application contains.
Msg GroupID	Message group ID: the identification number used for a list of formats employed when conveying information between the active device and the standby device.
Session Signature	Session signature: a unique ID to identify a current session in a shared negotiation scenario.
Nego_Session_ID	Negotiation session ID: the identification number used by ISSU for this negotiation session.
Nego_Session_Name	Negotiation session name: a character string describing this negotiation session.
Transport_Mtu	Maximum packet size (in bytes) of the ISSU messages conveyed between the two endpoints. A value of 0 means there is no restriction on size; in this case, fragmentation and reassembly then are handled in a manner transparent to the ISSU infrastructure.

Related Commands

Command	Description
show issu clients	Lists the current ISSU clients—that is, the applications on this network supported by ISSU.
show issu message types	Displays the formats, versions, and maximum packet size of ISSU messages supported by a particular client.
show issu negotiated	Displays results of a negotiation that occurred concerning message versions or client capabilities.

show mpls atm-ldp bindings

Note Effective with Cisco IOS Release 12.4(20)T, the **show mpls atm-ldp bindings** command is not available in Cisco IOS software.

To display specified entries from the ATM label binding database, use the **show mpls atm-ldp bindings** command in privileged EXEC mode.

show mpls atm-ldp bindings [*network* {*mask* | *length*}] [**local-label** *vpi vci*] [**remote-label** *vpi vci*] [**neighbor** *interface*]

Syntax Description

network	(Optional) Defines the destination network number.
mask	(Optional) Defines the network mask in the form A.B.C.D (destination prefix).
length	(Optional) Defines the mask length (1 to 32).
local-label *vpi vci*	(Optional) Selects the label values assigned by this router. The virtual path identifier (VPI) range is 0 to 4095. The virtual channel identifier (VCI) range is 0 to 65535.
remote-label *vpi vci*	(Optional) Selects the label values assigned by the other router. VPI range is 0 to 4095. VCI range is 0 to 65535.
neighbor *interface*	(Optional) Selects the label values assigned by the neighbor on a specified interface.

Command Default

The entire ATM label binding database is displayed if no optional arguments or keywords are specified.

Note To display information about entries in the label binding database for interfaces other than ATM interfaces, use the **show mpls ip binding** command.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was modified to use Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	The VPI range of values for this command was extended to 4095.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Release	Modification
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000-PRE2 router.
12.4(20)T	This command was removed.

Usage Guidelines

The ATM label binding database contains entries for label virtual circuits (VCs) on label-controlled (LC)-ATM interfaces. Command output can show a summary of entries from the entire database, or the output can be limited to a subset of entries based on the following:

- Specific prefix
- Specific VC label value
- Specific assigning interface

Note This command displays ATM label bindings learned by the Label Distribution Protocol (LDP) or Tag Distribution Protocol (TDP). TDP is not supported for LDP features in Cisco IOS 12.0(30)S and later releases, 12.2(27)SBC and later 12.2S releases, and 12.3(14)T and later releases.

Note The **show mpls ip binding** command includes the output generated by the **show mpls atm-ldp bindings** command and information about label bindings for packet interfaces.

Examples

The following is sample output from the **show mpls atm-ldp bindings** command:

```
Router# show mpls atm-ldp bindings

 Destination: 10.24.0.0/24
    Tailend Router ATM1/0.1 1/39 Active, VCD=3
 Destination: 10.15.0.15/32
    Tailend Router ATM1/0.1 1/33 Active, VCD=4
 Destination: 10.0.7.7/32
    Headend Router ATM1/0.1 (2 hops) 1/34  Active, VCD=810
```

The following is sample output from the **show mpls atm-ldp bindings** command on an ATM switch:

```
Router# show mpls atm-ldp bindings

Destination: 172.16.0.0/16
    Tailend Switch ATM0/0/3 1/35 Active -> Terminating Active
Destination: 10.4.4.4/32
    Transit ATM0/0/3 1/33 Active -> ATM0/1/1 1/33 Active
```

Table 79 describes the significant fields shown in the displays.

Table 79 show mpls atm-ldp bindings Field Descriptions

Field	Description
Destination	Destination (network/mask).
Headend Router Tailend Router Tailend Switch Transit	Indicates types of VCs. Options are the following: • Tailend—VC that terminates at this platform • Headend—VC that originates at this router • Transit—VC that passes through a switch
ATM1/0.1	ATM interface.
1/35	VPI/VCI.
Active	Indicates VC state. Options include the following: • Active—Set up and working • Bindwait—Waiting for a response • Remote Resource Wait—Waiting for resources (VPI/VCI space) to be available on the downstream device • Parent Wait—Transit VC input side waiting for output side to become active
VCD=3	Virtual circuit descriptor number.

Related Commands

Command	Description
show mpls ip binding	Displays specified information about label bindings learned by the MPLS LDP.

show mpls atm-ldp bindwait

Note Effective with Cisco IOS Release 12.4(20)T, the **show mpls atm-ldp bindwait** command is not available in Cisco IOS software.

To display the number of bindings waiting for label assignments from a remote Multiprotocol Label Switching (MPLS) ATM switch, use the **show mpls atm-ldp bindwait** command in privileged EXEC mode.

show mpls atm-ldp bindwait

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(4)T	This command was modified to use MPLS Internet Engineering Task Force (IETF) command syntax and terminology.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.4(20)T	This command was removed.

Usage Guidelines

Use this command to display information about virtual circuits (VCs) in the bindwait state.

Examples

The following is sample output from the **show mpls atm-ldp bindwait** command:

```
Router# show mpls atm-ldp bindwait

Waiting for bind on ATM1/0.2
  10.3.3.1/32          10.3.3.1/32          10.3.3.2/32
  10.3.3.2/32          10.3.3.3/32          10.3.3.3/32
  10.3.3.4/32          10.3.3.4/32          10.3.3.5/32
  10.3.3.5/32          10.3.3.6/32          10.3.3.6/32
  10.3.3.7/32          10.3.3.7/32          10.3.3.8/32
  10.3.3.8/32          10.3.3.9/32          10.3.3.9/32
.
.
.
```

```
end
```

If there are no bindings waiting for label assignments from the remote MPLS ATM switch, this command does not display any output.

Related Commands

Command	Description
show mpls atm-ldp bindings	Displays specified entries from the ATM label binding database.

show mpls atm-ldp capability

Note Effective with Cisco IOS Release 12.4(20)T, the **show mpls atm-ldp capability** command is not available in Cisco IOS software.

To display the Multiprotocol Label Switching (MPLS) ATM capabilities negotiated with Label Distribution Protocol (LDP) neighbors for label-controlled (LC)-ATM interfaces, use the **show mpls atm-ldp capability** command in privileged EXEC mode.

show mpls atm-ldp capability

Syntax Description

This command has no arguments or keywords.

Command Default

This command always displays all the MPLS ATM capabilities negotiated with all the LDP neighbors.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was modified to use MPLS Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000-PRE2 router.
12.4(20)T	This command was removed.

Usage Guidelines

When two label switch routers (LSRs) establish an LDP session, they negotiate parameters for the session, such as the range of virtual path identifiers (VPIs) and virtual channel identifiers (VCIs) that will be used as labels.

This command displays the MPLS ATM capabilities negotiated by LDP or the Tag Distribution Protocol (TDP).

Note TDP is not supported for LDP features in Cisco IOS 12.0(30)S and later releases, 12.2(27)SBC and later 12.2S releases, and 12.3(14)T and later releases.

Examples

The following is sample output from the **show mpls atm-ldp capability** command:

```
Router# show mpls atm-ldp capability

               VPI           VCI           Alloc   Odd/Even  VC Merge
ATM0/1/0       Range         Range         Scheme  Scheme    IN   OUT
  Negotiated   [100 - 101]   [33 - 1023]   UNIDIR            -    -
  Local        [100 - 101]   [33 - 16383]  UNIDIR            EN   EN
  Peer         [100 - 101]   [33 - 1023]   UNIDIR            -    -

               VPI           VCI           Alloc   Odd/Even  VC Merge
ATM0/1/1       Range         Range         Scheme  Scheme    IN   OUT
  Negotiated   [201 - 202]   [33 - 1023]   BIDIR             -    -
  Local        [201 - 202]   [33 - 16383]  UNIDIR  ODD       NO   NO
  Peer         [201 - 202]   [33 - 1023]   BIDIR   EVEN      -    -
```

Table 80 describes the significant fields shown in the display.

Table 80 show mpls atm-ldp capability Field Descriptions

Field	Description
VPI Range	Minimum and maximum numbers of VPIs supported on this interface.
VCI Range	Minimum and maximum numbers of VCIs supported on this interface.
Alloc Scheme	Indicates the applicable allocation scheme, as follows: • UNIDIR—Unidirectional capability indicates that the peer can, within a single VPI, support binding of the same VCI to different prefixes on different directions of the link. • BIDIR—Bidirectional capability indicates that within a single VPI, a single VCI can appear in one binding only. In this case, one peer allocates bindings in the even VCI space, and the other in the odd VCI space. The system with the lower LDP identifier assigns even-numbered VCIs. The negotiated allocation scheme is UNIDIR, only if both peers have UNIDIR capability. Otherwise, the allocation scheme is BIDIR. **Note** These definitions for *unidirectional* and *bidirectional* are consistent with normal ATM usage of the terms; however, they are exactly opposite from the definitions for them in the IETF LDP specification.
Odd/Even Scheme	Indicates whether the local device or the peer is assigning an odd- or even-numbered VCI when the negotiated scheme is BIDIR. It does not display any information when the negotiated scheme is UNIDIR.

Table 80 show mpls atm-ldp capability Field Descriptions (continued)

Field	Description
VC Merge	Indicates the type of virtual circuit (VC) merge support available on this interface. There are two possibilities, as follows: • IN—Indicates the input interface merge capability. IN accepts the following values: – EN—The hardware interface supports VC merge, and VC merge is enabled on the device. – DIS—The hardware interface supports VC merge and VC merge is disabled on the device. – NO—The hardware interface does not support VC merge. • OUT—Indicates the output interface merge capability. OUT accepts the same values as the input merge side. The VC merge capability is meaningful only on ATM switches. This capability is not negotiated.
Negotiated	Indicates the set of options that both LDP peers have agreed to share on this interface. For example, the VPI or VCI allocation on either peer remains within the negotiated range.
Local	Indicates the options supported locally on this interface.
Peer	Indicates the options supported by the remote LDP peer on this interface.

Related Commands

Command	Description
mpls ldp atm vc-merge	Controls whether the vc-merge (multipoint-to-point) is supported for unicast label VCs.

show mpls atm-ldp summary

Note Effective with Cisco IOS Release 12.4(20)T, the **show mpls atm-ldp summary** command is not available in Cisco IOS software.

To display summary information about all the entries in the ATM label binding database, use the **show mpls atm-ldp summary** command in privileged EXEC mode.

show mpls atm-ldp summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was modified to use Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.4(20)T	This command was removed.

Usage Guidelines

Use this command to display dynamic ATM accounting information.

Examples

The following is sample output from the **show mpls atm-ldp summary** command:

```
Router# show mpls atm-ldp summary

Total number of destinations: 406

ATM label bindings summary
interface      total   active  local   remote  Bwait   Rwait   IFwait
```

```
ATM0/0/0        406     406     404     2       0       0       0
ATM0/0/1        406     406     3       403     0       0       0
```

Table 81 describes the significant fields shown in the display.

Table 81 show mpls atm-ldp summary Field Descriptions

Field	Description
Total number of destinations:	Number of known destination address prefixes.
interface	Name of an interface with associated ATM label bindings.
total	Total number of ATM labels on this interface.
active	Number of ATM labels in an “active” state that are ready to use for data transfer.
local	Number of ATM labels assigned by this label switch router (LSR) on this interface.
remote	Number of ATM labels assigned by the neighbor LSR on this interface.
Bwait	Number of bindings that are waiting for a label assignment from the neighbor LSR.
Rwait	Number of bindings that are waiting for resources (virtual path identifier [VPI] /virtual channel identifier [VCI] space) to be available on the downstream device.
IFwait	Number of bindings that are waiting for learned labels to be installed for switching use.

Related Commands

Command	Description
show isis database verbose	Displays the requested entries from the ATM LDP label binding database.

show mls cef mpls exact-route

To display the Multiprotocol Label Switching (MPLS) hardware load-sharing results from the Multilayer Switching (MLS) hardware Layer 3 switching table, use the **show mls cef mpls exact-route** command in user EXEC or privileged EXEC mode.

show mls cef mpls exact-route {*dst-address src-address* **label-stack-depth** *value* **label** *outer-most-value* | **label** *outer-most-value*} [**label** *inner-most-value*]

Syntax Description

dst-address	Destination IP address.
src-address	Source IP address.
label-stack-depth *value*	Specifies the depth of the label stack. The range is from 1 to 1048575. The default value is zero.
label *outer-most-value*	Specifies the top-most label in the incoming packet. The range is from 16 to 1048575. The default value is zero.
label *inner-most-value*	(Optional) Specifies the bottom-most label in the incoming packet. The range is from 16 to 1048575. The default value is zero.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
15.1(2)S	This command was introduced on Cisco 7600 series routers.

Usage Guidelines

You can use the **show mls cef mpls exact-route** command to find the actual path used by the label traffic in an Equal Cost Multipath (ECMP). This command helps in debugging Layer 2 VPN (L2VPN)) and Layer 3 VPN (L3VPN) load balancing.

Note The **show mls cef mpls exact-route** command is supported only for L2VPN and L3VPN.

You must configure the appropriate parameters based on the control word in the incoming packets as follows:

- If the incoming packet contains the control word, you need not provide the source and destination address along with the label stack depth value.

Note You must configure the inner label value if you do not specify the source and destination IP address.

- If the incoming packet does not have the control word, you must provide all the attributes applicable for the packet; that is, source address, destination address, and label stack depth value.

Note The **show mls cef mpls exact-route** command may not display valid results when you use the command on provider edge (PE) routers for L2 and L3 VPNs. Hence, Cisco does not recommend using the command on PE routers for L2 and L3 VPNs.

Examples

The following is sample output from the **show mls cef mpls exact-route** command. Fields in the display are self-explanatory.

```
Router# show mls cef mpls exact-route 192.0.2.1 192.0.2.2 label-stack-depth 2 label 19

For EOS [0] choice Adjancency details are:
        Interface: Gi3/3/0, Next Hop: 192.168.3.1, Vlan: 1019, DestinationMac:
0006.5248.a400

 For EOS [1] choice Adjancency details are:
        Interface: Gi3/3/0, Next Hop: 192.168.3.1, Vlan: 1019, DestinationMac:
0006.5248.a400
```

The following is sample output from the **show mls cef mpls exact-route** command when the source and destination IP address are not specified. Fields in the display are self-explanatory.

```
Router# show mls cef mpls exact-route label 18 label 20

 For EOS [0] choice Adjancency details are:
        Interface: Te1/0/0, Next Hop: 10.0.0.1, Vlan: 1023, DestinationMac: 000b.fc1c.ee40

 For EOS [1] choice Adjancency details are:
        Interface: Te1/0/0, Next Hop: 10.0.0.1, Vlan: 1023, DestinationMac: 000b.fc1c.ee40
```

Related Commands

Command	Description
show mpls forwarding-table	Displays the contents of the MPLS LFIB.

show mpls cos-map

Note Effective with Cisco IOS Release 12.4(20)T, the **show mpls cos-map** command is not available in Cisco IOS software.

To display the quality of service (QoS) map used to assign a quantity of label virtual circuits and the associated class of service (CoS) for those virtual circuits, use the **show mpls cos-map** command in privileged EXEC mode.

show mpls cos-map [*cos-map*]

Syntax Description

cos-map	(Optional) Number specifying the QoS map to be displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(10)ST	This command was modified to match Multiprotocol Label Switching (MPLS) syntax and terminology.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(25)S	The heading in the output was changed from tag-vc to label-vc.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.4(20)T	This command was removed.

Usage Guidelines

Not entering a specific QoS number causes all QoS maps to be displayed.

Note Cisco 10000 series routers do not use the **show mpls cos-map** command.

Examples

The following is sample output from the **show mpls cos-map** command:

```
Router# show mpls cos-map 2

cos-map 2    class  Label-VC
             3      control
             2      control
             1      available
             0      available
```

Table 82 describes the significant fields shown in the display.

Table 82 show mpls cos-map Field Descriptions

Field	Description
cos-map	Configures a class map, which specifies how classes map to MPLS virtual circuits when they are combined with a prefix map.
class	The IP precedence.
Label-VC	An ATM virtual circuit that is set up through ATM label switch router (LSR) label distribution procedures.

Related Commands

Command	Description
mpls cos-map	Creates a class map specifying how classes map to label virtual circuits when they are combined with a prefix map.

show mpls flow mappings

To display all entries in the Multiprotocol Label Switching (MPLS) Prefix/Application/Label (PAL) table, use the **show mpls flow mappings** command in user EXEC mode or privileged EXEC mode.

show mpls flow mappings

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you are interested in only a certain type of MPLS label and do not want to display the entire MPLS PAL table, you can use the **show mpls flow mappings | include** *label-type* command.

Examples

The following sample output from the **show mpls flow mappings** command displays all entries in the MPLS PAL table:

```
Router# show mpls flow mappings

Label    Owner    Route-Distinguisher Prefix          Allocated
18       LDP                          10.0.0.5        00:52:10
21       BGP                          0.0.0.0         00:52:18
22       BGP                          0.0.0.0         00:52:18
25       BGP                          0.0.0.0         00:51:44
26       LDP                          10.32.0.0       00:52:10
27       TE-MIDPT                     10.30.0.2       00:52:06
28       LDP                          10.33.0.0       00:52:10
29       LDP                          10.0.0.1        00:52:10
30       LDP                          10.0.0.3        00:52:10
```

In this example, the **mpls export vpnv4 prefixes** command was not configured. Therefore, the MPLS PAL table did not export a route distinguisher for the Border Gateway Protocol (BGP) application, and the associated prefix is exported as 0.0.0.0.

Table 83 describes the significant fields shown in the display.

Table 83 show mpls flow mappings Field Descriptions

Field	Description
Label	Value given to the MPLS label by the router.
Owner	MPLS application that allocated the label. • LDP = Label Distribution Protocol • BGP = Border Gateway Protocol • TE-MIDT = Traffic engineering tunnel midpoint
Route-Distinguisher	Value (8-byte) that is concatenated with an IPv4 prefix to create a unique VPN IPv4 prefix.
Prefix	Prefix used by the router to route data to the destination address.
Allocated	System uptime at which the MPLS PAL mapping record was created.

The following is sample output from the **show mpls flow mappings** command if you previously entered the **mpls export vpnv4 prefixes** command:

```
# show mpls flow mappings

Label    Owner    Route-Distinguisher Prefix           Allocated
16       LDP                          10.0.0.3        00:58:03
17       LDP                          10.33.0.0       00:58:03
19       TE-MIDPT                     10.30.0.2       00:58:06
20       LDP                          10.0.0.5        00:58:03
23       LDP                          10.0.0.1        00:58:03
24       LDP                          10.32.0.0       00:58:03
27       BGP      100:1               10.34.0.0       00:57:48
31       BGP      100:1               10.0.0.9        00:58:21
32       BGP      100:1               10.3.3.0        00:58:21
```

The following sample output from the **show mpls flow mappings | include LDP** command displays only MPLS PAL entries that were allocated by LDP:

```
Router# show mpls flow mappings | include LDP

Label    Owner    Route-Distinguisher Prefix           Allocated
16       LDP                          10.0.0.3        00:58:03
17       LDP                          10.33.0.0       00:58:03
20       LDP                          10.0.0.5        00:58:03
23       LDP                          10.0.0.1        00:58:03
24       LDP                          10.32.0.0       00:58:03
```

Related Commands

Command	Description
show ip cache verbose flow	Displays a detailed summary of NetFlow statistics.
show ip flow export	Displays the status and the statistics for NetFlow accounting data export.

show mpls forwarding vrf

To display label forwarding information for advertised Virtual Private Network (VPN) routing and forwarding (VRF) instance routes, use the **show mpls forwarding vrf** command in privileged EXEC mode. To disable the display of label forwarding information, use the **no** form of this command.

show mpls forwarding vrf *vrf-name* [*ip-prefix/length* [*mask*]] [**detail**] [*output-modifiers*]

no show mpls forwarding vrf *vrf-name* [*ip-prefix/length* [*mask*]] [**detail**] [*output-modifiers*]

Syntax Description

vrf-name	Displays network layer reachability information (NLRI) associated with the named VRF.
ip-prefix/length	(Optional) IP prefix address (in dotted decimal format) and length of mask (0 to 32).
mask	(Optional) Destination network mask, in dotted decimal format.
detail	(Optional) Displays detailed information on the VRF routes.
output-modifiers	(Optional) For a list of associated keywords and arguments, use context-sensitive help.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(21)ST	This command was modified to reflect new Multiprotocol Label Switching (MPLS) Internet Engineering Taskforce (IETF) terminology and CLI command syntax and was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(22)S	The command output was modified so that directly connected VRF networks no longer display as aggregate; no label appears instead.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command to display label forwarding entries associated with a particular VRF or IP prefix.

Examples

The following example shows label forwarding entries that correspond to the VRF called vpn1:

```
Router# show mpls forwarding vrf vpn1 detail

Local  Outgoing    Prefix            Bytes tag  Outgoing   Next Hop
tag    tag or VC   or Tunnel Id      switched   interface
35     24 10.0.0.0/8[V]     0          Et0/0/4 10.0.0.1
        MAC/Encaps=14/22, MRU=1496, Tag Stack{24 19}
        00D006FEDBE100D0974988048847 0001800000013000
        VPN route: vpn1
        No output feature configured
    Per-packet load-sharing
```

Related Commands

Command	Description
show ip cef vrf	Displays VRFs and associated interfaces.
show mpls forwarding-table	Displays the contents of the LFIB.

show mpls forwarding-table

To display the contents of the Multiprotocol Label Switching (MPLS) Label Forwarding Information Base (LFIB), use the **show mpls forwarding-table** command in user EXEC or privileged EXEC mode.

show mpls forwarding-table [*network* {*mask* | *length*} | **interface** *interface* | **labels** *label* [**-** *label*] | **lcatm atm** *atm-interface-number* | **next-hop** *address* | **lsp-tunnel** [*tunnel-id*]] [**vrf** *vrf-name*] [**detail slot** *slot-number*]

Syntax Description

network	(Optional) Destination network number.
mask	IP address of the destination mask whose entry is to be shown.
length	Number of bits in the mask of the destination.
interface *interface*	(Optional) Displays entries with the outgoing interface specified.
labels *label - label*	(Optional) Displays entries with the local labels specified.
lcatm atm *atm-interface-number*	Displays ATM entries with the specified Label Controlled Asynchronous Transfer Mode (LCATM).
next-hop *address*	(Optional) Displays only entries with the specified neighbor as the next hop.
lsp-tunnel	(Optional) Displays only entries with the specified label switched path (LSP) tunnel, or with all LSP tunnel entries.
tunnel-id	(Optional) Specifies the LSP tunnel for which to display entries.
vrf *vrf-name*	(Optional) Displays entries with the specified VPN routing and forwarding (VRF) instance.
detail	(Optional) Displays information in long form (includes length of encapsulation, length of MAC string, maximum transmission unit [MTU], and all labels).
slot *slot-number*	(Optional) Specifies the slot number, which is always 0.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T. The command was updated with MPLS terminology and command syntax.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T. The command was modified to accommodate use of the MPLS experimental (EXP) level as a selection criterion for packet forwarding. The output display was modified to include a bundle adjacency field and exp (vcd) values when the optional **detail** keyword is specified.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S. The IPv6 MPLS aggregate label and prefix information was added to the display.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.0(27)S	This command was integrated into Cisco IOS Release 12.0(27)S. The command output was modified to include explicit-null label information.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S. The output was changed in the following ways: • The term "tag" was replaced with the term "label." • The term "untagged" was replaced with the term "no label."
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA. This command was modified to remove the **lsp-tunnel** keyword.
12.2(33)SXH	This command was modified. The command output shows the status of local labels in holddown for the Cisco IOS Software Modularity: MPLS Layer 3 VPNs feature. The status indicator showing that traffic is forwarded through an LSP tunnel is moved to the local label and the **lsp-tunnel** keyword was removed.
Cisco IOS XE Release 3.1S	This command was integrated into Cisco IOS XE Release 3.1S.
15.1(1)S	This command was integrated into Cisco IOS Release 15.1(1)S. The output was modified to display the pseudowire identifier when the **interface** keyword is used.

Examples

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

```
Router# show mpls forwarding-table

Local Outgoing      Prefix            Bytes label Outgoing       Next Hop
Label Label or VC   or Tunnel Id      switched  interface
26    No Label      10.253.0.0/16     0         Et4/0/0       10.27.32.4
28    1/33          10.15.0.0/16      0         AT0/0.1       point2point
29    Pop Label     10.91.0.0/16      0         Hs5/0         point2point
      1/36          10.91.0.0/16      0         AT0/0.1       point2point
30    32            10.250.0.97/32    0         Et4/0/2       10.92.0.7
      32            10.250.0.97/32    0         Hs5/0         point2point
34    26            10.77.0.0/24      0         Et4/0/2       10.92.0.7
      26            10.77.0.0/24      0         Hs5/0         point2point
35    No Label[T]   10.100.100.101/32 0         Tu301         point2point
36    Pop Label     10.1.0.0/16      0         Hs5/0         point2point
      1/37          10.1.0.0/16      0         AT0/0.1       point2point

[T]     Forwarding through a TSP tunnel.
        View additional labeling info with the 'detail' option
```

The following is sample output from the **show mpls forwarding-table** command when the IPv6 Provider Edge Router over MPLS feature is configured to allow IPv6 traffic to be transported across an IPv4 MPLS backbone. The labels are aggregated because there are several prefixes for one local label, and the prefix column contains "IPv6" instead of a target prefix.

```
Router# show mpls forwarding-table

Local Outgoing      Prefix            Bytes label Outgoing       Next Hop
Label Label or VC   or Tunnel Id      switched  interface
16    Aggregate     IPv6              0
17    Aggregate     IPv6              0
18    Aggregate     IPv6              0
19    Pop Label     192.168.99.64/30  0         Se0/0         point2point
```

```
20    Pop Label     192.168.99.70/32  0         Se0/0         point2point
21    Pop Label     192.168.99.200/32 0         Se0/0         point2point
22    Aggregate     IPv6              5424
23    Aggregate     IPv6              3576
24    Aggregate     IPv6              2600
```

The following is sample output from the **show mpls forwarding-table** command when you specify the **detail** keyword. If the MPLS EXP level is used as a selection criterion for packet forwarding, a bundle adjacency exp (vcd) field is included in the display. This field includes the EXP value and the corresponding virtual circuit descriptor (VCD) in parentheses. The line in the output that reads "No output feature configured" indicates that the MPLS egress NetFlow accounting feature is not enabled on the outgoing interface for this prefix.

```
Router# show mpls forwarding-table detail

Local Outgoing      Prefix            Bytes label Outgoing       Next Hop
label   label or VC     or Tunnel Id      switched  interface
16    Pop label       10.0.0.6/32        0         AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/12, MTU=4474, label Stack{}
      00010000AAAA030000008847
      No output feature configured
17    18            10.0.0.9/32        0         AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/16, MTU=4470, label Stack{18}
      00010000AAAA030000008847 00012000
      No output feature configured
18    19            10.0.0.10/32        0        AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/16, MTU=4470, label Stack{19}
      00010000AAAA030000008847 00013000
      No output feature configured
19    17            10.0.0.0/8         0        AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/16, MTU=4470, label Stack{17}
      00010000AAAA030000008847 00011000
      No output feature configured
20    20            10.0.0.0/8         0        AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/16, MTU=4470, label Stack{20}
      00010000AAAA030000008847 00014000
      No output feature configured
21    Pop label       10.0.0.0/24        0        AT1/0.1       point2point
      Bundle adjacency exp(vcd)
      0(1) 1(1) 2(1) 3(1) 4(1) 5(1) 6(1) 7(1)
      MAC/Encaps=12/12, MTU=4474, label Stack{}
      00010000AAAA030000008847
      No output feature configured
22    Pop label       10.0.0.4/32         0        Et2/3         10.0.0.4
      MAC/Encaps=14/14, MTU=1504, label Stack{}
      000427AD10430005DDFE043B8847
      No output feature configured
```

The following is sample output from the **show mpls forwarding-table** command when you use the **detail** keyword. In this example, the MPLS egress NetFlow accounting feature is enabled on the first three prefixes, as indicated by the line in the output that reads "Feature Quick flag set."

```
Router# show mpls forwarding-table detail

Local  Outgoing    Prefix            Bytes label  Outgoing   Next Hop
label    label or VC   or Tunnel Id      switched   interface
16     Aggregate   10.0.0.0/8[V]     0
        MAC/Encaps=0/0, MTU=0, label Stack{}
        VPN route: vpn1
        Feature Quick flag set
Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
17     No label    10.0.0.0/8[V]      0          Et0/0/2    10.0.0.1
        MAC/Encaps=0/0, MTU=1500, label Stack{}
        VPN route: vpn1
        Feature Quick flag set
Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
18     No label    10.42.42.42/32[V] 4185       Et0/0/2    10.0.0.1
        MAC/Encaps=0/0, MTU=1500, label Stack{}
        VPN route: vpn1
        Feature Quick flag set
Per-packet load-sharing, slots: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
19     2/33        10.41.41.41/32    0          AT1/0/0.1  point2point
        MAC/Encaps=4/8, MTU=4470, label Stack{2/33(vcd=2)}
        00028847 00002000
        No output feature configured
```

Cisco 10000 Series Examples

The following is sample output from the **show mpls forwarding-table** command for Cisco 10000 series routers:

```
Router# show mpls forwarding-table

Local   Outgoing      Prefix            Bytes Label   Outgoing   Next Hop
Label   Label or VC   or Tunnel Id      Switched      interface
16      Pop Label     10.0.0.0/8        0             Fa1/0/0    10.0.0.2
        Pop Label     10.0.0.0/8        0             Fa1/1/0    10.0.0.2
17      Aggregate     10.0.0.0/8[V]     570           vpn2
21      Pop Label     10.11.11.11/32    0             Fa1/0/0    10.0.0.2
22      Pop Label     10.12.12.12/32    0             Fa1/1/0    10.0.0.2
23      No Label      10.3.0.0/16[V]     0             Fa4/1/0   10.0.0.2
```

The following is sample output from the **show mpls forwarding-table** command when you specify the **detail** keyword for Cisco 10000 series routers:

```
Router# show mpls forwarding-table detail

Local   Outgoing      Prefix            Bytes Label   Outgoing   Next Hop
Label   Label or VC   or Tunnel Id      Switched      interface
16      Pop Label     10.0.0.0/8        0             Fa1/0/0    10.0.0.2
        MAC/Encaps=14/14, MRU=1500, Label Stack{}
        000B45C93889000B45C930218847
        No output feature configured
        Pop Label     10.0.0.0/8        0             Fa1/1/0     10.0.0.2
        MAC/Encaps=14/14, MRU=1500, Label Stack{}
        000B45C92881000B45C930288847
        No output feature configured
17      Aggregate    10.0.0.0/8[V]      570           vpn2
        MAC/Encaps=0/0, MRU=0, Label Stack{}
        VPN route: vpn2
        No output feature configured
21      Pop Label     10.11.11.11/32     0            Fa1/0/0     10.0.0.2
```

```
 MAC/Encaps=14/14, MRU=1500, Label Stack{}
000B45C93889000B45C930218847
No output feature configured
```

Table 84 describes the significant fields shown in the displays.

Table 84 show mpls forwarding-table Field Descriptions

Field	Description
Local label	Label assigned by this router.
Outgoing Label or VC **Note** This field is not supported on the Cisco 10000 series routers.	Label assigned by the next hop or the virtual path identifier (VPI)/virtual channel identifier (VCI) used to get to next hop. The entries in this column are the following: • [T]—Forwarding is through an LSP tunnel. • No Label—There is no label for the destination from the next hop or label switching is not enabled on the outgoing interface. • Pop Label—The next hop advertised an implicit NULL label for the destination and the router removed the top label. • Aggregate—There are several prefixes for one local label. This entry is used when IPv6 is configured on edge routers to transport IPv6 traffic over an IPv4 MPLS network.
Prefix or Tunnel Id	Address or tunnel to which packets with this label are sent. **Note** If IPv6 is configured on edge routers to transport IPv6 traffic over an IPv4 MPLS network, "IPv6" is displayed here. • [V]—The corresponding prefix is in a VRF.
Bytes label switched	Number of bytes switched with this incoming label. This includes the outgoing label and Layer 2 header.
Outgoing interface	Interface through which packets with this label are sent.
Next Hop	IP address of the neighbor that assigned the outgoing label.
Bundle adjacency exp(vcd)	Bundle adjacency information. Includes the MPLS EXP value and the corresponding VCD.
MAC/Encaps	Length in bytes of the Layer 2 header and length in bytes of the packet encapsulation, including the Layer 2 header and label header.
MTU	MTU of the labeled packet.
label Stack	All the outgoing labels. If the outgoing interface is transmission convergence (TC)-ATM, the VCD is also shown. **Note** TC-ATM is not supported on Cisco 10000 series routers.
00010000AAAA030000008847 00013000	The actual encapsulation in hexadecimal form. A space is shown between Layer 2 and the label header.

Explicit-Null Label Example

The following is sample output, including the explicit-null label = 0 (commented in bold), for the **show mpls forwarding-table** command on a CSC-PE router:

```
Router# show mpls forwarding-table

Local  Outgoing      Prefix            Bytes label  Outgoing   Next Hop
label  label or VC   or Tunnel Id      switched     interface
17     Pop label     10.10.0.0/32      0            Et2/0      10.10.0.1
18     Pop label     10.10.10.0/24     0            Et2/0      10.10.0.1
19     Aggregate     10.10.20.0/24[V]  0
20     Pop label     10.10.200.1/32[V] 0            Et2/1      10.10.10.1
21     Aggregate     10.10.1.1/32[V]   0
22     0             192.168.101.101/32[V]   \
                                       0            Et2/1      192.168.101.101
23     0             192.168.101.100/32[V]   \
                                       0            Et2/1      192.168.101.100
25     0             192.168.102.125/32[V] 0        Et2/1      192.168.102.125 !outlabel
value 0
```

Table 85 describes the significant fields shown in the display.

Table 85 show mpls forwarding-table Field Descriptions

Field	Description
Local label	Label assigned by this router.
Outgoing label or VC	Label assigned by the next hop or VPI/VCI used to get to the next hop. The entries in this column are the following: • [T]—Forwarding is through an LSP tunnel. • No label—There is no label for the destination from the next hop or that label switching is not enabled on the outgoing interface. • Pop label—The next hop advertised an implicit NULL label for the destination and that this router popped the top label. • Aggregate—There are several prefixes for one local label. This entry is used when IPv6 is configured on edge routers to transport IPv6 traffic over an IPv4 MPLS network. • 0—The explicit null label value = 0.
Prefix or Tunnel Id	Address or tunnel to which packets with this label are sent. **Note** If IPv6 is configured on edge routers to transport IPv6 traffic over an IPv4 MPLS network, IPv6 is displayed here. • [V]—Means that the corresponding prefix is in a VRF.
Bytes label switched	Number of bytes switched with this incoming label. This includes the outgoing label and Layer 2 header.
Outgoing interface	Interface through which packets with this label are sent.
Next Hop	IP address of the neighbor that assigned the outgoing label.

Cisco IOS Software Modularity: MPLS Layer 3 VPNs Example

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

```
Router# show mpls forwarding-table

Local      Outgoing   Prefix           Bytes Label   Outgoing   Next Hop
Label      Label      or Tunnel Id     Switched      interface
16         Pop Label  IPv4 VRF[V]      62951000      aggregate/v1
17    [H]  No Label   10.1.1.0/24      0             AT1/0/0.1 point2point
           No Label   10.1.1.0/24      0             PO3/1/0 point2point
      [T]  No Label   10.1.1.0/24      0             Tu1 point2point
18    [HT] Pop Label  10.0.0.3/32      0             Tu1 point2point
19    [H]  No Label   10.0.0.0/8       0             AT1/0/0.1 point2point
           No Label   10.0.0.0/8       0             PO3/1/0 point2point
20    [H]  No Label   10.0.0.0/8       0             AT1/0/0.1 point2point
           No Label   10.0.0.0/8       0             PO3/1/0 point2point
21    [H]  No Label   10.0.0.1/32      812           AT1/0/0.1 point2point
           No Label   10.0.0.1/32      0             PO3/1/0 point2point
22    [H]  No Label   10.1.14.0/24     0             AT1/0/0.1 point2point
           No Label   10.1.14.0/24     0             PO3/1/0 point2point
23    [HT] 16         172.1.1.0/24[V]  0             Tu1 point2point
24    [HT] 24         10.0.0.1/32[V]   0             Tu1 point2point
25    [H]  No Label   10.0.0.0/8[V]    0             AT1/1/0.1 point2point
26    [HT] 16         10.0.0.3/32[V]   0             Tu1 point2point
27         No Label   10.0.0.1/32[V]   0             AT1/1/0.1 point2point

[T]     Forwarding through a TSP tunnel.
        View additional labelling info with the 'detail' option
[H]     Local label is being held down temporarily.
```

Table 86 describes the Local Label fields relating to the Cisco IOS Software Modularity: MPLS Layer 3 VPNs feature.

Table 86 show mpls forwarding-table Field Descriptions

Field	Description
Local Label	Label assigned by this router. • [H]—Local labels are in holddown, which means that the application that requested the labels no longer needs them and stops advertising them to its labeling peers. The label's forwarding-table entry is deleted after a short, application-specific time. If any application starts advertising a held-down label to its labeling peers, the label could come out of holddown. **Note** [H] is not shown if labels are held down globally. A label enters global holddown after a stateful switchover or a restart of certain processes in a Cisco IOS modularity environment. • [T]—The label is forwarded through an LSP tunnel. **Note** Although [T] is still a property of the outgoing interface, it is shown in the Local Label column. • [HT]—Both conditions apply.

L2VPN Inter-AS Option B: Example

The following is sample output from the **show mpls forwarding-table interface** command. In this example, the pseudowire identifier (that is, 4096) is displayed in the Prefix or Tunel Id column. The **show mpls l2transport vc detail** command can be used to obtain more information about the specific pseudowire displayed.

```
Router# show mpls forwarding-table

Local      Outgoing   Prefix           Bytes Label    Outgoing   Next Hop
Label      Label      or Tunnel Id     Switched       interface
1011       No Label   l2ckt(4096)          0          none       point2point
```

Table 87 describes the fields shown in the display.

Table 87 show mpls forwarding-table interface Field Descriptions

Field	Description
Local Label	Label assigned by this router.
Outgoing Label	Label assigned by the next hop or virtual path identifier (VPI)/virtual channel identifier (VCI) used to get to the next hop.
Prefix or Tunnel Id	Address or tunnel to which packets with this label are going.
Bytes Label Switched	Number of bytes switched with this incoming label. This includes the outgoing label and Layer 2 header.

Table 87 show mpls forwarding-table interface Field Descriptions (continued)

Field	Description
Outgoing interface	Interface through which packets with this label are sent.
Next Hop	IP address of the neighbor that assigned the outgoing label.

Related Commands

Command	Description
neighbor send-label	Enables a BGP router to send MPLS labels with BGP routes to a neighboring BGP router.
neighbor send-label explicit-null	Enables a BGP router to send MPLS labels with explicit-null information for a CSC-CE router and BGP routes to a neighboring CSC-PE router.
show mpls l2transport vc detail	Displays information about AToM VCs and static pseudowires that have been enabled to route Layer 2 packets on a router.

show mpls interfaces

To display information about one or more or all interfaces that are configured for label switching, use the **show mpls interfaces** command in user EXEC or privileged EXEC mode.

show mpls interfaces [*interface* | **vrf** *vpn-name*] [**all**] [**detail**] [**internal**]

Syntax Description

interface	(Optional) Defines the interface about which to display label switching information.
vrf *vpn-name*	(Optional) Displays information about the interfaces that have been configured for label switching for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance (*vpn-name)*.
all	(Optional) When the **all** keyword is specified alone in this command, information about the interfaces configured for label switching is displayed for all VPNs, including the VPNs in the default routing domain.
detail	(Optional) Displays detailed label switching information.
internal	(Optional) Indicates whether Multiprotocol Label Switching (MPLS) egress NetFlow accounting and other internal options are enabled.

Command Default

If no optional keyword or argument is specified in this command, summary information is displayed for each interface that has been configured for label switching in the default routing domain.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.1(3)T	This command was updated with MPLS command syntax and terminology.
12.0(10)ST	The **internal** keyword was added.
12.0(14)ST	This command was modified to reflect MPLS VPN support for LDP.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(25)S	This command was modified to show Border Gateway Protocol (BGP) and static routing information.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.0(1)S	This command was modified to reflect when a tunnel is configured as a traffic engineering tunnel. When a traffic engineering tunnel is configured, the word “Targeted” is added to the "Interface config”.

Usage Guidelines

This command shows MPLS information about the specified interface, or about all the interfaces for which MPLS has been configured.

If no optional keyword or argument is specified in this command, summary information is displayed for each interface configured for label switching.

Examples

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

```
Router# show mpls interfaces

Interface              IP         Tunnel   Operational
Ethernet1/1/1          Yes (tdp)  No       No
Ethernet1/1/2          Yes (tdp)  Yes      No
Ethernet1/1/3          Yes (tdp)  Yes      Yes
POS2/0/0               Yes (tdp)  No       No
ATM0/0.1               Yes (tdp)  No       No          (ATM labels)
ATM3/0.1               Yes (ldp)  No       Yes         (ATM labels)
ATM0/0.2               Yes (tdp)  No       Yes
```

Cisco 10000 Series Example

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

```
Router# show mpls interfaces

Interface                   IP           Tunnel   BGP Static Operational
GigabitEthernet1/0/0        Yes          No       No  No     No
GigabitEthernet2/0/0        No           No       No  Yes    No
GigabitEthernet3/0/0        No           Yes      No  No     No
```

Note If an interface uses LC-ATM procedures, the associated line in the display is flagged with the notation (ATM labels).

Table 88 describes the significant fields shown in the display.

Table 88 show mpls interfaces Field Descriptions

Field	Description
Interface	Interface name.
IP	If IP label switching (sometimes called hop-by-hop label switching) is enabled on this interface, the column entry is "Yes." Otherwise, the entry is "No."
Tunnel	If label switched path (LSP) tunnel labeling is on this interface, the column entry is "Yes." Otherwise, the entry is "No."
BGP	If BGP has been enabled, the column entry is "Yes." Otherwise, the entry is "No."
Static	If static routes have been enabled, the column entry is "Yes." Otherwise, the entry is "No."
Operational	If packets are being labeled, the column entry is "Yes." Otherwise, the entry is "No."

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

```
Router# show mpls interfaces detail

Interface Ethernet1/1/1:
        IP labeling enabled (tdp)
        LSP Tunnel labeling not enabled
        MPLS operational
        MPLS turbo vector
        MTU = 1500
Interface POS2/0/0:
        IP labeling enabled (ldp)
        LSP Tunnel labeling not enabled
        MPLS not operational
        MPLS turbo vector
        MTU = 4470
Interface ATM3/0.1:
        IP labeling enabled (ldp)
        LSP Tunnel labeling not enabled
        MPLS operational
        MPLS turbo vector
        MTU = 4470
        ATM labels: Label VPI = 1
                Label VCI range = 33 - 65535
                Control VC = 0/32
```

Cisco 10000 Series Example

The following example is sample output of the **show mpls interfaces** command with the **detail** keyword:

```
Router# show mpls interfaces detail

Interface GigabitEthernet1/0/0:
         IP labeling enabled (ldp)
         LSP Tunnel labeling not enabled
         MPLS operational
         MTU = 1500
Interface POS2/0/0:
         IP labeling enabled (ldp)
         LSP Tunnel labeling not enabled
         MPLS not operational
         MTU = 4470
```

Table 89 describes the significant fields shown in the display.

Table 89 show mpls interfaces detail Field Descriptions

Field	Description
Interface	Interface name.
IP labeling	If IP label switching is enabled on this interface, the entry is "enabled." Otherwise, the entry is "not enabled." The output also shows whether LDP or TDP is being used.
LSP Tunnel labeling	If the LSP tunnel labeling is enabled on this interface, the entry is "enabled." Otherwise, the entry is "not enabled."
MPLS	If packets are labeled, the entry is "operational." Otherwise, the entry is "not operational."
BGP	If BGP has been enabled, the entry is "enabled." Otherwise, the entry is "not enabled."
MTU	The setting of the maximum transmission unit, in bytes.
ATM labels: Label VPI	The virtual path identifier (VPI). **Note** This field does not apply to the Cisco 10000 series routers.
Label VCI range	The range of values used in the VPI field for label VCs. **Note** This field does not apply to the Cisco 10000 series routers.
Control VC	The values assigned to the control VC. **Note** This field does not apply to the 10000 series routers.

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

```
Router# show mpls interfaces all

Interface              IP           Tunnel   Operational
ATM1/1/0.1             Yes (tdp)    No       Yes

VRF vpn1:
ATM3/0/0.1             Yes (ldp)    No       Yes

VRF vpn2:
ATM3/0/0.2             Yes (ldp)    No       Yes

VRF vpn3:
```

```
ATM3/0/0.3              Yes (ldp)     No       Yes

VRF vpn4:
ATM3/0/0.4              Yes (ldp)     No       Yes

VRF vpn5:
ATM3/0/0.5              Yes (ldp)     No       Yes

VRF vpn6:
Interface               IP            Tunnel   Operational
ATM3/0/0.6              Yes (ldp)     No       Yes

VRF vpn7:
ATM3/0/0.7              Yes (ldp)     No       Yes

VRF vpn8:
ATM3/0/0.8              Yes (ldp)     No       Yes

VRF vpn9:
ATM3/0/0.9              Yes (ldp)     No       Yes

VRF vpn10:
ATM3/0/0.10             Yes (ldp)     No       Yes

VRF vpn11:
ATM3/0/0.11             Yes (ldp)     No       Yes

VRF vpn12:
ATM3/0/0.12             Yes (ldp)     No       Yes
   .
   .
   .
```

The following is sample output from the **show mpls interfaces** command with the **internal** keyword. The output shows whether MPLS egress NetFlow accounting is enabled on the interface. If MPLS egress NetFlow accounting is disabled, the Output_feature_state field displays 0x0. If MPLS egress Netflow accounting is enabled, the Output_feature_state field is any number, except 0x0.

```
Router# show mpls interfaces internal

Interface Ethernet0/0/1:
        IP labeling enabled (tdp)
        LSP Tunnel labeling not enabled
        MPLS operational
        IP to Tag Fast Feature Switching Vector
        MPLS turbo vector
        MTU = 1500, status=0x100043, appcount=1
        Output_feature_state=0x0
Interface Ethernet0/0/2:
        IP labeling enabled (tdp)
        LSP Tunnel labeling not enabled
        MPLS operational
        IP to Tag Fast Feature Switching Vector
        MPLS turbo vector
        MTU = 1500, status=0x100043, appcount=1
        Output_feature_state=0x1
```

Related Commands

Command	Description
mpls ip (global configuration)	Enables MPLS forwarding of IPv4 packets along normally routed paths for the platform.
mpls ip (interface configuration)	Enables MPLS forwarding of IPv4 packets along normally routed paths for a particular interface.
mpls label protocol (global configuration)	Specifies the default label distribution protocol for a platform.
mpls label protocol (interface configuration)	Specifies the label distribution protocol to be used on a given interface.
mpls traffic-eng tunnels (global configuration)	Enables MPLS traffic engineering tunnel signaling on a device.
mpls traffic-eng tunnels (interface configuration)	Enables MPLS traffic engineering tunnel signaling on an interface.

show mpls ip binding

To display specified information about label bindings learned by the Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP), use the **show mpls ip binding** command in user EXEC or privileged EXEC mode.

show mpls ip binding [**vrf** *vrf-name* | **all**] [*network* {*mask* | *length*} [**longer-prefixes**]] [**neighbor** *address* | **local**] [**local-label** {**atm** *vpi vci* | *label* [**-** *label*]}] [**remote-label** {**atm** *vpi vci* | *label* [**-** *label*]}] [**interface** *interface*] [**generic** | **atm**]

show mpls ip binding [**vrf** *vrf-name* | **all**] [**detail** | **summary**]

Cisco 10000 Series Routers

show mpls ip binding [*network* {*mask* | *length*} [**longer-prefixes**]] [**neighbor** *address* | **local**] [**local-label** *label* [**-** *label*]] [**remote-label** *label* [**-** *label*]] [**generic**]

show mpls ip binding [**detail** | **summary**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the LDP neighbors for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance (*vrf-name*). **Note** This keyword and argument pair does not apply to the Cisco 10000 series routers.
all	(Optional) Displays binding information for all VRFs. **Note** This keyword does not apply to the Cisco 10000 series routers.
network	(Optional) Defines the destination network number.
mask	Defines the network mask, written as A.B.C.D.
length	Defines the mask length (1 to 32 characters).
longer-prefixes	(Optional) Selects any prefix that matches the *mask* with a *length* from 1 to 32 characters.
neighbor *address*	(Optional) Displays label bindings assigned by the selected neighbor.
local	(Optional) Displays the local label bindings.
local-label atm *vpi vci*	(Optional) Displays the entry with the locally assigned ATM label that matches the specified ATM label value. The virtual path identifier (VPI) range is 0 to 4095. The virtual channel identifier (VCI) range is 0 to 65535. **Note** These keywords and arguments do not apply to the Cisco 10000 series routers.
local-label *label* **-** *label*	(Optional) Displays entries with locally assigned labels that match the specified label values. Use the *label* **-** *label* arguments and keyword to indicate the label range. The hyphen (**-**) keyword is required for a label range.
remote-label atm *vpi vci*	(Optional) Displays entries with remotely assigned ATM label values learned from neighbor routers that match the specified ATM label value. The VPI range is 0 to 4095. The VCI range is 0 to 65535. **Note** These keywords and arguments do not apply to the Cisco 10000 series routers.

remote-label *label* **-** *label*	(Optional) Displays entries with remotely assigned labels learned from neighbor routers that match the specified label values. Use the *label* **-** *label* arguments and keyword to indicate the label range. The hyphen (**-**) keyword is required for a label range.
interface *interface*	(Optional) Displays label bindings associated with the specified interface (for label-controlled (LC)-ATM only). **Note** This keyword and argument pair does not apply to the Cisco 10000 series routers.
generic	(Optional) Displays only generic (non-LC-ATM) label bindings.
atm	(Optional) Displays only LC-ATM label bindings. **Note** This keyword does not apply to the Cisco 10000 series routers.
detail	(Optional) Displays detailed information about label bindings learned by LDP.
summary	(Optional) Displays summary information about label bindings learned by LDP.

Defaults

All label bindings are displayed when no optional arguments or keywords are specified.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(10)ST	This command was introduced.
12.0(14)ST	This command was modified to reflect MPLS VPN support for LDP.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	The VPI range of values was extended to 4095.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(25)S	The **detail** keyword was added to display checkpoint status for local label bindings.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **show mpls ip binding** command displays label bindings learned by LDP or the Tag Distribution Protocol (TDP).

Note TDP is not supported for LDP features in Cisco IOS 12.0(30)S and later releases, 12.2(27)SBC and later 12.2S releases, and 12.3(14)T and later releases.

To summarize information about label bindings learned by LDP, use the **show mpls ip binding summary** command in user EXEC or privileged EXEC mode.

A request can specify that the entire database be displayed, that a summary of entries from the database be displayed, or that the display be limited to a subset of entries. The subset can be limited according to any of the following:

- Prefix
- Input or output label values or ranges
- Neighbor advertising the label
- Interface for label bindings of interest (LC-ATM only)

  Note LC-ATM label binding interface does not apply to the Cisco 10000 series routers.

- Generic (non-LC-ATM) label bindings
- LC-ATM label bindings

  Note LC-ATM label binding interface does not apply to the Cisco 10000 series routers.

Examples

The following is sample output from the **show mpls ip binding** command. The output shows all the label bindings in the database.

```
Router# show mpls ip binding

  10.0.0.0/8
        in label:     20
        out label:    26        lsr: 10.0.0.55:0
        out vc label: 1/80      lsr: 10.0.7.7:2      ATM1/0.8
                      Active    ingress 3 hops (vcd 49)
  172.16.0.0/8
        in label:     25
        in vc label:  1/36      lsr: 10.0.7.7:2      ATM1/0.8
                      Active    egress (vcd 55)
        out label:    imp-null  lsr: 10.0.0.55:0     inuse
```

```
  192.168.0.66/32
        in label:     26
        in vc label:  1/39      lsr: 10.0.7.7:2      ATM1/0.8
                      Active    egress (vcd 58)
        out label:    16        lsr: 10.0.0.55:0     inuse
        .
        .
        .
```

In the following example, a request is made for the display of the label binding information for prefix 192.168.44.0/24:

```
Router# show mpls ip binding 192.168.44.0 24

  192.168.44.0/24
        in label:     24
        in vc label:  1/37      lsr: 10.0.7.7:2      ATM1/0.8
                      Active    egress (vcd 56)
        out label:    imp-null  lsr: 10.0.0.55:0     inuse
```

In the following example, the **local-label** keyword is used to request that label binding information be displayed for the prefix with local label 58:

```
Router# show mpls ip binding local-label 58

  192.168.0.0/16
        in label:     58
        out label:    imp-null  lsr: 10.0.0.55:0     inuse
```

The following sample output shows the label bindings for the VPN routing and forwarding instance named vpn1:

```
Router# show mpls ip binding vrf vpn1

  10.3.0.0/16
        in label:    117
        out label:   imp-null  lsr:10.14.14.14:0
  10.13.13.13/32
        in label:    1372
        out label:   268       lsr:10.14.14.14:0
  10.14.14.14/32
        in label:    118
        out label:   imp-null  lsr:10.14.14.14:0
  10.15.15.15/32
        in label:    1370
        out label:   266       lsr:10.14.14.14:0
  10.16.16.16/32
        in label:    8370
        out label:   319       lsr:10.14.14.14:0
  10.18.18.18/32
        in label:    21817
        out label:   571       lsr:10.14.14.14:0
  30.2.0.0/16
        in label:    6943
        out label:   267       lsr:10.14.14.14:0
  10.30.3.0/16
        in label:    2383
        out label:   imp-null  lsr:10.14.14.14:0
  10.30.4.0/16
        in label:    77
        out label:   imp-null  lsr:10.14.14.14:0
  10.30.5.0/16
        in label:    20715
        out label:   504       lsr:10.14.14.14:0
```

```
  10.30.7.0/16
        in label:    17
        out label:   imp-null  lsr:10.14.14.14:0
  10.30.10.0/16
        in label:    5016
        out label:   269       lsr:10.14.14.14:0
  10.30.13.0/16
        in label:    76
        out label:   imp-null  lsr:10.14.14.14:0
```

The following sample output shows label binding information for all VRFs:

```
Router# show mpls ip binding all

  10.0.0.0/24
        in label:     imp-null
        out label:    imp-null  lsr: 10.131.0.1:0
  10.11.0.0/24
        in label:     imp-null
        out label:    imp-null  lsr: 10.131.0.1:0
  10.101.0.1/32
        out label:    imp-null  lsr: 10.131.0.1:0
  10.131.0.1/32
        in label:     20
        out label:    imp-null  lsr: 10.131.0.1:0      inuse
  10.134.0.1/32
        in label:     imp-null
        out label:    16        lsr: 10.131.0.1:0
VRF vrf1:
  10.0.0.0/24
        out label:    imp-null  lsr: 10.132.0.1:0
  10.11.0.0/24
        out label:    imp-null  lsr: 10.132.0.1:0
  10.12.0.0/24
        in label:     17
        out label:    imp-null  lsr: 10.132.0.1:0
  10.132.0.1/32
        out label:    imp-null  lsr: 10.132.0.1:0
  10.134.0.2/32
        in label:     18
        out label:    16        lsr: 10.132.0.1:0
  10.134.0.4/32
        in label:     19
        out label:    17        lsr: 10.132.0.1:0
  10.138.0.1/32
        out label:    imp-null  lsr: 10.132.0.1:0
```

Cisco 10000 Series Examples Only

The following sample shows binding information for a Cisco 10000 series router:

```
Router# show mpls ip binding

  0.0.0.0/0
        in label:     imp-null
  10.29.0.0/16
        in label:     imp-null
        out label:    imp-null  lsr: 10.66.66.66:0
        out label:    imp-null  lsr: 10.44.44.44:0
  10.20.0.0/24
        in label:     imp-null
        out label:    26        lsr: 10.66.66.66:0
        out label:    imp-null  lsr: 10.44.44.44:0
```

```
  10.30.0.0/24
        in label:     imp-null
        out label:    imp-null  lsr: 10.66.66.66:0
        out label:    18        lsr: 10.44.44.44:0
  10.44.44.44/32
        in label:     21
        out label:    19        lsr: 10.66.66.66:0
        in label:     imp-null
        out label:    26        lsr: 10.66.66.66:0
        out label:    imp-null  lsr: 10.44.44.44:0
  10.30.0.0/24
        in label:     imp-null
        out label:    imp-null  lsr: 10.66.66.66:0
        out label:    18        lsr: 10.44.44.44:0
  10.44.44.44/32
        in label:     21
        out label:    19        lsr: 10.66.66.66:0
        out label:    imp-null  lsr: 10.44.44.44:0    inuse
  10.55.55.55/32
        in label:     imp-null
        out label:    25        lsr: 10.66.66.66:0
        out label:    55        lsr: 10.44.44.44:0
  10.66.66.66/32
        in label:     18
        out label:    imp-null  lsr: 10.66.66.66:0    inuse
        out label:    16        lsr: 10.44.44.44:0
  10.255.254.244/32
        in label:     24
        out label:    16        lsr: 10.66.66.66:0
        out label:    59        lsr: 10.44.44.44:0
```

In the following example on a Cisco 10000 series router, a request is made for the display of the label binding information for prefix 172.16.44.44/32:

```
Router# show mpls ip binding 172.16.44.44 32

  172.16.44.44/32
        in label:     21
        out label:    19        lsr: 10.66.66.66:0
        out label:    imp-null  lsr: 10.44.44.44:0    inuse
```

In the following example on a Cisco 10000 series router, the **local-label** keyword is used to request that label binding information be displayed for the prefix with local label 21:

```
Router# show mpls ip binding local-label 21

  10.44.44.44/32
        in label:     21
```

Table 90 describes the significant fields shown in the displays.

Table 90 show mpls ip binding Field Descriptions

Field	Description
172.16.44.44/32	Destination prefix. Indicates that the following lines are for a particular destination (network/mask).
in label	Incoming label. This is the local label assigned by the label switch router (LSR) and advertised to other LSRs. The label value imp-null indicates the well-known Implicit NULL label.

Table 90 show mpls ip binding Field Descriptions (continued)

Field	Description
out label	Outgoing label. This is a remote label learned from an LDP neighbor. The neighbor is identified by its LDP ID in the lsr field.
inuse	Indicates that the outgoing label is in use for Multiprotocol Label Switching (MPLS) forwarding, that is, it is installed in the MPLS forwarding table (the Label Forwarding Information Base [LFIB]).
in vc label	Incoming MPLS ATM label. This is the local VPI/VCI assigned by the LSR as the incoming label for the destination and advertised to the upstream LSRs. **Note** This field applies to the Cisco 7500 series routers only.
out vc label	Outgoing MPLS ATM label. This is the VPI/VCI learned from the destination next hop as its label for the destination and advertised to this LSR. **Note** This field applies to the Cisco 7500 series routers only.
ATM1/0.8	The ATM interface with which the MPLS ATM label is associated. **Note** This field applies to the Cisco 7500 series routers only.
Active	State of the label VC (LVC) associated with the destination prefix. **Note** This field applies to the Cisco 7500 series routers only. States are the following: • Active. Established and operational. • Bindwait. Waiting for a response from the destination next hop. • Remote Resource Wait. Waiting for resources (VPI/VCI) to become available on the destination next hop. • Parent Wait. Transit LVC upstream side waiting for downstream side to become active. • AbortAckWait. Waiting for response to a Label Abort message sent to the destination next hop. • ReleaseWait. Waiting for response to a Label Withdraw message sent to an upstream neighbor.

Table 90 show mpls ip binding Field Descriptions (continued)

Field	Description
vcd 49	Virtual circuit descriptor number for the LVC. **Note** This field applies to the Cisco 7500 series routers only.
ingress 3 hops	Indicates whether the LSR is an ingress, transit, or egress node for the destination. **Note** This field applies to the Cisco 7500 series routers only. Options include the following: • Ingress 3 hops. The LSR is an ingress edge router for the MPLS ATM cloud for the destination. • Egress. The LSR is an egress edge router for the MPLS ATM cloud for the destination. • Transit. The LSR is a transit LSR within the MPLS ATM cloud for the destination.

The following sample output displays detailed information about the label bindings:

```
Router# show mpls ip binding detail

  10.0.0.0/8, rev 2, chkpt: add-skipped
        in label:     imp-null   (owner LDP)
          Advertised to:
          10.60.60.60:0          10.30.30.30:0
        out label:    imp-null  lsr: 10.60.60.60:0
        out label:    imp-null  lsr: 10.30.30.30:0
  10.10.10.10/32, rev 18, chkpt: added
        in label:     17         (owner LDP)
          Advertised to:
          10.60.60.60:0          10.30.30.30:0
        out label:    142       lsr: 10.60.60.60:0
        out label:    19        lsr: 10.30.30.30:0    inuse
  10.0.0.1/32, rev 10, chkpt: add-skipped
        in label:     imp-null   (owner LDP)
          Advertised to:
          10.60.60.60:0          10.30.30.30:0
        out label:    21        lsr: 10.60.60.60:0
        out label:    17        lsr: 10.30.30.30:0
  10.30.30.30/32, rev 20, chkpt: added
        in label:     18         (owner LDP)
          Advertised to:
          10.60.60.60:0          10.30.30.30:0
        out label:    22        lsr: 10.60.60.60:0
```

Table 91 describes the significant fields shown in the display.

Table 91 show mpls ip binding detail Field Descriptions

Field	Description
chkpt	The status of the checkpointed entry. • add-skipped—Means that the local label is a null label and does not need to be checkpointed. • added— Means that the checkpoints entry was copied to the backup Route Processor (RP)
owner	The application that created the binding. • owner LDP—Means that LDP created the binding. • owner other—Means that another application created the binding, possibly Border Gateway protocol (BGP).
Advertised to	The LSRs that received the local label binding.
inuse or stale	The status of the label. • inuse—Indicates that the outgoing label is in use for MPLS forwarding, that is, it is installed in the MPLS forwarding table (LFIB). • stale—Indicates a label that is no longer in use. This happens when an LDP session is lost and the routers begin a graceful restart. Then the remote label bindings are marked stale.

Cisco 7500 Series Example Only

The following sample output shows summary information about the label bindings learned by LDP:

```
Router# show mpls ip binding summary

Total number of prefixes: 53

Generic label bindings
                      assigned        learned
       prefixes      in labels     out labels
             53             53             51

ATM label bindings summary
      interface   total  active   local  remote   Bwait   Rwait  IFwait
       ATM1/0.8      47      47      40       7       0       0       0
Router#
```

Table 92 describes the significant fields shown in the display.

Table 92 show mpls ip binding summary Field Descriptions (Cisco 7500 Series Example)

Field	Description
Total number of prefixes	Number of destinations for which the LSR has label bindings.
Generic label bindings	Indicates the start of summary information for “generic” label bindings. Generic labels are used for MPLS forwarding on all interface types except MPLS ATM interfaces.
prefixes	Number of destinations for which the LSR has a generic label binding.

Table 92 show mpls ip binding summary Field Descriptions (Cisco 7500 Series Example)

assigned in labels	Number of prefixes for which the LSR has assigned an incoming (local) label.
learned out labels	Number of prefixes for which the LSR has learned an outgoing (remote) label from an LDP neighbor.
ATM label bindings summary	Indicates the start of summary information for MPLS ATM label bindings. An ATM label is a VPI/VCI.
interface	Indicates a row in the ATM label bindings summary table. The summary information in the row is for ATM labels associated with this interface.
total	Total number of ATM labels associated with the interface.
active	Number of ATM labels (LVCs) in the active (operational) state.
local	Number of ATM labels assigned by this LSR for the interfaces. These are incoming labels.
remote	Number of ATM labels learned from the neighbor LSR for this interface. These are outgoing labels.
Bwait	Number of bindings (LVCs) waiting for a label assignment from the neighbor LSR for the interface.
Rwait	Number of bindings (LVCs) waiting for resources (VPI/VCIs) to become available on the neighbor LSR for the interface.
IFwait	Number of bindings (LVCs) waiting for labels to be installed for switching use.

Cisco 10000 Series Example Only

The following sample output displays summary information about the label bindings learned by LDP:

```
Router# show mpls ip binding summary

Total number of prefixes: 53

Generic label bindings
                     assigned        learned
       prefixes      in labels     out labels
             53             53             51
```

Table 93 describes the significant fields shown in the display.

Table 93 show mpls ip binding summary Field Descriptions (Cisco 10000 Series Example)

Field	Description
Total number of prefixes	Number of destinations for which the LSR has label bindings.
Generic label bindings	Indicates the start of summary information for “generic” label bindings. Generic labels are used for MPLS forwarding on all interface types except MPLS ATM interfaces.
prefixes	Number of destinations for which the LSR has a generic label binding.

Table 93 show mpls ip binding summary Field Descriptions (Cisco 10000 Series Example)

Field	Description
assigned in labels	Number of prefixes for which the LSR has assigned an incoming (local) label.
learned out labels	Number of prefixes for which the LSR has learned an outgoing (remote) label from an LDP neighbor.

Related Commands

Command	Description
show mpls atm-ldp bindings	Displays specified entries from the ATM label binding database.
show mpls ldp bindings	Displays the contents of the LIB.

show mpls ip iprm counters

To display the number of occurrences of various Multiprotocol Label Switching (MPLS) IP Rewrite Manager (IPRM) events, use the **show mpls ip iprm counters** command in privileged EXEC mode.

show mpls ip iprm counters

Syntax Description

This command has no arguments or keywords.

Defaults

No default behaviors or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

This command reports the occurrences of IPRM events.

Examples

The command in the following example displays the events that the IPRM logs:

```
Router# show mpls ip iprm counters

  CEF Tree Changes Processed/Ignored:           91/12
  CEF Deletes Processed/Ignored:                12/2
  Label Discoveries:                            74
  Rewrite Create Successes/Failures:            60/0
  Rewrite Gets/Deletes:                         82/0
  Label Announcements: Info/Local/Path:         6/119/80
  Walks: Recursion Tree/CEF Full/CEF interface: 78/2/0
```

Table 94 describes the significant fields shown in the display.

Table 94 show mpls ip iprm counters Command Field Descriptions

Field	Description
CEF Tree Changes Processed/Ignored	Processed—The number of Cisco Express Forwarding tree change announcements that IPRM processed. Ignored—The number of Cisco Express Forwarding tree change announcements that IPRM ignored. Typically, IPRM processes tree change announcements only for prefixes in a routing table.
CEF Deletes Processed/Ignored	Processed—The number of Cisco Express Forwarding delete entry announcements that IPRM processed. Ignored—The number of Cisco Express Forwarding delete entry announcements that IPRM ignored. Typically, IPRM processes delete entry announcements only for prefixes in a routing table.
Label Discoveries	The number of label discoveries performed by IPRM. Label discovery is the process by which IPRM obtains prefix labels from the IP Label Distribution Modules (LDMs).
Rewrite Create Successes/Failures	Successes—The number of times IPRM successfully updated the MPLS forwarding information. Failures—The number of times IPRM attempted to update the MPLS forwarding information and failed.
Rewrite Gets/Deletes	Gets—The number of times IPRM retrieved forwarding information from the MPLS forwarding infrastructure. Deletes—The number of times IPRM removed prefix forwarding information from the MPLS forwarding infrastructure.

Table 94 show mpls ip iprm counters Command Field Descriptions (continued)

Field	Description
CEF Tree Changes Processed/Ignored	Processed—The number of Cisco Express Forwarding tree change announcements that IPRM processed. Ignored—The number of Cisco Express Forwarding tree change announcements that IPRM ignored. Typically, IPRM processes tree change announcements only for prefixes in a routing table.
Label Announcements: Info/Local/Path	Info—The number of times an IP label distribution module informed IPRM that label information for a prefix changed. Local—The number of times an IP label distribution module specified local labels for a prefix. Path—The number of times an IP LDM specified outgoing labels for a prefix route.
Walks: Recursion Tree/CEF Full/CEF interface	Recursion Tree—The number of times IPRM requested Cisco Express Forwarding to walk the recursion (path) tree for a prefix. CEF Full—The number of times IPRM requested Cisco Express Forwarding to walk a Cisco Express Forwarding table and notify IPRM about each prefix. CEF interface—The number of times IPRM requested Cisco Express Forwarding to walk a Cisco Express Forwarding table and notify IPRM about each prefix with a path that uses a specific interface.

Related Commands

Command	Description
clear mpls ip iprm counters	Clears the IPRM counters.
show mpls ip iprm ldm	Displays information about the IP LDMs that have registered with the IPRM.

show mpls ip iprm ldm

To display information about the IP Label Distribution Modules (LDMs) that have registered with the IP Rewrite Manager (IPRM), use the **show mpls ip iprm ldm** command in privileged EXEC mode.

show mpls ip iprm ldm [**table** {**all** | *table-id*} | **vrf** *vrf-name*] [**ipv4** | **ipv6**]

Cisco 10000 Series Routers

show mpls ip iprm ldm [**table** {**all** | *table-id*} | **vrf** *vrf-name*] [**ipv4**]

Syntax Description

table	(Optional) Displays the LDMs for one or more routing tables.
all	Displays the LDMs for all routing tables.
table-id	Displays the LDMs for the routing table you specify. Table 0 is the default or global routing table.
vrf	(Optional) Displays the LDMs for the VPN routing and forwarding (VRF) instance you specify.
vrf-name	(Optional) The name of the VRF instance. You can find VRF names with the **show ip vrf** command.
ipv4	(Optional) Displays IPv4 LDMs.
ipv6	(Optional) Displays IPv6 LDMs. **Note** Applies to Cisco 7500 series routers only.

Defaults

If you do not specify any keywords or parameters, the command displays the LDMs for the global routing table (the default).

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SSH.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

This command displays the IP LDMs registered with IPRM.

Examples

The command in the following example displays the LDMs for the global routing tables. It shows that two LDMs (lcatm and ldp) are registered for the ipv4 global routing table, and that one LDM (bgp ipv6) is registered for the ipv6 global routing table.

```
Router# show mpls ip iprm ldm

  table (glbl;ipv4); ldms: 2
    lcatm, ldp
  table (glbl;ipv6); ldms: 1
    bgp ipv6
```

The command in the following example displays all of the LDMs registered with IPRM. The output shows the following:

- The LDMs called lcatm and ldp have registered with IPRM for the ipv4 global table.
- The LDM called bgp ipv6 is registered for the IPv6 global table.
- The LDM called bgp vpnv4 is registered for all IPv4 vrf routing tables.

```
Router# show mpls ip iprm ldm table all

  table (glbl;ipv4); ldms: 2
    lcatm, ldp
  table (glbl;ipv6); ldms: 1
    bgp ipv6
  table (all-tbls;ipv4); ldms: 1
    bgp vpnv4
```

The command in the following example displays the LDMs registered for the IPv6 routing tables.

```
Router# show mpls ip iprm ldm ipv6

  table (glbl;ipv6); ldms: 1
    bgp ipv6
```

Cisco 10000 Series Examples Only

The command in the following example displays the LDMs for the global routing tables. It shows that one LDM (ldp) is registered for the ipv4 global routing table.

```
Router# show mpls ip iprm ldm

  table (glbl;ipv4); ldms: 1
    ldp
```

The command in the following example displays all of the LDMs registered with IPRM. The output shows the following:

- The LDM called ldp has registered with IPRM for the ipv4 global table.
- The LDM called bgp vpnv4 is registered for all IPv4 vrf routing tables.

```
Router# show mpls ip iprm ldm table all

  table (glbl;ipv4); ldms: 1
    ldp
  table (all-tbls;ipv4); ldms: 1
    bgp vpnv4
```

Related Commands

Command	Description
show mpls ip iprm counters	Displays the number of occurrences of various IPRM events.

show mpls ip iprm statistics

To display information about the IP Rewrite Manager (IPRM) statistics, use the **show mpls ip iprm statistics** command in privileged EXEC mode.

show mpls ip iprm statistics

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(20)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(20)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Examples

The following is sample output from the **show ip iprm statistics** command:

```
Router# show mpls ip iprm statistics

Chunk cache size: IPv4 pfx/path:              1/2
Chunk cache size: outinfo:                    2
```

Table 95 describes the significant fields shown in the display.

Table 95 show mpls ip iprm statistics Field Descriptions

Field	Description
Chunk cache size	Displays the size of the cache.

Related Commands

Command	Description
show mpls ip iprm counters	Displays the number of occurrences of various MPLS IPRM events.

show mpls l2 vc detail

To display detailed information related to the virtual connection (VC), use the **show mpls l2 vc detail** command in user EXEC or privileged EXEC mode.

show mpls l2 vc *vc-id* **detail**

Syntax Description

vc-id	Name of the VC.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(33)SRA	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SRE	This command was modified. STANDBY and HOTSTANDBY were added as options for the Status column in output displays.

Examples

This example shows how to display detailed status for a specific VC:

```
Router# show mpls l2 vc 1100 detail

Local interface: VFI VPLS-1100 up
 MPLS VC type is VFI, internetworking type is Ethernet
 Destination address: 1.1.1.1,VC ID:1100, VC status: up
  Output interface: Tu0,imposed label stack {27 17}
  Preferred path: not configured
  Default path: active
  Next hop:point2point
 Create time:2d23h, last status change time: 2d23h
 Signaling protocol: LDP, peer 1.1.1.1:0 up
  MPLS VC labels: local 17, remote 17
  Group ID: local 0, remote 0
  MTU: local 1500, remote 1500
  Remote interface description:
 Sequencing: receive disabled, send disabled
 VC statistics
  packet totals: receive 1146978, send 3856011
  byte totals: receive 86579172, send 316899920
  packet drops: receive 0, send 0
```

The following examples show the status of the active and backup pseudowires before, during, and after a switchover.

The **show mpls l2 vc detail** command on the active PE router displays the status of the pseudowires.

```
Router# show mpls l2 vc detail
```

```
Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
AT0/2/0.1      ATM VPC CELL 50            10.1.1.2         100        UP
AT0/2/0.1      ATM VPC CELL 50            10.1.1.3         100        STANDBY
```

The **show mpls l2 vc `detail`** command on the backup PE router displays the status of the pseudowires. The active pseudowire on the backup PE router has the HOTSTANDBY status.

```
Router-standby# show mpls l2 vc detail

Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
AT0/2/0.1      ATM VPC CELL 50            10.1.1.2         100        HOTSTANDBY
AT0/2/0.1      ATM VPC CELL 50            10.1.1.3         100        DOWN
```

During a switchover, the status of the active and backup pseudowires changes:

```
Router# show mpls l2 vc detail

Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
AT0/2/0.1      ATM VPC CELL 50            10.1.1.2         100        RECOVERING
AT0/2/0.1      ATM VPC CELL 50            10.1.1.3         100        DOWN
```

After the switchover is complete, the recovering pseudowire shows a status of UP:

```
Router# show mpls l2 vc detail

Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
AT0/2/0.1      ATM VPC CELL 50            10.1.1.2         100        UP
AT0/2/0.1      ATM VPC CELL 50            10.1.1.3         100        STANDBY
```

Related Commands

Command	Description
show xconnect	Displays information about xconnect attachment circuits and pseudowires.

show mpls l2transport binding

To display virtual circuit (VC) label binding information, use the **show mpls l2transport binding** command in EXEC mode.

show mpls l2transport binding [*vc-id* | *ip-address* | **local-label** *number* | **remote-label** *number*}

Syntax Description

vc-id	(Optional) Displays VC label binding information for the specified VC.
ip-address	(Optional) Displays VC label binding information for the specified VC destination.
local-label *number*	(Optional) Displays VC label binding information for the specified local assigned label.
remote-label *number*	(Optional) Displays VC label binding information for the specified remote assigned label.

Command Modes

EXEC

Command History

Release	Modification
12.0(23)S	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.0(27)S	This command was updated to display AToM Virtual Circuit Connection Verification (VCCV) information.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(30)S	This command was updated to display Connectivity Verification (CV) type capabilities.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was updated to display Circuit Emulation (CEM) information for the Cisco 7600 series router.
Cisco IOS XE Release 2.3	The command was updated to display information about multisegment pseudowires.
12.2(1)SRE	This command was modified to display VC label binding information for the control word.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC.

Examples

The following example shows the VC label binding information for Cisco IOS Releases 12.0(27)S and 12.2(18)SXE and later releases:

```
Router# show mpls l2transport binding

Destination Address: 10.0.0.203,  VC ID: 1
    Local Label:  16
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
```

```
        VCCV Capabilities: Type 1, Type 2
    Remote Label: 16
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV Capabilities: Type 1, Type 2
```

The following examples shows the VC label binding information for Cisco IOS Release 12.2(30)S and later releases:

```
Router# show mpls l2transport binding

Destination Address: 10.5.5.51,  VC ID: 108
    Local Label:  16
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: CW [1], RA [2]
              CV Type: LSPV [2]
    Remote Label: 16
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: RA [2]
              CV Type: LSPV [2]
```

The output of the command changed between Cisco IOS releases. The following table maps the older output to the new output:

Output in Cisco IOS Releases 12.0(27)S and 12.2(18)SXE	Output In Cisco IOS Release 12.2(30)S
VCCV Capabilities	VCCV: CC Type
Type 1	CW [1]
Type 2	RA [2]

The following example is a sample output of the **show mpls l2transport binding** command that shows the VC label binding information on a Cisco uBR10012 router:

```
Router# show mpls l2transport binding

Destination Address: 10.76.1.1,  VC ID: 2002
  Local Label:  42
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: CW [1], RA [2]
            CV Type: LSPV [2]
  Remote Label: 60
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
Destination Address: 10.76.1.1,  VC ID: 2003
  Local Label:  46
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: CW [1], RA [2]
            CV Type: LSPV [2]
  Remote Label: 27
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
Destination Address: 10.76.1.1,  VC ID: 2004
  Local Label:  unassigned.
  Remote Label: 111
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
```

```
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
Destination Address: 10.76.1.1,  VC ID: 2017
  Local Label:  43
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: CW [1], RA [2]
            CV Type: LSPV [2]
  Remote Label: 110
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
Destination Address: 10.76.1.1,  VC ID: 2018
  Local Label:  45
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: CW [1], RA [2]
            CV Type: LSPV [2]
  Remote Label: 88
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
Destination Address: 10.76.1.1,  VC ID: 2019
  Local Label:  44
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: CW [1], RA [2]
            CV Type: LSPV [2]
  Remote Label: 16
      Cbit: 1,    VC Type: Ethernet,    GroupID: 0
      MTU: 1500,   Interface Desc: n/a
      VCCV: CC Type: RA [2]
            CV Type: LSPV [2]
```

Table 96 describes the significant fields shown in the display.

Table 96 show mpls l2transport binding Field Descriptions

Field	Description
Destination Address	The IP address of the remote router's interface that is at the other end of the VC.
VC ID	The virtual circuit identifier assigned to one of the interfaces on the router.
Local Label	The VC label that a router signals to its peer router, which is used by the peer router during imposition.
Remote Label	The disposition VC label of the remote peer router.
Cbit	The control word bit. If it is set, the value is 1.
VC Type	The type of VC, such as Frame Relay, Ethernet, and ATM.
GroupID	The group ID assigned to the local or remote VCs.
MTU	The maximum transmission unit assigned.
Interface Desc	Interface parameters, if applicable.

Table 96 show mpls l2transport binding Field Descriptions (continued)

Field	Description
VCCV Capabilities	(Cisco IOS Releases 12.0(27)S and 12.2(18)SXE and later releses) AToM VCCV information. This field displays how an AToM VCCV packet is identified. • Type 1—The Protocol ID field of the AToM Control Word (CW) is identified in the AToM VCCV packet. • Type 2—An MPLS Router Alert (RA) Level above the VC label in identified in the AToM VCCV packet. Type 2 is used for VC types that do not support or do not interpret the AToM Control Word.
VCCV: CC Type	(Cisco IOS Releases 12.2(30)S and later releases) The types of Control Channel (CC) processing that are supported. The number indicates the position of the bit that was set in the received octet. The following values can be displayed: • CW [1]—Control Word • RA [2]—Router Alert • TTL [3]—Time to Live • Unkn [*x*]—Unknown
CV Type	(Cisco IOS Releases 12.2(30)S and later releases) The type of Connectivity Verification (CV) packets that can be processed in the control channel of the MPLS pseudowire. The number indicates the position of the bit that was set in the received octet. • ICMP [1]—Internet Control Management Protocol (ICMP) is used to verify connectivity. • LSPV [2]—LSP Ping is used to verify connectivity. • BFD [3]—Bidirectional Forwarding Detection is used to verify connectivity for more than one pseudowire. • Unkn [*x*]—A CV type was received that could not be interpreted.

The following sample output shows information about L2VPN multisegment pseudowires (in bold):

```
Router# show mpls l2transport binding

  Destination Address: 10.1.1.1,  VC ID: 102
    Local Label:  17
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: CW [1], RA [2], TTL [3]
              CV Type: LSPV [2]
    Remote Label: 16
        Cbit: 1,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: CW [1], RA [2], TTL [3]
              CV Type: LSPV [2]
        PW Switching Point:
             Vcid   local IP addr      remote IP addr      Description
101         10.11.11.11    10.20.20.20         PW Switching Point PE3
              100         10.20.20.20    10.11.11.11         PW Switching Point PE2
```

Table 97 describes the significant fields shown in the display.

Table 97 show mpls l2transport binding Field Descriptions for Multisegment Pseudowires

Field	Description
TTL	The Time to Live (TTL) setting of the label.
Vcid	The virtual circuit identifier.
local IP addr	The local IP address assigned to the switching point.
remote IP addr	The remote IP address assigned to the switching point.
Description	The description assigned to the switching point.

CEM circuits are supported on the Cisco 7600 series router transport time-division multiplexing (TDM) traffic. The following example displays AToM VCs and the applicable local and remote CEM settings as exchanged over LDP label mapping messages.

```
Router# show mpls l2transport binding

  Destination Address: 10.7.1.1,  VC ID: 100
    Local Label:  18
        Cbit: 1,    VC Type: CESoPSN BRI,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: RA [2]
              CV Type: LSPV [2]
        CEM/TDM Options
              Payload Bytes: 80,    Payload Type: 0
              SP bits: 11 - Data/Signaling,    CAS Type: CAS T1 SF
              RTP header in use: Yes,    Bitrate (Kbit/s): 64
              Differential Timestamp Mode: disabled
              Clock Frequency (kHz): 64
              Synchronization Source id: 0
    Remote Label: 19
        Cbit: 1,    VC Type: CESoPSN BRI,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: RA [2]
              CV Type: LSPV [2]
        CEM/TDM Options
              Payload Bytes: 80,    Payload Type: 0
              SP bits: 11 - Data/Signaling,    CAS Type: CAS T1 SF
              RTP header in use: Yes,    Bitrate (Kbit/s): 64
```

```
            Differential Timestamp Mode: disabled
            Clock Frequency (kHz): 64
            Synchronization Source id: 0
```

The following example shows the VC label binding information for the control word, which in this case is set to 0, meaning that it is disabled:

```
Router# show mpls l2transport binding 102

Destination Address: 10.1.1.3,  VC ID: 102
    Local Label:  1004
        Cbit: 0,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: CW [1], RA [2]
              CV Type: LSPV [2]
    Remote Label: 1005
        Cbit: 0,    VC Type: Ethernet,    GroupID: 0
        MTU: 1500,   Interface Desc: n/a
        VCCV: CC Type: RA [2]
              CV Type: LSPV [2]
```

The following example shows the maximum number of cells that can be packed (in bold) for both provider edge routers, as specified by the **cell-packing** command:

```
Router# show mpls l2transport binding 1010
  Destination Address: 10.6.1.2,  VC ID: 1010
    Local Label:  20008
        Cbit: 1,    VC Type: ATM VCC CELL,    GroupID: 0
        MTU: n/a,   Interface Desc: n/a
        Max Concatenated ATM Cells: 10
        VCCV: CC Type: CW [1], RA [2]
              CV Type: LSPV [2], BFD [3]
    Remote Label: 47
        Cbit: 1,    VC Type: ATM VCC CELL,    GroupID: 0
        MTU: n/a,   Interface Desc: n/a
        Max Concatenated ATM Cells: 10
        VCCV: CC Type: CW [1], RA [2]
              CV Type: LSPV [2]
```

Related Commands

Command	Description
show mpls l2transport hw-capability	Displays the transport types and their supported capabilities.
show mpls l2transport vc	Displays information about AToM VCs and static pseudowires that have been enabled to route Layer 2 packets on a router.

show mpls l2transport checkpoint

To display checkpointing information about Any Transport over MPLS (AToM) virtual circuits (VCs), use the **show mpls l2transport checkpoint** command in privileged EXEC mode.

show mpls l2transport checkpoint

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC.

Examples

The output of the commands varies, depending on whether the output reflects the active or standby Route Processor (RP).

On the active RP, the command displays the following output:

```
Router# show mpls l2transport checkpoint

AToM Checkpoint info for active RP
Checkpointing is allowed
Bulk-sync checkpointed state for 1 VC
```

On the standby RP, the command displays the following output:

```
Router# show mpls l2transport checkpoint

AToM HA Checkpoint info for standby RP
1 checkpoint information block in use
```

In general, the output on the active RP shows that checkpointing information was sent to the backup RP. The output on the backup RP shows that checkpointing information was received from the active RP.

Related Commands

Command	Description
show mpls l2transport vc	Displays information about the checkpointed data when checkpointing is enabled.

show mpls l2transport hw-capability

To display the transport types supported on an interface, use the **show mpls l2transport hw-capability** command in privileged EXEC mode.

show mpls l2transport hw-capability interface *type number*

Syntax Description

interface	Displays information for the specified interface.
type number	Type and number of the interface. For example, serial6/0.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(23)S	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.0(27)S	This command was updated to display AToM Virtual Circuit Connection Verification (VCCV) information.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(30)S	This command was updated to display VCCV type capabilities.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC.

Usage Guidelines

This command can help you determine the interface to use for the various transport types. Use this command to check if core-facing and edge-facing interfaces can accommodate different transport types.

Examples

The following is partial sample output of the **show mpls l2transport hw-capability** command for Cisco IOS Releases 12.0(23)S, 12.2(14)S, and 12.2(15)T and later. For more information on the fields, see Table 98.

```
Router# show mpls l2transport hw-capability interface serial5/1

Interface Serial5/1

Transport type FR DLCI
  Core functionality:
    MPLS label disposition supported
    Control word processing supported
    Sequence number processing not supported
  Edge functionality:
    MPLS label imposition supported
    Control word processing supported
    Sequence number processing not supported
.
.
```

.

Note These examples show only a portion of the output. The command displays the the capabilities of every transport type.

The following is partial sample output of the **show mpls l2transport hw-capability** command for Cisco IOS Releases 12.0(27)S and 12.2(18)SXE and later releases. This output shows VCCV data under the Core Functionality section. Type 1 means that the AToM Control Word identified the AToM VCCV packet. For more information on the fields, see Table 98.

```
Transport type FR DLCI
  Core functionality:
    MPLS label disposition supported
    Control word processing supported
    Sequence number processing not supported
    VCCV CC Type 1 processing supported

  Edge functionality:
    MPLS label imposition supported
    Control word processing supported
    Sequence number processing not supported
```

.

The following is partial sample output of the **show mpls l2transport hw-capability** command for Cisco IOS Releases 12.2(30)S and later releases. The VCCV output shows that AToM Control Word (CW) identified the AToM VCCV packet. For more information on the fields, see Table 98.

```
Transport type FR DLCI
  Core functionality:
    MPLS label disposition supported
    Control word processing supported
    Sequence number processing not supported
    VCCV CC Type CW [1] processing supported

  Edge functionality:
    MPLS label imposition supported
    Control word processing supported
    Sequence number processing not supported
```

.

The following is a sample output of the **show mpls l2transport hw-capability** command that displays the transport types supported on the Gigabit Ethernet interface 3/0/0 on a Cisco uBR10012 router:

```
Router# show mpls l2transport hw-capability interface gigabitethernet 3/0/0

Interface GigabitEthernet3/0/0

Transport type DOCSIS
  Core functionality:
    MPLS label disposition supported
    Control word processing supported
    Sequence number processing not supported
    VCCV CC Type CW [1] processing not supported
  Edge functionality:
    Not supported
```

```
Transport type DOCSIS VLAN
  Core functionality:
    MPLS label disposition supported
    Control word processing supported
    Sequence number processing not supported
    VCCV CC Type CW [1] processing not supported
  Edge functionality:
    Not supported
```

The output of the command changed between Cisco IOS releases. The following table maps the older output to the newer output:

Output in Cisco IOS Releases 12.0(27)S and 12.2(18)SXE and later	Output In Cisco IOS Release 12.2(30)S
`VCCV CC processing supported`	`VCCV CC processing supported`
`Type 1`	`Type CW [1]`

Table 98 describes the fields shown in the **show mpls l2transport hw-capability** command display.

Table 98 show mpls l2transport hw-capability Field Descriptions

Field	Description
Transport type	Indicates the transport type.
Core functionality	Displays the functionalities that the core-facing interfaces support, such as label disposition, and control word and sequence number processing.
VCCV CC Type processing supported	Displays whether the core-facing interfaces support Control Word processing, or Router Alert Processing. (Cisco IOS Releases 12.0(27)S and 12.2(18)SXE and later) • Type 1—The Protocol ID field of in the AToM Control Word (CW) identified the AToM VCCV packet. (Cisco IOS Releases 12.2(30)S and later) • CW [1]—Control Word • Unkn [*x*]—Unknown. The number indicates the position of the bit that was set in the received octet.
Edge functionality	Displays the functionalities that the edge-facing interfaces support, such as label disposition, and control word and sequence number processing.

Related Commands

Command	Description
show mpls l2transport binding	Displays virtual circuit (VC) label binding information.
show mpls l2transport checkpoint	Displays the checkpoint information about Any Transport over MPLS (AToM) virtual circuits.
show mpls l2transport summary	Displays summary information about virtual circuits.
show mpls l2transport vc	Displays information about AToM virtual circuits and static pseudowires that have been enabled to route Layer 2 packets on a router.

show mpls l2transport static-oam

To display the status of Multiprotocol Label Switching (MPLS) Transport Profile (TP) static pseudowires, use the **show mpls l2transport static-oam** command in privileged EXEC mode.

show mpls l2transport static-oam [**fault** [**inbound** |**outbound**]] [*ip-address vc-id*]

Syntax Description

fault	Displays faults related to static pseudowires.
inbound	Displays faults related to inbound static pseudowires.
outbound	Displays faults related to outbound static pseudowires.
ip-address	Displays information related to the static pseudowire with the specified peeer IP address.
vc-id	Displays information related to the static pseudowire with the specified virtual circuit (VC) ID.

Command Default

Status messages are not displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.1(1)SA	This command was introduced.
15.1(3)S	This command was integrated.

Usage Guidelines

This command is for MPLS-TP static pseudowires.

Examples

The following example enables the display of status messages for the static pseudowire with the peer IP address of 10.10.10.10 and the VC ID of 4:

```
Router# show mpls l2transport static-oam 10.10.10.10 4
```

Related Commands

Command	Description
debug mpls l2transport static-oam	Enables the display of messages related to static pseudowire operations administrative and management (OAM).

show mpls l2transport summary

To display summary information about virtual circuits (VCs) that have been enabled to route Any Transport over MPLS (AToM) Layer 2 packets on a router, use the **show mpls l2transport summary** command in privileged EXEC mode.

show mpls l2transport summary

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(23)S	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC.

Examples

The following is a sample output of the **show mpls l2transport summary** command that shows summary information about the VCs that have been enabled to transport Layer 2 packets:

```
Router# show mpls l2transport summary

Destination address: 10.16.24.12 Total number of VCs: 60
0 unknown, 58 up, 0 down, 2 admin down
5 active vc on MPLS interface PO4/0
```

The following is a sample output of the **show mpls l2transport summary** command that shows summary information about the VCs that have been enabled to transport Layer 2 packets on a Cisco uBR10012 router:

```
Router# show mpls l2transport summary

Destination address: 10.76.1.1, total number of vc: 6
  0 unknown, 5 up, 1 down, 0 admin down, 0 recovering, 0 standby
  5 active vc on MPLS interface Gi3/0/0
```

Table 99 describes the fields shown in the **show mpls l2transport summary** command display.

Table 99 show mpls l2transport summary Field Descriptions

Field	Description
Destination address	IP address of the remote router to which the VC has been established.
Total number of VCs	Number of VCs that have been established.
unknown	Number of VCs that are in an unknown state.
up	Number of VCs that are operational.
down	Number of VCs that are not operational.
admin down	Number of VCs that have been disabled.

Related Commands

Command	Description
show mpls l2transport binding	Displays virtual circuit (VC) label binding information.
show mpls l2transport checkpoint	Displays the checkpoint information about Any Transport over MPLS (AToM) virtual circuits.
show mpls l2transport hw-capability	Displays the transport types and their supported capabilities.
show mpls l2transport vc	Displays information about AToM VCs that have been enabled to route Layer 2 packets on a router.

show mpls l2transport vc

To display information about Any Transport over MPLS (AToM) virtual circuits (VCs) and static pseudowires that have been enabled to route Layer 2 packets on a router, use the **show mpls l2transport vc** command in user EXEC or privileged EXEC mode.

show mpls l2transport vc [[**vcid**] *vc-id-min*] [*vc-id-max*] [**interface** *type number* [*local-circuit-id*]] [**destination** {*ip-address* | *hostname*}] [**detail**] [**pwid** *pw-identifier*] [**vpls-id** *vpls-identifier*] [**stitch** *endpoint endpoint*]

Syntax Description

vcid	(Optional) Specifies the VC ID.
vc-id-min	(Optional) Minimum VC ID value. The range is from 1 to 4294967295.
vc-id-max	(Optional) Maximum VC ID value. The range is from 1 to 4294967295.
interface	(Optional) Specifies the interface or subinterface of the router that has been enabled to transport Layer 2 packets. Use this keyword to display information about the VCs that have been assigned VC IDs on that interface or subinterface.
type	(Optional) Interface type. For more information about the interface type, use the question mark (?) online help function.
number	(Optional) Interface or subinterface number. For more information about the numbering syntax for your networking device, use the question mark (?) online help function.
local-circuit-id	(Optional) The number assigned to the local circuit. This argument value is supported only with the following transport types: • For Frame Relay, enter the data-link connection identifier (DLCI) of the permanent virtual circuit (PVC). • For ATM adaptation layer 5 (AAL5) and cell relay, enter the virtual path identifier (VPI) or virtual channel identifier (VCI) of the PVC. • For Ethernet VLANs, enter the VLAN number.
destination	(Optional) Specifies the remote router.
ip-address	(Optional) The IP address of the remote router.
hostname	(Optional) The name assigned to the remote router.
detail	(Optional) Specifies detailed information about VCs.
pwid *pw-identifier*	(Optional) Specifies the number of a pseudowire for a single VC. Valid entries are from 1 to 4294967295.
vpls-id *vpls-identifier*	(Optional) Virtual Private LAN Switching (VPLS) ID extended community value.
stitch *endpoint endpoint*	(Optional) Specifies dynamically stitched pseudowires between specified endpoints. The endpoints are the Source Attachment Individual Identifier (SAII) and the Target Attachment Individual Identifier (TAII). When the **stitch** keyword is used in conjunction with the **vpls-id** keyword, a single pair of stitched VCs is displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S and implemented on the Cisco 10720 router.
12.0(23)S	This command was modified. The **interface** and **destination** keywords were added.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX and was implemented on the Supervisor Engine 720.
12.2(14)SZ	This command was integrated into Cisco IOS Release 12.2(14)SZ.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and was implemented on the Cisco 10000 series routers. The example output was changed for the Cisco 10000 series router, and two fields (SSO Descriptor and SSM segment/switch IDs) were removed from the output.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was modified. This command was updated to include forwarding equivalence class (FEC) 129 signaling information for pseudowires configured through VPLS Autodiscovery, and to support provisioning Any Transport over MPLS (AToM) static pseudowires.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SRC	This command was modified. This command was updated to display the number of MAC address withdrawal messages sent and received as part of the H-VPLS N-PE Redundancy for QinQ and MPLS Access feature. This command was updated to display pseudowire status between peer routers that have been configured for the MPLS Pseudowire Status Signaling feature.
Cisco IOS XE Release 2.1	This command was implemented on the Cisco ASR 1000 Series Aggregation Services Routers.
Cisco IOS XE Release 2.3	This command was modified. This command output was updated to display the following information: • The status of pseudowires before, during, and after a switchover. • The status of a pseudowire switching point for multisegment pseudowires. • The number of packets and bytes being sent from the router. The VC statistics fields include the word “transit” to show that the packet totals no longer include packets being sent to the router.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC.
12.2(33)SXI4	This command was modified. The command output was updated to display information about load balancing and the imposition and disposition of flow labels for the L2VPN Advanced VPLS feature.

Release	Modification
15.0(1)S	This command was modified. The command output was updated to display information about Bidirectional Forwarding Detection (BFD).
15.1(1)S	• This command was modified. Support for the L2VPN VPLS Inter-AS Option B feature was provided, and the **pwid**, **stitch,** and **vpls-id** keywords were added. • The command output was updated to display information about remote AC failures and when Virtual Circuit Connectivity Verification (VCCV) BFD status signaling is enabled.
12.2(33)SCF	This command was modified. The output was changed to capture the backup pseudowire information.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.

Usage Guidelines

If you do not specify any keywords or arguments, the command displays a summary of all the VCs.

Examples

The output of the commands varies, depending on the type of Layer 2 packets being transported over AToM VCs.

The following sample output shows information about interfaces and VCs that have been configured to transport various Layer 2 packets on the router:

```
Router# show mpls l2transport vc

Local intf     Local circuit      Dest address    VC ID      Status
-------------  ------------------ --------------- ---------- ----------
Se5/0          FR DLCI 55         10.0.0.1        55         UP
AT4/0          ATM AAL5 0/100     10.0.0.1        100        UP
AT4/0          ATM AAL5 0/200     10.0.0.1        200        UP
AT4/0.300      ATM AAL5 0/300     10.0.0.1        300        UP
```

Table 100 describes the fields shown in the display.

Table 100 show mpls l2transport vc Field Descriptions

Field	Description
Local intf	Interface on the local router that has been enabled to transport Layer 2 packets.
Local circuit	Type and number (if applicable) of the local circuit. The output shown in this column varies, depending on the transport type: • For Frame Relay, the output shows the DLCI of the PVC. • For ATM cell relay and AAL5, the output shows the VPI or VCI of the PVC. • For Ethernet VLANs, the output shows the VLAN number. • For PPP and High-Level Data Link Control (HDLC), the output shows the interface number.
Dest address	IP address of the remote router's interface that is the other end of the VC.

Table 100 show mpls l2transport vc Field Descriptions (continued)

Field	Description
VC ID	Virtual circuit identifier assigned to one of the interfaces on the router.
Status	Status of the VC, which can be one of the following: • Admin down—The VC was disabled by a user. • Down—The VC is not ready to carry traffic between the two VC endpoints. Use the **detail** keyword to determine the reason that the VC is down. • Hotstandby—The active pseudowire on a standby Route Processor (RP). • Recovering—The VC is recovering from a stateful switchover. • Standby—The VC is designated as the backup circuit in a stateful switchover configuration. • Up—The VC can carry traffic between the two VC endpoints. A VC is up when both imposition and disposition interfaces are programmed. – The disposition interface is programmed if the VC has been configured and the client interface is up. – The imposition interface is programmed if the disposition interface is programmed and you have a remote VC label and an Interior Gateway Protocol (IGP) label. The IGP label can be implicit null in a back-to-back configuration. An IGP label means there is a label switched path (LSP) to the peer.

The following sample output shows information about the nonstop forwarding (NSF), stateful switchover (SSO), and graceful restart capabilities on the AToM VC. The SSO portion indicates whether checkpoint data has been sent (on active) or received (on standby). When SSO data has not been successfully sent or has been released, the SSO information is not displayed.

```
Router# show mpls l2transport vc detail

Local interface: Fa5/1/1.2 down, line protocol down, Eth VLAN 2 up
  Destination address: 10.55.55.2, VC ID: 1002, VC status: down
    Output interface: Se4/0/3, imposed label stack {16}
    Preferred path: not configured
Default path: active
    Tunnel label: imp-null, next hop point2point
  Create time: 02:03:29, last status change time: 02:03:26
  Signaling protocol: LDP, peer 10.55.55.2:0 down
    MPLS VC labels: local 16, remote unassigned
    Group ID: local 0, remote unknown
    MTU: local 1500, remote unknown
    Remote interface description:
  Sequencing: receive disabled, send disabled
  SSO Descriptor: 10.55.55.2/1002, local label: 16
    SSM segment/switch IDs: 12290/8193, PWID: 8193
  VC statistics:
    packet totals: receive 0, send 0
    byte totals:   receive 0, send 0
    packet drops:  receive 0, send 0
```

Table 100 to Table 104 describe the fields shown in the display.

The following sample output shows the information that is displayed when an AToM static pseudowire has been provisioned and the **show mpls l2transport vc detail** command is used to check the configuration. The Signaling protocol field specifies Manual because a directed control protocol such as Label Distribution Protocol (LDP) cannot be used to exchange parameters on static pseudowires. The remote interface description field seen for nonstatic pseudowire configurations is not displayed because remote information is exchanged using signaling between the Provider Edge (PE) routers and this is not done on static pseudowires.

```
Router# show mpls l2transport vc detail

Local interface: Et1/0 up, line protocol up, Ethernet up
   Destination address: 10.1.1.2, VC ID: 100, VC status: up
     Output interface: Et2/0, imposed label stack {10003 150}
     Preferred path: not configured
     Default path: active
     Next hop: 10.0.0.2
   Create time: 00:18:57, last status change time: 00:16:10
   Signaling protocol: Manual
     MPLS VC labels: local 100, remote 150
     Group ID: local 0, remote 0
     MTU: local 1500, remote 1500
     Remote interface description:
   Sequencing: receive disabled, send disabled
   VC statistics:
     packet totals: receive 219, send 220
     byte totals:   receive 20896, send 26694
     packet drops:  receive 0, send 0
```

Table 100 to Table 104 describe the fields shown in the display.

The following sample output shows VC statistics, including the number of packets and bytes being sent from the router. The VC statistics fields include the word “transit” to indicate that the packet totals no longer include packets being sent to the router.

```
Router# show mpls l2transport vc detail

Local interface: Et1/0 up, line protocol up, Ethernet up
.
.
.
VC statistics:
     transit packet totals: receive 219, send 220
     transit byte totals:   receive 20896, send 26694
     transit packet drops:  receive 0, send 0
```

Table 101 describes the significant fields shown in the display.

Table 101 show mpls l2transport vc detail Field Descriptions

Field	Description
Local interface	Interface on the local router that has been enabled to send and receive Layer 2 packets. The interface varies, depending on the transport type. The output also shows the status of the interface.
line protocol	Status of the line protocol on the edge-facing interface.
Destination address	IP address of the remote router specified for this VC. Specify the destination IP address as part of the **mpls l2transport route** command.
VC ID	Virtual circuit identifier assigned to the interface on the router.

Table 101 show mpls l2transport vc detail Field Descriptions (continued)

Field	Description
VC status	Status of the VC, which can be one of the following: • Admin down—The VC was disabled by a user. • Down—The VC is not ready to carry traffic between the two VC endpoints. • up—The VC is in a state where it can carry traffic between the two VC endpoints. A VC is up when both imposition and disposition interfaces are enabled. – The disposition interface is enabled if the VC has been configured and the client interface is up. – The imposition interface is enabled if the disposition interface is enabled and a remote VC label and an IGP label exist. The IGP label can be an implicit null in a back-to-back configuration. (An IGP label means there is an LSP to the peer.)
Output interface	Interface on the remote router that has been enabled to transmit and receive Layer 2 packets.
imposed label stack	Summary of the Multiprotocol Label Switching (MPLS) label stack used to direct the VC to the PE router.
Preferred path	Path that was assigned to the VC and the status of that path. The path can be an MPLS traffic engineering tunnel or an IP address or hostname of a peer PE router.
Default path	Status of the default path, which can be disabled or active. By default, if the preferred path fails, the router uses the default path. However, you can disable the router from using the default path when the preferred path fails by specifying the **disable-fallback** keyword with the **preferred-path** command.

Table 101 show mpls l2transport vc detail Field Descriptions (continued)

Field	Description
Tunnel label	IGP label used to route the packet over the MPLS backbone to the destination router. The first part of the output displays the type of label. The second part of the output displays the route information. The tunnel label information can display any of the following states: • imp-null—Implicit null means that the provider (P) router is absent and the tunnel label will not be used. Alternatively, imp-null can signify traffic engineering tunnels between PE routers. • no adjacency—The adjacency for the next hop is missing. • no route—The label is not in the routing table. • not ready, Cisco Express Forwarding disabled—Cisco Express Forwarding is disabled. • not ready, LFIB disabled—The MPLS switching subsystem is disabled. • not ready, LFIB entry present—The tunnel label exists in the Label Forwarding Information Base (LFIB), but the VC is down. • not ready, no route—An IP route for the peer does not exist in the routing table. • not ready, not a host table—The route in the routing table for the remote peer router is not a host route. • unassigned—The label has not been assigned.
Create time	Time (in hours, minutes, and seconds) when the VC was provisioned.
last status change time	Last time (in hours, minutes, and seconds) the VC state changed.
Signaling protocol	Type of protocol used to send the MPLS labels on dynamically configured connections. The output also shows the status of the peer router. For AToM statically configured pseudowires, the field indicates Manual because there is no exchange of labels using a directed control protocol, such as LDP.
MPLS VC labels	Local VC label is a disposition label, which determines the egress interface of an arriving packet from the MPLS backbone. The remote VC label is a disposition VC label of the remote peer router.
Group ID	Local group ID used to group VCs locally. The remote group ID is used by the peer to group several VCs.
MTU	Maximum transmission unit specified for local and remote interfaces.
Remote interface description	Interface on the remote router that has been enabled to transmit and receive Layer 2 packets.
Sequencing	Indicates whether sequencing of out-of-order packets is enabled or disabled.
SSO Descriptor	Identifies the VC for which the information was checkpointed.
local label	Value of the local label that was checkpointed (that is, sent on the active RP and received on the standby RP).

Table 101 show mpls l2transport vc detail Field Descriptions (continued)

Field	Description
SSM segment/switch IDs	IDs used for the control plane and data plane for this VC. This data is not for customer use but for Cisco personnel for troubleshooting purposes. When the Source Specific Multicast (SSM) IDs are followed by the word "used," the checkpointed data has been successfully sent.
PWID	Pseudowire ID used in the data plane to correlate the switching context for the segment associated with the MPLS switching context. This data is not for customer use but for Cisco personnel for troubleshooting purposes.
packet totals	Number of packets sent and received. Received packets are those AToM packets received from the MPLS core. Sent packets are those AToM packets sent to the MPLS core. This number excludes dropped packets. **Note** If the VC statistics fields include the word "transit," the output shows the number of packets and bytes being sent from the router.
byte totals	Number of bytes sent and received from the core-facing interface, including the payload, control word if present, and AToM VC label. **Note** If the VC statistics fields include the word "transit," the output shows the number of packets and bytes being sent from the router.
packet drops	Number of dropped packets. **Note** If the VC statistics fields include the word "transit," the output shows the number of packets and bytes being sent from the router.

The following is sample output from the **show mpls l2transport vc detail** command when the VPLS Autodiscovery feature has been configured on VPLS pseudowires. The output that is specific to VPLS Autodiscovery is shown in bold.

```
Router# show mpls l2transport vc detail

Local interface: VFI my_test VFI up
  MPLS VC type is VFI, interworking type is Ethernet
  Destination address: 10.3.3.1, VC ID: 123456, VC status: up
    Next hop PE address: 10.55.55.2
    Output interface: Et3/0, imposed label stack {17 19}
    Preferred path: not configured
    Default path:
    Next hop: 10.1.0.2
  Create time: 2d05h, last status change time: 2d05h

Signaling protocol: LDP, peer 10.55.55.2:0 up
    MPLS VC labels: local 21, remote 19
    AGI: type 1, len 8,  0000 3333 4F4E 44C4
    Local AII:  type 1, len 4, 0909 0909 (10.9.9.9)
    Remote AII: type 1, len 4, 0303 0301 (10.3.3.3)
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
    Remote interface description:
  Sequencing: receive disabled, send disabled
  VC statistics:
    packet totals: receive 22611, send 22611
    byte totals:   receive 2346570, send 2853581
    packet drops:  receive 0, send 0
```

Table 102 describes the fields shown in the display.

Table 102 show mpls l2transport vc detail Field Descriptions for VPLS Autodiscovery

Field	Description
Next hop PE address	IP address of the next hop router.
AGI	Attachment group identifier (AGI).
Local AII	Attachment individual identifier (AII)—the local IP address used for signaling.
Remote AII	Remote IP address used for signaling. This address is the provisioned IP address, which might be different from the LDP peer IP address.

The following is sample output from the **show mpls l2 transport vc** command when the circuit emulation (CEM) interface is specified:

```
Router# show mpls l2transport vc interface CEM 3/1/1

Local intf  Local circuit  Dest address  VC ID  Status
----------  -------------  ------------  -----  ------
CE3/1/1     CESOPSN Basic 10.30.30.3    300    DOWN
```

Table 100 describes the fields shown in the display.

The following sample output displays (in bold) the number of MAC address withdrawal messages sent and received as part of the H-VPLS N-PE Redundancy for QinQ and MPLS Access feature:

```
Router# show mpls l2transport vc detail

Local interface: VFI TEST VFI up
  MPLS VC type is VFI, interworking type is Ethernet
  Destination address: 10.1.1.1, VC ID: 1000, VC status: up
    Output interface: Se2/0, imposed label stack {17}
    Preferred path: not configured
    Default path: active
    Next hop: point2point
  Create time: 00:04:34, last status change time: 00:04:15
  Signaling protocol: LDP, peer 10.1.1.1:0 up
    Targeted Hello: 10.1.1.1(LDP Id) -> 10.1.1.1
    MPLS VC labels: local 16, remote 17
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
    Remote interface description:
    MAC Withdraw: sent 5, received 3
  Sequencing: receive disabled, send disabled
  VC statistics:
    packet totals: receive 0, send 0
    byte totals:   receive 0, send 0
    packet drops:  receive 0, send 0
```

Table 100 to Table 104 describe the fields shown in the display.

The following sample output displays (in bold) the status messages for the MPLS Pseudowire Status Signaling feature when it is enabled on both PE routers:

```
Router# show mpls l2transport vc detail

Local interface: Et1/0 up, line protocol up, Ethernet up
  Destination address: 10.1.1.1, VC ID: 456, VC status: up
    Output interface: Et2/0, imposed label stack {10005 10240}
    Preferred path: not configured
    Default path: active
```

```
  Next hop: 10.0.0.1
Create time: 00:39:30, last status change time: 00:26:48
Signaling protocol: LDP, peer 10.1.1.1:0 up
  Targeted Hello: 10.1.1.2(LDP Id) -> 10.1.1.1
Status TLV support (local/remote)   : enabled/supported
  Label/status state machine        : established, LruRru
  Last local dataplane   status rcvd: no fault
  Last local SSS circuit status rcvd: no fault
  Last local SSS circuit status sent: no fault
  Last local  LDP TLV    status sent: no fault
  Last remote LDP TLV    status rcvd: PW DOWN(rx,tx faults)
MPLS VC labels: local 2000, remote 10240
Group ID: local 6, remote 0
MTU: local 1500, remote 1500
Remote interface description:
  Sequencing: receive disabled, send disabled
VC statistics:
  packet totals: receive 243651, send 243705
  byte totals:   receive 27768366, send 34109320
  packet drops:  receive 0, send 0
```

Table 103 describes the fields shown in the display.

Table 103 show mpls l2transport vc detail Field Descriptions for the MPLS Pseudowire Signaling Status Feature

Field	Description
Status TLV support (local/remote)	For the local router, the output indicates whether the MPLS Pseudowire Signaling Status feature is enabled or disabled. For the remote router, the output indicates whether the MPLS Pseudowire Signaling Status feature is supported.
Label/status state machine	First value in the output indicates whether label advertisement has been established or not. The second value (LruRru) indicates the status of the local and remote routers. The following list translates the status codes: • D—Dataplane • L—local router • r or n—ready (r) or not ready (n) • R—remote router • S—Local shutdown • u or d—up (u) or down (d) status
Last local dataplane status rcvd	Last status message received about the dataplane on the local router.
Last local SSS circuit status rcvd	Last status message received about the subscriber service switch (SSS) on the local router.
Last local SSS circuit status sent	Last status message sent about the subscriber service switch on the local router.
Last local LDP TLV status sent	Last status message sent about the type, length, values (TLV) on the local router.
Last remote LDP TLV status rcvd	Last status message received about the TLV on the local router.

The following sample output from the **show mpls l2 transport vc detail** command displays the status of multisegment pseudowires:

```
Router# show mpls l2transport vc detail

Local interface: Se3/0 up, line protocol up, HDLC up
  Destination address: 10.12.1.1, VC ID: 100, VC status: down
    Output interface: Se2/0, imposed label stack {23}
    Preferred path: not configured
    Default path: active
    Next hop: point2point
  Create time: 00:03:02, last status change time: 00:01:41
  Signaling protocol: LDP, peer 10.12.1.1:0 up
    Targeted Hello: 10.11.1.1(LDP Id) -> 10.12.1.1, LDP is UP
    Status TLV support (local/remote)   : enabled/supported
      LDP route watch                   : enabled
      Label/status state machine        : established, LruRrd
      Last local dataplane   status rcvd: No fault
      Last local SSS circuit status rcvd: No fault
      Last local SSS circuit status sent: DOWN(PW-tx-fault)
      Last local  LDP TLV    status sent: No fault
      Last remote LDP TLV    status rcvd: DOWN(PW-tx-fault)
       PW Switching Point:
       Fault type  Vcid   local IP addr   remote IP addr   Description
       PW-tx-fault  101        10.13.1.1         10.12.1.1   S-PE2
      Last remote LDP ADJ    status rcvd: No fault
    MPLS VC labels: local 19, remote 23
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
    Remote interface description:
  Sequencing: receive disabled, send disabled
  VC statistics:
    packet totals: receive 16, send 27
    byte totals:   receive 2506, send 3098
    packet drops:  receive 0, seq error 0, send 0
```

Table 104 describes the significant fields shown in the display.

Table 104 show mpls l2transport vc detail Field Descriptions for the MPLS Multisegment Pseudowire Feature

Field	Description
Fault type	Type of fault encountered on the switching point.
Vcid	ID of the VC on which the fault occurred.
local IP addr	Local IP address of the pseudowire.
remote IP addr	Remote IP address of the pseudowire.
Description	Descriptions assigned to the segment of the pseudowire.

The following sample output from the **show mpls l2 transport vc** command displays the status of the control word when it is not configured (that is, it defaults to autosense):

```
Router# show mpls l2transport vc 123400 detail

Local interface: Et0/0 up, line protocol up, Ethernet up
  Destination address: 10.1.1.2, VC ID: 123400, VC status: down
    Output interface: if-?(0), imposed label stack {}
    Preferred path: not configured
    Default path: no route
    No adjacency
```

```
  Create time: 01:03:48, last status change time: 01:03:48
  Signaling protocol: LDP, peer 10.1.1.3:0 up
    Targeted Hello: 10.1.1.1(LDP Id) -> 10.1.1.2
    Status TLV support (local/remote)   : enabled/unknown (no remote binding)
      Label/status state machine        : local ready, LruRnd
      Last local dataplane   status rcvd: no fault
      Last local SSS circuit status rcvd: no fault
      Last local SSS circuit status sent: not sent
      Last local  LDP TLV    status sent: no fault
      Last remote LDP TLV    status rcvd: unknown (no remote binding)
    MPLS VC labels: local 1002, remote unassigned
    Group ID: local 0, remote unknown
    MTU: local 1500, remote unknown
    Remote interface description:
  Sequencing: receive disabled, send disabled
  Control Word: on (configured: autosense)
```

If the control word is negotiated by the peer and is different from the configured value, the configured value is shown in parentheses.

- If the control word is configured to be disabled, the displayed value is as follows:

  ```
  Control Word: off (configured: disabled)
  ```

- If the control word is configured to be enabled but negotiated by the peer to be off, the displayed value is as follows:

  ```
  Control Word: off (configured: enabled)
  ```

- If the control word is not configured, the displayed value is as follows:

  ```
  Control Word: on (configured: autosense)
  ```

The following sample output from the **show mpls l2 transport vc detail** command displays load-balancing information and shows whether flow labels are added to the MPLS label as part of the L2VPN Advanced VPLS feature:

```
Router# show mpls l2transport vc detail

Local interface: VFI dci_vlan_100 VFI up
  MPLS VC type is VFI, interworking type is Ethernet
  Destination address: 10.2.2.2, VC ID: 100, VC status: up
    Output interface: Tu0, imposed label stack {16}
    Preferred path: not configured
    Default path: active
    Next hop: point2point
    Load Balance: Flow
    Flow Label: enabled
```

Table 105 describes the significant fields shown in the display.

Table 105 show mpls l2transport vc detail Field Descriptions for the L2VPN Advanced VPLS Feature

Field	Description
Load Balance	Displays the type of load balancing configured. The load-balancing configuration can be either flow-based or port channel-based.
Flow Label	Indicates whether the imposition and disposition of flow labels for the pseudowire is enabled.

The following sample output from the **show mpls l2 transport vc detail** command displays BFD information:

```
Router# show mpls l2transport vc detail

Local interface: AT1/1/0 up, line protocol up, ATM AAL5 10/101 up
 Destination address: 10.1.1.151, VC ID: 1234001, VC status: up
  Output interface: Gi1/0/0, imposed label stack {2000}
  Preferred path: not configured
  Default path: active
  Next hop: 10.151.152.1
 Create time: 6d03h, last status change time: 6d03h
 Signaling protocol: LDP, peer 10.1.1.151:0 up
  Targeted Hello: 10.1.1.152(LDP Id) -> 10.1.1.151, LDP is UP
  Status TLV support (local/remote)   : enabled/supported
   LDP route watch                    : enabled
   Label/status state machine         : established, LruRru
   Last local dataplane   status rcvd: No fault
   Last local SSS circuit status rcvd: No fault
   Last local SSS circuit status sent: No fault
   Last local  LDP TLV    status sent: No fault
   Last remote LDP TLV    status rcvd: No fault
   Last remote LDP ADJ    status rcvd: No fault
  MPLS VC labels: local 2000, remote 2000
  PWID: 20490
  Group ID: local 0, remote 0
  MTU: local 4470, remote 4470
  Remote interface description:
 Sequencing: receive disabled, send disabled
 Control Word: On (configured: autosense)
 VCCV BFD protection active
  BFD Template - sampleBFDTemplate
  CC Type -  1
  CV Type - fault detection only with IP/UDP headers
 VC statistics:
  transit packet totals: receive 0, send 0
  transit byte totals:   receive 0, send 0
  transit packet drops:  receive 0, seq error 0, send 0
```

Table 106 describes the significant fields shown in the display.

Table 106 show mpls l2transport vc detail Field Descriptions for the BFD CC over VCCV - Support for ATM Pseudowire Feature

Field	Description
VCCV BFD protection active	Displays the VCCV BFD protection status.
BFD Template	Displays the BFD template name.
CC Type	Displays the CC type. • Type 1: control word. • Type 2: MPLS router alert label. • Type 3: MPLS pseudowire label with TTL.
CV Type	Displays the Control Verification type.

The following is sample output from the **show mpls l2transport vc** command when the L2VPN VPLS Inter-AS Option B feature has been configured. The fields in the display are self-explanatory or described in other tables in this document.

```
Router# show mpls l2transport vc

Load for five secs: 4%/1%; one minute: 4%; five minutes: 2%
Time source is hardware calendar, *17:26:56.066 GMT Mon Oct 18 2010


Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
VFI auto       VFI                        10.1.1.1        100         UP
```

The following is sample output from the **show mpls l2transport vc detail** command when the L2VPN VPLS Inter-AS Option B feature has been configured. The output that is specific to the L2VPN VPLS Inter-AS Option B feature is shown in bold.

```
Router# show mpls l2transport vc detail

Load for five secs: 4%/1%; one minute: 4%; five minutes: 2%
Time source is hardware calendar, *17:27:28.076 GMT Mon Oct 18 2010

Local interface: VFI auto VFI up
  Interworking type is Ethernet
  Destination address: 192.0.2.1, VC ID: 100, VC status: up
  Next hop PE address: 198.51.100.1
    Output interface: Et1/0, imposed label stack {2012}
    Preferred path: not configured
    Default path: active
    Next hop: 10.0.0.3
  Create time: 00:00:48, last status change time: 00:00:48
  Signaling protocol: LDP, peer 192.0.2.3:0 up
    Targeted Hello: 192.0.2.6(from BGP) -> 192.0.2.8, LDP is UP
    Status TLV support (local/remote)   : enabled/supported
      LDP route watch                   : enabled
      Label/status state machine        : established, LruRru
      Last local dataplane   status rcvd: No fault
      Last local SSS circuit status rcvd: No fault
      Last local SSS circuit status sent: No fault
      Last local  LDP TLV    status sent: No fault
      Last remote LDP TLV    status rcvd: No fault
      Last remote LDP ADJ    status rcvd: No fault
    MPLS VC labels: local 1011, remote 2012
    PWID: 4096
    AGI: type 1, len 8, 000A 0001 0000 0001
    Local AII: type 1, len 4, 0101 0001 (203.0.113.1)
    Remote AII: type 1, len 4, 0201 0101 (203.0.113.5)
    VPLS-ID: 1:1
    Group ID: local n/a, remote n/a
    MTU: local 1500, remote 1500
    Remote interface description:
  Sequencing: receive disabled, send disabled
  Control Word: On (configured: autosense)
  SSO Descriptor: 203.0.113.5/100, local label: 1011
    SSM segment/switch IDs: 16387/8193 (used), PWID: 4096
  VC statistics:
    transit packet totals: receive 0, send 0
    transit byte totals:   receive 0, send 0
    transit packet drops:  receive 0, seq error 0, send 0
```

Table 107 describes the feature-specific significant fields shown in the display.

Table 107 show mpls l2transport vc detail Field Descriptions for the L2VPN VPLS Inter-AS Option B

Field	Description
PWID	Pseudowire identifier.
VPLS-ID	The VPLS identifier associated with the pseudowire.

The following is sample output from the **show mpls l2transport vc detail** command when there is a remote AC failure and when VCCV BFD status signaling is enabled, that is, **vccv bfd status signaling** is configured.

```
Router# show mpls l2transport vc detail

Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%
Time source is hardware calendar, *03:31:33.136 PST Thu Mar 24 2011

Local interface: Et1/0.1 up, line protocol up, Eth VLAN 1001 up
Destination address: 192.0.2.1, VC ID: 1234000, VC status: down
    Output interface: Et0/0, imposed label stack {150}
    Preferred path: not configured
    Default path: active
    Next hop: 198.58.100.2
  Create time: 00:03:45, last status change time: 00:00:02
  Signaling protocol: Manual
    Status TLV support (local/remote)   : enabled/N/A
      LDP route watch                   : enabled
      Label/status state machine        : established, LruRrd
      Last local dataplane   status rcvd: No fault
      Last BFD dataplane     status rcvd: No fault
      Last local SSS circuit status rcvd: No fault
      Last local SSS circuit status sent: DOWN AC(rx/tx faults)
      Last local  LDP TLV    status sent: None
      Last remote LDP TLV    status rcvd: DOWN AC(rx/tx faults), (UP)
      Last remote LDP ADJ    status rcvd: No fault
    MPLS VC labels: local 100, remote 150
    PWID: 4096
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
  Sequencing: receive disabled, send disabled
  Control Word: On (configured: autosense)
  VCCV BFD protection active
     BFD Template - t1
     CC Type -  1
     CV Type - fault detection and status signaling without IP/UDP headers
  VC statistics:
    transit packet totals: receive 0, send 5
    transit byte totals:   receive 0, send 580
    transit packet drops:  receive 0, seq error 0, send 0
```

Table 108 describes the significant fields shown in the display.

Table 108 show mpls l2transport vc detail Field Descriptions for Remote AC Failure

Field	Description
Last BFD dataplane status rcvd	Last status message received about the BFD dataplane on the local router.
Last local dataplane status rcvd	Last status message received about the dataplane on the local router.
Last local SSS circuit status rcvd	Last status message received about the subscriber service switch (SSS) on the local router.
Last local SSS circuit status sent	Last status message sent about the subscriber service switch on the local router.
Last remote LDP ADJ	Last status message received about the ADJ on the local router.
VCCV BFD protection active	Displays the VCCV BFD protection status.
BFD Template	Displays the BFD template name.
CC Type	Displays the CC type. • Type 1: control word. • Type 2: MPLS router alert label. • Type 3: MPLS pseudowire label with TTL.
CV Type	Displays the Control Verification type.

Sample Output for show mpls l2transport vc Command on a Cisco uBR10012 Router in the Brief Display Format in Cisco IOS Release 12.2(33)SCF

The following is sample output from the **show mpls l2transport vc** command when the L2VPN Pseudowire Redundancy feature has been configured. The fields in the display are self-explantory or described in other tables in this document:

```
Router# show mpls l2transport vc

Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
Bu254          DOCSIS 55                  10.2.3.4        55         DOWN
Bu254          DOCSIS 1000                10.2.3.4        1000       UP
Bu254          DOCSIS 400                 10.76.2.1       400        UP
Bu254          DOCSIS 600                 10.76.2.1       600        DOWN
Bu254          DOCSIS 1800                10.76.2.1       1800       UP
Bu254          DOCSIS 45454               10.76.2.1       45454      DOWN
```

Related Commands

Command	Description
show mpls forwarding-table	Displays the contents of the MPLS LFIB.
show mpls l2transport summary	Displays summary information about VCs that have been enabled to route AToM Layer 2 packets on a router.
show xconnect	Displays information about xconnect attachment circuits and pseudowires.

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 privileged EXEC mode.

show mpls label range

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(9)ST	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2. The “Usage Guidelines” and the sample command output changed.

Usage Guidelines

You can use the **mpls label range** command to configure a range for local labels that is different from the default range. The **show mpls label range** command displays both the label range currently in use and the label range that will be in use following the next router reload.

Examples

In the following example, the use of the **show mpls label range** command is shown before and after the **mpls label range** command is used to configure a label range that does not overlap the starting label range:

```
Router# show mpls label range

Downstream label pool: Min/Max label: 16/100000

Router# configure terminal

Router(config)# mpls label range 200 120000
Router(config)# exit

Router# show mpls label range

Downstream label pool: Min/Max label: 200/120000
```

Related Commands

Command	Description
mpls label range	Configures a range of values for use as local labels.

show mpls ldp backoff

To display information about the configured session setup backoff parameters and any potential Label Distribution Protocol (LDP) peers with which session setup attempts are being throttled, use the **show mpls ldp backoff** command in user EXEC or privileged EXEC mode.

show mpls ldp backoff [**vrf** *vrf-name* | **all**]

Syntax Description

vrf *vrf-name*	(Optional) Displays backoff information for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance (*vrf-name*).
all	(Optional) Displays LDP discovery information for all VPNs.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(10)ST	This command was introduced.
12.0(14)ST	This command was integrated into Cisco IOS Release 12.0(14)ST.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(30)S	The **vrf** *vrf-name* keyword-argument pair and the **all** keyword were added.
12.4(3)	The **vrf** *vrf-name* keyword-argument pair and the **all** keyword were added.
12.4(4)T	The **vrf** *vrf-name* keyword-argument pair and the **all** keyword were added.
12.0(32)S	The **vrf** *vrf-name* keyword-argument pair and the **all** keyword were added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

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

```
Router# show mpls ldp backoff

LDP initial/maximum backoff: 30/240 sec
Backoff table: 2 entries
LDP Id              Backoff(sec)   Waiting(sec)
10.144.0.44:0        60             30
10.155.0.55:0        120            90
```

Table 109 describes the significant fields shown in the display.

Table 109 show mpls ldp backoff Field Descriptions

Field	Description
LDP initial/maximum backoff	Indicates the configured backoff parameters (initial and maximum) in seconds.
Backoff table	Contains a list of discovered LDP neighbors for which session setup is being delayed because of previous failures to establish a session due to incompatible configuration. The backoff table incorporates the following information: • LDP Id—Identifies the LDP neighbors. • Backoff(sec)—Shows the amount of time that session setup is being delayed. • Waiting(sec)—Shows the approximate amount of time that session setup has been delayed.

The following is sample output from the **show mpls ldp backoff vrf** *vrf-name* command that shows one entry in the Backoff table for VRF vrf1:

```
Router# show mpls ldp backoff vrf vrf1

LDP initial/maximum backoff: 15/120 sec
VRF vrf1 Backoff table: 1 entries
LDP Id              Backoff(sec)   Waiting(sec)
10.12.0.2:0         120            30
```

The following is sample output from a form of the **show mpls ldp backoff** command using the **all** keyword:

```
Router# show mpls ldp backoff all

LDP initial/maximum backoff: 15/120 sec
Backoff table: 2 entries
LDP Id              Backoff(sec)   Waiting(sec)
10.155.0.55:0       120            30
10.144.0.44:0       60             60

VRF vrf1 Backoff table: 1 entries
LDP Id              Backoff(sec)   Waiting(sec)
10.12.0.2:0         120            45

VRF vrf2 Backoff table: 1 entries
LDP Id              Backoff(sec)   Waiting(sec)
10.13.0.1:0         120            30
```

See Table 109 for a description of the significant fields shown in the displays.

Related Commands

Command	Description
mpls ldp backoff	Configures session setup delay parameters for the LDP backoff mechanism.

show mpls ldp bindings

To display the contents of the Label Information Base (LIB), use the **show mpls ldp bindings** command in user EXEC or privileged EXEC mode.

show mpls ldp bindings [**vrf** *vrf-name* | **all**] [*network* {*mask* | *length*} [**longer-prefixes**]] [**local-label** *label* [**-** *label*]] [**remote-label** *label* [**-** *label*]] [**neighbor** *address* | **local**] [**detail**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the label bindings for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance (*vrf-name*).
all	(Optional) Displays LIB information for all VPNs.
network	(Optional) Destination network number.
mask	Network mask, written as A.B.C.D.
length	Mask length (1 to 32 characters).
longer-prefixes	(Optional) Selects any prefix that matches the value in the *mask* argument with a *length* from 1 to 32 characters.
local-label *label* **-** *label*	(Optional) Display entries matching local label values. Use the *label* **-** *label* arguments and keyword to indicate the label range. The hyphen (**-**) keyword is required for a label range.
remote-label *label* **-** *label*	(Optional) Displays entries matching the label values assigned by a neighbor router. Use the *label* **-** *label* arguments and keyword to indicate the label range. The hyphen (**-**) keyword is required for a label range.
neighbor *address*	(Optional) Displays the label bindings assigned by the selected neighbor.
local	(Optional) Displays the local label bindings.
detail	(Optional) Displays the checkpoint status of the local label bindings.

Defaults

If no optional keywords or arguments are entered, the command displays the LIB for the default routing domain only.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was modified to support Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was modified to include MPLS Virtual Private Network (VPN) support for Label Distribution Protocol (LDP).
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.

Release	Modification
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(25)S	The **detail** keyword was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SRC	The output of the command was updated to display information about LDP local label allocation filtering.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

The **show mpls ldp bindings** command displays label bindings learned by the LDP or Tag Distribution Protocol (TDP).

Note TDP is not supported for LDP features in Cisco IOS 12.0(30)S and later releases, 12.2(28)SB and later 12.2S releases, and 12.3(14)T and later releases.

A request can specify that the entire database be displayed, or that the display be limited to a subset of entries according to the following:

- Prefix
- Input or output label values or ranges
- Neighbor advertising the label

Note The **show mpls ip binding** command includes the output generated by the **show mpls ldp bindings** command. On the Cisco 7000 series router, this command displays information about label bindings for LC-ATM interfaces.

Examples

The following is sample output from the **show mpls ldp bindings** command. This form of the command displays the contents of the LIB for the default routing domain.

```
Router# show mpls ldp bindings

  10.0.0.0/8, rev 9
        local binding:  label: imp-null
        remote binding: lsr: 10.10.0.55:0, label: 17
        remote binding: lsr: 10.66.0.66:0, label: 18
        remote binding: lsr: 10.0.0.44:0, label: imp-null
  172.16.0.0/8, rev 17
        local binding:  label: 19
```

```
        remote binding: lsr: 10.0.0.55:0, label: imp-null
        remote binding: lsr: 10.66.0.66:0, label: 16
        remote binding: lsr: 10.0.0.44:0, label: imp-null
  192.168.0.66/32, rev 19
        local binding:  label: 20
        remote binding: lsr: 10.0.0.55:0, label: 19
        remote binding: lsr: 10.66.0.66:0, label: imp-null
        remote binding: lsr: 10.0.0.44:0, label: 18
        .
        .
        .
```

The following is sample output from the **show mpls ldp bindings** *network length* **longer-prefixes neighbor** *address* variant of the command; it displays labels learned from label switch router (LSR) 10.144.0.44 for network 10.166.0.0 and any of its subnets. The use of the **neighbor** keyword suppresses the output of local labels and labels learned from other neighbors.

```
Router# show mpls ldp bindings 10.166.0.0 8 longer-prefixes neighbor 10.144.0.44

  10.166.44.0/16, rev 31
        remote binding: lsr: 10.144.0.44:0, label: 25
  10.166.45.0/16, rev 33
        remote binding: lsr: 10.144.0.44:0, label: 26
  10.166.245.0/16, rev 71
        remote binding: lsr: 10.144.0.44:0, label: 45
  10.166.246.0/16, rev 73
        remote binding: lsr: 10.144.0.44:0, label: 46
.
.
.
```

The following is sample output from the **show mpls ldp bindings vrf vpn1** command, which displays the label bindings for the specified VPN routing and forwarding instance named vpn1:

```
Router# show mpls ldp bindings vrf vpn1

  10.3.3.0/16, rev 164
        local binding: label:117
        remote binding:lsr:10.14.14.14:0, label:imp-null
  10.13.13.13/32, rev 1650
        local binding: label:1372
        remote binding:lsr:10.14.14.14:0, label:268
  10.14.14.14/32, rev 165
        local binding: label:118
        remote binding:lsr:10.14.14.14:0, label:imp-null
  10.15.15.15/32, rev 1683
        local binding: label:1370
        remote binding:lsr:10.14.14.14:0, label:266
  10.16.16.16/32, rev 775
        local binding: label:8370
        remote binding:lsr:10.14.14.14:0, label:319
  10.18.18.18/32, rev 1655
        local binding: label:21817
        remote binding:lsr:10.14.14.14:0, label:571
  10.30.2.0/16, rev 1653
        local binding: label:6943
        remote binding:lsr:10.14.14.14:0, label:267
  10.30.3.0/16, rev 413
        local binding: label:2383
        remote binding:lsr:10.14.14.14:0, label:imp-null
  10.30.4.0/16, rev 166
        local binding: label:77
        remote binding:lsr:10.14.14.14:0, label:imp-null
```

```
  10.30.5.0/16, rev 1429
        local binding: label:20715
        remote binding:lsr:10.14.14.14:0, label:504
  10.30.7.0/16, rev 4
        local binding: label:17
        remote binding:lsr:10.14.14.14:0, label:imp-null
  10.30.10.0/16, rev 422
        local binding: label:5016
        remote binding:lsr:10.14.14.14:0, label:269
.
.
.
```

The following is sample output from the **show mpls ldp bindings all** command, which displays the label bindings for all VRFs:

```
Router# show mpls ldp bindings all

  lib entry: 10.0.0.0/24, rev 4
        local binding:  label: imp-null
        remote binding: lsr: 10.131.0.1:0, label: imp-null
  lib entry: 10.11.0.0/24, rev 15
        local binding:  label: imp-null
        remote binding: lsr: 10.131.0.1:0, label: imp-null
  lib entry: 10.101.0.1/32, rev 18
        remote binding: lsr: 10.131.0.1:0, label: imp-null
  lib entry: 10.131.0.1/32, rev 17
        local binding:  label: 20
        remote binding: lsr: 10.131.0.1:0, label: imp-null
  lib entry: 10.134.0.1/32, rev 6
        local binding:  label: imp-null
        remote binding: lsr: 10.131.0.1:0, label: 16
VRF vrf1:
  lib entry: 10.0.0.0/24, rev 6
        remote binding: lsr: 10.132.0.1:0, label: imp-null
  lib entry: 10.11.0.0/24, rev 7
        remote binding: lsr: 10.132.0.1:0, label: imp-null
  lib entry: 10.12.0.0/24, rev 8
        local binding:  label: 17
        remote binding: lsr: 10.132.0.1:0, label: imp-null
  lib entry: 10.132.0.1/32, rev 4
        remote binding: lsr: 10.132.0.1:0, label: imp-null
  lib entry: 10.134.0.2/32, rev 9
        local binding:  label: 18
        remote binding: lsr: 10.132.0.1:0, label: 16
  lib entry: 10.134.0.4/32, rev 10
        local binding:  label: 19
        remote binding: lsr: 10.132.0.1:0, label: 17
  lib entry: 10.138.0.1/32, rev 5
        remote binding: lsr: 10.132.0.1:0, label: imp-null
```

The following is sample output from the **show mpls ldp bindings detail** command:

```
Router# show mpls ldp bindings detail

lib entry: 10.3.3.0/16, rev 2,
        local binding:  label: imp-null
          Advertised to:
          10.20.20.20:0          10.25.25.25:0
        remote binding: lsr: 10.20.20.20:0, label: imp-null  stale
        remote binding: lsr: 10.25.25.25:0, label: imp-null  stale
  lib entry: 10.13.1.0/24, rev 4,
        local binding:  label: imp-null
          Advertised to:
```

```
        10.20.20.20:0          10.25.25.25:0
      remote binding: lsr: 10.20.20.20:0, label: imp-null  stale
      remote binding: lsr: 10.25.25.25:0, label: 16  stale
  lib entry: 10.13.2.0/24, rev 6,
      local binding:  label: imp-null
        Advertised to:
        10.20.20.20:0          10.25.25.25:0
      remote binding: lsr: 10.20.20.20:0, label: 16  stale
      remote binding: lsr: 10.25.25.25:0, label: imp-null  stale
  lib entry: 10.6.1.0/24, rev 22,
      local binding:  label: 21
        Advertised to:
        10.20.20.20:0          10.25.25.25:0
      remote binding: lsr: 10.20.20.20:0, label: 19  stale
      remote binding: lsr: 10.25.25.25:0, label: imp-null  stale
```

The following is sample output from the **show mpls ldp bindings detail** command when LDP local label allocation filtering is configured:

```
Router# show mpls ldp bindings detail

Advertisement spec:
        Prefix acl = bar
Local label filtering spec: host routes.


  lib entry: 10.1.1.1/32, rev 9
  lib entry: 10.10.7.0/24, rev 10
  lib entry: 10.10.8.0/24, rev 11
  lib entry: 10.10.9.0/24, rev 12
  lib entry: 10.41.41.41/32, rev 17
  lib entry: 10.50.50.50/32, rev 15
  lib entry: 10.60.60.60/32, rev 18
  lib entry: 10.70.70.70/32, rev 16
  lib entry: 10.80.80.80/32, rev 14
```

Table 110 describes the significant fields shown in the displays.

Table 110 show mpls ldp bindings Field Descriptions

Field	Description
10.3.3.0/16 10.1.1.1/32	IP prefix and mask for a particular destination (network/mask).
rev 9	Revision number that is used internally to manage label distribution for this destination.
Advertised to	The LSRs that received the label binding.
local binding	Labels assigned by the local LSR.
remote binding	List of outgoing labels for this destination learned from other LSRs. Each item in this list identifies the LSR from which the outgoing label was learned and the label itself. The LSR is identified by its LDP identifier.
stale	After an LDP session is lost and the routers begin a graceful restart, the remote label bindings are marked stale.
Local label filtering spec: host routes.	LDP allocates local labels for host routes.

Related Commandst

Command	Description
show mpls ip binding	Displays specified information about label bindings learned by the MPLS LDP.
show mpls ldp neighbor	Displays the status of LDP sessions.

show mpls ldp capabilities

To display the Label Distribution Protocol (LDP) capability information, use the **show mpls ldp capabilities** command in user EXEC or privileged EXEC mode.

show mpls ldp capabilities [**vrf** *vrf-name* | **all**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the LDP capability information for the specified VPN routing and forwarding (VRF) instance.
all	(Optional) Displays LDP capability information for all VPNs, including those in the default routing domain.

Defaults

Displays information about LDP capability for the default routing domain if you do not specify the optional **vrf** or **all** keyword.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRE4	This command was introduced.

Usage Guidelines

The **show mpls ldp capabilities** command can provide information about the capabilities that will be advertised through LDP sessions associated to a particular routing domain.

Examples

The following is sample output from the **show mpls ldp capabilities** command, which shows the router's capabilities associated with the default routing domain.

```
Router# show mpls ldp capabilities

LDP Capabilities - [<description> (<type>)]
-----------------------------------------------------------
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
```

The following is sample output from the **show mpls ldp capabilities all** command, which shows the router's capabilities associated with all VRF routing domains including the default routing domain.

```
Router# show mpls ldp capabilities all

LDP Capabilities - [<description> (<type>)]
-----------------------------------------------------------
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]

VRF vpn1:
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
```

```
VRF vpn2:
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
```

The following is sample output from the **show mpls ldp capabilities vrf** command, which shows the router's capabilities associated with the VRF routing domain named vpn1:

```
Router# show mpls ldp capabilities vrf vpn1

LDP Capabilities - [<description> (<type>)]
------------------------------------------------------------
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
```

Table 111 describes the significant fields shown in the displays.

Table 111 show mpls ldp neighbor Field Descriptions

Field	Description
LDP Capabilities	LDP capability information.
VRF	LDP capability information for the specified VRF.

Related Commands

Command	Description
show mpls ldp neighbor capabilities	Displays LDP announce and receive information for an LDP neighbor.
show mpls ldp neighbor details	Displays information in long form, including password information for a neighbor.

show mpls ldp checkpoint

To display information about the Label Distribution Protocol (LDP) checkpoint system on the active route processor, use the **show mpls ldp checkpoint** command in user EXEC or privileged EXEC mode.

show mpls ldp checkpoint

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

This command shows the following LDP checkpointing information:

- The status of the checkpointing system
- The status of the resend timer
- The number of Label Information Base (LIB) entries in a checkpointed state

This command displays checkpoint status information only for the active route processor.

Examples

The following example shows the LDP checkpoint settings and configuration:

```
Router# show mpls ldp checkpoint

Checkpoint status: dynamic-sync
Checkpoint resend timer: not running
5 local bindings in add-skipped
9 local bindings in added
1 of 15+ local bindings in none
```

Table 112 describes the significant fields shown in the display.

Table 112 show mpls ldp checkpoint Field Descriptions

Field	Description
Checkpoint status	The status of the checkpointing system. If the status shows dynamic-sync or another enabled state, then the checkpointing system is enabled. If the status shows disabled, then the checkpointing system is disabled.
Checkpoint resend timer	The status of the resend timer.
local bindings in add-skipped	The number of local bindings that were not checkpointed, because they do not need to be checkpointed. For example, local label bindings using null labels are not checkpointed.
local bindings in added	The number of local bindings that were copied to the standby route processor.
local bindings in none	The number of local bindings that reside on the active route processor and need to be copied to the backup route processor.

Related Commands

Command	Description
show mpls ldp graceful-restart	Displays a summary of the LDP Graceful Restart status.

show mpls ldp discovery

To display the status of the Label Distribution Protocol (LDP) discovery process, use the **show mpls ldp discovery** command in user EXEC or privileged EXEC mode.

show mpls ldp discovery [**vrf** *vrf-name* | **all**] [**detail**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the neighbor discovery information for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance.
all	(Optional) Displays LDP discovery information for all VPNs, including those in the default routing domain.
detail	(Optional) Displays detailed information about all LDP discovery sources on a label switch router (LSR).

Defaults

This command displays neighbor discovery information for the default routing domain if an optional **vrf** keyword is not specified.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST. The command was modified to comply with Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was modified for MPLS VPN support for LDP. The **vrf** and **all** keywords were added.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(8)T	This command was modified for MPLS VPN support for LDP. The **vrf** and **all** keywords were added.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(14)T	The **detail** keyword was added to the command to display information related to the LDP Autoconfiguration feature.
12.2(28)SB	The **detail** keyword was updated to display information related to LDP Message Digest 5 (MD5) password configuration.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.0(33)S	This command was integrated into Cisco IOS Release 12.0(33)S and LDP MD5 password rollover information displays in the command output when the **detail** argument is used with the **show mpls ldp discovery** command.

Usage Guidelines

This command displays neighbor discovery information for LDP or Tag Distribution Protocol (TDP). It generates a list of interfaces over which the LDP discovery process is running.

Examples

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

```
Router# show mpls ldp discovery

Local LDP Identifier:
    10.1.1.1:0
Discovery Sources:
    Interfaces:
        Ethernet1/1/3 (ldp): xmit/recv
            LDP Id: 172.23.0.77:0
            LDP Id: 10.144.0.44:0
            LDP Id: 10.155.0.55:0
        ATM3/0.1 (ldp): xmit/recv
            LDP Id: 10.203.0.7:2
        ATM0/0.2 (tdp): xmit/recv
            TDP Id: 10.119.0.1:1
Targeted Hellos:
        10.8.1.1 -> 10.133.0.33 (ldp): active, xmit/recv
            LDP Id: 10.133.0.33:0
        10.8.1.1 -> 192.168.7.16 (tdp): passive, xmit/recv
            TDP Id: 10.133.0.33:0
Router#
```

The following is sample output from the **show mpls ldp discovery all** command, which shows the interfaces engaged in LDP discovery activity for all the VPN routing and forwarding instances, including those in the default routing domain. In this example, note that the same neighbor LDP ID (10.14.14.14) appears in all the listed VRF interfaces, highlighting the fact that the same IP address can coexist in different VPN routing and forwarding instances.

```
Router# show mpls ldp discovery all

Local LDP Identifier:
    10.12.12.12:0
    Discovery Sources:
    Interfaces:
        ATM1/1/0.1 (tdp):xmit/recv
            TDP Id:10.11.11.11:0
VRF vpn1:Local LDP Identifier:
    172.30.7.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.1 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn2:Local LDP Identifier:
    172.30.13.2:0
```

```
    Discovery Sources:
    Interfaces:
        ATM3/0/0.2 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn3:Local LDP Identifier:
    172.30.15.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.3 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn4:Local LDP Identifier:
    172.30.17.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.4 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn5:Local LDP Identifier:
    172.30.19.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.5 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn6:Local LDP Identifier:
    172.30.21.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.6 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn7:Local LDP Identifier:
    172.23.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.7 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn8:Local LDP Identifier:
    172.30.25.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.8 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn9:Local LDP Identifier:
    172.30.27.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.9 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn10:Local LDP Identifier:
    172.30.29.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.10 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn11:Local LDP Identifier:
    172.30.31.2:0
    Discovery Sources:
    Interfaces:
        ATM3/0/0.11 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn12:Local LDP Identifier:
    172.30.33.2:0
    Discovery Sources:
```

```
    Interfaces:
        ATM3/0/0.12 (ldp):xmit/recv
            LDP Id:10.14.14.14:0
VRF vpn13:Local LDP Identifier:

Router#
```

Table 113 describes the significant fields shown in the display.

Table 113 show mpls ldp discovery Field Descriptions

Field	Description
Local LDP Identifier	The LDP identifier for the local router. An LDP identifier is 6-bytes displayed in the form “IP address:number.” By convention, the first four bytes of the LDP identifier constitute the router ID; integers, starting with 0, constitute the final two bytes of the IP address:number construct.
Interfaces	Lists the interfaces that are engaging in LDP discovery activity: • The xmit field—Indicates that the interface is sending LDP discovery hello packets. • The recv field—Indicates that the interface is receiving LDP discovery hello packets. • The (LDP) or (TDP) field—Indicates the Label Distribution Protocol or Tag Distribution Protocol configured for the interface. The LDP (or TDP) identifiers indicate the LDP (or TDP) neighbors discovered on the interface.
Targeted Hellos	Lists the platforms to which targeted hello messages are being sent: • The xmit, recv, (ldp), and (tdp) fields are as described for the Interfaces field. • The active field indicates that this LSR has initiated targeted hello messages. • The passive field indicates that the neighbor LSR has initiated targeted hello messages and that this LSR is configured to respond to the targeted hello messages from the neighbor. **Note** The entry for a given target platform may indicate both active and passive.

The following is sample output from the **show mpls ldp discovery detail** command showing that LDP was enabled by the **mpls ip** command and the **mpls ldp autoconfig** command:

```
Router# show mpls ldp discovery detail

Local LDP Identifier:
    10.11.11.11:0
    Discovery Sources:
    Interfaces:
        Serial2/0 (ldp): xmit/recv
            Enabled: Interface config, IGP config;
            Hello interval: 5000 ms; Transport IP addr: 10.11.11.11
```

```
LDP Id: 10.10.10.10:0
  Src IP addr: 172.140.0.1; Transport IP addr: 10.10.10.10
  Hold time: 15 sec; Proposed local/peer: 15/15 sec
```

Table 114 describes the significant fields shown in the display.

Table 114 show mpls ldp discovery detail Field Descriptions

Field	Description
Local LDP Identifier	The LDP identifier for the local router. An LDP identifier is a 6-byte construct displayed in the form "IP address:number." By convention, the first four bytes of the LDP identifier constitute the router ID; integers, starting with 0, constitute the final two bytes of the IP address:number construct.
Interfaces	Lists the interfaces that are engaging in LDP discovery activity: • The xmit field—Indicates that the interface is sending LDP discovery hello packets. • The recv field—Indicates that the interface is receiving LDP discovery hello packets. • The (LDP) or (TDP) field—Indicates the Label Distribution Protocol or Tag Distribution Protocol configured for the interface. The LDP (or TDP) identifiers indicate the LDP (or TDP) neighbors discovered on the interface.
Interface config, IGP config;	Describes how LDP is enabled: • Interface config—Enabled by the **mpls ip** command. • IGP config—Enabled by the **mpls ldp autoconfig** command. • Interface config, IGP config;—Enabled by the **mpls ip** command and the **mpls ldp autoconfig** command.
Hello interval	Period of time (in milliseconds) between the sending of consecutive hello messages.
Transport IP addr	Specifies that the interface address should be advertised as the transport address in the LDP discovery hello messages.
LDP Id	LDP ID of the peer router.
Src IP addr	Source IP address of the local router.
Transport IP addr	Specifies that the named IP address should be advertised as the transport address in the LDP discovery hello messages sent on an interface.
Hold time	Period of time (in seconds) a discovered LDP neighbor is remembered without receipt of an LDP hello message from the neighbor.
Proposed local/peer	Hold times (in seconds) proposed for LDP hello timer by the local router and the peer router. LDP uses the lower of these two values as the hold time.

The following is sample output from the **show mpls ldp discovery detail** command, which displays information related to LDP MD5 passwords. Information related to MD5 passwords is pointed out in bold text in the output.

```
Router# show mpls ldp discovery detail

 Local LDP Identifier:
    10.10.10.10:0
    Discovery Sources:
    Interfaces:
        Ethernet1/0 (ldp): xmit/recv
            Hello interval: 5000 ms; Transport IP addr: 10.10.10.10
            LDP Id: 10.4.4.4:0
              Src IP addr: 10.0.20.4; Transport IP addr: 10.4.4.4
              Hold time: 15 sec; Proposed local/peer: 15/15 sec
              Password: not required, none, stale       <-- LDP MD5 password information
    Targeted Hellos:
        10.10.10.10 -> 10.3.3.3 (ldp): passive, xmit/recv
            Hello interval: 10000 ms; Transport IP addr: 10.10.10.10
            LDP Id: 10.3.3.3:0
              Src IP addr: 10.3.3.3; Transport IP addr: 10.3.3.3
              Hold time: 90 sec; Proposed local/peer: 90/90 sec
              Password: required, neighbor, in use     <-- LDP MD5 password information
```

Password information displayed by this command includes:

- Password requirement for the neighbor (required or not required).
- Password source in the current configuration. The source is described by one of the following:
  - neighbor—The password for the neighbor is retrieved from the **mpls ldp neighbor** [**vrf** *vrf-name*] *ip-address* **password** [**0** | **7**] *password* command. The *ip-address* argument is the router ID of the neighbor.
  - num—The password for the neighbor is retrieved from **mpls ldp** [**vrf** *vrf-name*] **password option** *number* **for** *acl* [**0** | **7**] *password* command. The *number* argument is a number from 1 to 32767. The *acl* argument is the name or number of an IP standard access list that permits the neighbor router ID.
  - fallback—The password for the neighbor is retrieved from **mpls ldp** [**vrf** *vrf-name*] **password fallback** *password* command.
  - none—No password is configured for this neighbor.
- Password used by LDP sessions established with the neighbor is from current or previous configuration (in use or stale).

Related Commands

Command	Description
mpls label protocol (global configuration)	Specifies the LDP or TDP to be used on a platform.
mpls label protocol (interface configuration)	Specifies the LDP or TDP to be used on a given interface.
mpls ldp neighbor password	Configures a password key for computing MD5 checksums for the session TCP connection with the specified neighbor.
mpls ldp password fallback	Configures an MD5 password for LDP sessions with peers.
mpls ldp password option	Configures an MD5 password for LDP sessions with neighbors whose LDP router IDs are permitted by a specified access list.

Command	Description
mpls ldp password required	Specifies that LDP must use a password when establishing a session between LDP peers.
mpls ldp password rollover duration	Configures the duration before the new password takes effect on an MPLS label switch router (LSR).
show mpls interfaces	Displays information about one or more interfaces that have been configured for label switching.
show mpls ldp neighbor	Displays the status of LDP sessions.
show mpls ldp neighbor password	Displays password information used in established LDP sessions.

show mpls ldp graceful-restart

To display a summary of the Label Distribution Protocol (LDP) Graceful Restart status, use the **show mpls ldp graceful-restart** command in user EXEC or privileged EXEC mode.

show mpls ldp graceful-restart

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0(29)S	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

This command shows the following information about LDP sessions:

- Configured parameters.
- The state of the LDP sessions (for which Graceful Restart was negotiated during initialization).
- The list of LDP sessions for which graceful recovery is pending. However, the router has retained the state information from those neighbors.

Examples

The following example shows a summary of the LDP Graceful Restart settings and configuration:

```
Router# show mpls ldp graceful-restart

LDP Graceful Restart is enabled
Neighbor Liveness Timer: 5 seconds
Max Recovery Time: 200 seconds
Down Neighbor Database (0 records):
Graceful Restart-enabled Sessions:
VRF default:
    Peer LDP Ident: 10.18.18.18:0, State: estab
    Peer LDP Ident: 10.17.17.17:0, State: estab
```

Table 115 describes the significant fields shown in the display.

Table 115 show mpls ldp graceful-restart Field Descriptions

Field	Description
Neighbor Liveness Timer	The number of seconds the neighbor liveness timer is set for.
Max Recovery Time	The number of seconds the maximum recovery timer is set for.
Down Neighbor Database	Information about the down (failed or restarting) LDP neighbor.
Graceful Restart-enabled Sessions	Information about the LDP sessions that are enabled for Graceful Restart.
Peer LDP Ident	The LDP ID of the provider edge (PE) neighbor.
State	The state of the session with the neighbor.

Related Commands

Command	Description
show mpls ldp neighbor	Displays the status of LDP sessions.

show mpls ldp igp sync

To display the status of the Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP) synchronization process, use the **show mpls ldp igp sync** command in user EXEC or privileged EXEC mode.

show mpls ldp igp sync [**all** | **interface** *type-number* | **vrf** *vrf-name*]

Syntax Description

all	(Optional) Displays all the MPLS LDP-IGP synchronization information available.
interface *type-number*	(Optional) Displays the MPLS LDP-IGP synchronization information for the specified interface.
vrf *vrf-name*	(Optional) Displays the MPLS LDP-IGP synchronization information for the specified Virtual Private Network (VPN) routing and forwarding instance (*vpn-name*).

Command Default

If an optional argument is not specified, this command displays LDP synchronization for all interfaces enabled for MPLS LDP-IGP synchronization.

Command Modes

User EXEC(>)
Privileged EXEC(#)

Command History

Release	Modification
12.0(30)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
12.0(32)S	This command was integrated into Cisco IOS Release 12.0(32)S. The output of this command was changed to display the configured delay time and the time remaining on the delay timer.
12.4(12)	This command was integrated into Cisco IOS Release 12.4(12).
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Examples

The following is sample output from the **show mpls ldp igp sync** command when LDP-IGP synchronization is not enabled on an interface:

```
Router# show mpls ldp igp sync

Ethernet0/0:
 LDP configured;  SYNC enabled.
 SYNC status: sync achieved; peer reachable.
 IGP holddown time: infinite.
 Peer LDP Ident: 10.130.0.1:0
 IGP enabled: OSPF 1
```

Table 116 describes the significant fields shown in the display.

Table 116 show mpls ldp igp sync Field Descriptions

Field	Description
Ethernet0/0	Interface name and type.
LDP configured	Label Distribution Protocol is configured.
SYNC enabled	Synchronization is active.
SYNC status	Synchronization is successful. **Note** Peer reachable is an LDP internal state used only for MPLS LDP synchronization. Do not use it to verify that LDP can reach the peer or to troubleshoot LDP functionality.
IGP holddown time	Interior Gateway Protocol hold-down time. • Infinite—No specific time is set.
Peer LDP Ident	IP address of the peer.
IGP enabled	Interior Gateway Protocol is enabled for the specified Open Shortest Path First (OSPF) protocol.

If LDP-IGP synchronization is not enabled on an interface, the output looks like the following:

```
Router# show mpls ldp igp sync

Ethernet5/1:
 LDP configured; LDP-IGP Synchronization not enabled.
```

The following is sample output from the **show mpls ldp igp sync** command when you configured a time delay for MPLS LDP-IGP synchronization:

```
Router# show mpls ldp igp sync

Ethernet0/0:
 LDP configured; LDP-IGP Synchronization enabled.
 Sync status: sync achieved; peer reachable.
 Sync delay time: 20 seconds (10 seconds left)
 IGP holddown time: infinite.
 IGP enabled: OSPF 1
```

Related Commands

Command	Description
debug mpls ldp igp sync	Displays events related to MPLS LDP -IGP synchronization.
mpls ldp igp sync	Enables MPLS LDP-IGP synchronization on an interface that belongs to an OSPF process.
mpls ldp igp sync holddown	Specifies how long an IGP should wait for LDP synchronization to be achieved.
mpls ldp sync	Enables MPLS LDP-IGP synchronization on interfaces for an OSPF process or an IS-IS process.

show mpls ldp neighbor

To display the status of Label Distribution Protocol (LDP) sessions, use the **show mpls ldp neighbor** command in user EXEC or privileged EXEC mode.

show mpls ldp neighbor [**vrf** *vrf-name* | **all**] [*address* | *interface*] [**detail**] [**graceful-restart**] [**capabilities**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the LDP neighbors for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance.
all	(Optional) Displays LDP neighbor information for all VPNs, including those in the default routing domain.
address	(Optional) Identifies the neighbor with this IP address.
interface	(Optional) Identifies the LDP neighbors accessible over this interface.
detail	(Optional) Displays information in long form, including password information for this neighbor.
graceful-restart	(Optional) Displays per-neighbor graceful restart information.
capabilities	(Optional) Displays LDP announce and receive information for an LDP neighbor.

Command Default

This command displays information about LDP neighbors for the default routing domain if you do not specify the optional **vrf** keyword.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	The command was modified to reflect Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.0(14)ST	This command was modified to reflect MPLS VPN support for LDP and the **vrf** and **all** keywords were added.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.0(26)S	The **detail** keyword was updated to display information about inbound filtering.
12.2(25)S	The **graceful-restart** keyword was added.
12.3(14)T	The command output was updated so that the **detail** keyword displays information about MPLS LDP Session Protection.

Release	Modification
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(28)SB	The **detail** keyword was updated to include Message Digest 5 (MD5) password information and the command was implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.0(33)S	This command was integrated into Cisco IOS Release 12.0(33)S.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SRE4	The command was modified so that the **detail** keyword displays LDP capabilities announce and receive information. The **capabilities** keyword was added.

Usage Guidelines

The **show mpls ldp neighbor** command can provide information about all LDP neighbors, or the information can be limited to the following:

- Neighbor with specific IP address
- LDP neighbors known to be accessible over a specific interface

Note This command displays information about LDP and Tag Distribution Protocol (TDP) neighbor sessions.

Examples

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

```
Router# show mpls ldp neighbor

Peer LDP Ident: 10.0.7.7:2; Local LDP Ident 10.1.1.1:1
        TCP connection: 10.0.7.7.11032 - 10.1.1.1.646
        State: Oper; Msgs sent/rcvd: 5855/6371; Downstream on demand
        Up time: 13:15:09
        LDP discovery sources:
          ATM3/0.1
Peer LDP Ident: 10.1.1.1:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.1.1.1.646 - 10.1.1.1.11006
        State: Oper; Msgs sent/rcvd: 4/411; Downstream
        Up time: 00:00:52
        LDP discovery sources:
          Ethernet1/0/0
        Addresses bound to peer LDP Ident:
          10.0.0.29       10.1.1.1        10.0.0.199      10.10.1.1
          10.205.0.9
```

The following is sample output from the **show mpls ldp neighbor** command, in which duplicate addresses are detected. They indicate an error because a given address should be bound to only one peer.

```
Router# show mpls ldp neighbor

Peer LDP Ident: 10.0.7.7:2; Local LDP Ident 10.1.1.1:1
        TCP connection: 10.0.7.7.11032 - 10.1.1.1.646
        State: Oper; Msgs sent/rcvd: 5855/6371; Downstream on demand
        Up time: 13:15:09
        LDP discovery sources:
          ATM3/0.1
```

```
Peer LDP Ident: 10.1.1.1:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.1.1.1.646 - 10.1.1.1.11006
        State: Oper; Msgs sent/rcvd: 4/411; Downstream
        Up time: 00:00:52
        LDP discovery sources:
          Ethernet1/0/0
        Addresses bound to peer LDP Ident:
          10.0.0.29 10.1.1.1 10.0.0.199 10.10.1.1
          10.205.0.9
        Duplicate Addresses advertised by peer:
          10.10.8.111
```

The following is sample output from the **show mpls ldp neighbor vrf vpn10** command, which displays the LDP neighbor information for the specified VPN routing and forwarding instance named vpn10:

```
Router# show mpls ldp neighbor vrf vpn10

Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.29.0.2:0
        TCP connection:10.14.14.14.646 - 10.29.0.2.11384
        State:Oper; Msgs sent/rcvd:1423/800; Downstream
        Up time:02:38:11
        LDP discovery sources:
          ATM3/0/0.10
        Addresses bound to peer LDP Ident:
          10.3.36.9       10.7.0.1        10.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
```

The following is sample output from the **show mpls ldp neighbor detail** command, which displays information about inbound filtering:

```
Router# show mpls ldp neighbor vrf vpn1 detail

 Peer LDP Ident: 10.13.13.13:0; Local LDP Ident 10.33.0.2:0
   TCP connection: 10.13.13.13.646 - 10.33.0.2.31581
   State: Oper; Msgs sent/rcvd: 11/10; Downstream; Last TIB rev sent 13
   Up time: 00:02:25; UID: 26; Peer Id 0;
   LDP discovery sources:
    Ethernet1/0/2; Src IP addr: 10.33.0.1
     holdtime: 15000 ms, hello interval: 5000 ms
   Addresses bound to peer LDP Ident:
    10.3.105.1       10.13.13.13     10.33.0..1
   Peer holdtime: 180000 ms; KA interval: 60000 ms; Peer state: estab
   LDP inbound filtering accept acl:1
 Peer LDP Ident: 10.14.14.14:0; Local LDP Ident 10.33.0.2:0
   TCP connection: 10.14.14.14.646 - 10.33.0.2.31601
   State: Oper; Msgs sent/rcvd: 10/9; Downstream; Last TIB rev sent 13
   Up time: 00:01:17; UID: 29; Peer Id 3;
   LDP discovery sources:
    Ethernet1/0/3; Src IP addr: 10.33.0.1
     holdtime: 15000 ms, hello interval: 5000 ms
   Addresses bound to peer LDP Ident:
    10.3.104.1       10.14.14.14     10.32.0.1
```

```
   Peer holdtime: 180000 ms; KA interval: 60000 ms; Peer state: estab
   LDP inbound filtering accept acl:1
   Capabilities Sent:
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
   Capabilities Received:
    [Dynamic Announcement (0x0506)]
    [Typed Wildcard (0x050B)]
```

The following is sample output from the **show mpls ldp neighbor all** command, which displays the LDP neighbor information for all VPN routing and forwarding instances, including those in the default routing domain. In this example, note that the same neighbor LDP ID (10.14.14.14) appears in all the listed VRF interfaces, highlighting the fact that the same IP address can coexist in different VPN routing and forwarding instances.

```
Router# show mpls ldp neighbor all

Peer TDP Ident:10.11.11.11:0; Local TDP Ident 10.12.12.12:0
        TCP connection:10.11.11.11.711 - 10.12.12.12.11003
        State:Oper; PIEs sent/rcvd:185/187; Downstream
        Up time:02:40:02
        TDP discovery sources:
          ATM1/1/0.1
        Addresses bound to peer TDP Ident:
          10.3.38.3        10.1.0.2        10.11.11.11
VRF vpn1:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.7.0.2:0
        TCP connection:10.14.14.14.646 - 10.7.0.2.11359
        State:Oper; Msgs sent/rcvd:952/801; Downstream
        Up time:02:38:49
        LDP discovery sources:
          ATM3/0/0.1
        Addresses bound to peer LDP Ident:
          10.3.36.9       10.7.0.1        10.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
VRF vpn2:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.13.0.2:0
        TCP connection:10.14.14.14.646 - 10.13.0.2.11361
        State:Oper; Msgs sent/rcvd:964/803; Downstream
        Up time:02:38:50
        LDP discovery sources:
          ATM3/0/0.2
        Addresses bound to peer LDP Ident:
          10.3.36.9       10.7.0.1        10.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
```

```
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
VRF vpn3:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.15.0.2:0
        TCP connection:10.14.14.14.646 - 10.15.0.2.11364
        State:Oper; Msgs sent/rcvd:1069/800; Downstream
        Up time:02:38:52
        LDP discovery sources:
          ATM3/0/0.3
        Addresses bound to peer LDP Ident:
          10.3.36.9       10.17.0.1       10.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
VRF vpn4:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.17.0.2:0
        TCP connection:10.14.14.14.646 - 10.17.0.2.11366
        State:Oper; Msgs sent/rcvd:1199/802; Downstream
```

The following is sample output from the **show mpls ldp neighbor graceful-restart** command, which shows the Graceful Restart status of the LDP neighbors:

```
Router# show mpls ldp neighbor graceful-restart

Peer LDP Ident: 10.20.20.20:0; Local LDP Ident 10.17.17.17:0
   TCP connection: 10.20.20.20.16510 - 10.17.17.17.646
    State: Oper; Msgs sent/rcvd: 8/18; Downstream
    Up time: 00:04:39
    Graceful Restart enabled; Peer reconnect time (msecs): 120000
Peer LDP Ident: 10.19.19.19:0; Local LDP Ident 10.17.17.17:0
    TCP connection: 10.19.19.19.11007 - 10.17.17.17.646
    State: Oper; Msgs sent/rcvd: 8/38; Downstream
    Up time: 00:04:30
    Graceful Restart enabled; Peer reconnect time (msecs): 120000
```

The following sample output from the **show mpls ldp neighbor detail** command, which displays information about the MD5 password configuration:

```
Router# show mpls ldp neighbor detail

    Peer LDP Ident: 10.3.3:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.3.3.3.11018 - 10.1.1.1.646
        Password: required, neighbor, in use
        State: Oper; Msgs sent/rcvd: 167/167; Downstream; Last TIB rev sent 9
        Up time: 02:24:02; UID: 5; Peer Id 3;
        LDP discovery sources:
          Targeted Hello 10.1.1.1 -> 10.3.3.3, passive;
            holdtime: 90000 ms, hello interval: 10000 ms
        Addresses bound to peer LDP Ident:
          10.3.3.3        10.0.30.3
```

```
    Peer holdtime: 180000 ms; KA interval: 60000 ms; Peer state: estab
Peer LDP Ident: 10.4.4.4:0; Local LDP Ident 10.1.1.1:0
    TCP connection: 10.4.4.4.11017 - 10.1.1.1.646
    Password: not required, none, stale
    State: Oper; Msgs sent/rcvd: 9/9; Downstream; Last TIB rev sent 9
    Up time: 00:05:35; UID: 6; Peer Id 1;
    LDP discovery sources:
      Ethernet1/0; Src IP addr: 10.0.20.4
        holdtime: 15000 ms, hello interval: 5000 ms
    Addresses bound to peer LDP Ident:
      10.0.40.4       10.4.4.4        10.0.20.4
    Peer holdtime: 180000 ms; KA interval: 60000 ms; Peer state: estab
```

Table 117 describes the significant fields shown in the displays.

Table 117 show mpls ldp neighbor Field Descriptions

Field	Description
Peer LDP Ident	LDP (or TDP) identifier of the neighbor (peer) for this session.
Local LDP Ident	LDP (or TDP) identifier for the local label switch router (LSR) for this session.
TCP connection	TCP connection used to support the LDP session, shown in the following format: • peer IP address.peer port • local IP address.local port
Password	Indicates if password protection is being used. Password status is as follows: • Required or not required—Indicates whether password configuration is required. • Neighbor, none, option #, or fallback—Indicates the password source when the password was configured. • In use (current) or stale (previous)—Indicates the current LDP session password usage status.
State	State of the LDP session. Generally, this is Oper (operational), but transient is another possible state.
Msgs sent/rcvd	Number of LDP messages sent to and received from the session peer. The count includes the transmission and receipt of periodic keepalive messages, which are required for maintenance of the LDP session.
Downstream on demand	Indicates that the Downstream on Demand method of label distribution is being used for this LDP session. When the Downstream on Demand method is used, an LSR advertises its locally assigned (incoming) labels to its LDP peer only when the peer requests them.
Downstream	Indicates that the downstream method of label distribution is being used for this LDP session. When the downstream method is used, an LSR advertises all of its locally assigned (incoming) labels to its LDP peer (subject to any configured access list restrictions).
Up time	Length of time (in hours, minutes, seconds) the LDP session has existed.
Graceful Restart enabled	Indicates whether the LDP session has Graceful Restart enabled.

Table 117 show mpls ldp neighbor Field Descriptions (continued)

Field	Description
Peer reconnect time	The length of time, in milliseconds (ms), the peer router waits for a router to reconnect.
LDP discovery sources	Sources of LDP discovery activity that led to the establishment of this LDP session.
Targeted Hello	Lists the platforms to which targeted hello messages are being sent: • The active field indicates that this LSR has initiated targeted hello messages. • The passive field indicates that the neighbor LSR has initiated targeted hello messages and that this LSR is configured to respond to the targeted hello messages from the neighbor.
holdtime	Period of time, in milliseconds (ms), a discovered LDP neighbor is remembered without receipt of an LDP hello message from the neighbor.
hello interval	Period of time, in milliseconds (ms), between the sending of consecutive hello messages.
Addresses bound to peer LDP Ident	Known interface addresses of the LDP session peer. These are addresses that might appear as “next hop” addresses in the local routing table. They are used to maintain the Label Forwarding Information Base (LFIB).
Duplicate Addresses advertised by peer	IP addresses that are bound to another peer. They indicate an error because a given address should be bound to only one peer.
Peer holdtime	The time, in milliseconds (ms), that the neighbor session is retained without the receipt of an LDP message from the neighbor.
KA Interval	Keepalive Interval. The amount of time, in milliseconds (ms), that a router lets pass without sending an LDP message to its neighbor. If this time elapses and the router has nothing to send, it sends a Keepalive message.
Peer state	State of the peer; estab means established.
LDP inbound filtering accept acl:1	Access list that is permitted for inbound label binding filtering.
Capabilities Sent	LDP capabilities that are advertised through LDP sessions associated with a specific routing domain.
Capabilities Received	LDP capabilities that are received from LDP sessions associated with a specific routing domain.

Related Commands

Command	Description
mpls ldp neighbor password	Configures a password key for computing MD5 checksums for the session TCP connection with the specified neighbor.
mpls ldp password fallback	Configures an MD5 password for LDP sessions with peers.
mpls ldp password option	Configures an MD5 password for LDP sessions with neighbors whose LDP router IDs are permitted by a specified access list.
mpls ldp password required	Specifies that LDP must use a password when establishing a session between LDP peers.
mpls ldp password rollover duration	Configures the duration before the new password takes effect on an MPLS LSR.
show mpls interfaces	Displays information about one or more interfaces that have been configured for label switching.
show mpls ldp discovery	Displays the status of the LDP discovery process.
show mpls ldp neighbor password	Displays password information used in established LDP sessions.

show mpls ldp neighbor password

To display password information used in established Label Distribution Protocol (LDP) sessions, use the **show mpls ldp neighbor password** command in user EXEC mode or privileged EXEC mode.

show mpls ldp neighbor [**vrf** *vrf-name*] [*ip-address* | *interface*] **password** [**pending** | **current**] [**all**]

Syntax Description

vrf *vrf-name*	(Optional) Displays the LDP neighbors for the specified Virtual Private Network (VPN) routing and forwarding (VRF) instance.
ip-address	(Optional) Identifies the neighbor that has this IP address.
interface	(Optional) Identifies the LDP neighbors accessible over this interface.
pending	(Optional) Displays LDP sessions whose password is different from that in the current configuration.
current	(Optional) Displays LDP sessions whose password is the same as that in the current configuration.
all	(Optional) When the **all** keyword is specified alone in this command, the command displays LDP password information for all neighbors in all VPNs, including those in the global routing table.

Defaults

If you do not specify an optional keyword for this command, password information for all established LDP sessions is displayed.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(28)SB	This command was introduced.
12.0(32)SY	This command was integrated into Cisco IOS Release 12.0(32)SY.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.0(33)S	This command was integrated into Cisco IOS Release 12.0(33)S.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

Use this command to display password information for established LDP sessions. If you do not specify an option, password information for all established LDP sessions is displayed. To display LDP sessions whose password is the same as that in the current configuration, use the **current** keyword with the command. To display LDP sessions whose password is different from that in the current configuration, use the **pending** keyword with the command.

Examples

The following is sample output from the **show mpls ldp neighbor password** command, which displays information for all established LDP sessions:

```
Router# show mpls ldp neighbor password

    Peer LDP Ident: 10.4.4.4:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.4.4.4.11017 - 10.10.01.10.646
        Password: not required, none, stale
        State: Oper; Msgs sent/rcvd: 57/57
    Peer LDP Ident: 10.3.3.3:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.3.3.3.11018 - 10.1.1.1.646
        Password: required, neighbor, in use
        State: Oper; Msgs sent/rcvd: 216/215
```

The following is sample output from the **show mpls ldp neighbor password pending** command, which displays information for LDP sessions whose passwords are different from those in the current configuration:

```
Router# show mpls ldp neighbor password pending

    Peer LDP Ident: 10.4.4.4:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.4.4.4.11017 - 10.1.1.1.646
        Password: not required, none, stale
        State: Oper; Msgs sent/rcvd: 57/57
```

The following is sample output from the **show mpls ldp neighbor password current** command, which displays information for LDP sessions whose passwords are the same as those in the current configuration:

```
Router# show mpls ldp neighbor password current

    Peer LDP Ident: 10.3.3.3:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.3.3.3.11018 - 10.1.1.1.646
        Password: required, neighbor, in use
        State: Oper; Msgs sent/rcvd: 216/215
```

Table 118 describes the significant fields shown in the displays.

Table 118 show mpls ldp neighbor password Field Descriptions

Field	Description
Peer LDP Ident	LDP identifier of the neighbor (peer) for this session.
Local LDP Ident	LDP identifier for the local label switch router (LSR) for this session.
TCP connection	TCP connection used to support the LDP session, shown in the following format: • peer IP address.peer port • local IP address.local port

Table 118 show mpls ldp neighbor password Field Descriptions (continued)

Field	Description
Password	Indicates the password source and status. • Required or not required indicates whether password configuration is required or not. • Neighbor, none, option #, or fallback indicates the password source when the password was configured. None indicates that no password was configured. • In use (current) or stale (previous) is the usage status of the current LDP session password.
State	State of the LDP session. Generally this is Oper (operational), but transient is another possible state.
Msgs sent/rcvd	Numbers of LDP messages sent to and received from the session peer. The count includes the transmission and receipt of periodic keepalive messages, which are required for maintaining the LDP session.

Related Commands

Command	Description
mpls ldp neighbor password	Configures a password key for computing MD5 checksums for the session TCP connection with the specified neighbor.
mpls ldp password fallback	Configures an MD5 password for LDP sessions with peers.
mpls ldp password option	Configures an MD5 password for LDP sessions with neighbors whose LDP router IDs are permitted by a specified access list.
mpls ldp password required	Specifies that LDP must use a password when establishing a session between LDP peers.
mpls ldp password rollover duration	Configures the duration before the new password takes effect on an MPLS LSR.
show mpls interfaces	Displays information about one or more interfaces that have been configured for label switching.
show mpls ldp discovery	Displays the status of the LDP discovery process.
show mpls ldp neighbor	Displays the status of LDP sessions.
show mpls ldp neighbor password	Displays password information used in established LDP sessions.

show mpls ldp parameters

To display current Label Distribution Protocol (LDP) parameters, use the **show mpls ldp parameters** command in user EXEC or privileged EXEC mode.

show mpls ldp parameters

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was integrated into Cisco IOS Release 12.0(10)ST. The command was modified to reflect Multiprotocol Label Switching (MPLS) Internet Engineering Task Force (IETF) command syntax and terminology.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000-PRE2 router.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

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

```
Router# show mpls ldp parameters

Protocol version: 1
Downstream label pool: min label 16; max label 100000
Session hold time: 180 sec; keep alive interval: 60 sec
Discovery hello: holdtime: 15 sec; interval: 5 sec
Discovery targeted hello: holdtime: 180 sec; interval: 5 sec
LDP for targeted sessions; peer acl: 1
LDP initial/maximum backoff: 30/240 sec
Router#
```

Table 119 describes the significant fields shown in the display.

Table 119 show mpls ldp parameters Field Descriptions

Field	Description
Protocol version	Indicates the version of LDP running on the platform.
Downstream label pool	Describes the range of labels available for the platform to assign for label switching purposes. The available labels range from the smallest label value (min label) to the largest label value (max label), with a modest number of labels at the low end of the range (reserved labels) reserved for diagnostic purposes.
Session hold time	Indicates the time (in seconds) that an LDP session is to be maintained with an LDP peer without receiving LDP traffic or an LDP keepalive message from the peer.
keep alive interval	Indicates the interval of time (in seconds) between consecutive transmissions of LDP keepalive messages to an LDP peer.
Discovery hello	Indicates the amount of time (in seconds) to remember that a neighbor platform wants an LDP session without receiving an LDP hello message from the neighbor (hold time), and the time interval between the transmission of consecutive LDP hello messages to neighbors (interval).
Discovery targeted hello	Indicates the amount of time to remember that a neighbor platform wants an LDP session when: 1. The neighbor platform is not directly connected to the router. 2. The neighbor platform has not sent an LDP hello message. This intervening interval is known as hold time. This field also indicates the time interval between the transmission of consecutive hello messages to a neighbor not directly connected to the router.
LDP for targeted sessions	Reports the parameters that have been set by the **show mpls atm-ldp bindings** command.
LDP initial/maximum backoff	Reports the parameters that have been set by the **mpls ldp backoff** command.

Related Commands

Command	Description
mpls ldp holdtime	Changes the time for which an LDP session is maintained in the absence of LDP messages from the session peer.

show mpls memory

To display information about the Multiprotocol Label Switching (MPLS) Label Distribution Protocol memory usage, use the **show mpls memory** command in user EXEC or privileged EXEC mode.

show mpls memory [**all**] [**component** *string* | **detailed**]

Syntax Description

all	(Optional) Specifies all the related memory of other modules.
component *string*	(Optional) Specifies the sorted output based on component names.
detailed	(Optional) Specifies the details about the memory usage.

Command Modes

User EXEC(>)
Privileged EXEC(#)

Command History

Release	Modification
12.4(22)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(22)T.
12.2(33)SRC	This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SRC.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Examples

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

```
Router: show mpls memory

  Allocator-Name                  In-use/Allocated           Count
  ------------------------------------------------------------------------------
  LFD: AToM pwid            :           0/67232      (  0%) [      0] Chunk
  LFD: FPI LBL              :         144/22424      (  0%) [      4] Chunk
  LFD: LTE                  :         192/35704      (  0%) [      4] Chunk
  LFD: MOI DEAG             :          96/22704      (  0%) [      3] Chunk
  LFD: MOI DROP             :          20/24208      (  0%) [      1] Chunk
  LFD: RW NONE              :         160/36248      (  0%) [      4] Chunk
  LSD: FPI FRR              :       22312/22424      ( 99%) [      2]
  LSD: FPI LBL              :       22312/22424      ( 99%) [      2]
  LSD: MOI DEAG             :       23424/23536      ( 99%) [      2]
  LSD: MOI DROP             :       13424/13536      ( 99%) [      2]
  LSD: RW NONE              :       36136/36248      ( 99%) [      2]
  LSD: intf                 :       33512/33624      ( 99%) [      2]
  LSD: label tbl            :       22704/35952      ( 63%) [    516] Chunk
  LSD: label tbl            :          64/1800       (  3%) [      1] Chunk
  MFI: Clnt CMsg            :           0/65592      (  0%) [      0] Chunk
  MFI: Clnt SMsg            :       71200/131184     ( 54%) [      4] Chunk
  MFI: InfoReq              :           0/808        (  0%) [      0] Chunk
  MFI: InfoRply             :           0/65592      (  0%) [      0] Chunk

  Total allocated: 0.629 Mb, 645 Kb, 661240 bytes
```

Table 120 describes the significant fields shown in the display.

Table 120 show mpls memory Field Descriptions

Field	Description
Allocator-Name	The specific name of the allocator.
In-use/Allocated	The details of usage of the allocators.
Count	The number of allocators used.

Related Commands

Command	Description
debug mpls ldp igp sync	Displays events related to MPLS LDP-IGP synchronization.
mpls ldp igp sync	Enables MPLS LDP-IGP synchronization on an interface that belongs to an OSPF process.
mpls ldp igp sync holddown	Specifies how long an IGP should wait for LDP synchronization to be achieved.
mpls ldp sync	Enables MPLS LDP-IGP synchronization on interfaces for an OSPF process or an IS-IS process.