



MPLS Label Distribution Protocol Commands on Cisco IOS XR Software

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

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, refer to the *Cisco IOS XR MPLS Configuration Guide*.

backoff

To configure the parameters for the 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

<i>initial</i>	Initial backoff delay in seconds. Range is 5 to 2147483 seconds.
<i>maximum</i>	Maximum backoff delay in seconds. Range is 5 to 2147483 seconds.

Defaults

initial: 15 seconds
maximum: 120 seconds

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 LSR delays the next attempt increasing the delay exponentially with each successive failure (until the maximum backoff delay is reached).

Task ID

Task ID	Operations
mpls-ldp	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/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(config)# mpls ldp
RP/0/RP0/CPU0:router(config-ldp)# backoff 30 240
```

Related Commands

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

clear mpls ldp msg-counters neighbor

To clear the LDP message counters, use the **clear mpls ldp msg-counters** command in EXEC mode.

```
clear mpls ldp msg-counters neighbor {A.B.C.D. | all}
```

Syntax Description

<i>A.B.C.D.</i>	LSR or LDP ID of the neighbor.
all	Clears LDP message counters for all neighbors.

Command Modes

EXEC

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router# clear mpls ldp msg-counters neighbor 10.20.20.20
```

Related Commands

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

clear mpls ldp neighbor

To force LDP session restart, use the **clear mpls ldp neighbor** command in EXEC mode.

```
clear mpls ldp neighbor [A.B.C.D.]
```

Syntax Description	<i>A.B.C.D.</i> (Optional) Neighbor IP address or LDP ID.
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Defaults	No default behavior or values
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Command Modes	EXEC
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Command History	Release	Modification
	Release 3.3.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router# clear mpls ldp neighbor 10.20.20.20
```

Related Commands	Command	Description
	show mpls ldp neighbor	Displays information about LDP neighbors.

default-route

To enable 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.

Defaults

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 on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

When the IP default route 0.0.0.0/0 is configured on an egress router, it is advertised through IGP to other routers to enable default IP forwarding. When MPLS LDP is configured and establishing 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/RP0/CPU0:router (config-ldp) # default-route
```

Related Commands	Command	Description
	show mpls ldp bindings	Displays LDP label bindings.
	show mpls ldp forwarding	Displays LDP installed forwarding state.

discovery hello

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

Defaults

holdtime: 15 seconds

interval: 5 seconds

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router(config-ldp)# discovery hello holdtime 30
```

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

```
RP/0/RP0/CPU0:router(config-ldp)# discovery hello interval 10
```

Related Commands

Command	Description
discovery targeted-hello	Configures targeted-hello messages.

discovery instance-tlv disable

To disable transmit and receive processing for 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.

Defaults No default behavior or values

Command Modes MPLS LDP configuration

Command History

Release	Modification
Release 3.4.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# mpls ldp
RP/0/RP0/CPU0:router(config-ldp)# discovery hello holdtime 30
```

Related Commands

Command	Description
discovery targeted-hello	Configures targeted-hello messages.

discovery targeted-hello

To configure the interval between transmission of consecutive 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 {accept [from acl] | holdtime seconds | interval seconds}
```

```
no discovery targeted-hello {accept | holdtime | interval}
```

Syntax Description

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

Defaults

accept: Targeted hello messages are not accepted from any source (neighbor).

holdtime: 90 seconds

interval: 10 seconds

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router. Support was added for the from <i>acl</i> keyword and argument under the accept command.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/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/RP0/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/RP0/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/RP0/CPU0:router(config)# ipv4 access-list peer_acl_10
```

```
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.1.1.1
```

```
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.2.2.2
```

```
RP/0/RP0/CPU0:router(config-ldp)# discovery targeted-hello accept from peer_acl_10
```

Related Commands

Command	Description
show mpls ldp discovery	Displays LDP discovery information.
show mpls ldp parameters	Displays LDP parameters information.

discovery transport-address

To provide an alternative address for a Transmission Control Protocol (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.

discovery transport-address {*A.B.C.D.* | **interface**}

no discovery transport-address {*A.B.C.D.* | **interface**}

Syntax Description

<i>A.B.C.D.</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.

Defaults

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 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 value, 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 POS interface 0/1/0/0:

```
RP/0/RP0/CPU0:router(config-ldp)# interface POS 0/1/0/0
RP/0/RP0/CPU0:router(config-ldp-if)# discovery transport-address 10.10.3.1

RP/0/RP0/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	Displays the status of the LDP discovery process.
show mpls ldp neighbor	Displays information about LDP neighbors.

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.

```
explicit-null { to peer-acl | for prefix-acl [to peer-acl] }
```

```
no explicit-null
```

Syntax Description

for <i>prefix-acl</i>	(Optional) Specifies prefixes for which explicit-null is advertised instead of implicit-null. Range is 1 to 99.
to <i>peer-acl</i>	(Optional) Specifies LDP peers for which explicit-null is advertised instead of implicit-null. Range is 1 to 99.

Defaults

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 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router. Support was added for the for and to keywords.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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.

Run the **explicit-null** command to advertise explicit-null labels in place of implicit null labels for directly connected prefixes. Use **mpls ldp explicit-null** command when running in global configuration mode.

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/RP0/CPU0:router(config-ldp)# 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/RP0/CPU0:router(config)# ipv4 access-list pfx_acl_192_168
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 192.168.0.0
RP/0/RP0/CPU0:router(config-ldp)# 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/RP0/CPU0:router(config)# ipv4 access-list peer_acl_10
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.1.1.1
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.2.2.2
```

```
RP/0/RP0/CPU0:router(config-ldp)# 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/RP0/CPU0:router(config-ldp)# explicit-null for pfx_acl_192_168 to peer_acl_10
```

Related Commands

Command	Description
show mpls ldp bindings	Displays the contents of LDP label information base (LIB).
show mpls ldp forwarding	Displays the contents of the LDP forwarding database.
show mpls ldp parameters	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

forwarding-state-holdtime <i>seconds</i>	(Optional) Time the local forwarding state is preserved (without being reclaimed) after the local LDP control plane restarts. Range is 60 to 600 seconds.
reconnect-timeout <i>seconds</i>	(Optional) 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. Range is 60 to 300 seconds.

Defaults

By default, graceful restart is disabled.

reconnect-timeout: 120 seconds

forwarding-state-holdtime: 180 seconds

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 switching 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 non graceful restart to graceful restart, all the sessions are restarted. Only graceful restart sessions are restarted upon graceful restart to non graceful 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/RP0/CPU0:router(config-ldp)# graceful-restart
```

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

```
RP/0/RP0/CPU0:router(config-ldp)# graceful-restart
```

```
RP/0/RP0/CPU0:Apr  3 10:56:05.392 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
2.2.2.2:0, DOWN
RP/0/RP0/CPU0:Apr  3 10:56:05.392 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
3.3.3.3:0, DOWN
RP/0/RP0/CPU0:Apr  3 10:56:09.525 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
3.3.3.3:0, UP
RP/0/RP0/CPU0:Apr  3 10:56:11.114 : mpls_ldp[336]: %ROUTING-LDP-5-NBR_CHANGE : Nbr
2.2.2.2:0, UP
```

```
RP/0/RP0/CPU0:router# show mpls ldp neighbor brief
```

```
v
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/RP0/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	Displays the contents of the LDP forwarding database.
	show mpls ldp graceful-restart	Displays information related to graceful restart.
	show mpls ldp neighbor	Displays information about LDP neighbors.
	show mpls ldp parameters	Displays current LDP parameter settings.
	show mpls ldp summary	Displays summarized information regarding the LDP process.

holdtime (MPLS LDP)

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

holdtime *seconds*

no holdtime

Syntax Description	<i>seconds</i>	Time that an LDP session is maintained in the absence of LDP messages from the session peer. Range is 15 to 65535 seconds.
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Defaults	<i>seconds</i> : 180
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Command Modes	MPLS LDP configuration
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Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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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:
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```
RP/0/RP0/CPU0:router (config-ldp)# holdtime 30
```

Related Commands	Command	Description
	show mpls ldp parameters	Displays current LDP parameter settings.

igmp auto-config disable

To disable 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

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values

Command Modes MPLS LDP interface configuration

Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

IGMP auto-configuration can be enabled on ISIS and OSPF. Configuration details are described in *Cisco IOS XR Routing Configuration Guide*, Release 3.5.

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/RP0/CPU0:router(config)# mpls ldp
RP/0/RP0/CPU0:router(config-ldp)# interface pos 0/1/0/3
RP/0/RP0/CPU0:router(config-ldp-if)# igmp auto-config disable
```

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

igp sync delay

To enable LDP 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 that declaration of LDP sync state being up is delayed after session establishment upon link coming up. Range is 5 to 60 seconds.
----------------	--

Defaults

LDP does not delay declaration of sync up and notifies IGP as soon 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 on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

By default, LDP declares LDP sync up as soon as all the requisite conditions are met; namely:

- an 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.

Task ID

Task ID	Operations
mpls-ldp	read, write

■ **igp sync delay****Examples**

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

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# mpls ldp
RP/0/RP0/CPU0:router(config-ldp)# igp sync delay 30
```

Related Commands

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

interface (MPLS LDP)

To configure or enable MPLS 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-id
```

```
no interface type interface-id
```

Syntax Description

<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-id</i>	Identifies a 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.

Defaults

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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.

■ interface (MPLS LDP)

**Note**

You cannot enable LDP on loopback interfaces.

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/RP0/CPU0:router(config-ldp)# interface POS 0/1/0/0
RP/0/RP0/CPU0:router(config-ldp-if)#
```

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

```
RP/0/RP0/CPU0:router(config-ldp)# interface tunnel-te 123
RP/0/RP0/CPU0:router(config-ldp-if)#
```

Related Commands

Command	Description
show mpls ldp parameters	Displays current LDP parameter settings.
show mpls ldp neighbor	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** *A.B.C.D*

no label accept for *prefix-acl* **from** *A.B.C.D*

Syntax Description

for <i>prefix-acl</i>	Accept and retain remote bindings for prefixes which are permitted by the prefix access list <i>prefix-acl</i> .
from <i>A.B.C.D</i>	Peer IP address.

Defaults

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.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

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/RP0/CPU0:router(config-ldp)# label accept
RP/0/RP0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_1 from 1.1.1.1
RP/0/RP0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_2 from 2.2.2.2
RP/0/RP0/CPU0:router(config-ldp-lbl-acpt)# for pfx_acl_3 from 3.3.3.3
```

Related Commands

Command	Description
label advertise	Controls advertisement of LDP local label bindings (Outbound label filtering)
clear mpls ldp neighbor	Resets LDP neighbor sessions.
show mpls ldp bindings	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** *interface* }

no label advertise { **disable** | **for** *prefix-acl* [**to** *peer-acl*] | **interface** *interface* }

Syntax Description

disable	Disables label advertisement to all peers for all prefixes.
for <i>prefix-access-list</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 <i>interface</i>	(Optional) Specifies an interface (interface) for label allocation and advertisement of its interface IP address.

Defaults

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 on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

- Every command has a prefix- 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 described below:
 - 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** form of the command has been configured, 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/RP0/CPU0:router(config-ldp)# label advertise
RP/0/RP0/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/RP0/CPU0:router(config)# ipv4 access-list pfx_acl_1
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.1.1.0
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 20.1.1.0
```

```
RP/0/RP0/CPU0:router(config-ldp)# label advertise
RP/0/RP0/CPU0:router(config-ldp-lbl-advt)# disable
RP/0/RP0/CPU0:router(config-ldp-lbl-advt)# 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/RP0/CPU0:router(config)# ipv4 access-list pfx_acl_10
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.0.0.0

RP/0/RP0/CPU0:router(config)# ipv4 access-list pfx_acl_20
```

```

RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 20.0.0.0

RP/0/RP0/CPU0:router(config)# ipv4 access-list peer_acl_10
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.1.1.1
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 10.2.2.2

RP/0/RP0/CPU0:router(config)# ipv4 access-list peer_acl_20
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 20.1.1.1

RP/0/RP0/CPU0:router(config-ldp)# label advertise
RP/0/RP0/CPU0:router(config-ldp-lbl-advrt)# for pfx_acl_10 to peer_acl_10
RP/0/RP0/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 **label advertise**.

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

```

RP/0/RP0/CPU0:router(config-ldp)# label advertise
RP/0/RP0/CPU0:router(config-ldp-lbl-advrt)# interface POS 0/1/0/0

```

Related Commands

Command	Description
show mpls ldp neighbor	Displays information about LDP neighbors.
show mpls ldp bindings	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*

no label allocate

Syntax Description	for <i>prefix-acl</i>	Specifies set of prefixes for which local label needs to be allocated.
---------------------------	------------------------------	--

Defaults	LDP allocates local label for all learnt routes (prefixes).
-----------------	---

Command Modes	MPLS LDP configuration
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Command History	Release	Modification
	Release 3.3.0	This command was introduced on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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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 LSPs for Loopback /32 addresses for PE routers (rendering it unnecessary to allocate and advertise local labels for other IGP prefixes).

LDP supports IPv4 standard access lists only.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples

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/RP0/CPU0:router(config)# ipv4 access-list pfx_acl_1  
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 192.168.1.1  
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 192.168.2.2  
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit 192.168.3.3  
  
RP/0/RP0/CPU0:router(config-ldp)# label allocate for pfx_acl_1
```

Related Commands

Command	Description
show mpls ldp bindings	Displays information about LDP label bindings.
show mpls ldp forwarding	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.

Defaults No default behavior or values

Command Modes MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router(config-ldp)# log graceful-restart
```

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

```
RP/0/RP0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 4.4.4.4:0 (instance 1)
disconnected
```

```
RP/0/RP0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 4.4.4.4:0 (instance 2)
reconnected
```

```
RP/0/RP0/CPU0:router: mpls_ldp[340]: %ROUTING-LDP-5-GR : GR session 5.5.5.5:0 (instance 3)
timed out
```

```
RP/0/RP0/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	Displays information about LDP neighbors.
show mpls ldp graceful-restart	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.

Defaults

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	The log neighbor command replaced the former log neighbor changes command.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Use the **log neighbor** command to receive a syslog/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/RP0/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/RP0/CPU0:10 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	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.

Defaults No default behavior or values

Command Modes MPLS LDP configuration

Command History

Release	Modification
Release 3.6.0	This command was introduced on the Cisco XR 12000 Series Router Cisco CRS-1 router.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

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

```
RP/0/RP0/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.

Defaults

No default behavior or values

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.3.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Use the **log session-protection** command to receive a syslog/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/RP0/CPU0:router(config-ldp)# log session-protection
```

**Note**

Logging messages are issued when session protection events occur.

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

```
RP/0/RP0/CPU0: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/RP0/CPU0: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	Displays information about LDP neighbors.

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. Range is 1 to 250 interfaces.
--------------------	---------------	--

Defaults	By default, you can enable LDP on up to 100 interfaces.
----------	---

Command Modes	MPLS LDP configuration
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Command History	Release	Modification
	Release 3.3.0	This command was introduced on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
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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/RP0/CPU0:router(config-ldp)# maximum interfaces 150
```

Related Commands	Command	Description
	show mpls ldp discovery	Displays LDP discovery information.
	show mpls ldp summary	Displays LDP summary information.

mpls ldp nsr

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

mpls ldp nsr

no mpls ldp nsr

Syntax Description This command has no arguments or keywords.

Defaults By default, MPLS LDP NSR is disabled.

Command Modes Global configuration

Command History	Release	Modification
	Release 3.6.0	This command was introduced on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples The following example shows how to enable MPLS LDP NSR:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# mpls ldp
RP/0/RP0/CPU0:router(config-ldp)# nsr
```

Related Commands	Command	Description
	nsr process-failures switchover	Configures failover as a recovery action for active instances to switch over to a standby route processor (RP) or a distributed route processor (DRP), to maintain nonstop routing (NSR). For more information, see <i>Cisco IOS XR IP Addresses and Services Command Reference</i> .
	show mpls ldp neighbor	Displays standby node specific information.

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.

```
neighbor A.B.C.D. password {clear | encrypted} password
```

```
no neighbor A.B.C.D. password
```

Syntax Description

<i>A.B.C.D.</i>	Neighbor IP address.
clear	(Optional) Encryption parameter for the password, indicating that an unencrypted password will follow.
encrypted	(Optional) Encryption parameter for password, indicating that an encrypted password will follow.
<i>password</i>	Cleartext or encrypted password string.

Defaults

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

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router. The command was changed to use clear and encrypted instead of numbers 0/7 .
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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.

■ neighbor password

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples

The following example shows how to configure the password “*cisco*” for neighbor 10.20.20.20:

```
RP/0/RP0/CPU0:router(config-ldp)# neighbor 10.20.20.20 password clear cisco
```

Related Commands

Command	Description
neighbor targeted	Configures transmission of targeted hellos towards a neighbor.

neighbor targeted

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

neighbor A.B.C.D. targeted

no neighbor A.B.C.D. targeted

Syntax Description	A.B.C.D.	Neighbor IP address.
---------------------------	----------	----------------------

Defaults	No default behavior or values
-----------------	-------------------------------

Command Modes	MPLS LDP configuration
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Command History	Release	Modification
	Release 3.3.0	This command was introduced on the Cisco CRS-1 and Cisco XR 12000 Series Router.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i> .
-------------------------	--

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

Related Commands	Command	Description
	neighbor password	Configures password authentication using MD5.

Command	Description
show mpls ldp neighbor	Displays information about LDP neighbors.
show mpls ldp discovery	Displays information about LDP discovery sources.

router-id (MPLS LDP)

To specify the IP address of a preferred interface or a specific IP address as the LDP 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.

router-id *A.B.C.D.*

no router-id

Syntax Description

A.B.C.D. 32-bit router ID value specified in four-part, dotted-decimal notation.

Defaults

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 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	Deprecated interface keyword.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

The **router-id** command lets you specify an interface with an IP address to be used as the LDP router ID (which is necessary when an IP address selected as the LDP router ID might not be advertisable by the routing protocol to a neighboring router). In such cases, use the **router-id** command to select the IP address of the specified loopback interface (if the interface is operational) or a specific IP address.

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 the LDP router-id with an ip-address to avoid unnecessary session flaps.

Task ID

Task ID	Operations
mpls-ldp	read, write

Examples

The following example shows how to specify loopback interface 1 as the preferred interface used to determine the LDP router ID:

```
RP/0/RP0/CPU0:router(config-ldp)# router-id loopback 1
```

Related Commands

Command	Description
show mpls ldp discovery	Displays the status of the LDP discovery process.
show mpls ldp neighbor	Displays information about LDP neighbors.
show mpls ldp parameters	Displays current LDP parameter settings.

session protection

To enable 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 seconds.
infinite	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.

Defaults

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 on the Cisco CRS-1 and Cisco XR 12000 Series Router.
Release 3.4.0	Default value for duration keyword changed from infinite to 24 hours. Added infinite keyword for duration value.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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.

■ session protection

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/RP0/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/RP0/CPU0:router(config-ldp)# session protection for peer_acl duration 30
```

Related Commands

Command	Description
show mpls ldp neighbor	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 backoff

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 is sample output from the **show mpls ldp backoff** command.

```
RP/0/RP0/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

Table 1 describes the significant fields shown in the display.

Table 1 *show mpls ldp backoff Field Descriptions*

Field	Description
Backoff Time	Initial and maximum backoff time parameters in seconds.
Backoff Table	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: <ul style="list-style-type: none"> • <i>LDP Id</i>—Identifies the LDP neighbors. • <i>Backoff (sec)</i>—Time the session setup is delayed. • <i>Waiting (sec)</i>—Approximate time the session setup has been delayed.

Related Commands

Command	Description
backoff	Configure LDP backoff parameters.
show mpls ldp forwarding	Displays the contents of MPLS forwarding table.
show mpls ldp bindings	Displays the contents of LDP label information base (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 bindings [prefix {mask | length}] [advertisement-acls] [detail] [local] [local-label
label [to label]] [neighbor address] [remote-label label [to label]] [summary]
```

Syntax Description		
<i>A.B.C.D/prefix</i>	(Optional) Destination prefix/mask length, written as A.B.C.D.	
<i>mask</i>	Network mask, written as A.B.C.D.	
<i>length</i>	Mask length. Range is 0 to 32 bits.	
advertisement-acls	(Optional) Displays the label bindings as applied for (advertisement) outbound label filtering ACLs.	
detail	(Optional) Displays detailed information for label bindings, including local label bindings advertised to peers.	
local	(Optional) Displays the local label bindings.	
local-label label to label	(Optional) Displays entries matching local label values. Use the <i>label to label</i> argument to indicate the label range.	
neighbor address	(Optional) Displays the label bindings assigned by the selected neighbor.	
remote-label label to label	(Optional) Displays entries matching the label values assigned by a neighbor router. Use the <i>label to label</i> argument to indicate the label range.	
summary	(Optional) Displays a summary of the contents of the Label Information Base (LIB).	

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router. Added support for the advertisement-acls keyword.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

```
RP/0/RP0/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 from the **show mpls ldp bindings** command specifies a network number and displays labels learned from label switched router (LSR) 10.255.255.255 for all networks.

Use the **neighbor** option to suppress the output of remote labels learned from other neighbors:

```
RP/0/RP0/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
```

Table 2 describes the significant fields shown in the display.

Table 2 *show mpls ldp bindings and show mpls ldp bindings neighbor 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.
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 is sample output from the **show mpls ldp bindings** command using the **summary** keyword:

```
RP/0/RP0/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
```

Table 3 describes the significant fields shown in the display.

Table 3 *show mpls ldp bindings summary Field Descriptions*

Field	Description
Total Prefix	Number of prefixes (routes) known to LDP LIB. All invalid, timed-out routes display as no-routes.
Revision No	Current Rev. 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 is sample output from the **show mpls ldp advertisement-acls** command:

```
RP/0/RP0/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'
```

[Table 4](#) describes the significant fields shown in the display.

Table 4 *show mpls ldp bindings advertisement-acls 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).

Related Commands

Command	Description
label advertise	Configure LDP local label advertisement control
label accept	Configure LDP remote label acceptance
show mpls ldp neighbor	Displays information on LDP neighbors.
show mpls ldp forwarding	Displays the contents of the LDP forwarding database.

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 discovery [*type interface-id* | **summary**]

Syntax Description		
<i>type</i>		Interface type. For more information, use the question mark (?) online help function.
<i>interface-id</i>		Identifies a 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		Display summarized information for LDP discovery.

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	Added new summary keyword and option.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

```
RP/0/RP0/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)
```

[Table 5](#) describes the significant fields shown in the display.

Table 5 *show mpls ldp discovery Field Descriptions*

Field	Description
Local LDP Identifier	The LDP identifier for the local router. An LDP identifier is a 6-byte construct displayed in the form IP address:number. By convention, the first 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.
Interfaces	Interfaces engaged in LDP discovery activity, as described below: <ul style="list-style-type: none"> xmit field—Indicates that the interface is transmitting LDP discovery hello packets. recv field—Indicates that the interface is receiving LDP discovery hello packets. The LDP identifiers indicate the LDP neighbors discovered on the interface.
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 is sample output from the **show mpls ldp discovery** command using the **summary** keyword:

```
RP/0/RP0/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)
```

Table 6 describes the significant fields shown in the display.

Table 6 *show mpls ldp discovery summary Field Descriptions*

Field	Description
LDP Identifier	The LDP identifier for the local router.
Interfaces	Summary of interfaces engaged in LDP activity. <ul style="list-style-type: none"> Configured—Number of interfaces configured for LDP. Enabled—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.
Discovery	Summary of LDP discovery process. <ul style="list-style-type: none"> Hello xmit—Number of local LDP discovery sources (including link and targeted hellos) emitting LDP hellos. Hello rcv—Number of discovered hello sources via link or targeted hello mechanics.

Related Commands

Command	Description
discovery hello	Configures LDP link hello parameters.
discovery targeted-hello	Configures LDP targeted-hello parameters.
neighbor targeted	Configures LDP targeted neighbor.
session protection	Configures LDP session protection.
interface (MPLS LDP)	Configures LDP on an interface.
show mpls ldp neighbor	Displays information about LDP neighbors.

show mpls ldp forwarding

To display the LDP forwarding state installed in MPLS forwarding, use the **show mpls ldp forwarding** command in EXEC mode.

```
show mpls ldp forwarding [A.B.C.D/prefix {mask | length}]
```

Syntax Description		
	<i>A.B.C.D/prefix</i>	(Optional) IP address, specified in four-part, dotted-decimal notation.
	<i>mask</i>	Network mask.
	<i>length</i>	Mask length. Range is 0 to 32 bits.

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	Modified show output.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

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

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

Prefix          Label Label   Outgoing   Next Hop   GR Stale
                In    Out      Interface
-----
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
```

Table 7 describes the significant fields shown in the display.

Table 7 *show mpls ldp forwarding Field Descriptions*

Field	Description
Prefix/mask	Prefix on the Forwarding Equivalence Class (FEC) 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.
GR	Graceful restart status (Y or N).
Stale	Status of the entry, stale or not stale.
Chkpt	Status of the entry, checkpointed or not checkpointed.
Stale	Status of the entry. An entry is marked stale when the next-hop graceful restart neighbor disconnects and is unmarked when neighbor reconnects and refreshes the label.

Related Commands

Command	Description
graceful-restart (MPLS LDP)	Configure LDP Graceful restart feature.
show mpls ldp bindings	Displays the contents of LDP label information base (LIB).

show mpls ldp graceful-restart

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

show mpls ldp graceful-restart

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History

Release	Modification
Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 is sample output from the **show mpls ldp graceful-restart** command:

```
RP/0/RP0/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
-----	---	-----	-----	-----
139.0.0.2	Y	1	-	-

Table 8 describes the significant fields shown in the display.

Table 8 *show mpls ldp graceful-restart 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 re-connected.
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)	Configures the LDP graceful restart feature.
show mpls ldp neighbor	Displays information about LDP neighbors.

show mpls ldp igp sync

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

```
show mpls ldp igp sync [interface type interface-id]
```

Syntax Description	interface	(Optional) Interface type.
	<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
	<i>interface-id</i>	Identifies a 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 Modes	EXEC
---------------	------

Command History	Release	Modification
	Release 3.3.0	This command was introduced on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 Label Switched Path (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 IGPs (OSPF, IS-IS); accordingly, LDP displays and advertises this information for all LDP-enabled interfaces (regardless of whether or not the interface is configured for LDP IGP).

Task ID	Task ID	Operations
	mpls-ldp	read

Examples

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

```
RP/0/RP0/CPU0:router1# show mpls ldp igp sync
```

```
GigabitEthernet0/3/0/0:
  Sync status: Ready
  Peers:
    2.2.2.2:0
    3.3.3.3:0 (GR)
  GR-only Reachability:
    4.4.4.4:0 (Chkpt-created)
```

```
POS0/2/0/0:
  Sync status: Not ready
                (Deferred; 24 sec remaining)
```

```
POS0/2/0/1:
  Sync status: Not ready
```

[Table 9](#) describes the significant fields shown in the display.

Table 9 *show mpls ldp igp sync Field Descriptions*

Field	Description
Sync status	<p>MPLS LDP convergence status on a given link. Ready indicates that the link is converged and is used by IGP. The terms Ready and Not Ready are equivalent to Achieved and Not Achieved, respectively.</p> <p>The status is Ready when all of the following conditions are met:</p> <ul style="list-style-type: none"> • LDP adjacency on the interface is up and running. • LDP has sent all its bindings to the peer. • LDP has started receiving bindings from the peer. • LDP IGP sync delay timer, if configured, has expired. <p>Not Ready with Deferred means that the link fulfills LDP IGP synchronization requirements but is deferred by the IGP synchronization delay configuration setting. While the synchronization delay timer is running, the remaining time is displayed.</p> <p>The IGP synchronization delay should not be confused with the IGP holddown used in Cisco IOS. The synchronization delay is the time to wait after the LSP session is up before changing it to Ready. Cisco IOS-XR does not use a holddown timer.</p>
Peers	<p>List of peers converged on the given link. If the peer session is graceful restart-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.</p>
GR-only Reachability	<p>List of graceful restart peers that are not currently converged on a given link but are still in the forwarding state.</p>

■ show mpls ldp igp sync

Related Commands	Command	Description
	igp sync delay	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 interface *type interface-id* [**summary** | **brief**]

Syntax Description		
<i>type</i>		Interface type. For more information, use the question mark (?) online help function.
<i>interface-id</i>		Identifies a 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.

Command Modes EXEC

Command History	Release	Modification
	Release 3.5.0	This command was introduced on the Cisco CRS-1 and the Cisco XR 12000 Series Router.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

Task ID	Task ID	Operations
	mpls-ldp	read

show mpls ldp interface

Examples

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

```
RP/0/RP0/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
```

[Table 10](#) describes the significant fields shown in the display.

Table 10 *show mpls ldp interface Field Descriptions*

Field	Description
Auto-config items	Lists IGPs that specify an interface for MPLS LDP auto-configuration: <ul style="list-style-type: none"> • OSPF: ospf <i>instance area</i> • ISIS: isis <i>instance</i>

Related Commands

Command	Description
igp auto-config disable	Disables LDP auto-configuration.

show mpls ldp neighbor

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

show mpls ldp neighbor [*A.B.C.D.* | *type interface-id* | **gr** | **non-gr** | **sp** | | **standby** | **brief**] [**detail**]

Syntax Description		
<i>A.B.C.D.</i>	(Optional) Neighbor IP address.	
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.	
<i>interface-id</i>	Identifies a 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.	
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.	
non-gr	(Optional) Displays non-graceful restartable neighbors.	
sp	(Optional) Displays neighbors with session protection.	
standby	(Optional) Displays standby-node-specific information.	
tunnel-te <i>tunnel-id</i>	(Optional) Displays MPLS traffic engineering tunnel interfaces and TE tunnel-id value. Range is 0 to 65535.	

Defaults No default behavior or values

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was introduced on the Cisco XR 12000 Series Router.
	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 holdtime
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.

■ **show mpls ldp neighbor**

Release	Modification
Release 3.6.0	Support was added for the standby keyword.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 non-graceful restartable
- LDP neighbors enabled with session protection

Task ID

Task ID	Operations
mpls-ldp	read

Examples

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

```
RP/0/RP0/CPU0:router# show mpls ldp neighbor 10.22.22.22

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: 46/43
  Up time: 00:31:21
  LDP Discovery Sources:
    POS 0/2/0/0
  Addresses bound to this peer:
    10.22.22.22    10.10.2.1
```

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

```
RP/0/RP0/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

```

Table 11 describes the significant fields shown in the display.

Table 11 *show mpls ldp neighbor Field Descriptions*

Field	Description
Peer LDP Identifier	LDP identifier of the neighbor (peer) for this session.
Graceful Restart	Graceful-restart status (Y or N).
TCP connection	TCP ¹ connection used to support the LDP session, shown in the following format: <ul style="list-style-type: none"> neighbor IP address: peer port local IP address: local port
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. ²

1. Transmission Control Protocol
2. Label Forwarding Information Base

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

```

RP/0/RP0/CPU0:router# show mpls ldp neighbor brief

Peer          GR Up Time          Discovery Address
-----
139.0.0.2:0   Y 00:31:36          1          3

```

Table 12 describes the significant fields shown in the display.

Table 12 *show mpls ldp neighbor brief 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 <i>hh:mm:ss</i> format).
Discovery	Number of LDP discovery sources corresponding to the neighbor.
Address	Number of addresses bound to this peer.

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

```
RP/0/RP0/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      12.0.0.2      123.0.0.2      5.42.37.119
    2.2.2.2
  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
```

Table 13 describes the significant fields shown in the display.

Table 13 *show mpls ldp neighbor detail* Field Descriptions

Field	Description
Peer LDP Identifier	LDP identifier of the neighbor (peer) for this session.
TCP connection	TCP ¹ connection used to support the LDP session, shown in the following format: <ul style="list-style-type: none"> neighbor IP address: peer port local IP address: local port
Graceful Restart	Graceful-restart status (Y or N).
Session Holdtime	Session holdtime 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.

Table 13 *show mpls ldp neighbor detail Field Descriptions (continued)*

Field	Description
Session Protection	State of the session protection: <ul style="list-style-type: none"> • Incomplete: Targeted discovery requested but not yet up. • Ready: Targeted discovery and at least one link hello adjacency to the peer are up. • Protecting: Targeted discovery is up and there is no link hello adjacency to the peer. Targeted discovery is protecting and backing up link discoveries.
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.

1. Transmission Control Protocol

Related Commands

Command	Description
graceful-restart (MPLS LDP)	Configures the LDP graceful restart feature.
label accept	Configures the LDP inbound label filtering feature.
session protection	Configures the LDP session protection feature.
show mpls ldp discovery	Displays the status of the LDP discovery process.

show mpls ldp parameters

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

show mpls ldp parameters

Syntax Description This command has no arguments or keywords.

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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

```
RP/0/RP0/CPU0:router# show mpls ldp parameters
```

```
LDP Parameters:
  Protocol Version: 1
  Router ID: 11.11.11.11
  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

```

Table 14 describes the significant fields shown in the display.

Table 14 *show mpls ldp parameters 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	Indicates the 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).
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	Graceful-restart status (Y or N).
Timeouts	Various timeouts (of interest) that LDP is using. One timeout is <i>binding no route</i> , which indicates how long LDP will wait 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	Configures the parameters for the LDP backoff mechanism.
discovery hello	Configures the interval between transmission of LDP discovery messages.
explicit-null	Configures a router to advertise an explicit-null label.

■ show mpls ldp parameters

Command	Description
graceful-restart (MPLS LDP)	Configures the LDP graceful restart feature.
holdtime (MPLS LDP)	Configures keepalive message hold time for LDP sessions.
neighbor targeted	Specifies the preferred interface or IP address of a Loopback interface for determining the LDP router ID.

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 statistics msg-counters [A.B.C.D.]
```

Syntax Description	A.B.C.D. (Optional) Neighbor IP address.
---------------------------	--

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

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
Release 3.0	No modification.	
Release 3.2	This command was supported on the Cisco XR 12000 Series Router.	
Release 3.3.0	No modification.	
Release 3.4.0	No modification.	
Release 3.5.0	No modification.	
Release 3.6.0	No modification.	
Release 3.7.0	No modification.	

Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the <i>Configuring AAA Services on Cisco IOS XR Software</i> module of the <i>Cisco IOS XR System Security Configuration Guide</i>.</p> <p>The show mpls ldp statistics msg-counters command can provide counter information about different types of messages sent and received between neighbors.</p>
-------------------------	---

Task ID	Task ID	Operations
	mpls-ldp	read

Examples

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

```
RP/0/RP0/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 describes the significant fields shown in the display.

Table 15 *show mpls ldp statistics msg-counters* 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	Clears MPLS LDP message counter values.
show mpls ldp bindings	Displays the contents of LDP label information base (LIB).
show mpls ldp neighbor	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 summary

Syntax Description This command has no keywords or arguments.

Command Modes EXEC

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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 is sample output from the **show mpls ldp summary** command:

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

Routes      : 4
Neighbors   : 1 (1 GR)
Hello Adj   : 1
Interfaces  : 4 (1 forward reference, 2 LDP configured)
Addresses   : 3
Clients     : 0
Servers     :

                Connected  Registered
                -----  -
SysDB         Y           Y
IM            Y           Y
IPv4 ARM      Y           -
LSD           Y           Y
RIBv4        Y           Y
```

Table 16 describes the significant fields shown in the display.

Table 16 *show mpls ldp summary* Field Descriptions

Field	Description
Routes	Number of known IP routes (prefixes).
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.
Clients	Number of external LDP clients. This number is always zero.
Servers	Connection and registration status with servers: System Database (SysDB), Interface Manager (IM), IPv4 Address Resource Manager (IPv4 ARM), Label Switching Database (LSD), and IPv4 Routing Information Base (RIBv4).

Related Commands

Command	Description
show mpls ldp bindings	Displays the contents of LDP label information base (LIB).
show mpls ldp discovery	Displays the status of the LDP discovery process.
show mpls ldp forwarding	Displays the contents of the LDP forwarding database.
show mpls ldp graceful-restart	Displays the status of the LDP graceful restart.
show mpls ldp parameters	Displays current LDP parameter settings.

signalling dscp (LDP)

To assign 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 submode. To return to the default behavior, use the **no** form of this command.

signalling dscp *dscp*

no signalling dscp

Syntax Description

dscp DSCP priority value. Range is 0 to 63.

Defaults

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

Command Modes

MPLS LDP configuration

Command History

Release	Modification
Release 3.2	This command was supported on the Cisco CRS-1.
Release 3.3.0	No modification.
Release 3.4.0	No modification.
Release 3.5.0	No modification.
Release 3.6.0	No modification.
Release 3.7.0	No modification.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/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 router configuration mode.

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

Syntax Description	up	Session up notification
	down	Session down notification
	threshold	Session backoff threshold crossed notification

Defaults LDP does not send SNMP traps.

Command Modes Router configuration

Command History	Release	Modification
	Release 2.0	This command was introduced on the Cisco CRS-1.
	Release 3.0	No modification.
	Release 3.2	This command was supported on the Cisco XR 12000 Series Router.
	Release 3.3.0	No modification.
	Release 3.4.0	No modification.
	Release 3.5.0	No modification.
	Release 3.6.0	No modification.
	Release 3.7.0	No modification.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes the proper task IDs. For detailed information about user groups and task IDs, see the *Configuring AAA Services on Cisco IOS XR Software* module of the *Cisco IOS XR System Security Configuration Guide*.

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/RP0/CPU0:router(config)# snmp-server traps mpls ldp up
```