



MPLS Label Distribution Protocol Commands

This module describes the commands used to configure Label Distribution Protocol (LDP) in a Multiprotocol Label Switching (MPLS) network on the .

LDP provides a standard methodology for hop-by-hop (or dynamic label) distribution in an MPLS network by assigning labels to routes that have been chosen by the underlying Interior Gateway Protocol (IGP) routing protocols. The resulting labeled paths, called *label switch paths* (LSPs), forward labeled traffic across an MPLS backbone.

LDP also provides the means for label switching routers (LSRs) to request, distribute, and release label prefix binding information to peer routers in a network. LDP enables LSRs to discover potential peers and establish LDP sessions with those peers to exchange label binding information.

For detailed information about MPLS concepts, configuration tasks, and examples, see *Cisco IOS XR MPLS Configuration Guide for the Cisco XR 12000 Series Router*.

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backoff

To configure the parameters for the Label Distribution Protocol (LDP) backoff mechanism, use the **backoff** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

backoff *initial maximum*

no backoff

Syntax Description

initial Initial backoff delay, in seconds. Range is 5 to 50331.

maximum Maximum backoff delay, in seconds. Range is 5 to 50331.

Command Default

initial : 15

maximum : 120

Command Modes

MPLS LDP configuration

Command History

Release

Release 3.2

Modification

This command was supported.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The LDP backoff mechanism prevents two incompatibly configured label switch routers from engaging in an unthrottled sequence of session setup failures. If a session setup attempt fails (due to incompatibility), each Label Switching Router (LSR) delays the next attempt, increasing the delay exponentially with each successive failure until the maximum backoff delay is reached.

Task ID

Task ID

mpls-ldp

Operations

read, write

Examples

The following example shows how to configure the initial backoff delay to 30 seconds and the maximum backoff delay to 240 seconds:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# backoff 30 240
```

Related Commands

Command	Description
show mpls ldp backoff, on page 78	Displays information about the configured session setup backoff parameters and LDP peers.
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.

clear mpls ldp forwarding

To clear (or reset) the MPLS Label Distribution Protocol (LDP) forwarding rewrites, use the **clear mpls ldp forwarding** command in EXEC mode.

```
clear mpls ldp [vrf vrf-name] [ipv4 ] forwarding [prefix/length ]
```

Syntax Description

<i>vrf vrf-name</i>	(Optional) Clears the VRF information for the specified VRF.
ipv4	(Optional) Specifies IP version 4 address family.
<i>prefix</i>	(Optional) Destination prefix, written in A.B.C.D format.
<i>length</i>	(Optional) Network mask length, in bits. Range is 0 to 32.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 4.0.1	This command was introduced.
Release 5.1.1	The vrf and ipv4 keywords were added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This command resets LDP installed forwarding state for all prefixes or a given prefix. It is useful when installed LDP forwarding state needs to be reprogrammed in LSD and MPLS forwarding.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

This example shows how to clear (or reset) the MPLS LDP forwarding rewrites using the **clear mpls ldp forwarding** command:

```
RP/0/0/CPU0:router# clear mpls ldp forwarding
```

Related Commands

Command	Description
show mpls ldp forwarding	Displays the LDP forwarding state installed in MPLS forwarding.
show mpls forwarding	Displays the contents of the MPLS Label Forwarding Information Base (LFIB).
graceful-restart (MPLS LDP), on page 30	Configures the LDP graceful restart feature.
show mpls ldp bindings, on page 80	Displays the contents of LDP LIB.

clear mpls ldp msg-counters neighbor

To clear the Label Distribution Protocol (LDP) message counters, use the **clear mpls ldp msg-counters neighbor** command in EXEC mode.

```
clear mpls ldp [vrf vrf-name] msg-counters neighbor [lsr-id | ldp-id]
```

Syntax Description

<i>vrf vrf-name</i>	(Optional) Clears the VRF information for the specified VRF.
<i>lsr-id</i>	LSR ID of neighbor in A.B.C.D format.
<i>ldp-id</i>	LDP ID of neighbor in A.B.C.D: format.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.2	This command was supported.
Release 5.1.1	The vrf keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **clear mpls ldp msg-counters neighbor** command to clear the statistics on message counters for a specific neighbor (IP address) or for all neighbors. These message counters count the number of LDP protocol messages sent to and received from LDP neighbors.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to clear message counters for neighbor 10.20.20.20:

```
RP/0/0/CPU0:router# clear mpls ldp msg-counters neighbor 10.20.20.20
```

Related Commands

Command	Description
show mpls ldp statistics msg-counters, on page 128	Displays statistics about the type and count of the messages sent and received from neighbors.

clear mpls ldp neighbor

To force Label Distribution Protocol (LDP) session restart, use the **clear mpls ldp neighbor** command in EXEC mode.

clear mpls ldp [**vrf all**] [**vrf vrf-name**] **neighbor** [*ip-address* | *ldp-id*]

Syntax Description

vrf all	(Optional) Clears all LDP configured VRF neighbors.
vrf vrf-name	(Optional) Clears the VRF information for the specified VRF.
<i>ip-address</i>	(Optional) Neighbor IP address.
<i>ldp-id</i>	(Optional) Neighbor LDP ID in A.B.C.D: format.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 5.1.1	The vrf and vrf all keywords were added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **clear mpls ldp neighbor** command to restart a single LDP session or all LDP sessions (without restarting the LDP process itself).

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to force an unconditional LDP session restart:

```
RP/0/0/CPU0:router# clear mpls ldp neighbor 10.20.20.20
```

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

clear mpls ldp nsr statistics neighbor

To clear the nonstop routing (NSR) statistics, use the **clear mpls ldp nsr statistics neighbor** command in EXEC mode.

clear mpls ldp [*vrf vrf-name*] **nsr statistics neighbor** [*lsr-id* | *ldp-id*]

Syntax Description

<i>vrf vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
<i>lsr-id</i>	(Optional) LSR ID of neighbor in A.B.C.D format.
<i>ldp-id</i>	(Optional) LDP ID of neighbor in A.B.C.D: format.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to clear NSR statistics for neighbor 10.20.20.20:

```
RP/0/0/CPU0:router#clear mpls ldp nsr statistics neighbor 10.20.20.20
```

debug mpls ldp rsi

To enable the display of MPLS LDP router space infrastructure (RSI) debugging events, use the **debug mpls ldp rsi** command in EXEC mode. To disable the display of MPLS LDP RSI debugging information, use the **no** form of this command.

```
debug mpls ldp rsi [location node-id]
no debug mpls ldp rsi [location node-id]
```

Syntax Description

location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to enable MPLS LDP RSI debugging events:

```
RP/0/0/CPU0:router# debug mpls ldp rsi
```

debug mpls ldp vrf

To enable the display of MPLS LDP virtual routing and forwarding (VRF) debugging events, use the **debug mpls ldp vrf** command in EXEC mode. To disable the display of MPLS LDP VRF debugging information, use the **no** form of this command.

```
debug mpls ldp vrf [location node-id]
```

```
no debug mpls ldp vrf [location node-id]
```

Syntax Description

location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
--------------------------------	---

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to enable MPLS LDP VRF debugging events:

```
RP/0/0/CPU0:router# debug mpls ldp vrf
```

default-route

To enable Multiprotocol Label Switching (MPLS) switching for IP default route by allocating and advertising non-null label, use the **default-route** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

default-route

no default-route

Syntax Description This command has no arguments or keywords.

Command Default Allocates null (implicit or explicit) local label for IP default route prefix 0.0.0.0/0.

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.3.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When the IP default route 0.0.0.0/0 is configured on an egress router, it is advertised through Interior Gateway Protocol (IGP) to other routers to enable default IP forwarding. When MPLS LDP is configured and establishing label switch paths (LSPs) for other prefixes, you can emulate default forwarding and switching for MPLS in the same way as IP forwarding. To do so, allocate a non-null local label and advertise this label to its peers.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to enable default MPLS switching for default prefix:

```
RP/0/0/CPU0:router(config-ldp)# default-route
```

Related Commands

Command	Description
show mpls ldp bindings, on page 80	Displays LDP label bindings.
show mpls ldp forwarding, on page 95	Displays LDP installed forwarding state.

discovery hello

To configure the interval between transmission of consecutive Label Distribution Protocol (LDP) discovery hello messages and the holdtime for a discovered LDP neighbor, use the **discovery hello** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
discovery hello {holdtime seconds} interval seconds}
```

```
no discovery hello {holdtime | interval}
```

Syntax Description

holdtime	Sets the time, in seconds, a discovered LDP neighbor is remembered without receipt of an LDP hello message from the neighbor. Default is 15.
interval	Sets the time, in seconds, between consecutive hello messages. Default is 5.
<i>seconds</i>	Time value, in seconds. Range is 1 to 65535 (65535 means infinite).

Command Default

holdtime: 15

interval: 5

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure the link hello holdtime to 30 seconds:

```
RP/0/0/CPU0:router (config-ldp) # discovery hello holdtime 30
```

The following example shows how to configure the link hello interval to 10 seconds:

```
RP/0/0/CPU0:router(config-ldp)# discovery hello interval 10
```

Related Commands

Command	Description
discovery targeted-hello, on page 20	Configures targeted-hello messages.

discovery instance-tlv disable

To disable transmit and receive processing for Type-Length-Value (TLV), use the **discovery instance-tlv disable** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

discovery instance-tlv disable

no discovery instance-tlv disable

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.4.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to disable transmit and receive processing for TLV:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# discovery instance-tlv disable
```

Related Commands	Command	Description
	discovery targeted-hello , on page 20	Configures targeted-hello messages.

discovery targeted-hello

To configure the interval between transmission of consecutive Label Distribution Protocol (LDP) discovery targeted-hello messages, the hold time for a discovered targeted LDP neighbor, and to accept targeted hello from peers, use the **discovery targeted-hello** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
discovery targeted-hello address-family {ipv4 } {accept| [from acl]| holdtime seconds| interval seconds}
no discovery targeted-hello {accept | holdtime | interval}
```

Syntax Description

accept	Accepts targeted hellos from any source.
ipv4	Specifies IP version 4 address family.
from <i>acl</i>	(Optional) Accepts targeted hellos from LDP peers as permitted by the access-list.
holdtime	Configures the time a discovered LDP neighbor is remembered without receipt of an LDP hello message from a neighbor.
interval	Displays time between consecutive hello messages.
<i>seconds</i>	Time value, in seconds. Range is 1 to 65535.

Command Default

accept : Targeted hello messages are not accepted from any source (neighbor).
holdtime : 90
interval : 10

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	Support was added for the from <i>acl</i> keyword and argument under the accept command.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

LDP supports IPv4 standard access lists only.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure the targeted-hello holdtime to 45 seconds:

```
RP/0/0/CPU0:router(config-ldp)# discovery targeted-hello holdtime 45
```

The following example shows how to configure the targeted-hello interval to 5 seconds:

```
RP/0/0/CPU0:router(config-ldp)# discovery targeted-hello interval 5
```

The following example shows how to configure acceptance of targeted hellos from all peers:

```
RP/0/0/CPU0:router(config-ldp)# discovery targeted-hello accept
```

The following example shows how to configure acceptance of targeted hello from peers 10.1.1.1 and 10.2.2.2 only:

```
RP/0/0/CPU0:router(config)# ipv4 access-list peer_acl_10
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.1.1.1
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.2.2.2
RP/0/0/CPU0:router(config-ldp)# discovery targeted-hello accept from peer_acl_10
```

Related Commands

Command	Description
show mpls ldp discovery, on page 89	Displays LDP discovery information.
show mpls ldp parameters, on page 123	Displays LDP parameters information.

discovery transport-address

To provide an alternative address for a TCP connection, use the **discovery transport-address** command in MPLS LDP interface configuration mode. To return to the default behavior, use the **no** form of this command.

```
[vrf vrf-name [interface type interface-path-id]] address-family ipv4 discovery transport-address
{ip-address | interface}
```

```
no [vrf vrf-name [interface type interface-path-id]] address-family {ipv4 } discovery transport-address
{ip-address | interface}
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Specifies the VRF name.
interface <i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
address-family ipv4	Specifies IP version 4 address family.
<i>ip-address</i>	IP address to be advertised as the transport address in discovery hello messages.
interface	Advertises the IP address of the interface as the transport address in discovery hello messages.

Command Default

LDP advertises its LDP router ID as the transport address in LDP discovery hello messages.

Command Modes

MPLS LDP interface configuration

Command History

Release	Modification
Release 3.2	This command was supported.
Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf keyword was added. • The interface keyword was added. • The address-family ipv4 keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Establishing an LDP session between two routers requires a session TCP connection. To establish the session TCP connection, each router must know the transport address (IP address) of the other router.

The LDP discovery mechanism provides the means for a router to advertise transport addresses. Transport address is implicit or explicit. Implicit addresses do not appear as part of the contents of the discovery hello messages sent to the peer. If explicit, the advertisement appears as part of the contents of discovery hello messages sent to the peer.

The **discovery transport-address** command modifies the default behavior described above. Using the **interface** keyword, LDP advertises the IP address of the interface in LDP discovery hello messages sent from the interface. Using the *ip-address* argument, LDP advertises the IP address in LDP discovery hello messages sent from the interface.

**Note**

When a router has multiple links connecting it to its peer device, the router must advertise the same transport address in the LDP discovery hello messages it sends on all such interfaces.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to specify an exiting address (10.10.3.1) as the transport address on an interface POS 0/1/0/0:

```
RP/0/0/CPU0:router(config-ldp)# interface POS 0/1/0/0
RP/0/0/CPU0:router(config-ldp-if)# address-family ipv4
RP/0/0/CPU0:router(config-ldp-if-af)#discovery transport-address 10.10.3.1

RP/0/0/CPU0:router# show mpls ldp neighbor

Peer LDP Identifier: 10.44.44.44:0
```

```

TCP connection: 10.44.44.44:65520 - 10.10.3.1:646
Graceful Restart: Yes (Reconnect Timeout: 15 sec, Recovery: 180 sec)
State: Oper; Msgs sent/rcvd: 13/9
Up time: 00:00:11
LDP Discovery Sources:
  POS 0/1/0/0
Addresses bound to this peer:
  10.10.3.2      10.44.44.44

```

Related Commands

Command	Description
show mpls ldp discovery, on page 89	Displays the status of the LDP discovery process.
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

downstream-on-demand

To configure MPLS Label Distribution Protocol (LDP) downstream-on-demand mode, use the **downstream-on-demand** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
[vrf vrf-name session] downstream-on-demand with access-list
no [vrf vrf-name session] downstream-on-demand with access-list
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
session	(Optional) Configures session parameters.
with	Displays access list of LDP peers.
<i>access-list</i>	IPv4 access-list name.

Command Default

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 4.0.1	This command was introduced.
Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf keyword was added. • The session keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read, write

Examples

This is a sample output from the **downstream-on-demand** command:

```
RP/0/0/CPU0:router(config-ldp)# downstream-on-demand with access-list
```

Related Commands

Command	Description
graceful-restart (MPLS LDP), on page 30	Configures the LDP graceful restart feature.
show mpls ldp bindings, on page 80	Displays the contents of LDP LIB.

explicit-null

To configure a router to advertise explicit null labels instead of implicit null labels, use the **explicit-null** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
[vrf vrf-name] address-family {ipv4 } label local advertise explicit-null [to peer-acl | for prefix-acl [to peer-acl]]
```

```
no [vrf vrf-name] address-family {ipv4 } label local advertise explicit-null [to peer-acl | for prefix-acl [to peer-acl]]
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Specifies the VRF name.
address-family ipv4	Specifies IP version 4 address family.
label	Configures label control and policies.
local	Configures local label control and policies.
advertise	Configures outbound label advertisement control.
to <i>peer-acl</i>	(Optional) Specifies LDP peers for which explicit-null is advertised instead of implicit-null. Range is 1 to 99.
for <i>prefix-acl</i>	(Optional) Specifies prefixes for which explicit-null is advertised instead of implicit-null. Range is 1 to 99.

Command Default

Implicit null is advertised as default null label for routes, such as directly connected routes.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	Support was added for the for and to keywords
Release 5.0.0	This command was introduced.

Release	Modification
Release 5.1.1	<p>The following items were added:</p> <ul style="list-style-type: none"> • The vrf keyword was added. • The address-family ipv4 keyword was added. • The label keyword was added. • The local keyword was added. • The advertise keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Normally, LDP advertises an implicit null label for directly connected routes. The implicit null label causes the previous hop router to perform next to last router hop popping.

The **explicit-null** command advertises the explicit-null labels in place of implicit null labels for directly connected prefixes.

LDP supports IPv4 standard access lists only.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following command shows how to advertise explicit null for all directly connected routes to all LDP peers:

```
RP/0/0/CPU0:router(config-ldp-af-lbl-lcl-adv) # explicit-null
```

The following command sequence shows how to advertise explicit-null for directly connected route 192.168.0.0 to all LDP peers and implicit-null for all other directly connected routes:

```
RP/0/0/CPU0:router(config) # ipv4 access-list pfx_acl_192_168
RP/0/0/CPU0:router(config-ipv4-acl) # permit 192.168.0.0
RP/0/0/CPU0:router(config-ldp-af-lbl-lcl-adv) # explicit-null for pfx_acl_192_168
```

The following command sequence shows how to send explicit-null for all directly connected routes to peers 10.1.1.1 and 10.2.2.2 and implicit-null to all other peers:

```
RP/0/0/CPU0:router(config) # ipv4 access-list peer_acl_10
RP/0/0/CPU0:router(config-ipv4-acl) # permit 10.1.1.1
RP/0/0/CPU0:router(config-ipv4-acl) # permit 10.2.2.2

RP/0/0/CPU0:router(config-ldp-af-lbl-lcl-adv) # explicit-null to peer_acl_10
```

The following command shows how to advertise explicit-null for prefix 192.168.0.0 to peers 10.1.1.1 and 10.2.2.2 and advertise implicit-null for all other applicable routes to all other peers:

```
RP/0/0/CPU0:router(config-ldp-af-lbl-lcl-advrt)# explicit-null for pfx_acl_192_168 to peer_acl_10
```

Related Commands

Command	Description
show mpls ldp bindings, on page 80	Displays the contents of LDP LIB.
show mpls ldp forwarding, on page 95	Displays the contents of the LDP forwarding database.
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.

graceful-restart (MPLS LDP)

To configure graceful restart, use the **graceful-restart** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

graceful-restart [**reconnect-timeout** *seconds*| **forwarding-state-holdtime** *seconds*]

no graceful-restart [**reconnect-timeout**| **forwarding-state-holdtime**]

Syntax Description

reconnect-timeout <i>seconds</i>	(Optional) Configures the time that the local LDP sends to its graceful restartable peer, indicating how long its neighbor should wait for reconnection in the event of a LDP session failure, in seconds. Range is 60 to 1800.
forwarding-state-holdtime <i>seconds</i>	(Optional) Configures the time the local forwarding state is preserved (without being reclaimed) after the local LDP control plane restarts, in seconds. Range is 60 to 1800.

Command Default

By default, graceful restart is disabled.

reconnect-timeout: 120

forwarding-state-holdtime: 180

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.9.0	The maximum value for the seconds argument is 1800.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the LDP graceful restart capability to achieve nonstop forwarding (NSF) during an LDP control plane communication failure or restart. To configure graceful restart between two peers, enable LDP graceful restart on both label switch routers (LSRs).

When an LDP graceful restart session is established and there is control plane failure, the peer LSR starts graceful restart procedures, initially keeps the forwarding state information pertaining to the restarting peer, and marks this state as stale. If the restarting peer does not reconnect within the reconnect timeout, the stale forwarding state is removed. If the restarting peer reconnects within the reconnect time period, it is provided recovery time to resynchronize with its peer. After this time, any unsynchronized state is removed.

The value of the forwarding state hold time keeps the forwarding plane state associated with the LDP control-plane in case of a control-plane restart or failure. If the control plane fails, the forwarding plane retains the LDP forwarding state for twice the forwarding state hold time. The value of the forwarding state hold time is also used to start the local LDP forwarding state hold timer after the LDP control plane restarts. When the LDP graceful restart sessions are renegotiated with its peers, the restarting LSR sends the remaining value of this timer as the recovery time to its peers. Upon local LDP restart with graceful restart enabled, LDP does not replay forwarding updates to MPLS forwarding until the forwarding state hold timer expires.

**Note**

In the presence of a peer relationship, any change to the LDP graceful restart configuration will restart LDP sessions. If LDP configuration changes from nongraceful restart to graceful restart, all the sessions are restarted. Only graceful restart sessions are restarted upon graceful restart to nongraceful restart configuration changes.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure an existing session for graceful restart:

```
RP/0/0/CPU0:router(config-ldp)# graceful-restart

RP/0/0/CPU0:router:Apr  3 10:56:05.392 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
2.2.2.2:0, DOWN
RP/0/0/CPU0:router:Apr  3 10:56:05.392 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
3.3.3.3:0, DOWN
RP/0/0/CPU0:router:Apr  3 10:56:09.525 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
3.3.3.3:0, UP
RP/0/0/CPU0:router:Apr  3 10:56:11.114 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
2.2.2.2:0, UP

RP/0/0/CPU0:router# show mpls ldp neighbor brief

Peer                GR Up Time          Discovery Address
-----
3.3.3.3:0           Y 00:01:04           3           8
2.2.2.2:0           N 00:01:02           2           5

RP/0/0/CPU0:router# show mpls ldp graceful-restart

Forwarding State Hold timer : Not Running
GR Neighbors                  : 1

Neighbor ID           Up Connect Count  Liveness Timer  Recovery Timer
-----
3.3.3.3               Y           1                -                -
```

Related Commands

Command	Description
show mpls ldp forwarding, on page 95	Displays the contents of the LDP forwarding database.
show mpls ldp graceful-restart, on page 101	Displays information related to graceful restart.
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.
show mpls ldp summary, on page 130	Displays summarized information regarding the LDP process.

session holdtime (MPLS LDP)

To change the time for which an Label Distribution Protocol (LDP) session is maintained in the absence of LDP messages from the session peer, use the **session holdtime** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

session holdtime *seconds*

no session holdtime

Syntax Description

<i>seconds</i>	Time, in seconds, that an LDP session is maintained in the absence of LDP messages from the session peer. Range is 15 to 65535.
----------------	---

Command Default

seconds: 180

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to change the hold time of LDP sessions to 30 seconds:

```
RP/0/0/CPU0:router(config-ldp)# session holdtime 30
```

Related Commands

Command	Description
show mpls ldp parameters , on page 123	Displays current LDP parameter settings.

igmp auto-config disable

To disable Label Distribution Protocol (LDP) auto-configuration, use the **igmp auto-config disable** command in MPLS LDP interface configuration mode. To return to the default behavior, use the **no** form of this command.

igmp auto-config disable

no igmp auto-config disable

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP interface configuration

Command History	Release	Modification
	Release 3.5.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

IGMP auto-configuration can be enabled on ISIS and OSPF. Configuration details are described in *Cisco IOS XR Routing Configuration Guide for the Cisco XR 12000 Series Router*.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to disable LDP auto-configuration on POS 0/1/0/3:

```
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# interface pos 0/1/0/3
RP/0/0/CPU0:router(config-ldp-if)# igmp auto-config disable
```

Related Commands	Command	Description
	show mpls ldp interface , on page 107	Displays information about LDP-enabled interfaces.

igp auto-config disable

igp sync delay

To enable Label Distribution Protocol (LDP) Interior Gateway Protocol (IGP) sync delay timer feature, use the **igp sync delay** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

igp sync delay *seconds*

no igp sync delay

Syntax Description

<i>seconds</i>	Time, in seconds, that declaration of LDP sync state being up is delayed after session establishment upon link coming up. Range is 5 to 300.
----------------	--

Command Default

LDP does not delay declaration of sync up and notifies IGP as soon as sync up conditions are met for a link.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

- By default, LDP declares LDP sync up as soon as all the requisite conditions are met, namely:
 - LDP session is up.
 - LDP has sent all its label bindings to at least one peer.
 - LDP has received at least one label binding from a peer.

This minimizes traffic loss on link up but can still lead to substantial traffic loss under certain circumstances (for example, when interoperating with an LSR with ordered mode operation). It may be necessary to delay declaration of sync up after the session comes up by configuring a timeout period.

- When the graceful-restart event is configured, the IGP sync delay timer does not take effect.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure LDP to delay declaration of sync-up to 30 seconds:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# igp sync delay 30
```

Related Commands

Command	Description
show mpls ldp igp sync, on page 104	Displays LDP IGP sync information for link(s).

igp sync delay on-proc-restart

To delay the declaration of synchronization events to the Interior Gateway Protocol (IGP) when the label distribution protocol (LDP) fails or restarts, use the **igp sync delay on-proc restart** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

igp sync delay on-proc restart *seconds*

no igp sync delay on-proc restart *seconds*

Syntax Description

<i>seconds</i>	Time, in seconds, duration of process-level delay for synchronization events when the LDP fails or restarts. Range is from 60 to 600.
----------------	---

Command Default

This command is disabled by default.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **igp sync delay on-proc restart** command enables a process-level delay for synchronization events when the LDP fails or restarts. This delay defers the sending of sync-up events to the IGP until most or all the LDP sessions converge and also allows the LDP to stabilize. This allows the LDP process failure to be less stressful because IGP receive all the sync-up events in bulk. This means that the IGP is required to run the shortest path first (SPF) and link-state advertisements (LSAs) only one time with an overall view of the sync-up events.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure LDP to delay the declaration of synchronization events to IGP by 60 seconds:

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

```
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# igp sync delay on-proc restart 60
```

The following example shows the status following execution of the command:

```
RP/0/0/CPU0:router# show mpls ldp igp sync

  Process Restart Sync Delay: 60 sec, Gloal timer running (15 sec remaining)
  GigabitEthernet0/3/0/2:
  Sync status: Deferred
  ....
```

When the timer is not running, the output displays the following:

```
Process Restart Sync Delay: 60 sec, Global timer not running
```

Related Commands

Command	Description
show mpls ldp igp sync, on page 104	Displays LDP IGP sync information for link(s).

interface (MPLS LDP)

To configure or enable Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP) on an interface, use the **interface** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

interface *type interface-path-id*

no interface *type interface-path-id*

Syntax Description

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

When you configure LDP on an interface, the LDP process begins neighbor discovery, sending link hello messages on the interface. This can result in a session setup with discovered neighbors. When LDP is enabled on tunnel-te interfaces, targeted discovery procedures apply.

LDP interface configuration supports forward reference; accordingly, it is possible to configure a nonexistent interface under LDP.



Note You cannot enable LDP on loopback interfaces.

MPLS LDP is supported over Generic Route Encapsulation (GRE) tunnels by configuring the tunnel-ip interface. LDP establishes a link session (as opposed to a targeted LDP session) over the GRE tunnel.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure LDP on POS interface 0/1/0/0:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# interface POS 0/1/0/0
RP/0/0/CPU0:router(config-ldp-if)#
```

The following example shows how to configure LDP on an MPLS TE tunnel:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# interface tunnel-te 123
RP/0/0/CPU0:router(config-ldp-if)#
```

Related Commands

Command	Description
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.
show mpls ldp neighbor, on page 110	Displays LDP neighbor session parameters.

label accept

To control the receipt of labels (remote bindings) for a set of prefixes from a peer, use the **label accept** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

label accept for *prefix-acl* from *ip-address*

no label accept for *prefix-acl* from *ip-address*

Syntax Description

for <i>prefix-acl</i>	Accepts and retains remote bindings for prefixes that are permitted by the prefix access list <i>prefix-acl</i> argument.
from <i>ip-address</i>	Displays the peer IP address.

Command Default

LDP accepts and retains label bindings for all prefixes from all peers.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

By default, LDP accepts labels (as remote bindings) for all prefixes from all its peers. To save resources (such as memory) configure the access list to specify label and binding acceptance for a set of prefixes from a peer.

If the inbound label filtering policy changes such that it now allows previously denied prefixes from a peer, you must reset the LDP session with the peer using the **clear mpls ldp neighbor** command.

LDP supports IPv4 standard access lists only.



Note

Label acceptance control is also referred to as LDP inbound label filtering.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure inbound label filtering policy. In this example, an LSR is configured to accept and retain label bindings for prefixes 192.168.1.1 (pfx_acl_1) from peer 1.1.1.1, prefix 192.168.2.2 (pfx_acl_2) from peer 2.2.2.2, and prefixes 192.168.1.1, 192.168.2.2, 192.168.3.3 (pfx_acl_3) from peer 3.3.3.3:

```
RP/0/0/CPU0:router(config-ldp)# label accept
RP/0/0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_1 from 1.1.1.1
RP/0/0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_2 from 2.2.2.2
RP/0/0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_3 from 3.3.3.3
```

Related Commands

Command	Description
label advertise, on page 45	Controls advertisement of LDP local label bindings (outbound label filtering).
clear mpls ldp neighbor, on page 10	Resets LDP neighbor sessions.
show mpls ldp bindings, on page 80	Displays LDP binding information.

label advertise

To control the advertisement of local labels, use the **label advertise** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
label advertise [disable] for prefix-acl [to peer-acl] interface type interface-path-id
no label advertise [disable] for prefix-acl [to peer-acl] interface type interface-path-id
```

Syntax Description

disable	(Optional) Disables label advertisement to all peers for all prefixes.
for <i>prefix-acl</i>	(Optional) Specifies prefix destinations for which labels will be advertised.
to <i>peer-acl</i>	(Optional) Specifies which LDP neighbors will receive label advertisements.
interface	(Optional) Specifies an interface for label allocation and advertisement of its interface IP address.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

LDP advertises labels for all known prefixes to all peers. LDP does not advertise labels for local interfaces addresses other than Loopback interfaces.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **label advertise** command determines how the label switch router (LSR) advertises local labels. The following rules describe the effects of running multiple commands:

- Every command has a prefix-acl or peer-acl pair associated with it, as follows:
 - In the absence of the **for** or **to** keywords, the access list pair is (none, none).
 - When using the **for** keyword without the **to** keyword, the access list is (prefix-acl, none).
- A prefix can have a maximum of one (prefix-acl, peer-acl) pair, as follows:
 - A (prefix-acl, peer-acl) pair applies to a prefix only if the prefix-acl matches the prefix. A match occurs if the prefix-acl permits the prefix.
 - If more than one (prefix-acl, peer-acl) pair from multiple **label advertise** commands matches a prefix, the (prefix-acl, peer-acl) pair in the first command applies to the prefix.
- When an LSR is ready to advertise a label for a prefix, the LSR determines whether a (prefix-acl, peer-acl) pair applies to the prefix.
 - If none applies, and if the **disable** keyword has been configured for the command, the label for the prefix is not advertised to any peer; otherwise, the label is advertised to all peers.
 - If a (prefix-acl, peer-acl) pair applies to the prefix, and if the prefix-acl denies the prefix, the label is not advertised to any peer.
 - If the prefix-acl permits the prefix and the peer-acl is none (that is, the command that applies to the prefix is an **label advertise for prefix-acl** command without the **to** keyword), the label is advertised to all peers.
 - If the prefix-acl permits the prefix and there is a peer-acl, the label is advertised to all peers permitted by the peer-acl.

Normally, LDP advertises labels for non-BGP routes present in the routing table. Additionally, LDP advertises labels from /32 IP addresses on Loopback interfaces and does not advertise /32 addresses for other non-Loopback interfaces. To control advertisement of labels for /32 IP addresses on these interfaces, use the **label advertise interface** command.

LDP supports IPv4 standard access lists only.



Note Label advertisement control is also referred to as LDP outbound label filtering.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to disable advertisement of all locally assigned labels to all peers:

```
RP/0/0/CPU0:router(config-ldp)# label advertise
RP/0/0/CPU0:router(config-ldp-lbl-advt)# disable
```

The following example shows how to send labels only for prefixes 10.1.1.0 and 20.1.1.0 to all peers:

```
RP/0/0/CPU0:router(config)# ipv4 access-list pfx_acl_1
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.1.1.0
RP/0/0/CPU0:router(config-ipv4-acl)# permit 20.1.1.0

RP/0/0/CPU0:router(config-ldp)# label advertise
RP/0/0/CPU0:router(config-ldp-lbl-advrt)# disable
RP/0/0/CPU0:router(config-ldp-lbl-advrt)# for pfx_acl_1
```

The following example shows how to send labels for prefix 10.0.0.0 to peers 10.1.1.1 and 10.2.2.2, labels for prefix 20.0.0.0 to peer 20.1.1.1, and labels for all other prefixes to all other peers:

```
RP/0/0/CPU0:router(config)# ipv4 access-list pfx_acl_10
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.0.0.0

RP/0/0/CPU0:router(config)# ipv4 access-list pfx_acl_20
RP/0/0/CPU0:router(config-ipv4-acl)# permit 20.0.0.0

RP/0/0/CPU0:router(config)# ipv4 access-list peer_acl_10
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.1.1.1
RP/0/0/CPU0:router(config-ipv4-acl)# permit 10.2.2.2

RP/0/0/CPU0:router(config)# ipv4 access-list peer_acl_20
RP/0/0/CPU0:router(config-ipv4-acl)# permit 20.1.1.1

RP/0/0/CPU0:router(config-ldp)# label advertise
RP/0/0/CPU0:router(config-ldp-lbl-advrt)# for pfx_acl_10 to peer_acl_10
RP/0/0/CPU0:router(config-ldp-lbl-advrt)# for pfx_acl_20 to peer_acl_20
```



Note

To advertise pfx_acl_10 to peer_acl_10 and pfx_acl_20 to peer_acl_20 and disable all other advertisements to all other peers, include the **disable** keyword with the **label advertise** command.

The following example shows how to use the **interface** keyword to advertise /32 IP address for POS 0/1/0/0:

```
RP/0/0/CPU0:router(config-ldp)# label advertise
RP/0/0/CPU0:router(config-ldp-lbl-advrt)# interface POS 0/1/0/0
```

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.
show mpls ldp bindings, on page 80	Displays information about LDP label bindings.

label allocate

To control allocation of local label only for a set of prefixes, use the **label allocate** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

label allocate for {*prefix-acl* | **host-routes**}

no label allocate

Syntax Description

for	Specifies set of prefixes for which local label needs to be allocated.
<i>prefix-acl</i>	IP access-list name or number. Range is from 1 to 99.
host-routes	Allocates the label for host routes only.

Command Default

LDP allocates local label for all learned routes (prefixes).

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.9.0	The host-routes keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Local label allocation control lets you override the default label allocation policy and provides many benefits, including reduced memory usage and fewer forwarding and network updates.

By default, LDP allocates local labels for all learned routes. There are times when you may want to limit label allocation for a given set of prefixes; for example, when using LDP in the core network to provide MPLS transport from one edge to another edge. In such cases, it is necessary to set up label switch packets (LSPs) for Loopback /32 addresses for provider edge (PE) routers (rendering it unnecessary to allocate and advertise local labels for other Interior Gateway Protocol (IGP) prefixes).

LDP supports IPv4 standard access lists only.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure LDP to limit allocation of local labels to prefixes 192.168.1.1, 192.168.2.2, and 192.168.3.3 only:

```
RP/0/0/CPU0:router(config)# ipv4 access-list pfx_acl_1
RP/0/0/CPU0:router(config-ipv4-acl)# permit 192.168.1.1
RP/0/0/CPU0:router(config-ipv4-acl)# permit 192.168.2.2
RP/0/0/CPU0:router(config-ipv4-acl)# permit 192.168.3.3

RP/0/0/CPU0:router(config-ldp)# label allocate for pfx_acl_1
```

Related Commands

Command	Description
show mpls ldp bindings, on page 80	Displays information about LDP label bindings.
show mpls ldp forwarding, on page 95	Displays the contents of the LDP forwarding database.

log graceful-restart

To set up notification describing graceful-restart (GR) session events, use the **log graceful-restart** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

log graceful-restart

no log graceful-restart

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.3.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **log graceful-restart** command to receive a syslog/console message when a graceful restart-related session event occurs, including LDP graceful restart session disconnection, reconnection, and timeout.



Note A logging message is issued upon graceful restart session events.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to enable logging messages for graceful restart session events:

```
RP/0/0/CPU0:router(config-ldp)# log graceful-restart
```

The following sample output shows the logging events that can be displayed on the console:

```
RP/0/0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 4.4.4.4:0 (instance 1)
```

disconnected

RP/0/0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 4.4.4.4:0 (instance 2)
reconnected

RP/0/0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 5.5.5.5:0 (instance 3)
timed out

RP/0/0/CPU0:router: mpls_ldp[336]: %ROUTING-LDP-5-GR_RESTART_COMPLETE : GR forwarding state
hold timer has expired

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.
show mpls ldp graceful-restart, on page 101	Displays information about LDP GR sessions.

log neighbor

To enable logging of notices describing session changes, use the **log neighbor** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

log neighbor

no log neighbor

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.3.0	The log neighbor command replaced the former log neighbor changes command.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **log neighbor** command to receive a syslog or console message when a neighbor goes up or down.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to enable logging messages for neighbor session up and down events:

```
RP/0/0/CPU0:router(config-ldp)# log neighbor
```



Note

A logging message is issued when an LDP session state changes from up to down (and down to up).

The following shows sample output of logging events that can be displayed on the console:

```
RP/0/0/CPU0:router:10 21:11:32.111:mpls_ldp[113]:%LDP-5-NBR_CHANGE: Nbr 10.44.44.44:0, DOWN
```

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

log nsr

To enable logging of nonstop routing (NSR) synchronization events, use the **log nsr** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

log nsr

no log nsr

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.6.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to enable logging of NSR synchronization events:

```
RP/0/0/CPU0:router(config-ldp)# log nsr
```

log session-protection

To enable logging of notices describing LDP session protection events, use the **log session-protection** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

log session-protection

no log session-protection

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.3.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **log session-protection** command to receive a syslog or console message when LDP session protection event occurs. These events include LDP session protection initiation, recovery, and timeout.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to enable logging messages for session protection events:

```
RP/0/0/CPU0:router(config-ldp)# log session-protection
```



Note Logging messages are issued when session protection events occur.

The following sample output shows the logging events that are displayed on the console:

```
RP/0/0/CPU0:router:Apr 21 12:15:01.742: mpls_ldp[315]:%ROUTING-LDP-5-SESSION_PROTECTION:
Session hold up initiated for peer 4.4.4.4:0
```

```
RP/0/0/CPU0:router:Apr 21 12:18:04.987: mpls_ldp[315]:%ROUTING-LDP-5-SESSION_PROTECTION:  
Session recovery succeeded for peer 4.4.4.4:0
```

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

make-before-break

To enable Multicast Label Distribution Protocol (MLDP) make-before-break (MBB) support, use **make-before-break** command in MPLS LDP MLDP configuration.

address-family ipv4 make-before-break[*delay seconds*| *route-policy name*]

Syntax Description

delay seconds	(Optional) Specifies the MBB forwarding delay in seconds. Range is 0 to 600.
route-policy name	(Optional) Specifies the route policy name.

Command Default

No default behavior or values

Command Modes

MPLS LDP MLDP configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read, write

Examples

The following example shows how to enable MLDP MBB support:

```
RP/0/0/CPU0:router(config-ldp-mldp)# address-family ipv4 make-before-break
```

maximum interfaces (MPLS LDP)

To configure upper limit on maximum number of LDP configured interfaces, use the **maximum interfaces** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

maximum interfaces *number*

no maximum interfaces

Syntax Description

<i>number</i>	Maximum number of LDP configured interfaces. Default is 800.
---------------	--

Command Default

By default, you can enable LDP on up to 800 interfaces.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.5.1	Support for this command was removed.
Release 3.8.0	This command was moved to 'hidden' status and is no longer valid.
Release 4.0.1	This command was removed.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to set an upper limit of 150 as maximum number of LDP interfaces, which can be enabled on the box:

```
RP/0/0/CPU0:router(config-ldp)# maximum interfaces 150
```

Related Commands

Command	Description
show mpls ldp discovery, on page 89	Displays LDP discovery information.
show mpls ldp summary, on page 130	Displays LDP summary information.

mldp disable

To disable Multicast Label Distribution Protocol (MLDP) on Label Distribution Protocol (LDP) enabled interfaces, use **mldp disable** command in MPLS LDP configuration mode.

interface *type interface-path-id* **address-family** {**ipv4** | **ipv6**} **igp mldp disable**

Syntax Description

interface type	Interface type. For more information, use the question mark (?) online help function.
interface-path-id	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to disable MLDP on a LDP enabled interface:

```
RP/0/0/CPU0:router(config-ldp-if-af)# igp mldp disable
```

mldp logging notifications

To enable Multicast Label Distribution Protocol (MLDP) system log notifications, use the **mldp logging notifications** command in MPLS LDP MLDP configuration mode. To disable this function, use the **no** form of this command.

mldp logging notifications

no mldp logging notifications

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes MPLS LDP MLDP configuration

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read

Examples The following example shows how to enable MLDP system log notifications:

```
RP/0/0/CPU0:router (config-ldp) # mldp logging notifications
```

mofrr

To enable Multicast Label Distribution Protocol (MLDP) multicast only fast reroute (MoFRR) support, use **mofrr** command in MPLS LDP MLDP configuration.

address-family ipv4 mofrr [*route-policy name*]

Syntax Description

route-policy name	(Optional) Specifies the route policy name.
--------------------------	---

Command Default

No default behavior or values

Command Modes

MPLS LDP MLDP configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to enable MLDP MoFRR support:

```
RP/0/0/CPU0:router(config-ldp-mldp)# address-family ipv4 mofrr
```

mpls ldp

To enter MPLS Label Distribution Protocol (LDP) configuration mode, use the **mpls ldp** command in global configuration mode.

mpls ldp

Syntax Description This command has no arguments or keywords.

Command Default No default behavior or values

Command Modes Global configuration

Command History	Release	Modification
	Release 3.9.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to MPLS LDP configuration mode:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)
```

neighbor password

To configure password authentication using the TCP Message Digest 5 (MD5) option for a neighbor, use the **neighbor password** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
[vrf vrf-name] neighbor ldp-id password {clear| disable| encrypted} password
no [vrf vrf-name] neighbor ldp-id password
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Specifies the VRF name.
<i>ldp-id</i>	LDP ID of neighbor in A.B.C.D:0 format.
clear	Clears the password for the encryption parameter to specify that an unencrypted password will follow.
disable	Disables the global password from the specified neighbor.
encrypted	Specifies that an encrypted password will follow.
<i>password</i>	(Clear text) Encrypted or unencrypted password string.

Command Default

LDP sessions are negotiated without any password (and MD5).

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	The command was changed to use clear and encrypted instead of the numbers 0/7 .
Release 3.8.0	The command functionality was modified in the way the neighbor password command was being used for configuring global default passwords.
Release 5.1.1	The vrf and disable keywords were added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

This security feature is enabled per neighbor, so that a session establishment attempt is allowed only when a password match has been configured. This option must be configured so that both peer passwords match.

To override the default password for a specific neighbor, use the **neighbor ldp-id password** command, where the *ldp-id* argument is the LDP ID of the neighbor.

**Note**

The global default password must be configured before being able to override the default password for a specific neighbor.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to configure the password *abc* for neighbor 10.20.20.20:

```
RP/0/0/CPU0:router(config-ldp)# neighbor 10.20.20.20:0 password clear abc
```

Related Commands

Command	Description
neighbor targeted , on page 67	Configures transmission of targeted hellos towards a neighbor.

neighbor password disable

To override an individual neighbor which requires no password, use the **neighbor password disable** command in MPLS LDP configuration mode.

neighbor *IP-address* **password disable**

Syntax Description

<i>IP-address</i>	Neighbor IP address.
-------------------	----------------------

Command Default

LDP sessions are negotiated without any password (and MD5).

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.8.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The system uses the global password to compute each neighbor's effective password and overrides the global password with the individual neighbor password, if configured. The session remains stable if you shift from an individual neighbor password to an equal global password. However, if the effective password changes during configuration, the session might be rendered unstable.



Note

You must configure the password for an individual neighbor using the neighbor's LSR ID.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to override the individual password *abc*, for the neighbor:

```
RP/0/0/CPU0:router(config-ldp)# neighbor 10.20.20.20 password disable abc
RP/0/0/CPU0:router(config-ldp)#
```

neighbor targeted

To configure transmission of targeted hellos toward a neighbor for setting up an LDP session, use the **neighbor targeted** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

address-family {ipv4 } neighbor *IP address* targeted

no address-family {ipv4 } neighbor *IP address* targeted

Syntax Description

<i>IP address</i>	Neighbor IP address.
ipv4	Specifies IP version 4 address family.

Command Default

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to set up a targeted discovery session for neighbor 200.1.1.1:

```
RP/0/RP0/CPU0:router(config-ldp)# neighbor 200.1.1.1 targeted
```

Related Commands

Command	Description
neighbor password , on page 64	Configures password authentication using MD5.

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.
show mpls ldp discovery, on page 89	Displays information about LDP discovery sources.

nsr (MPLS-LDP)

To configure nonstop routing for LDP protocols in the event of a disruption in service, use the **nsr** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

nsr

no nsr

Syntax Description This command has no arguments or keywords.

Command Default By default, MPLS LDP NSR is disabled.

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 3.6.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

A disruption in service may include any of the following events:

- Route processor (RP) or distributed route processor (DRP) failover
- LDP process restart
- In-service system upgrade (ISSU)
- Minimum disruption restart (MDR)

Enabling NSR causes events such as these to be invisible to the routing peers and provide minimal service disruption.



Note

The LDP Process restart is supported by NSR only if the NSR process-failures switchover is configured, else the process restart causes the session to be unstable.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples

The following example shows how to enable MPLS LDP NSR:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)# mpls ldp
RP/0/0/CPU0:router(config-ldp)# nsr
```

Related Commands

Command	Description
nsr process-failures switchover	Configures switchover as a recovery action for active instances to switch over to a standby RP or a DRP, to maintain NSR. For more information, see <i>Cisco IOS XRIP Addresses and Services Command Reference for the Cisco XR 12000 Series Router</i> .
show mpls ldp neighbor, on page 110	Displays standby node specific information.

recursive-fec

To enable Multicast Label Distribution Protocol (MLDP) recursive-fec support, use **recursive-fec** command in MPLS LDP MLDP configuration.

address-family ipv4 recursive-fec [*route-policy name*]

Syntax Description

route-policy name	(Optional) Specifies the route policy name.
--------------------------	---

Command Default

No default behavior or values

Command Modes

MPLS LDP MLDP configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to enable MLDP recursive fec support:

```
RP/0/0/CPU0:router(config-ldp-mldp)# address-family ipv4 recursive-fec
```

router-id (MPLS LDP)

To specify an IPv4 address to act as the router ID, use the **router-id** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

```
[vrf vrf-name] router-id lsr-id
```

```
no [vrf vrf-name] router-id
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Specifies the VRF name.
<i>lsr-id</i>	LSR ID in A.B.C.D format.

Command Default

LDP uses router ID as determined by global router ID agent, IP Address Repository Manager (IP ARM).

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.4.0	Deprecated interface keyword.
Release 5.1.1	The vrf keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

LDP uses the router ID from different sources in the following order:

- 1 Configured LDP router ID.
- 2 Global router ID (if configured).
- 3 Calculated (computed) using the primary IPv4 address of the highest numbered configured loopback address. We recommend configuring at least one loopback address.



Note

We recommend that you configure an IP address for the LDP router-id to avoid unnecessary session flaps.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to specify an LSR ID as the router ID:

```
RP/0/0/CPU0:router(config-ldp)#router-id 10.0.0.1
```

Related Commands

Command	Description
show mpls ldp discovery, on page 89	Displays the status of the LDP discovery process.
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.

router ospf

To enable Open Shortest Path First (OSPF) LDP IGP synchronization for a specific VRF or a specific VRF area or a specific VRF area interface, use the **router ospf** command in Global Configuration mode.

```
router ospf process-id [vrf vrf-name [area {area-id | ip-address}] [interface type interface-path-id] mpls
ldp sync [disable]]
```

Syntax Description

<i>process-id</i>	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process.
vrf <i>vrf-name</i>	(Optional) Specifies the name of the VRF instance to associate with OSPF VRF processes.
area	(Optional) Enters the OSPF area configuration submenu.
<i>area-id</i>	Specifies the OSPF area ID as a decimal value.
<i>ip-address</i>	Specifies the OSPF area ID as an IP address in A.B.C.D format.
interface	(Optional) Enters the OSPF interface configuration submenu.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

sync	Enables LDP IGP synchronization on the specified interface.
disable	(Optional) Disables MPLS LDP synchronization.

Command Default No default behavior or values

Command Modes Global Configuration mode

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Operation
mpls-ldp	read, write

Examples The following example shows how to enable OSPF LDP IGP synchronization for a specific VRF:

```
RP/0/0/CPU0:router# configure
RP/0/0/CPU0:router(config)#router ospf 109
RP/0/0/CPU0:router(config-ospf)#
```

session protection

To enable the LDP session protection feature for keeping LDP peer session up by means of targeted discovery following the loss of link discovery with a peer, use the **session protection** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

session protection [*duration seconds*| **infinite**] [**for peer-acl**]

no session protection

Syntax Description

duration <i>seconds</i>	(Optional) Specifies the protection duration, that is, the number of seconds that targeted discovery should continue following the loss of link discovery to a neighbor. Range is 30 to 2147483.
infinite	(Optional) Specifies session protection to last forever after loss of link discovery.
for <i>peer-acl</i>	(Optional) Specifies set of LDP peers for which session protection is to be enabled.

Command Default

By default, session protection is disabled. When enabled without peer-acl and duration, session protection is provided for all LDP peers and continues for 24 hours after a link discovery loss.

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced.
Release 3.4.0	Default value for duration keyword changed from infinite to 24 hours. The infinite keyword was added for duration value.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

LDP session protection feature allows you to enable the automatic setup of targeted hello adjacencies with all or a set of peers and specify the duration for which session needs to be maintained using targeted hellos after loss of link discovery.

LDP supports only IPv4 standard access lists.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to enable session protection for all discovered peers with unlimited duration to maintain the session after link discovery loss:

```
RP/0/0/CPU0:router(config-ldp)# session protection
```

The following example shows how to enable session protection for a set of peers (as permitted by a peer ACL) with duration of 30 seconds to maintain the session after link discovery loss:

```
RP/0/0/CPU0:router(config-ldp)# session protection for peer_acl duration 30
```

Related Commands

Command	Description
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

show mpls ldp backoff

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

show mpls ldp [*vrf vrf-name*] **backoff** [*location node-id*] **standby**]

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.9.0	The location and standby keywords were added.
Release 5.1.1	

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

You must enable the MPLS LDP application to use the **show mpls ldp backoff** command.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

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

```
RP/0/0/CPU0:router# show mpls ldp backoff
```

```
Backoff Time:
  Initial:15 sec, Maximum:120 sec
```

```
Backoff Table: (2 entries)
```

LDP Id	Backoff (sec)	Waiting (sec)
33.33.33.33:0	15	15
11.11.11.11:0	30	30

This table describes the significant fields shown in the display.

Table 1: show mpls ldp backoff Command Field Descriptions

Field	Description
Backoff Time	Initial and maximum backoff time parameters, in seconds.
Backoff Table	<p>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:</p> <p>LDP Id</p> <p>Identifies the LDP neighbors.</p> <p>Backoff (sec)</p> <p>Specifies the time that the session setup is delayed.</p> <p>Waiting (sec)</p> <p>Specifies an approximate time the session setup has been delayed.</p>

Related Commands

Command	Description
backoff , on page 4	Configures LDP backoff parameters.
show mpls ldp forwarding , on page 95	Displays the contents of MPLS forwarding table.
show mpls ldp bindings , on page 80	Displays the contents of LDP LIB.

show mpls ldp bindings

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

show mpls ldp [**vrf all**] [**vrf vrf-name**] [**ipv4**] **bindings** [*prefix/length*] [**advertisement-acls**] [**brief**] [**detail**] [**local**] [**local-label label [to label]**] [**local-only**] [**neighbor address**] [**remote-only**][**remote-label label [to label]**] [**summary**] [**location node-id | standby**] [**all**]

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf vrf-name	(Optional) Displays the VRF information for the specified VRF.
ipv4	(Optional) Specifies IP version 4 address family.
<i>prefix</i>	(Optional) Destination prefix, written in A.B.C.D format.
<i>length</i>	(Optional) Network mask length, in bits. Range is 0 to 32.
advertisement-acls	(Optional) Displays the label bindings as applied for (advertisement) outbound label filtering ACLs.
brief	(Optional) Displays all the prefixes in the LDP database.
detail	(Optional) Displays the total counts of advertised-to and remote-binding peers in IP address sort order, with remote bindings in tabular format.
local	(Optional) Displays the local label bindings.
local-label label [to label]	(Optional) Displays entries matching local label values. Add the <i>label to label</i> argument to indicate the label range.
local-only	(Optional) Displays binding matches with a local label only.

neighbor <i>address</i>	(Optional) Displays the label bindings assigned by the selected neighbor.
remote-only	(Optional) Displays bindings matches with a remote label only.
remote-label <i>label</i> [<i>to label</i>]	(Optional) Displays entries matching the label values assigned by a neighbor router. Add the <i>label tolabel</i> argument to indicate the label range. Range is from 0 to 2147483647.
summary	(Optional) Displays a summary of the contents of the Label Information Base (LIB).
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.
all	(Optional) Displays the aggregate summary across LDP processes and all VRFs.

Command Default No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.2	The advertisement-acls keyword was supported.
	Release 3.6.3	The location , standby , remote-only , remote-label , and local-only keywords were added.
	Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The ipv4 keyword was added. • The all keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp bindings** command displays local and remote label bindings learned from neighbors for non-BGP routes (such as IGP prefixes and static routes).

You can choose to view the entire database or a subset of entries according to the following criteria:

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

**Note**

The **show mpls ldp bindings summary** command displays summarized information from the LIB and is used when testing scalability or when deployed in a large scale network.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

The following sample output displays the contents of the LIB for the default routing domain:

```
RP/0/0/CPU0:router# show mpls ldp bindings

 5.41.0.0/16 , rev 4
   local binding: label:IMP-NULL
   No remote bindings
 5.43.9.98/32 , rev 6
   local binding: label:IMP-NULL
   No remote bindings
10.10.2.0/24 , rev 12
   local binding: label:IMP-NULL
   remote bindings :
     lsr:10.255.255.255:0, label:16
     lsr:10.256.256.256:0, label:IMP-NULL
10.10.3.0/24 , rev 10
   local binding: label:IMP-NULL
   remote bindings :
     lsr:10.255.255.255:0, label:IMP-NULL
     lsr:10.256.256.256:0, label:22
22.22.22.22/32 , rev 14
   local binding: label:16
   remote bindings :
     lsr:10.255.255.255:0, label:17
     lsr:10.256.256.256:0, label:IMP-NULL
33.33.33.33/32 , rev 2
   local binding: label:IMP-NULL
   remote bindings :
     lsr:10.255.255.255:0, label:18
     lsr:10.256.256.256:0, label:23
```

The following sample output shows detailed information for the total counts of advertised-to and remote-binding peers in IP address sort order, with remote bindings for 150.150.150.150/32:

```
RP/0/0/CPU0:router# show mpls ldp bindings 150.150.150.150/32 detail

150.150.150.150/32, rev 2
  Local binding: label: IMP-NULL
  Advertised to: (6 peers)
    120.120.120.120:0 130.130.130.130:0 150.150.150.1:0 150.150.150.2:0
    150.150.150.3:0 150.150.150.4:0
  Remote bindings: (3 peers)
    Peer          Label
  -----
    120.120.120.120:0 27018
    130.130.130.130:0 26017
    160.160.160.160:0 27274
```

The following sample output specifies a network number and displays labels learned from label switched router (LSR) 10.255.255.255 for all networks. The **neighbor** keyword is used to suppress the output of remote labels learned from other neighbors:

```
RP/0/0/CPU0:router# show mpls ldp bindings neighbor 10.255.255.255

10.10.2.0/24 , rev 12
  local binding: label:IMP-NULL
  remote bindings :
    lsr:10.255.255.255, label:16
10.10.3.0/24 , rev 10
  local binding: label:IMP-NULL
  remote bindings :
    lsr:10.255.255.255:0, label:IMP-NULL
22.22.22.22/32 , rev 14
  local binding: label:16
  remote bindings :
    lsr:10.255.255.255:0, label:17
33.33.33.33/32 , rev 2
  local binding: label:IMP-NULL
  remote bindings :
    lsr:10.255.255.255:0, label:18
44.44.44.44/32 , rev 16
  local binding: label:17
  remote bindings :
    lsr:10.255.255.255:0, label:IMP-NULL
```

This table describes the significant fields shown in the display.

Table 2: show mpls ldp bindings and show mpls ldp bindings neighbor Command Field Descriptions

Field	Description
a.b.c.d/n	IP prefix and mask for a particular destination (network/mask).
rev	Revision number (rev) that is used internally to manage label distribution for this destination.
local binding	Locally assigned label for a prefix.

Field	Description
remote bindings	Outgoing labels for this destination learned from other LSRs. ¹ Each item in this list identifies the LSR from which the outgoing label was learned and reflects the label associated with that LSR. Each LSR in the transmission path is identified by its LDP identifier.
(rewrite)	Binding has been written into MPLS forwarding and is in use.
(no route)	Route is not valid. LDP times it out before the local binding is deleted.

¹ Label switched routers.

The following sample output summarizes the content by using the **summary** keyword:

```
RP/0/0/CPU0:router# show mpls ldp bindings summary

LIB Summary:
  Total Prefix      : 20
  Revision No      : Current:34, Advertised:34
  Local Bindings   : 14
    NULL           : 10 (implicit:10, explicit:0)
    Non-NULL       : 4 (lowest:48, highest:51)
  Remote Bindings  : 24
```

This table describes the significant fields shown in the display.

Table 3: show mpls ldp bindings summary Command Field Descriptions

Field	Description
Total Prefix	Number of prefixes (routes) known to LDP LIB. All invalid and timed-out routes display as no-routes.
Revision No	Current revision number of LIB entries as well as the minimum revision number that has been advertised to all peers.
Local Bindings	Total number of local bindings, with information on how many of them are Null, non-null, and lowest/highest label assigned or allocated by LDP.
Remote Bindings	Number of remote bindings.

The following sample output shows the access-list advertisement:

```
RP/0/0/CPU0:router# show mpls ldp bindings advertisement-acls

Advertisement Spec:
  Prefix ACL = 'pfx_11'
  Prefix ACL = 'pfx_22'
  Prefix ACL = 'pfx_40_1'; Peer ACL = 'peer_11'

5.41.0.0/16 , rev 82
11.11.11.11/32 , rev 69
  Advert ACL(s): Prefix ACL 'pfx_11'
20.20.20.20/32 , rev 83
22.22.22.22/32 , rev 78
  Advert ACL(s): Prefix ACL 'pfx_22'
40.1.1.0/24 , rev 79
  Advert ACL(s): Prefix ACL 'pfx_40_1'; Peer ACL 'peer_11'
```

This table describes the significant fields shown in the display.

Table 4: show mpls ldp bindings advertisement-acls Command Field Descriptions

Field	Description
Advertisement Spec	Lists all prefix and peer access-lists used as outbound label advertisement control.
Advert ACL(s)	Lists the first matching rule (if any) for the prefix entry for outbound label advertisement control (for prefix-acl).

The following sample output shows all the prefixes in the LDP database using the **brief** keyword:

```
RP/0/0/CPU0:router# show mpls ldp bindings brief

Prefix                Local Advertised Remote Bindings
Label                 (peers) (peers)
-----
1.1.2.2/32            -         0         1
1.2.3.4/32            16010     396       0
4.4.4.4/32            16004     396       3
10.0.0.0/24           19226     396       395
```

The following sample output shows that the binding matches with a local label:

```
RP/0/0/CPU0:router# show mpls ldp bindings local-only

10.12.32.2/32, rev 4
  Local binding: label: IMP-NULL
  No remote bindings
```

The following sample output shows that the binding matches with a remote label:

```
RP/0/0/CPU0:router# show mpls ldp bindings remote-only

10.26.4.0/24, rev 0
  No local binding
  Remote bindings: (1 peers)
    Peer                Label
    -----
    10.6.6.6:0          IMP-NULL
10.43.4.0/24, rev 0
```

show mpls ldp bindings

```

No local binding
Remote bindings: (1 peers)
  Peer          Label
  -----
10.46.4.0/24, rev 0
  10.4.4.4:0    IMP-NULL
No local binding
Remote bindings: (2 peers)
  Peer          Label
  -----
10.4.4.4:0     IMP-NULL
10.6.6.6:0     IMP-NULL

```

Related Commands

Command	Description
label accept, on page 43	Configures the LDP remote label acceptance.
label advertise, on page 45	Configures the LDP local label advertisement control.
show mpls ldp neighbor, on page 110	Displays information on the LDP neighbors.
show mpls ldp forwarding, on page 95	Displays the contents of the LDP forwarding database.

show mpls ldp capabilities

To display the database capability information for an LDP session, use the **show mpls ldp capabilities** command in EXEC mode.

```
show mpls ldp [vrf vrf-name] capabilities [detail] [location node-id] standby]
```

Syntax Description		
	vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
	detail	(Optional) Displays detailed database capability information for an LDP session.
	location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
	standby	(Optional) Displays standby node-specific information.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read

Examples

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

```
RP/0/0/CPU0:router# show mpls ldp capabilities
```

Type	Description	Owner
0x50b	Typed Wildcard FEC	LDP
0x3eff	Cisco IOS-XR	LDP
0x508	MP: Point-to-Multipoint (P2MP)	mLDP
0x509	MP: Multipoint-to-Multipoint (MP2MP)	mLDP
0x703	P2MP PW	L2VPN-AToM

show mpls ldp discovery

To display the status of the LDP discovery process, use the **show mpls ldp discovery** command in EXEC mode.

```
show mpls ldp [vrf all][vrf vrf-name] [ipv4 ] discovery [lsr-id | ldp-id] [type interface-path-id] brief| link| targeted| summary [all]| [detail] [location node-id | standby]
```

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
ipv4	(Optional) Specifies IP version 4 address family.
<i>lsr-id</i>	(Optional) Neighbor LSR ID in A.B.C.D format.
<i>ldp-id</i>	(Optional) Neighbor LDP ID in A.B.C.D: format.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
brief	(Optional) Displays concise information about a specified LDP-enabled interface.
link	(Optional) Displays link information for LDP discovery.
targeted	(Optional) Displays targeted information for LDP discovery.

summary	(Optional) Displays summarized information for LDP discovery.
all	(Optional) Displays the aggregate summary across LDP processes and all VRFs.
detail	(Optional) Displays detailed information (including, inbound label filtering, session KAs, and session protection state) for an LDP session.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.3.0	The summary keyword was added.
Release 3.6.3	The following items were added: <ul style="list-style-type: none"> • The location keyword was added. • The standby keyword was added. • Sample output was added for the brief keyword.
Release 3.9.0	The following items were added: <ul style="list-style-type: none"> • The link keyword was added. • The targeted keyword was added.

Release	Modification
Release 5.1.1	<p>The following items were added:</p> <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The ipv4 keyword was added. • The all keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp discovery** command shows both link discovery and targeted discovery. When no interface filter is specified, this command generates a list of interfaces running the LDP discovery process. This command also displays neighbor discovery information for the default routing domain.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

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

```
RP/0/0/CPU0:router# show mpls ldp discovery

Local LDP Identifier: 10.44.44.44:0
Discovery Sources:
  Interfaces:
    POS 0/1/0/0 : xmit/recv
      LDP Id: 10.33.33.33:0, Transport address: 10.33.33.33
      Hold time: 15 sec (local:15 sec, peer:15 sec)
```

This table describes the significant fields shown in the display.

Table 5: show mpls ldp discovery Command Field Descriptions

Field	Description
Local LDP Identifier	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 4 bytes of the LDP identifier constitute the router ID; integers, starting with 0, constitute the final two bytes of the IP address:number construct.

Field	Description
Interfaces	<p>Interfaces engaged in LDP discovery activity, as follows:</p> <p>xmit field</p> <p>Indicates that the interface is transmitting LDP discovery hello packets.</p> <p>recv field</p> <p>indicates that the interface is receiving LDP discovery hello packets.</p> <p>The LDP identifiers indicate the LDP neighbors discovered on the interface.</p>
Transport Address	Address associated with this LDP peer (advertised in hello messages).
LDP Id	LDP identifier of the LDP peer.
Hold time	State of the forwarding hold timer and its current value.

The following sample output summarizes information for LDP discovery by using the **summary** keyword:

```
RP/0/0/CPU0:router# show mpls ldp discovery summary
LDP Identifier: 139.0.0.1:0
Interfaces:
  Configured: 2
  Enabled   : 1
Discovery:
  Hello xmit: 1 (1 link)
  Hello recv: 1 (1 link)
```

This table describes the significant fields shown in the display.

Table 6: show mpls ldp discovery summary Command Field Descriptions

Field	Description
LDP Identifier	The LDP identifier for the local router.

Field	Description
Interfaces	<p>Summary of interfaces engaged in LDP activity.</p> <p>Configured</p> <p>Number of interfaces configured for LDP.</p> <p>Enabled</p> <p>Number of interfaces on which LDP is actively enabled and is thus sending LDP hellos. An interface configured for LDP is enabled only if running IP and not in the down state.</p>
Discovery	<p>Summary of LDP discovery process.</p> <p>Hello xmit</p> <p>Number of local LDP discovery sources (including link and targeted hellos) emitting LDP hellos.</p> <p>Hello rcv</p> <p>Number of discovered hello sources via link or targeted hello mechanics.</p>

The following sample output shows the MPLS LDP discovery hello information in brief form:

```
RP/0/0/CPU0:router# show mpls ldp discovery brief

Local LDP Identifier: 192.168.0.3:0

Discovery Source          VRF Name          Peer LDP Id          Holdtime    Session
-----
PO0/3/0/2                default           192.168.0.1:0       15          Y
```

The following sample shows the MPLS LDP afi-all discovery brief command output:

```
RP/0/0/CPU0:router#show mpls ldp afi-all discovery brief

Local LDP Identifier: 192.168.0.1:0

Discovery Source    AFI  VRF Name          Peer LDP Id          Holdtime  Session
-----
PO0/3/0/0          IPv6  default           192.168.0.2:0       15        Y
                  IPv4  default           192.168.0.2:0       15        Y
PO0/3/0/1          IPv4  default           192.168.0.3:0       15        Y
PO0/3/0/2          IPv4  default           192.168.0.4:0       15        Y
PO0/3/0/3          IPv6  default           192.168.0.3:0       15        Y
PO0/3/0/4          IPv6  default           192.168.0.5:0       15        Y
```

Related Commands

Command	Description
discovery hello, on page 17	Configures LDP link hello parameters.
discovery targeted-hello, on page 20	Configures LDP targeted-hello parameters.
neighbor targeted, on page 67	Configures LDP targeted neighbor.
session protection, on page 76	Configures LDP session protection.
interface (MPLS LDP), on page 41	Configures LDP on an interface.
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

show mpls ldp forwarding

To display the Label Distribution Protocol (LDP) forwarding state installed in MPLS forwarding, use the **show mpls ldp forwarding** command in EXEC mode.

```
show mpls ldp [vrf all] [vrf vrf-name] [ipv4] forwarding [prefix/length] [fast-reroute] [detail] [next-hop
{address ip-address | interface interface-path-id | label label-value | neighbor ldp-id | unlabelled}] [local-label
label-value] [location node-id | summary | standby] [all]
```

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
ipv4	(Optional) Specifies IP version 4 address family.
<i>prefix</i>	(Optional) Destination prefix, written in A.B.C.D format.
<i>length</i>	(Optional) Network mask length, in bits. Range is 0 to 32.
detail	(Optional) Displays detailed information for the LDP timestamp that is used for the routing and forwarding update.
fast-reroute	(Optional) Displays the prefix that is LFA FRR protected in nature.
next-hop	Matches prefixes by next-hop IP address.
local-label <i>label-value</i>	(Optional) Displays the prefix with the specified local label. Range is from 0 to 1048575.
neighbor	Matches prefixes with a path through specified LDP neighbor.
unlabelled	Matches prefixes containing unlabelled paths.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.

summary	(Optional) Displays the summary information for the LDP forwarding information base (LFIB).
standby	(Optional) Displays standby-node specific information.
all	(Optional) Displays the aggregate summary across LDP processes and all VRFs.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.3.0	Sample output was modified.
Release 3.9.0	The following items were added: <ul style="list-style-type: none"> • The detail keyword. • Sample output for the detail keyword. • The local-label keyword. • The location keyword. • The standby keyword.
Release 4.0.1	These items were added: <ul style="list-style-type: none"> • The fast-reroute keyword. • The summary keyword. • The next-hop keyword. • The neighbor keyword. • The unlabelled keyword.

Release	Modification
Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The ipv4 keyword was added. • The all keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp forwarding** command displays the LDP forwarding entries and provides LDP view of its installed forwarding entries.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

This is a sample output from the **show mpls ldp forwarding** command:

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

Prefix          Label In  Label Out  Outgoing Interface  Next Hop  GR Stale
-----
2.2.2.2/32      22      ImpNull PO0/2/0/1  12.0.0.2  N N
3.0.0.1/32      24      20      PO0/2/0/1  12.0.0.2  N N
3.0.0.2/32      25      21      PO0/2/0/1  12.0.0.2  N N
3.0.0.3/32      26      22      PO0/2/0/1  12.0.0.2  N N
4.4.4.4/32      20      ExpNullv4 tt10      4.4.4.4   N N
4.4.4.5/32      21      ExpNullv4 tt10      4.4.4.4   N N
123.0.0.0/24    23      ImpNull PO0/2/0/1  12.0.0.2  N N
3.3.3.3/32      16000  16001  PO0/2/0/3.1 131.1.1.4  Y N
                 16002  PO0/2/0/3.2 131.1.2.4  Y N
                 16003  PO0/2/0/3.3 131.1.3.4  N N
                 16002  PO0/2/0/1   192.11.1.1 (!) Y N
                 Unlabelled PO0/2/0/2   192.11.2.1 (!) N N
```



Note

The (!) symbol refers to a non-primary LFA backup path.

This sample output shows detailed information for the LDP timestamp that is used for routing and forwarding update from the **detail** keyword:

```
RP/0/0/CPU0:router# show mpls ldp forwarding 1.1.1.1/32 detail
```

```

Prefix          Label In  Label Out  Outgoing Interface  Next Hop      GR Stale
-----
3.3.3.3/32     16000    16001     PO0/2/0/3.1        131.1.1.4     N  N
[ Protected; path-id 1 backup-path-id 33;
peer 13.13.13.1:0 ]
16002          PO0/2/0/3.2  131.1.2.4     Y  N
[ Protected; path-id 2 backup-path-id 33;
peer 13.13.13.1:0 ]
16003          PO0/2/0/3.3  131.1.3.4     N  N
[ Protected; path-id 3 backup-path-id 34;
peer 13.13.13.2:0 ]
16002          PO0/2/0/1    192.11.1.1 (!)  Y  N
[ Backup; path-id 33; peer 14.14.14.1:0 ]
Unlabelled PO0/2/0/2  192.11.2.1 (!)  N  N
[ Backup; path-id 34 ]

Routing update   : Mar 31 13:35:25.348 (00:55:32 ago)
Forwarding update: Mar 31 13:35:25.349 (00:55:32 ago)

```

**Note**

The (!) symbol refers to a non-primary LFA backup path.

This sample output shows only LDP prefixes with protection (ECMP or secondary LFA backups) update from the **fast-reroute** keyword:

This sample output shows the statistics of protected prefixes and protected paths from the **summary** keyword:

```

RP/0/0/CPU0:router# show mpls ldp forwarding summary
Forwarding Server (LSD):
  Connected: Yes
  Forwarding State Holdtime: 360 sec
Forwarding States:
  Interfaces: 10
  Local labels: 8
  Rewrites:
    Prefix:
      Total: 8 (0 with ECMP, 8 FRR protected)
      Labelled:
        Primary pathset : 8 labelled (0 partial), 0 unlabelled
        Backup pathset  : 8 labelled (0 partial), 0 unlabelled
        Complete pathset: 8 labelled (0 partial), 0 unlabelled
    Paths:
      Total: 16 (8 backup, 8 FRR protected)
      Labelled: 16 (8 backup)

```

This table describes the significant fields shown in the display.

Table 7: show mpls ldp forwarding Command Field Descriptions

Field	Description
Prefix/mask	Prefix on the FEC ² for an MPLS forwarding entry.
Label In	Local label assigned to the prefix/mask.
Label Out	Outgoing label for the prefix/mask.
Outgoing Interface	Outgoing physical interface.
Next Hop	Next Hop address.

Field	Description
GR	Graceful restart status (Y or N).
Stale	Status of the entry, stale or not stale. An entry is marked stale when the next-hop graceful restart neighbor disconnects and is unmarked when neighbor reconnects and refreshes the label.
Chkpt	Status of the entry, checkpointed or not checkpointed.
path-id	Primary Path-id.
Backup-path-id	The backup path-id is the path-id of the path protecting a given primary path. A protecting path can be primary path or a non-primary path.
Peer	Displays next-hop LDP peer's LDP identifier.
Connected	Displays LDP connection state with LSD forwarding server.
Forwarding State Holdtime	Displays time that LDP has registered with LSD server to keep LDP forwarding state intact upon LDP disconnect event.
Interfaces	Number of LDP enabled MPLS interfaces.
Local Labels	Number of LDP allocated local labels from LSD.
Rewrites	Counts of Forwarding rewrites. Displays total number of known IPv4 prefixes alongwith information on number of prefixes with more than one ECMP path. This also displays number of prefixes with LFA-FRR protection. The labelled set prints the counts related to prefixes with none, all, partial labelled paths as shown by unlabeled, labelled, and partial keywords. This information is available for primary, backup, and complete path set.
Paths	Forwarding path counts. Displays count of total number of known forwarding paths, along with number of backup paths and number of FRR protected paths. It also displays the count of labelled paths indicating how many of non-primary paths are labelled.

² Forwarding Equivalence Class.

Related Commands

Command	Description
graceful-restart (MPLS LDP), on page 30	Configures the LDP graceful restart feature.
show mpls ldp bindings, on page 80	Displays the contents of LDP LIB.

show mpls ldp graceful-restart

To display the status of the Label Distribution Protocol (LDP) graceful restart, use the **show mpls ldp graceful-restart** command in EXEC mode.

```
show mpls ldp [vrf all] [vrf vrf-name] graceful-restart [location node-id ] [standby] [ detail ]
```

Syntax Description		
	vrf all	(Optional) Displays all LDP configured VRFs.
	vrf vrf-name	(Optional) Displays the VRF information for the specified VRF.
	location node-id	(Optional) Displays location information for the specified node ID.
	standby	(Optional) Displays standby-node-specific information.
	detail	(Optional) Displays detailed information about the specified VRF.

Command Default No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.2	This command was supported.
	Release 3.9.0	The location and standby keywords were added.
	Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The detail keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp graceful-restart** command displays LDP graceful-restart-related information when the **graceful-restart** command is enabled.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp graceful-restart** command:

```
RP/0/0/CPU0:router# show mpls ldp graceful-restart

Forwarding State Hold timer : Not Running
GR Neighbors                 : 1

Neighbor ID      Up   Connect Count  Liveness Timer  Recovery Timer
-----
10.0.0.2        Y    1              -                -
```

This table describes the significant fields shown in the display.

Table 8: show mpls ldp graceful-restart Command Field Descriptions

Field	Description
Forwarding State Hold timer	State of the hold timer—running or not running.
GR Neighbors	Number of graceful restartable neighbors.
Neighbor ID	Router ID of each neighbor.
Up	Neighbor up or down.
Connect Count	Number of times the same neighbor has reconnected.
Liveness Timer	State of the liveness timer (running or not running) and its expiration time, if running.
Recovery Timer	State of the recovery timer (running or not running) and its expiration time, if running.

Related Commands

Command	Description
graceful-restart (MPLS LDP), on page 30	Configures the LDP graceful restart feature.
show mpls ldp neighbor, on page 110	Displays information about LDP neighbors.

show mpls ldp igp sync

To display Label Distribution Protocol (LDP) Interior Gateway Protocol (IGP) synchronization information on interface(s), use the **show mpls ldp igp sync** command in EXEC mode.

show mpls ldp [**vrf all**] [**vrf** *vrf-name*] [**ipv4**] **igp sync** [**interface** *type interface-path-id*] [**brief**] [**location** *node-id*] [**standby**]

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
ipv4	(Optional) Specifies IP version 4 address family.
brief	(Optional) Displays brief information about a specified LDP-enabled interface.
interface	(Optional) Displays the interface type.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby node-specific information.

Command Default No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.3.0	This command was introduced.
	Release 3.9.0	The location and standby keywords were added.
	Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The ipv4 keyword was added. • The brief keyword was added.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

LDP IGP synchronization addresses traffic loss issues as a result of synchronization between MPLS LDP and IP (IGP). For instance, upon a link up, IGP can advertise a link before MPLS converges on the link. Also, the IGP link is still used even when MPLS session goes down and MPLS LSP is broken on this link. The use of IGP link is determined based on MPLS LDP convergence synchronization status on the link.

Use the **show mpls ldp igp sync** command to display MPLS convergence status. The configuration for LDP IGP synchronization resides in IGP (OSPF, ISIS); accordingly, LDP displays and advertises this information for all LDP-enabled interfaces (regardless if the interface is configured for LDP IGP).

Task ID	Task ID	Operations
	mpls-ldp	read

Examples The following shows a sample output from the **show mpls ldp igp sync** command:

```
RP/0/0/CPU0:router# show mpls ldp igp sync
  POS0/3/0/2:
    VRF: 'default' (0x60000000)
    Sync delay: Disabled
    Sync status: Ready
    Peers:
```

```
192.168.0.1:0 (GR)
```

This table describes the significant fields shown in the display.

Table 9: show mpls ldp igp sync Command Field Descriptions

Field	Description
VRF	VRF of the interface.
Sync status	MPLS LDP convergence status on a given link. Ready indicates that the link is converged and is ready to be used by IGP. Not Ready with Deferred means that the link fulfills LDP IGP synchronization requirements but is deferred by LDP IGP synchronization delay timeout configuration setting. Not Ready means that the link is not ready to be used by IGP.
Peers	List of peers converged on the given link. If the peer session is GR ³ -enabled, output is tagged as GR. If GR-only reachability is indicated due to a GR neighbor record recovered from checkpoint after local start, then Chkpt-created flag is also set.

³ Graceful Restart.

Related Commands

Command	Description
igp sync delay , on page 37	Configures LDP IGP sync delay timeout.

show mpls ldp interface

To display information about LDP-enabled interfaces, use the **show mpls ldp interfaces** command in EXEC mode.

```
show mpls ldp [ipv4 ] interface [type interface-path-id | summary] [brief] [location node-id | standby]
```

Syntax Description

ipv4	(Optional) Specifies IP version 4 address family.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
summary	(Optional) Displays summary information about a specified LDP-enabled interface.
brief	(Optional) Displays concise information about a specified LDP-enabled interface.
detail	(Optional) Displays detailed information about a specified LDP-enabled interface.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.5.0	This command was introduced.
Release 3.9.0	The location and standby keywords were added.
Release 4.2.0	The detail keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Task ID	Operations
	mpls-ldp	read

Examples

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

```
RP/0/0/CPU0:router# show mpls ldp interface
Interface GigabitEthernet0/3/0/3
  No LDP config
Interface POS0/2/0/0
  No LDP config
  Auto-config items:
    ospf/100/0
Interface POS0/2/0/1
  No LDP config
  Auto-config items:
    ospf/100/0
Interface POS0/2/0/2
  No LDP config
  Auto-config items:
    ospf/100/0
Interface POS0/2/0/3
  No LDP config
  Auto-config items:
    ospf/100/0
```

This table describes the significant fields shown in the display.

Table 10: show mpls ldp interface Command Field Descriptions

Field	Description
Auto-config items	Lists IGP's that specify an interface for MPLS LDP auto-configuration: OSPF <i>ospf instance area</i> ISIS <i>isis instance</i>

The following shows a sample output from the **show mpls ldp interface detail** command for the mesh groups:

```
RP/0/0/CPU0:router# show mpls ldp interface detail
```

```

Interface GigabitEthernet0/2/0/0 (0x20200040)
  Enabled via config: LDP interface
Interface GigabitEthernet0/2/0/1 (0x20200060)
  Disabled via config: IGP Auto-config disable
  Ignoring: LDP interface
Interface GigabitEthernet0/2/0/2 (0x20200080)
  Disabled via config: IGP Auto-config disable
  Ignoring: LDP interface
Interface tunnel-te1 (0x200000f0)
  Disabled
Interface tunnel-te100 (0x20000110)
  Enabled via config: TE Mesh-group 123, TE Mesh-group all
Interface tunnel-te101 (0x20000130)
  Enabled via config: TE Mesh-group 123, TE Mesh-group all

```

Related Commands

Command	Description
igp auto-config disable, on page 35	Disables LDP auto-configuration.

show mpls ldp neighbor

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

show mpls ldp [**vrf all**] [**vrf vrf-name**] **neighbor** [*ip-address* | *ldp-id*] [*type interface-path-id*] [**brief**] [**capabilities**] [**detail**] [**gr**] [**location node-id**] [**non-gr**] [**sp**] [**standby**]

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf vrf-name	(Optional) Displays the VRF information for the specified VRF.
<i>ip-address</i>	(Optional) Neighbor IP address.
<i>ldp-id</i>	(Optional) Neighbor LDP ID in A.B.C.D: format.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
brief	(Optional) Displays the existing LDP sessions in brief format.
capabilities	(Optional) Displays the neighbor capabilities information.
detail	(Optional) Displays detailed information (including, inbound label filtering, session KAs, and session protection state) for an LDP session.

gr	(Optional) Displays graceful restartable neighbors.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
non-gr	(Optional) Displays non-graceful restartable neighbors.
sp	(Optional) Displays neighbors with session protection.
standby	(Optional) Displays standby-node-specific information.

Command Default No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 3.2	This command was introduced.
	Release 3.3.0	Introduced two new keywords: <ul style="list-style-type: none"> • sp keyword filters sessions with session protection capability • detail keyword displays detailed information including session protection state and hold time
	Release 3.6.0	Support was added for the standby keyword.
	Release 3.9.0	The following items were added: <ul style="list-style-type: none"> • The tunnel-gte interface type was added. • The location keyword was added. • Sample output for the brief keyword was modified to add the NSR and IPv4 Label columns.
	Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The capabilities keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp neighbor** command provides information about all LDP neighbors in the entire routing domain—conversely, the show output is filtered to display:

- LDP neighbors with specific IP addresses
- LDP neighbors on a specific interface
- LDP neighbors that are graceful restartable
- LDP neighbors that are nongraceful restartable
- LDP neighbors enabled with session protection

Task ID

Task ID	Operations
mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp neighbor** command using an IP address:

```
RP/0/0/CPU0:router# show mpls ldp neighbor 4.4.4.4

Peer LDP Identifier: 4.4.4.4:0
TCP connection: 14.1.0.41:38022 - 1.1.1.1:646
Graceful Restart: Yes (Reconnect Timeout: 120 sec, Recovery: 96 sec)
Session Holdtime: 180 sec
State: Oper; Msgs sent/rcvd: 1721/1716; Downstream-Unsolicited
Up time: 1d00h
LDP Discovery Sources:
  IPv4: (1)
    GigabitEthernet0/1/0/0
  IPv6: (0)
Addresses bound to this peer:
  IPv4: (3)
    4.4.4.4      14.1.0.41    24.1.0.4
  IPv6: (0)
```

The following shows a sample output from the **show mpls ldp neighbor** command using the **non-gr** keyword:

```
RP/0/0/CPU0:router# show mpls ldp neighbor non-gr

Peer LDP Identifier: 10.44.44.44:0
TCP connection: 10.44.44.44:65535 - 10.33.33.33:646
Graceful Restart: No
State: Oper; Msgs sent/rcvd: 49/46
Up time: 00:33:33
LDP Discovery Sources:
  POS 0/1/0/0
Addresses bound to this peer:
  10.44.44.44    10.10.3.2
Peer LDP Identifier: 10.22.22.22:0
TCP connection: 10.22.22.22:646 - 10.33.33.33:65530
Graceful Restart: No
```



```

State: Oper; Msgs sent/rcvd: 48/45
Up time: 00:33:11
LDP Discovery Sources:
  POS 0/2/0/0
Addresses bound to this peer:
  10.22.22.22    10.10.2.1

```

This table describes the significant fields shown in the display.

Table 11: show mpls ldp neighbor Command Field Descriptions

Field	Description
Peer LDP Identifier	LDP identifier of the neighbor (peer) for this session.
TCP connection	TCP connection used to support the LDP session, shown in the following format: neighbor IP address peer port local IP address local port
Graceful Restart	Graceful-restart status (Y or N).
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.
Up time	The length of time that this session has been up for (in <i>hh:mm:ss</i> format).
LDP Discovery Sources	The source(s) of LDP discovery activity leading to the establishment of the LDP session.
Addresses bound to this peer	The 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 LFIB ⁴ .

⁴ LFIB = Label Forwarding Information Base.

The following shows a sample output from the **show mpls ldp neighbor** command using the **brief** keyword:

```

RP/0/0/CPU0:router# show mpls ldp neighbor brief
Peer                GR  NSR  Up Time      Discovery  Addresses  Labels

```

				ipv4	ipv6	ipv4	ipv6	ipv4	ipv6
4.4.4.4:0	Y	N	1d00h	1	0	3	0	5	0
46.46.46.2:0	N	N	1d00h	1	1	3	3	5	5
46.46.46.46:0	Y	N	1d00h	2	2	4	4	5	5
6.6.6.1:0	Y	N	23:25:50	0	1	0	2	0	5

This table describes the significant fields shown in the display.

Table 12: show mpls ldp neighbor brief Command Field Descriptions

Field	Description
Peer	LDP identifier of the neighbor (peer) for this session.
GR	Graceful-restart status (Y or N).
Up Time	Time the session has been up (in hh:mm:ss format).
Discovery	Number of LDP discovery sources corresponding to the neighbor.
Address	Number of addresses bound to this peer.

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

```
RP/0/0/CPU0:router# show mpls ldp neighbor detail

Peer LDP Identifier: 2.2.2.2:0
TCP connection: 2.2.2.2:11707 - 1.1.1.1:646
Graceful Restart: No
Session Holdtime: 180 sec
State: Oper; Msgs sent/rcvd: 33/29
Up time: 00:13:37
LDP Discovery Sources:
  POS0/2/0/1
  Targeted Hello (1.1.1.1 ->2.2.2.2, active)
Addresses bound to this peer:
  23.0.0.2 2.0.0.2      123.0.4.2      10.42.37.119
  10.2.2.2
Peer holdtime: 180 sec; KA interval: 60 sec; Peer state: Estab
Clients: Dir Adj Client
Inbound label filtering: accept acl 'pfx_acl2'
Session Protection:
  Enabled, state: Ready
  Duration: 30 seconds
```

This table describes the significant fields shown in the display.

Table 13: show mpls ldp neighbor detail Command Field Descriptions

Field	Description
Peer LDP Identifier	LDP identifier of the neighbor (peer) for this session.

Field	Description
TCP connection	TCP connection used to support the LDP session, shown in the following format: neighbor IP address peer port local IP address local port
Graceful Restart	Graceful-restart status (Y or N).
Session Holdtime	Session hold time, in seconds.
State	State of the LDP session (operational or transient).
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.
Up time	Time the session has been up for (in <i>hh:mm:ss</i> format).
Peer holdtime	Time to keep LDP peer session up without receipt of LDP protocol message from a peer.
Peer state	Peer session state.
Peer holdtime	Time to keep LDP peer session up without receipt of LDP protocol message from a peer.
Clients	LDP (internal) clients requesting session with a neighbor.
Inbound label filtering	LDP neighbor inbound filtering policy.

Field	Description
Session Protection	<p>State of the session protection:</p> <p>Incomplete Targeted discovery requested but not yet up.</p> <p>Ready Targeted discovery and at least one link hello adjacency to the peer are up.</p> <p>Protecting Targeted discovery is up and there is no link hello adjacency to the peer. Targeted discovery is protecting and backing up link discoveries.</p>
Duration	Maximum time to maintain session through targeted discovery upon loss of primary link discovery.
Holdtimer	When in “protecting” state, time to keep LDP peer session up without receipt of LDP protocol message from a peer.

Related Commands

Command	Description
graceful-restart (MPLS LDP) , on page 30	Configures the LDP graceful restart feature.
label accept , on page 43	Configures the LDP inbound label filtering feature.
session protection , on page 76	Configures the LDP session protection feature.
show mpls ldp discovery , on page 89	Displays the status of the LDP discovery process.

show mpls ldp nsr pending neighbor

To display the nonstop routing (NSR) pending neighbor information for an LDP session, use the **show mpls ldp nsr pending neighbor** command in the EXEC mode.

```
show mpls ldp [vrf vrf-name] nsr pending neighbor [lsr-id | ldp-id][location node-id | standby]
```

Syntax Description		
	vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
	<i>lsr-id</i>	(Optional) LSR ID of neighbor in A.B.C.D format.
	<i>ldp-id</i>	(Optional) LDP ID of neighbor in A.B.C.D: format.
	location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
	standby	(Optional) Displays standby-node-specific information.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read

Examples

The following example shows how to display NSR pending neighbor information for an LDP session:

```
RP/0/0/CPU0:router# show mpls ldp nsr pending neighbor
```

show mpls ldp nsr statistics

To display the nonstop routing (NSR) statistics for an LDP session, use the **show mpls ldp nsr statistics** command in EXEC mode.

```
show mpls ldp [vrf vrf-name] nsr statistics [location node-id | standby] [neighbor [lsr-id | ldp-id]] [location node-id | standby]
```

Syntax Description		
vrf <i>vrf-name</i>		(Optional) Displays the VRF information for the specified VRF.
location <i>node-id</i>		(Optional) Displays location information for the specified node ID.
standby		(Optional) Displays standby-node-specific information.
neighbor		(Optional) Displays neighbor information.
<i>lsr-id</i>		(Optional) LSR ID of neighbor in A.B.C.D format.
<i>ldp-id</i>		(Optional) LDP ID of neighbor in A.B.C.D: format.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp nsr statistics** command:

```
RP/0/0/CPU0:router# show mpls ldp nsr statistics

Global Init Sync:
  Start: Oct 27 12:12:23 (00:01:20 ago)
  End:   Oct 27 12:12:23 (00:01:20 ago)

Protocol message stats:
  4 Peer, 5 Adj, 0 DHCB, 14/20 sent/rcvd Capabilities
  23 peer label for 18 FEC
  Send-Ack: 0 Lcl-Addr-WD

Sync message stats:
  Tx msgs/bytes = 32/5024
  Rx msgs/bytes = 0/0
  Max IPC Tx/Rx bytes = 4396/0
  Default MTU bytes = 4768, IPCs exceeding MTU = 0
  TX current/total fail count = 0/0
  IPC restart count = 1
```


show mpls ldp nsr summary

To display the nonstop routing (NSR) summary for an LDP session, use the **show mpls ldp nsr summary** command in EXEC mode.

```
show mpls ldp [vrf all] [vrf vrf-name] nsr summary [location node-id | standby] [all]
```

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf vrf-name	(Optional) Displays the VRF information for the specified VRF.
location node-id	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.
all	(Optional) Displays the aggregate summary across LDP processes and all VRFs.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp nsr summary** command:

```
RP/0/0/CPU0:router# show mpls ldp nsr summary
```

```
Sessions:  
  Total: 1, NSR-eligible: 1, Sync-ed: 1  
    (1 Oper)
```

show mpls ldp parameters

To display current LDP parameters, use the **show mpls ldp parameters** command in EXEC mode.

```
show mpls ldp [vrf vrf-name] parameters [location node-id | standby]
```

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.9.0	The location and standby keywords were added.
Release 5.1.1	The vrf keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp parameters** command displays all LDP operational and configuration parameters.

Task ID

Task ID	Operations
mpls-ldp	read
network	read

Examples

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

```
RP/0/0/CPU0:router# show mpls ldp parameters

LDP Parameters:
  Protocol Version: 1
  Router ID: 10.11.11.11
  Null Label: Implicit
  Session:
    Hold time: 180 sec
    Keepalive interval: 60 sec
    Backoff: Initial:15 sec, Maximum:120 sec
  Discovery:
    Link Hellos:      Holdtime:15 sec, Interval:5 sec
    Targeted Hellos:  Holdtime:90 sec, Interval:10 sec
                    (Accepting peer ACL 'peer_acl_10')
  Graceful Restart:
    Enabled (Configured)
    Reconnect Timeout:120 sec, Forwarding State Holdtime:180 sec
  Timeouts:
    Binding with no-route: 300 sec
    LDP application recovery (with LSD): 360 sec
  OOR state
    Memory: Normal
```

This table describes the significant fields shown in the display.

Table 14: show mpls ldp parameters Command Field Descriptions

Field	Description
Protocol Version	Version of LDP running on the platform.
Router ID	Currently used router ID.
Null Label	LDP use of implicit-null or explicit-null as label for prefixes where it has to use a null label.
Session Hold time	Time LDP session is to be maintained with an LDP peer without receiving LDP traffic or an LDP keepalive message from the peer.
Session Keepalive interval	Time interval between consecutive transmissions of LDP keepalive messages to an LDP peer.
Session Backoff	Initial maximum backoff time for sessions.
Discovery Link Hellos	Time 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).

Field	Description
Discovery Targeted Hellos	Indicates the time: <ul style="list-style-type: none"> To remember that a neighbor platform wants an LDP session when the neighbor platform is not directly connected to the router or the neighbor platform has not sent an LDP hello message. This intervening interval is known as <i>hold time</i>. Interval between the transmission of consecutive hello messages to a neighbor not directly connected to the router and if targeted hellos are being accepted, displaying peer-acl (if any).
Graceful Restart	Status of graceful-restart status (Y or N).
Timeouts	Various timeouts (of interest) that the LDP is using. One timeout is <i>binding no route</i> , which indicates how long the LDP waits for an invalid route before deleting it. It also shows restart recovery time for LSD and LDP.
OOR state	Out of resource memory state: Normal, Major, or Critical.

Related Commands

Command	Description
backoff , on page 4	Configures the parameters for the LDP backoff mechanism.
discovery hello , on page 17	Configures the interval between transmission of LDP discovery messages.
explicit-null , on page 27	Configures a router to advertise an explicit-null label.
graceful-restart (MPLS LDP) , on page 30	Configures the LDP graceful restart feature.
session holdtime (MPLS LDP) , on page 33	Configures keepalive message hold time for LDP sessions.
neighbor targeted , on page 67	Specifies the preferred interface or IP address of a Loopback interface for determining the LDP router ID.

show mpls ldp statistics fwd-setup

To display the statistics of the forwarding setup counters related to RIB/LSD, use the **show mpls ldp statistics fwd-setup** command in EXEC mode.

show mpls ldp [*vrf vrf-name*] **statistics fwd-setup** [*location node-id* | **standby**]

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp statistics fwd-setup** command:

```
RP/0/0/CPU0:router# show mpls ldp statistics fwd-setup
RIB
```

```

===

Thread counters:
  Events In           : 10
  Events Out          : 39
  RIB fetch throttled : 0 (0 during last throttle)

TC Thread counters:
  Events In           : 39 (3 skipped)
  Events Out          : 12 (0 failed, 2 skipped)

Address Family: IPv4
RIB server connects: 1
RIB converged: Yes
Op counters:
  Fetch               : 4 (2 buffers per fetch)
                     no-data: 0
                     callbacks: 33 routes, 3 convg, 0 rcmd
  Route Up            : 33 (0 protected; Paths: 29/0/0 total/backup/protected)
  Route Down          : 0
  Route Filtered     : 5 (0 intern, 5 misc, 0 alloc, 0 admin,
                        0 un supp-intf 0, un supp-protection,
                        0 bgp, 0 bgp-unlabelled, 0 ibgp-no-lbl-u cast)

MFI
===

Thread counters:
  Events In           : 9
  Events Out          : 8
  LSD Rsrc-Complete   : 1
  LSD server connects : 1

Op counters:
                                     Successful      Failed
                                     -----
Control                            :          3          0
RCMD Markers                        :          0          0
State cleanup                       :          0          0
Interface Enable                    :          5          0
Interface Disable                   :          0          0
Label alloc                         :          4          0
Label alloc - mldp                  :          0          0
Label free                           :          0          0
Label free - mldp                   :          0          0
Rewrite create                      :          6          0
Rewrite delete                      :          0          0
Label/Rewrite create                :          0          0
Label/Rewrite delete                :          0          0
Label OOR cleared                   :          3          0

Total LSD Reqs/Msgs                :          7          0

LSD flow control status:
Flow control                        : 0
Flow control cnt                    : 0
Evt queue item cnt                  : 0
Last flow control                    : N/A

```

show mpls ldp statistics msg-counters

To display statistics of the messages exchanged between neighbors, use the **show mpls ldp statistics msg-counters** command in EXEC mode.

show mpls ldp [*vrf vrf-name*] **statistics msg-counters** [*lsr-id* | *ldp-id*] [**location** *node-id* | **standby**]

Syntax Description

vrf <i>vrf-name</i>	(Optional) Displays the VRF information for the specified VRF.
<i>lsr-id</i>	(Optional) LSR ID of neighbor in A.B.C.D format.
<i>ldp-id</i>	(Optional) LDP ID of neighbor in A.B.C.D: format.
location <i>node-id</i>	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.2	This command was supported.
Release 5.1.1	The vrf keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp statistics msg-counters** command can provide counter information about different types of messages sent and received between neighbors.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

The following shows a sample output from the **show mpls ldp statistics msg-counters** command:

```
RP/0/0/CPU0:router# show mpls ldp statistics msg-counters
```

```
Peer LDP Identifier: 10.33.33.33:0
Msg Sent: (80)
  Init           : 1
  Address        : 1
  Address_Withdraw : 0
  Label_Mapping  : 5
  Label_Withdraw : 0
  Label_Release  : 0
  Notification   : 0
  KeepAlive      : 73

Msg Rcvd: (81)
  Init           : 1
  Address        : 1
  Address_Withdraw : 0
  Label_Mapping  : 8
  Label_Withdraw : 0
  Label_Release  : 0
  Notification   : 0
  KeepAlive      : 71
```

[Table 15: show mpls ldp statistics msg-counters Command Field Descriptions](#), on page 129 describes the significant fields shown in the display.

Table 15: show mpls ldp statistics msg-counters Command Field Descriptions

Field	Description
Peer LDP Identifier	LDP identifier of the neighbor (peer).
Msg Sent	Summary of messages sent to the LDP peer.
Msg Rcvd	Summary of messages received from the LDP peer.

Related Commands

Command	Description
clear mpls ldp msg-counters neighbor , on page 8	Clears MPLS LDP message counter values.
show mpls ldp bindings , on page 80	Displays the contents of LDP LIB.
show mpls ldp neighbor , on page 110	Displays LDP neighbor information.

show mpls ldp summary

To display a summary of LDP information, use the **show mpls ldp summary** command in EXEC mode.

show mpls ldp [**vrf all**] [**vrf vrf-name**] **summary** [**location node-id** | **standby**] [**all**]

Syntax Description

vrf all	(Optional) Displays all LDP configured VRFs.
vrf vrf-name	(Optional) Displays the VRF information for the specified VRF.
location node-id	(Optional) Displays location information for the specified node ID.
standby	(Optional) Displays standby-node-specific information.
all	(Optional) Displays the aggregate summary across LDP processes and all VRFs.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 3.2	This command was supported.
Release 3.9.0	The location and standby keywords were added.
Release 5.1.1	The following items were added: <ul style="list-style-type: none"> • The vrf all keyword was added. • The vrf keyword was added. • The all keyword was added.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show mpls ldp summary** command can provide information about the number of LDP neighbors, interfaces, forwarding state (rewrites), servers connection/registration, and graceful-restart information.

Task ID

Task ID	Operations
mpls-ldp	read

Examples

The following example shows a sample output from the **show mpls ldp summary** command:

```
RP/0/0/CPU0:router# show mpls ldp summary
AFIs      : IPv4
Routes    : 4
Neighbors : 1 (1 GR)
Hello Adj : 1
Addresses : 3
Interfaces: 4 LDP configured
```

The following example shows a sample output from the **show mpls ldp summary all** command:

```
RP/0/0/CPU0:router# show mpls ldp summary all
VRFs      : 1 (1 oper)
AFIs      : IPv4
Routes    : 4
Neighbors : 1 (1 GR)
Hello Adj : 1
Addresses : 3
Interfaces : 4 (1 forward reference, 2 LDP configured)
Collaborators:

                Connected  Registered
                -----  -
SysDB          Y          Y
IM             Y          Y
RSI            Y          -
IP-ARM         Y          -
IPv4-RIB       Y          Y (1/1 tables)
LSD            Y          Y
LDP-NSR-Partner Y          -
L2VPN-AToM    Y          -
mLDP          -          N
```

This table describes the significant fields shown in the display.

Table 16: show mpls ldp summary Command Field Descriptions

Field	Description
Routes	Number of known IP routes (prefixes).

Field	Description
Neighbors	Number of LDP neighbors, including targeted and graceful restartable neighbors.
Hello Adj	Number of discovered LDP discovery sources.
Interfaces	Number of known IP interfaces and number of LDP configured interfaces. LDP is configured on a forward-referenced interface which may not exist or for which no IP address is configured.
Addresses	Number of known local IP addresses.

Related Commands

Command	Description
show mpls ldp bindings, on page 80	Displays the contents of LDP LIB.
show mpls ldp discovery, on page 89	Displays the status of the LDP discovery process.
show mpls ldp forwarding, on page 95	Displays the contents of the LDP forwarding database.
show mpls ldp graceful-restart, on page 101	Displays the status of the LDP graceful restart.
show mpls ldp parameters, on page 123	Displays current LDP parameter settings.

show mpls ldp trace vrf

To display the Label Distribution Protocol (LDP) VRF event traces, use the **show mpls ldp trace vrf** command in EXEC mode.

```
show mpls ldp trace vrf [binding] [capabilities] [config] [dev] [discovery] [error] [file file-name]
[forwarding] [gr] [hexdump] [iccp] [igp-sync] [interface] [last] [location {node-id | name | all | mgmt-nodes}]
[misc] [mldp] [nsr] [peer] [process] [pw] [reverse] [route] [since] [stats] [tailf] [unique] [usec] [verbose]
[wide] [wrapping]
```

Syntax Description

binding	(Optional) Displays the binding event traces.
capabilities	(Optional) Displays the capabilities event traces.
config	(Optional) Displays the configuration event traces.
dev	(Optional) Displays the development private traces.
discovery	(Optional) Displays Hello or discovery and adj event traces.
error	(Optional) Displays error traces.
file <i>file-name</i>	(Optional) Displays trace of a specific file.
forwarding	(Optional) Displays forwarding event traces.
gr	(Optional) Displays graceful-restart event traces.
hexdump	(Optional) Displays traces in hexadecimal.
iccp	(Optional) Displays ICCP signaling event traces.
igp-sync	(Optional) Displays IGP sync event traces.
interface	(Optional) Displays interface event traces.

last	(Optional) Displays last number of entries.
location	(Optional) Identifies the location of the card whose CPU controller trace information you want to display.
<i>node-id</i>	The node-id argument is expressed in the rack/slot/module notation.
<i>name</i>	Specifies the name of the card.
<i>all</i>	Specifies all locations.
<i>mgmt-nodes</i>	Specifies all managements nodes.
misc	(Optional) Displays miscellaneous event traces.
mldp	(Optional) Displays MLDP event traces.
nsr	(Optional) Displays non-stop routing event traces.
peer	(Optional) Displays peer session event traces.
process	(Optional) Displays process-level event traces.
pw	(Optional) Displays L2VPN pseudo-wire event traces.
reverse	(Optional) Displays latest traces first.
route	(Optional) Displays route event traces.
since last-start	(Optional) Displays traces since the last start time.
stats	(Optional) Displays statistics.
tailf	(Optional) Displays new traces as they are added.
unique	(Optional) Displays unique entries with count.

usec	(Optional) Displays timestamp w/usec detail.
verbose	(Optional) Displays internal debugging information.
wide	(Optional) Do not display buffer name, node name and tid.
wrapping	(Optional) Displays wrapping entries.

Command Default No default behavior or values

Command Modes EXEC mode

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read

Examples The following example shows how to display the LDP VRF event traces:

```
RP/0/0/CPU0:router# show mpls ldp trace vrf
```

show lcc

To display label consistency checker (LCC) information, use the **show lcc** command in EXEC mode.

```
show lcc {ipv4|ipv6} unicast {all|label|tunnel-interface|statistics} [summary|scan-id scan-id]; [vrf
vrfname]
```

Syntax Description

ipv4	Specifies IP version 4 address prefixes.
ipv6	Specifies IP version 6 address prefixes.
unicast	Specifies unicast address prefixes.
all	Scans all routes.
label	Scans all labels.
tunnel-interface	Specifies the interface of a tunnel.
statistics	Displays route consistency check statistics information.
scan-id	Specifies the value of scan-id. Range is from 0 to 100000.
summary	Displays background route consistency check statistics summary information.
vrf <i>vrfname</i>	(Optional) Specifies a particular VPN routing and forwarding (VRF) instance or all VRF instances.

Command Default

None

Command Modes

IPv4 address family configuration
IPv6 address family configuration

Command History

Release	Modification
Release 4.2.0	This command was introduced.

Usage Guidelines

You must be in a user group associated with a task group that includes the proper task IDs. The command reference guides include the task IDs required for each command. If you suspect user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operations
IPv4	read
IPv6	read

Examples

The following example shows an outcome of the label consistency checker information:

```
RP/0/0/CPU0:router# show lcc ipv4 unicast all
```

```
Sending scan initiation request to IPv4 LSD ... done
Waiting for scan to complete (max time 600 seconds).....
Scan Completed
Collecting scan results from FIBs (max time 30 seconds)... done
Number of nodes involved in the scan: 2
Number of nodes replying to the scan: 2
```

Legend:

```
? - Currently Inactive Node, ! - Non-standard SVD Role
* - Node did not reply
```

Node	Checks Performed	Errors
0/2/CPU0	6	0
0/0/CPU0	6	0

Related Commands

Command	Description
show rcc	Displays route consistency checker related information.

signalling dscp (LDP)

To assign label distribution protocol (LDP) signaling packets a differentiated service code point (DSCP) to assign higher priority to the control packets while traversing the network, use the **signalling dscp** command in MPLS LDP configuration mode. To return to the default behavior, use the **no** form of this command.

signalling dscp *dscp*

no signalling dscp

Syntax Description

<i>dscp</i>	DSCP priority value. Range is 0 to 63.
-------------	--

Command Default

LDP control packets are sent with precedence 6 (*dscp*: 48)

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was supported.
Release 3.4.0	

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

DSCP marking improves signaling setup and teardown times.

Ordinarily, when LDP sends hello discovery or protocol control messages, these are marked using the default control packet precedence value (6, or *dscp* 48). You can use the **signalling dscp** command to override that DSCP value to ensure that all control messages sent are marked with a specified DSCP.



Note

While the **signalling dscp** command controls LDP signaling packets (Discovery hellos and protocol messages), it has no effect on ordinary IP or MPLS data packets.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to assign LDP packets a DSCP value of 56:

```
RP/0/0/CPU0:router(config-ldp)# signalling dscp 56
```

snmp-server traps mpls ldp

To inform a network management system of session and threshold cross changes, use the **snmp-server traps mpls ldp** command in global configuration mode.

```
snmp-server traps mpls ldp {up | down | threshold}
```

Syntax Description

up	Displays the session-up notification.
down	Displays the session-down notification.
threshold	Displays the session-backoff-threshold crossed notification.

Command Default

LDP does not send SNMP traps.

Command Modes

Global configuration

Command History

Release	Modification
Release 3.2	This command was supported.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **snmp-server traps mpls ldp** command sends notifications to the SNMP server. There are three types of traps sent by LDP:

Session up

Generated when sessions go up.

Session down

Generated when sessions go down.

Threshold

Generated when attempts to establish a session fails. The predefined value is 8.

Task ID

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

Examples

The following example shows how to enable LDP SNMP trap notifications for Session up:

```
RP/0/0/CPU0:router(config)# snmp-server traps mpls ldp up
```

static

To enable Multicast Label Distribution Protocol (MLDP) static LSP support, use **static** command in MPLS LDP MLDP configuration

```
address-family ipv4 static {mp2mp ip-address| p2mp ip-address}
```

Syntax Description

mp2mp <i>ip-address</i>	Specifies multi-point to multi-point (MP2MP) LSP root IP address followed by the number of LSPs in the range 1 to 1000.
p2mp <i>ip-address</i>	Specifies point to multi-point (P2MP) LSP root IP address followed by the number of LSPs in the range 1 to 1000.

Command Default

No default behavior or values

Command Modes

MPLS LDP MLDP configuration

Command History

Release	Modification
Release 5.1.1	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID

Task ID	Operation
mpls-ldp	read

Examples

The following example shows how to set up MLDP static support for MP2MP with forty five LSPs:

```
RP/0/0/CPU0:router(config-ldp-mldp)# address-family ipv4 static mp2mp 1.1.1.1 45
```

address-family ipv4/ipv6 label

To configure label control and policies on a specific IPv4 or IPv6 destination, use the **address-family ipv4/ipv6 label** command in the MPLS LDP configuration mode.

```
[ vrf vrf-name ]address-family { ipv4 } label [remote accept from ldp-id for prefix-acl] local [default-route]
[allocate for {prefix-acl | host-routes}] [ advertise [to ldp-id for prefix-acl] [interface type interface-path-id
]]
```

Syntax Description

address-family	Configure address-family and its parameters.
ipv4	Specifies IP version 4 address family.
label	(Optional) Configure label control and policies.
remote	(Optional) Configure remote/peer label control and policies.
accept	(Optional) Configure inbound label acceptance control.
from ldp-id	Specifies which LDP neighbors will receive label advertisements. LDP ID is written in A.B.C.D: format.
for prefix-acl	Specifies prefix destinations for which labels will be advertised.
local	(Optional) Configure local label control and policies.
default-route	(Optional) Enable MPLS forwarding for default route.
allocate	(Optional) Configure label allocation control.
for prefix-acl	Specifies prefix destinations for which labels will be allocated.
host-routes	Allocates labels for host routes only.
advertise	(Optional) Configure outbound label advertisement control.

<i>to ldp-id</i>	(Optional) Specifies which LDP neighbors will receive label advertisements. LDP ID is written in A.B.C.D: format.
<i>for prefix-acl</i>	(Optional) Specifies prefix destinations for which labels will be advertised.
interface	(Optional) Advertise interface host address.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or a virtual interface. Note Use the show interfaces command to see a list of all possible interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.

Command Default No default behavior or values

Command Modes MPLS LDP configuration

Command History	Release	Modification
	Release 5.1.1	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operation
	mpls-ldp	read, write

Examples

The following example shows how to configure label control and policies on a specific IPv4 destination:

```
RP/0/0/CPU0:router(config-ldp)# address-family ipv4 label
```

