



# MPLS

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# mpls ip default-route

To enable the distribution of labels associated with the IP default route, use the **mpls ip default-route** command in global configuration mode.

## mpls ip default-route

**Syntax Description** This command has no arguments or keywords.

**Command Default** No distribution of labels for the IP default route.

**Command Modes** Global configuration

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.1	This command was introduced.

**Usage Guidelines** Dynamic label switching (that is, distribution of labels based on routing protocols) must be enabled before you can use the **mpls ip default-route** command.

**Examples** The following example shows how to enable the distribution of labels associated with the IP default route:

```
Switch# configure terminal
Switch(config)# mpls ip
Switch(config)# mpls ip default-route
```

Related Commands	Command	Description
	<b>mpls ip</b> (global configuration)	Enables MPLS forwarding of IPv4 packets along normally routed paths for the platform.
	<b>mpls ip</b> (interface configuration)	Enables MPLS forwarding of IPv4 packets along normally routed paths for a particular interface.

## mpls ip (global configuration)

To enable Multiprotocol Label Switching (MPLS) forwarding of IPv4 and IPv6 packets along normally routed paths for the platform, use the **mpls ip** command in global configuration mode. To disable this feature, use the **no** form of this command.

**mpls ip**  
**no mpls ip**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Label switching of IPv4 and IPv6 packets along normally routed paths is enabled for the platform.

**Command Modes** Global configuration

Release	Modification
Cisco IOS XE Denali 16.3.1	This command was introduced.

**Usage Guidelines** MPLS forwarding of IPv4 and IPv6 packets along normally routed paths (sometimes called dynamic label switching) is enabled by this command. For a given interface to perform dynamic label switching, this switching function must be enabled for the interface and for the platform.

The **no** form of this command stops dynamic label switching for all platform interfaces regardless of the interface configuration; it also stops distribution of labels for dynamic label switching. However, the **no** form of this command does not affect the sending of labeled packets through label switch path (LSP) tunnels.

### Examples

The following example shows that dynamic label switching is disabled for the platform, and all label distribution is terminated for the platform:

```
Switch(config)# no mpls ip
```

Command	Description
<b>mpls ip</b> (interface configuration)	Enables MPLS forwarding of IPv4 and IPv6 packets along normally routed paths for the associated interface.

## mpls ip (interface configuration)

To enable Multiprotocol Label Switching (MPLS) forwarding of IPv4 and IPv6 packets along normally routed paths for a particular interface, use the **mpls ip** command in interface configuration mode. To disable this configuration, use the **no** form of this command.

**mpls ip**  
**no mpls ip**

**Syntax Description** This command has no arguments or keywords.

**Command Default** MPLS forwarding of IPv4 and IPv6 packets along normally routed paths for the interface is disabled.

**Command Modes** Interface configuration (config-if)

**Command History**

Release	Modification
Cisco IOS XE Denali 16.3.1	This command was introduced.

**Usage Guidelines**

MPLS forwarding of IPv4 and IPv6 packets along normally routed paths is sometimes called dynamic label switching. If dynamic label switching has been enabled for the platform when this command is issued on an interface, label distribution for the interface begins with the periodic transmission of neighbor discovery Hello messages on the interface. When the outgoing label for a destination routed through the interface is known, packets for the destination are labeled with that outgoing label and forwarded through the interface.

The **no** form of this command causes packets routed out through the interface to be sent unlabeled; this form of the command also terminates label distribution for the interface. However, the no form of the command does not affect the sending of labeled packets through any link-state packet (LSP) tunnels that might use the interface.

**Examples**

The following example shows how to enable label switching on the specified Ethernet interface:

```
Switch(config)# configure terminal
Switch(config-if)# interface TenGigabitEthernet1/0/3
Switch(config-if)# mpls ip
```

The following example shows that label switching is enabled on the specified vlan interface (SVI) on a Cisco Catalyst switch:

```
Switch(config)# configure terminal
Switch(config-if)# interface vlan 1
Switch(config-if)# mpls ip
```

# mpls label protocol (global configuration)

To specify the Label Distribution Protocol (LDP) for a platform, use the **mpls label protocol** command in global configuration mode. To restore the default LDP, use the **no** form of this command.

**mpls label protocol ldp**  
**no mpls label protocol ldp**

## Syntax Description

<b>ldp</b>	Specifies that LDP is the default label distribution protocol.
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## Command Default

LDP is the default label distribution protocol.

## Command Modes

Global configuration

## Command History

Release	Modification
Cisco IOS XE Denali 16.3.1	This command was introduced.

## Usage Guidelines

If neither the global **mpls label protocol ldp** command nor the interface **mpls label protocol ldp** command is used, all label distribution sessions use LDP.

## Examples

The following command establishes LDP as the label distribution protocol for the platform:

```
Switch(config)# mpls label protocol ldp
```

## mpls label protocol (interface configuration)

To specify the label distribution protocol for an interface, use the **mpls label protocol** command in interface configuration mode. To remove the label distribution protocol from the interface, use the **no** form of this command.

**mpls label protocol ldp**  
**no mpls label protocol ldp**

### Syntax Description

<b>ldp</b>	Specifies that the label distribution protocol (LDP) is to be used on the interface.
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### Command Default

If no protocol is explicitly configured for an interface, the label distribution protocol that was configured for the platform is used. To set the platform label distribution protocol, use the global **mpls label protocol** command.

### Command Modes

Interface configuration (config-if)

### Command History

Release	Modification
Cisco IOS XE Denali 16.3.1	This command was introduced.

### Usage Guidelines

To successfully establish a session for label distribution for a link connecting two label switch routers (LSRs), the link interfaces on the LSRs must be configured to use the same label distribution protocol. If there are multiple links connecting two LSRs, all of the link interfaces connecting the two LSRs must be configured to use the same protocol.

### Examples

The following example shows how to establish LDP as the label distribution protocol for the interface:

```
Switch(config-if)# mpls label protocol ldp
```

# mpls label range

To configure the range of local labels available for use with Multiprotocol Label Switching (MPLS) applications on packet interfaces, use the **mpls label range** command in global configuration mode. To revert to the platform defaults, use the **no** form of this command.

**mpls label range** *minimum-value maximum-value* [**static** *minimum-static-value maximum-static-value*]  
**no mpls label range**

Syntax Description		
<i>minimum-value</i>		The value of the smallest label allowed in the label space. The default is 16.
<i>maximum-value</i>		The value of the largest label allowed in the label space. The default is platform-dependent.
<b>static</b>		(Optional) Reserves a block of local labels for static label assignments. If you omit the <b>static</b> keyword and the <i>minimum-static-value maximum-static-value</i> arguments, no labels are reserved for static assignment.
<i>minimum-static-value</i>		(Optional) The minimum value for static label assignments. There is no default value.
<i>maximum-static-value</i>		(Optional) The maximum value for static label assignments. There is no default value.

**Command Default** The platform's default values are used.

**Command Modes** Global configuration

Command History	Release	Modification
	Cisco IOS XE Denali 16.3.1	This command was introduced.

**Usage Guidelines** The labels 0 through 15 are reserved by the IETF (see RFC 3032, MPLS Label Stack Encoding, for details) and cannot be included in the range specified in the **mpls label range** command. If you enter a 0 in the command, you will get a message that indicates that the command is an unrecognized command.

The label range defined by the **mpls label range** command is used by all MPLS applications that allocate local labels (for dynamic label switching, MPLS traffic engineering, MPLS Virtual Private Networks (VPNs), and so on).

You can use label distribution protocols, such as Label Distribution Protocol (LDP), to reserve a generic range of labels from 16 through 1048575 for dynamic assignment.

You specify the optional **static** keyword, to reserve labels for static assignment. The MPLS Static Labels feature requires that you configure a range of labels for static assignment. You can configure static bindings only from the current static range. If the static range is not configured or is exhausted, then you cannot configure static bindings.

The range of label values is 16 to 4096. The maximum value defaults to 4096. You can split for static label space between say 16 to 100 and for dynamic label space between 101 to 4096.

The upper and lower minimum static label values are displayed in the help line. For example, if you configure the dynamic label with a minimum value of 16 and a maximum value of 100, the help lines display as follows:

```
Switch(config)# mpls label range 16 100 static ?
<100> Upper Minimum static label value
<16> Lower Minimum static label value
Reserved Label Range --> 0 to 15
Available Label Range --> 16 to 4096
Static Label Range --> 16 to 100
Dynamic Label Range --> 101 to 4096
```

In this example, you can configure a static range from 16 to 100.

If the lower minimum static label space is not available, the lower minimum is not displayed in the help line. For example:

```
Switch(config)# mpls label range 16 100 static ?
<16-100> static label value range
```

## Examples

The following example shows how to configure the size of the local label space. In this example, the minimum static value is set to 200, and the maximum static value is set to 4000.

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# mpls label range 200 4000
Switch(config)#
```

If you had specified a new range that overlaps the current range (for example, the new range of the minimum static value set to 16 and the maximum static value set to 1000), then the new range takes effect immediately.

The following example show how to configure a dynamic local label space with a minimum static value set to 100 and the maximum static value set to 1000 and a static label space with a minimum static value set to 16 and a maximum static value set to 99:

```
Switch(config)# mpls label range 100 1000 static 16 99
Switch(config)#
```

In the following output, the **show mpls label range** command, executed after a reload, shows that the configured range is now in effect:

```
Switch# show mpls label range
Downstream label pool: Min/Max label: 100/1000
Range for static labels: Min/Max/Number: 16/99
```

The following example shows how to restore the label range to its default value:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# no mpls label range
Switch(config)# end
```

## Related Commands

Command	Description
<b>show mpls label range</b>	Displays the range of the MPLS local label space.

# show mpls label range

To display the range of local labels available for use on packet interfaces, use the show **show mpls label range** command in privileged EXEC mode.

**show mpls label range**

## Syntax Description

This command has no arguments or keywords.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
Cisco IOS XE Denali 16.3.1	This command was introduced.

## Usage Guidelines

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

## Examples

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

```
Switch# show mpls label range
Downstream label pool: Min/Max label: 16/100
Switch# configure terminal
Switch(config)# mpls label range 101 4000
Switch(config)# exit
Switch# show mpls label range
Downstream label pool: Min/Max label: 101/4000
```

## Related Commands

Command	Description
<b>mpls label range</b>	Configures a range of values for use as local labels.

