MPLS LDP Autoconfiguration

The MPLS LDP Autoconfiguration feature enables you to globally configure Label Distribution Protocol (LDP) on every interface associated with a specified Interior Gateway Protocol (IGP) instance.

Restrictions for MPLS LDP Autoconfiguration

- If the Label Distribution Protocol (LDP) is disabled globally, the **mpls ldp autoconfig** command fails and generates a console message explaining that LDP must first be enabled globally by using the **mpls ip** global configuration command.

- If the **mpls ldp autoconfig** command is configured for an IGP instance, you cannot enter the **no mpls ip** global configuration command. To disable LDP, you must first issue the **no mpls ldp autoconfig** command.

- For interfaces running Intermediate System-to-Intermediate System (IS-IS) processes, you can enable Multiprotocol Label Switching (MPLS) for each interface, using the router mode command **mpls ldp autoconfig** or the **mpls ldp igp autoconfig** interface configuration command.

- You specify that the default label distribution protocol is LDP for a device or for an interface. Tag Distribution Protocol (TDP) is not supported.

- The MPLS LDP Autoconfiguration feature is not supported on traffic engineering tunnel interfaces.

Information About MPLS LDP Autoconfiguration

MPLS LDP Autoconfiguration on OSPF and IS-IS Interfaces

The MPLS LDP Autoconfiguration feature enables you to globally enable Label Distribution Protocol (LDP) on every interface associated with an Interior Gateway Protocol (IGP) instance. This feature is supported on Open Shortest Path First (OSPF) and Intermediate System-to-Intermediate System (IS-IS) IGPs. It provides a means to block LDP from being enabled on interfaces that you do not want enabled. The goal of the MPLS LDP Autoconfiguration feature is to make configuration easier, faster, and error free.

You issue the **mpls ldp autoconfig** command to enable LDP on each interface that is running an OSPF or IS-IS process. If you do not want some of the interfaces to have LDP enabled, you can issue the **no mpls ldp igp autoconfig** command on those interfaces.

How to Configure MPLS LDP Autoconfiguration

Configuring MPLS LDP Autoconfiguration with OSPF Interfaces

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **mpls ip**
4. **mpls label protocol ldp**
5. **interface** *type number*
6. **ip address** *prefix mask*
7. **mpls ip**
8. **exit**
9. **router ospf** *process-id*
10. **network** *ip-address wildcard-mask* **area** *area-id*
11. **mpls ldp autoconfig** [**area** *area-id*]
12. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	**Purpose**
Step 2	**configure terminal**	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	**mpls ip**	Globally enables hop-by-hop forwarding.
	Example:	
	Device(config)# mpls ip	
Step 4	**mpls label protocol ldp**	Specifies the Label Distribution Protocol (LDP) as the default protocol.
	Example:	
	Device(config)# mpls label protocol ldp	
Step 5	**interface** *type number*	Specifies the interface to configure, and enters interface configuration mode.
	Example:	
	Device(config)# interface gigabitethernet 0/0/0	
Step 6	**ip address** *prefix mask*	Assigns an IP address to the interface.
	Example:	
	Device(config-if)# ip address 10.25.0.11 255.255.255.255	
Step 7	**mpls ip**	Enables hop-by-hop forwarding on the interface.
	Example:	
	Device(config-if)# mpls ip	
Step 8	**exit**	Returns to global configuration mode.
	Example:	
	Device(config-if)# exit	
Step 9	**router ospf** *process-id*	Enables Open Shortest Path First (OSPF) routing, and enters router configuration mode.
	Example:	
	Device(config)# router ospf 1	

	Command or Action	Purpose

Step 10	**network** *ip-address wildcard-mask* **area** *area-id*
	
	Example:
	
	`Device(config-router)# network 10.0.0.0`
	`0.255.255.255 area 3`
		Defines an interface on which OSPF runs and defines the area ID for that interface.

Step 11	**mpls ldp autoconfig** [**area** *area-id*]
	
	Example:
	
	`Device(config-router)# mpls ldp autoconfig`
	`area 3`
		Enables the MPLS LDP Autoconfiguration feature to enable LDP on interfaces belonging to the OSPF process.
		
		• If no area is specified, the command applies to all interfaces associated with the OSPF process. If an area ID is specified, then only interfaces associated with that OSPF area are enabled with LDP.

Step 12	**end** **Example:** `Device(config-router)# end`	Returns to privileged EXEC mode.

Disabling MPLS LDP Autoconfiguration from Selected OSPF Interfaces

When you issue the **mpls ldp autoconfig** command, all the interfaces that belong to an Open Shortest Path First (OSPF) area are enabled for the Label Distribution Protocol (LDP). To remove LDP from some interfaces, use the **no mpls ldp igp autoconfig** command on those interfaces. The following configuration steps show how to disable LDP from some of the interfaces after they were configured with the MPLS LDP Autoconfiguration feature with the **mpls ldp autoconfig** command.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **no mpls ldp igp autoconfig**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: Device> enable	• Enter your password if prompted.
Step 2	**configure terminal** **Example:** Device# configure terminal	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** Device(config)# interface POS 3/0	Specifies the interface to configure and enters interface configuration mode.
Step 4	**no mpls ldp igp autoconfig** **Example:** Device(config-if)# no mpls ldp igp autoconfig	Disables LDP for that interface.
Step 5	**end** **Example:** Device(config-if)# end	Returns to privileged EXEC mode.

Verifying MPLS LDP Autoconfiguration with OSPF

SUMMARY STEPS

1. **enable**
2. **show mpls interfaces** [*type number* | **vrf** *vpn-name*] [**all**] [**detail**] [**internal**]
3. **show mpls ldp discovery** [**vrf** *vpn-name* | **all**] [**detail**]

DETAILED STEPS

Step 1 **enable**
Enables privileged EXEC mode. Enter your password if prompted.

Step 2 **show mpls interfaces** [*type number* | **vrf** *vpn-name*] [**all**] [**detail**] [**internal**]
Displays the method used to enable the Label Distribution Protocol (LDP) on an interface:

• If LDP is enabled by the **mpls ldp autoconfig** command, the output displays:

Example:

```
IP labeling enabled (ldp):
   IGP config
```

• If LDP is enabled by the **mpls ip** command, the output displays:

Example:

```
IP labeling enabled (ldp):
  Interface config
```

• If LDP is enabled by the **mpls ip** command and the **mpls ldp autoconfig** command, the output displays:

Example:

```
IP labeling enabled (ldp):
  Interface config
  IGP config
```

The following example shows that LDP was enabled on the interface by both the **mpls ip** and **mpls ldp autoconfig** commands:

Example:

```
Device# show mpls interfaces Serial 2/0 detail

Interface Serial2/0:
        IP labeling enabled (ldp):
          Interface config
          IGP config
        LSP Tunnel labeling enabled
        BGP labeling not enabled
        MPLS operational
        Fast Switching Vectors:
          IP to MPLS Fast Switching Vector
          MPLS Turbo Vector
        MTU = 1500
```

Step 3   **show mpls ldp discovery** [**vrf** *vpn-name* | **all**] [**detail**]

Displays how LDP was enabled on the interface. In the following example, LDP was enabled by both the **mpls ip** and **mpls ldp autoconfig** commands:

Example:

```
Device# show mpls ldp discovery detail

Local LDP Identifier:
    10.11.11.11:0
    Discovery Sources:
    Interfaces:
        Serial2/0 (ldp): xmit/recv
            Enabled: Interface config, IGP config;
            Hello interval: 5000 ms; Transport IP addr: 10.11.11.11
            LDP Id: 10.10.10.10:0
```

```
Src IP addr: 10.0.0.1; Transport IP addr: 10.10.10.10
Hold time: 15 sec; Proposed local/peer: 15/15 sec
```

Configuring MPLS LDP Autoconfiguration with IS-IS Interfaces

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **ip address** *prefix mask*
5. **ip router isis**
6. **exit**
7. **mpls ip**
8. **mpls label protocol ldp**
9. **router isis**
10. **mpls ldp autoconfig** [**level-1** | **level-2**]
11. **end**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** Device> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Device# configure terminal	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** Device(config)# interface POS 0/2	Specifies the interface to configure and enters interface configuration mode.

	Command or Action	**Purpose**
Step 4	**ip address** *prefix mask* **Example:** Device(config-if)# ip address 10.50.72.4 255.0.0.0	Assigns an IP address to the interface.
Step 5	**ip router isis** **Example:** Device(config-if)# ip router isis	Enables the Intermediate System-to-Intermediate System (IS-IS) for IP on the interface.
Step 6	**exit** **Example:** Device(config-if)# exit	Returns to global configuration mode.
Step 7	**mpls ip** **Example:** Device(config)# mpls ip	Globally enables hop-by-hop forwarding.
Step 8	**mpls label protocol ldp** **Example:** Device(config)# mpls label protocol ldp	Specifies the Label Distribution Protocol (LDP) as the default protocol.
Step 9	**router isis** **Example:** Device(config)# router isis	Enables an IS-IS process on the device and enters router configuration mode.
Step 10	**mpls ldp autoconfig** [**level-1** | **level-2**] **Example:** Device(config-router)# mpls ldp autoconfig	Enables the LDP for interfaces that belong to an IS-IS process.
Step 11	**end** **Example:** Device(config-router)# end	Returns to privileged EXEC mode.

Disabling MPLS LDP Autoconfiguration from Selected IS-IS Interfaces

When you issue the **mpls ldp autoconfig** command, all the interfaces that belong to an Intermediate System-to-Intermediate System (IS-IS) process are enabled for the Label Distribution Protocol (LDP). To remove LDP from some interfaces, use the **no mpls ldp igp autoconfig** command on those interfaces. The following configuration steps show how to disable LDP from some of the interfaces after they were configured with the MPLS LDP Autoconfiguration feature with the **mpls ldp autoconfig** command.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **no mpls ldp igp autoconfig**
5. **end**

DETAILED STEPS

	Command or Action	**Purpose**
Step 1	**enable** **Example:** Device> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Device# configure terminal	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** Device(config)# interface POS 3/0	Specifies the interface to configure and enters interface configuration mode.
Step 4	**no mpls ldp igp autoconfig** **Example:** Device(config-if)# no mpls ldp igp autoconfig	Disables LDP for that interface.
Step 5	**end** **Example:** Device(config-if)# end	Returns to privileged EXEC mode.

Verifying MPLS LDP Autoconfiguration with IS-IS

SUMMARY STEPS

1. **enable**
2. **show isis mpls ldp**

DETAILED STEPS

Step 1　**enable**
Enables privileged EXEC mode.

Step 2　**show isis mpls ldp**
Shows that the Intermediate System-to-Intermediate System (IS-IS) is configured on the interface and that the Label Distribution Protocol (LDP) is enabled:

Example:

```
Device# show isis mpls ldp

Interface: POS0/2; ISIS tag null enabled
 ISIS is UP on interface
 AUTOCONFIG Information :
   LDP enabled: YES
 SYNC Information :
   Required: NO
```

The output shows:

- IS-IS is up.

- LDP is enabled.

If the MPLS LDP Autoconfiguration feature is not enabled on an interface, the output looks like the following:

Example:

```
Interface: Ethernet0; ISIS tag null enabled
 ISIS is UP on interface
 AUTOCONFIG Information :
   LDP enabled: NO
 SYNC Information :
   Required: NO
```

Troubleshooting Tips

You can use the **debug mpls ldp autoconfig** command to display events that are related to the MPLS LDP Autoconfiguration feature.

Configuration Examples for MPLS LDP Autoconfiguration

Example: MPLS LDP Autoconfiguration with OSPF

The following configuration commands enable the Label Distribution Protocol (LDP) for Open Shortest Path First (OSPF) process 1 area 3. The **mpls ldp autoconfig area 3** command and the OSPF **network** commands enable LDP on POS interfaces 0/0, 0/1, and 1/1. The **no mpls ldp igp autoconfig** command on POS interface 1/0 prevents LDP from being enabled on POS interface 1/0, even though OSPF is enabled for that interface.

```
configure terminal
 interface POS 0/0
  ip address 10.0.0.1 255.0.0.0
!
 interface POS 0/1
  ip address 10.0.1.1 255.0.0.1
!
 interface POS 1/1
  ip address 10.1.1.1 255.255.0.0
!
 interface POS 1/0
  ip address 10.1.0.1 0.1.0.255
  exit
!
 router ospf 1
  network 10.0.0.0 0.0.255.255 area 3
  network 10.1.0.0 0.0.255.255 area 3
  mpls ldp autoconfig area 3
  end
 interface POS 1/0
  no mpls ldp igp autoconfig
```

Example: MPLS LDP Autoconfiguration with IS-IS

The following example shows the configuration of the MPLS LDP Autoconfiguration feature on POS0/2 and 0/3 interfaces, which are running Intermediate System-to-Intermediate System (IS-IS) processes:

```
configure terminal
 interface POS 0/2
  ip address 10.0.0.1 255.0.0.1
  ip router isis
!
 interface POS 0/3
  ip address 10.1.1.1 255.0.1.0
  ip router isis
  exit
mpls ip
mpls label protocol ldp
router isis
mpls ldp autoconfig
```