MPLS LDP-IGP Synchronization

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Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP) Interior Gateway Protocol (IGP) Synchronization ensures that LDP is fully established before the IGP path is used for switching.

Feature History for MPLS LDP-IGP Synchronization

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This feature was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This feature was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.0(32)SY</td>
<td>Support for enabling synchronization on interfaces running Intermediate System-to-Intermediate System (IS-IS) processes was added to Cisco IOS Release 12.0(32)SY.</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This feature was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

Note: MPLS LDP-IGP Synchronization for IS-IS is not supported in this release.

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Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Contents

- Prerequisites for MPLS LDP-IGP Synchronization, page 2
- Restrictions for MPLS LDP-IGP Synchronization, page 2
- Information About MPLS LDP-IGP Synchronization, page 2
- How to Configure MPLS LDP-IGP Synchronization, page 4
- Configuration Examples for MPLS LDP-IGP Synchronization, page 13
Prerequisites for MPLS LDP-IGP Synchronization

- This feature is only supported on interfaces running OSPF or IS-IS processes.
- This feature works when LDP is enabled on interfaces with either the `mpls ip` or `mpls ldp autoconfig` command.

Restrictions for MPLS LDP-IGP Synchronization

- In Cisco IOS Release 12.2(33)SRB, the MPLS LDP-IGP Synchronization is not supported with IS-IS. Only OSPF is supported.
- TDP is not supported. You must specify that the default label distribution protocol is LDP for a router or for an interface.
- This feature is not supported on tunnel interfaces or LC-ATM interfaces.
- This feature is not supported with interface-local label space or downstream-on-demand (DoD) requests.
- This feature does not support targeted LDP sessions. Therefore, Any Transport over MPLS (AToM) sessions are not supported.

Information About MPLS LDP-IGP Synchronization

To configure LDP-IGP Synchronization, you should understand the following concepts:

- How MPLS LDP-IGP Synchronization Works, page 2
- MPLS LDP-IGP Synchronization Requires Peer To Be Reachable, page 3
- MPLS LDP-IGP Synchronization Compatibility with IGP Nonstop Forwarding, page 3
- MPLS LDP-IGP Synchronization Compatibility with LDP Graceful Restart, page 3

How MPLS LDP-IGP Synchronization Works

Packet loss can occur because the actions of the IGP and LDP are not synchronized. Packet loss can occur in the following situations:

- When an IGP adjacency is established, the router begins forwarding packets using the new adjacency before the LDP label exchange completes between the peers on that link.
- If an LDP session closes, the router continues to forward traffic using the link associated with the LDP peer rather than an alternate pathway with a fully synchronized LDP session.

The MPLS LDP-IGP Synchronization feature:

- Provides a means to synchronize LDP and IGPs to minimize MPLS packet loss.
MPLS LDP-IGP Synchronization

- Enables you to globally enable LDP-IGP Synchronization on each interface associated with an IGP Open Shortest Path First (OSPF) or IS-IS process.
- Provides a means to disable LDP-IGP Synchronization on interfaces that you do not want enabled.
- Prevents MPLS packet loss due to synchronization conflicts.
- Works when LDP is enabled on interfaces using either the `mpls ip` or `mpls ldp autoconfig` command.

To enable LDP-IGP Synchronization on each interface that belongs to an OSPF or IS-IS process, enter the `mpls ldp sync` command. If you do not want some of the interfaces to have LDP-IGP Synchronization enabled, issue the `no mpls ldp igp sync` command on those interfaces.

If the LDP peer is reachable, the IGP waits indefinitely (by default) for synchronization to be achieved. To limit the length of time the IGP session must wait, enter the `mpls ldp igp sync holddown` command. If the LDP peer is not reachable, the IGP establishes the adjacency to enable the LDP session to be established.

When an IGP adjacency is established on a link but LDP-IGP Synchronization is not yet achieved or is lost, the IGP advertises the max-metric on that link.

MPLS LDP-IGP Synchronization Requires Peer To Be Reachable

When the MPLS LDP-IGP Synchronization feature is enabled on an interface, LDP determines if any peer connected by the interface is reachable by looking up the peer's transport address in routing table. If a routing entry (including longest match and/or default routing entry) for the peer exists, LDP assumes that LDP-IGP Synchronization is required for the interface and notifies the IGP to wait for LDP convergence.

This requires that the routing table be correct and accurate for peer's transport address. If the routing table shows there is a route for the peer's transport address, that route must be able to reach the peer's transport address. However, if the route is a summary route, default route, or a statically configured route, it might not be the correct route for the peer. You must verify that the route in the routing table can reach the peer’s transport address.

When the routing table has an inaccurate route for peer's transport address, LDP cannot set up a session with the peer, which causes the IGP wait for LDP convergence unnecessarily for the sync holddown time.

MPLS LDP-IGP Synchronization Compatibility with IGP Nonstop Forwarding

The MPLS LDP-IGP Synchronization feature is not supported during the startup period if IGP NSF is configured. The MPLS LDP-IGP Synchronization feature conflicts with IGP NSF when the IGP is performing NSF during startup. After the NSF startup is complete, the MPLS LDP-IGP Synchronization feature is supported.

MPLS LDP-IGP Synchronization Compatibility with LDP Graceful Restart

LDP Graceful Restart protects traffic when an LDP session is lost. If an interface that supports a Graceful Restart-enabled LDP session fails, MPLS LDP-IGP Synchronization is still achieved on the interface while it is protected by Graceful Restart. MPLS LDP-IGP Synchronization is eventually lost under the following circumstances:

- If LDP fails to restart before the LDP Graceful Restart reconnect timer expires.
• If an LDP session restarts through other interfaces, but the LDP session on the protected interface fails to recover when the LDP Graceful Restart recovery timer expires.

How to Configure MPLS LDP-IGP Synchronization

This section contains the following procedures:
• Configuring MPLS LDP-IGP Synchronization with OSPF Interfaces, page 4 (required)
• Selectively Disabling MPLS LDP-IGP Synchronization from Some OSPF Interfaces, page 6 (optional)
• Verifying MPLS LDP-IGP Synchronization with OSPF, page 7 (optional)
• Configuring MPLS LDP-IGP Synchronization with IS-IS Interfaces, page 8 (required)
• Selectively Disabling MPLS LDP-IGP Synchronization from Some IS-IS Interfaces, page 11 (optional)
• Verifying MPLS LDP-IGP Synchronization with IS-IS, page 12 (optional)

Configuring MPLS LDP-IGP Synchronization with OSPF Interfaces

The following sections contain the steps and examples for configuring MPLS LDP-IGP Synchronization for interfaces running OSPF processes:

SUMMARY STEPS

1. enable
2. configure terminal
3. mpls ip
4. mpls label protocol ldp
5. interface interface
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 sync
**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 1** enable | Enables privileged EXEC mode.  
  - Enter your password if prompted. |
| **Example:** Router> enable | |
| **Step 2** configure terminal | Enters global configuration mode. |
| **Example:** Router# configure terminal | |
| **Step 3** mpls ip | Globally enables hop-by-hop forwarding. |
| **Example:** Router(config)# mpls ip | |
| **Step 4** mpls label protocol ldp | Specifies LDP as the default label distribution protocol. |
| **Example:** Router(config)# mpls label protocol ldp | |
| **Step 5** interface interface | Specifies the interface to configure and enters interface configuration mode. |
| **Example:** Router(config)# interface POS3/0 | |
| **Step 6** ip address prefix mask | Assigns an IP address to the interface. |
| **Example:** Router(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:** Router(config-if)# mpls ip | |
| **Step 8** exit | Exits interface configuration mode. |
| **Example:** Router(config-if)# exit | |
| **Step 9** router ospf process-id | Enables OSPF routing and enters router configuration mode. |
| **Example:** Router(config)# router ospf 1 | |
How to Configure MPLS LDP-IGP Synchronization

Selectively Disabling MPLS LDP-IGP Synchronization from Some OSPF Interfaces

When you issue the `mpls ldp sync` command, all of the interfaces that belong to an OSPF process are enabled for LDP-IGP Synchronization. To remove LDP-IGP Synchronization from some interfaces, use the `no` form of the `mpls ldp igp sync` command on those interfaces. The following configuration steps show how to disable LDP-IGP Synchronization from some of the interfaces after they are configured with LDP-IGP Synchronization through the `mpls ldp sync` command.

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `interface interface`
4. `no mpls ldp igp sync`

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> <code>enable</code></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> <code>Router&gt; enable</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> <code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong> <code>Router# configure terminal</code></td>
<td></td>
</tr>
</tbody>
</table>
How to Configure MPLS LDP-IGP Synchronization

Verifying MPLS LDP-IGP Synchronization with OSPF

After you configure the interfaces for LDP, OSPF, and LDP-IGP Synchronization, verify that the configuration is working correctly using the `show mpls ldp igp sync` and `show ip ospf mpls ldp interface` commands.

**SUMMARY STEPS**

1. `show mpls ldp igp sync`
2. `show ip ospf mpls ldp interface`

**DETAILED STEPS**

Step 1

`show mpls ldp igp sync`

The output of this command (as shown in the following example) shows that LDP-IGP Synchronization is configured correctly, because LDP is configured and the SYNC status shows that synchronization is achieved.

Router# `show mpls ldp igp sync`

Ethernet0/0:

  LDP configured; SYNC enabled.
  SYNC status: sync achieved; peer reachable.
  IGP holdown time: infinite.
  Peer LDP Ident: 10.0.0.1:0
  IGP enabled: OSPF 1

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<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| **Step 3**

  `interface interface`

  **Example:**
  
  `Router(config)# interface POS3/0`

| Step 4

  `no mpls ldp igp sync`

  **Example:**
  
  `Router(config-if)# no mpls ldp igp sync`

  Disables LDP-IGP Synchronization for that interface.
If LDP-IGP Synchronization is not enabled on an interface, the output appears as follows:

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

**Step 2**  
**show ip ospf mpls ldp interface**

The output of the `show ip ospf mpls ldp interface` command in the following example shows that the interfaces are properly configured:

```
Router# show ip ospf mpls ldp interface

Ethernet3/0/0
Process ID 1, Area 0
LDP is configured through LDP autoconfig
LDP-IGP Synchronization: Yes
Hold down timer is not configured
Timer is not running
Ethernet3/0/2
Process ID 1, Area 0
LDP is configured through LDP autoconfig
LDP-IGP Synchronization: Yes
Hold down timer is not configured
Timer is not running
```

### Configuring MPLS LDP-IGP Synchronization with IS-IS Interfaces

*Note* In Cisco IOS Release 12.2(33)SRB, the MPLS LDP-IGP Synchronization is not supported with IS-IS. Only OSPF is supported.

The following sections contain the steps and examples for configuring MPLS LDP-IGP Synchronization for interfaces running IS-IS processes:

- Configuring MPLS LDP-IGP Synchronization on All IS-IS Interfaces, page 8
- Configuring MPLS LDP-IGP Synchronization on an IS-IS Interface, page 10

### Configuring MPLS LDP-IGP Synchronization on All IS-IS Interfaces

This section contains the steps for configuring MPLS LDP-IGP Synchronization on all interfaces running IS-IS processes.

**SUMMARY STEPS**

1. `enable`
2. `configure terminal`
3. `mpls ip`
4. `mpls label protocol ldp`
5. `router isis word`
6. `mpls ldp sync`
7. `interface interface`
**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| Step 1  
**enable** | Enables privileged EXEC mode. |
| **Example:**  
Router> enable | - Enter your password if prompted. |
| Step 2  
**configure terminal** | Enters global configuration mode. |
| **Example:**  
Router# configure terminal | |
| Step 3  
**mpls ip** | Globally enables hop-by-hop forwarding. |
| **Example:**  
Router(config)# mpls ip | |
| Step 4  
**mpls label protocol ldp** | Specifies LDP as the default label distribution protocol. |
| **Example:**  
Router(config)# mpls label protocol ldp | |
| Step 5  
**router isis word** | Enables IS-IS protocol on the router and specifies an IS-IS process. Enters router configuration mode. |
| **Example:**  
Router(config)# router isis ISIS | |
| Step 6  
**mpls ldp sync** | Enables LDP-IGP Synchronization for interfaces belonging to an IS-IS process. |
| **Example:**  
Router(config-router)# mpls ldp sync | |
| Step 7  
**interface interface** | Specifies the interface to configure and enters interface configuration mode. |
| **Example:**  
Router(config-router)# interface POS0/3 | |
| Step 8  
**ip address prefix mask** | Assigns an IP address to the interface. |
| **Example:**  
Router(config-if)# ip address 10.25.25.11 255.255.255.0 | |
| Step 9  
**ip router isis word** | Enables IS-IS. |
| **Example:**  
Router(config-if)# ip router isis ISIS | |
Configuring MPLS LDP-IGP Synchronization on an IS-IS Interface

This section contains the steps for configuring MPLS LDP-IGP Synchronization on an interface that is running an IS-IS process.

**SUMMARY STEPS**

1. enable
2. configure terminal
3. interface interface
4. ip address prefix mask
5. ip router isis
6. router isis
7. mpls ldp sync

**DETAILED STEPS**

<table>
<thead>
<tr>
<th>Command or Action</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1 enable</td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router&gt; enable</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Enter your password if prompted.</td>
</tr>
<tr>
<td>Step 2 configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router# configure terminal</td>
</tr>
<tr>
<td>Step 3 interface interface</td>
<td>Specifies the interface to configure and enters interface configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config)# interface POS0/2</td>
</tr>
<tr>
<td>Step 4 ip address prefix mask</td>
<td>Assigns an IP address to the interface.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# ip address 10.50.72.4 255.0.0.0</td>
</tr>
<tr>
<td>Step 5 ip router isis</td>
<td>Enables IS-IS for IP on the interface.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# ip router isis</td>
</tr>
<tr>
<td>Step 6 router isis</td>
<td>Enables IS-IS process on the router and enters router configuration mode.</td>
</tr>
<tr>
<td><strong>Example:</strong></td>
<td>Router(config-if)# router isis</td>
</tr>
</tbody>
</table>
MPLS LDP-IGP Synchronization

How to Configure MPLS LDP-IGP Synchronization

1. **Selectively Disabling MPLS LDP-IGP Synchronization from Some IS-IS Interfaces**

   When you issue the `mpls ldp sync` command, all of the interfaces that belong to an IS-IS process are enabled for LDP-IGP Synchronization. To remove LDP-IGP Synchronization from some interfaces, use the `no` form of the `mpls ldp igp sync` command on those interfaces. The following configuration steps show how to disable LDP-IGP Synchronization from some of the interfaces after they are configured with LDP-IGP Synchronization through the `mpls ldp sync` command.

   **SUMMARY STEPS**

   1. `enable`
   2. `configure terminal`
   3. `interface interface`
   4. `no mpls ldp igp sync`

   **DETAILED STEPS**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Step 1</strong> <code>enable</code></td>
<td>Enables privileged EXEC mode.</td>
</tr>
<tr>
<td>Example: <code>Router&gt; enable</code></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong> <code>configure terminal</code></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td>Example: <code>Router# configure terminal</code></td>
<td></td>
</tr>
</tbody>
</table>
How to Configure MPLS LDP-IGP Synchronization

Verifying MPLS LDP-IGP Synchronization with IS-IS

After you configure the interfaces for LDP-IGP Synchronization with IS-IS, you can verify that the configuration is working correctly with the `show isis mpls ldp` command.

**SUMMARY STEPS**

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

**DETAILED STEPS**

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

**Step 2** `show isis mpls ldp`  
The output of the following command shows that IS-IS is configured on the interface and LDP-IGP Synchronization with IS-IS is configured properly:

- ISIS is UP
- SYNC achieved

Router# `show isis mpls ldp`

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

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

Interface: Ethernet0; ISIS tag null enabled
ISIS is UP on interface
AUTOCONFIG Information:
  LDP enabled: NO
SYNC Information:
  Required: NO
If LDP-IGP Synchronization with IS-IS is configured but is not achieved, the output looks like the following:

```
Interface: Ethernet0/0; ISIS tag ISIS-1 enabled
ISIS is UP on interface
AUTOCONFIG Information :
  LDP enabled: YES
SYNC Information :
  Required: YES
  Achieved: NO
  IGP Delay: YES
  Holdown time: Infinite
  State: Holding down until SYNC
```

The IS-IS process holds down the adjacency of the interface until synchronization is achieved.

---

**Troubleshooting Tips**

Use the `debug mpls ldp igp sync` command to display events related to MPLS LDP-IGP Synchronization.

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**Configuration Examples for MPLS LDP-IGP Synchronization**

The following sections show examples for MPLS LDP-IGP Synchronization with OSPF and IS-IS processes:

- **MPLS LDP-IGP Synchronization with OSPF Examples**, page 13
- **MPLS LDP-IGP Synchronization with IS-IS Examples**, page 14

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**MPLS LDP-IGP Synchronization with OSPF Examples**

The following configuration commands enable LDP for OSPF process 1. The `mpls ldp sync` command and the OSPF `network` commands enable LDP on interfaces POS0/0, POS0/1, and POS1/1, respectively. The `no mpls ldp igp sync` command on interface POS1/0 prevents LDP from being enabled on interface POS1/0, even though OSPF is enabled for that interface.

```
Router# configure terminal
Router(config)# interface POS0/0
Router(config-if)# ip address 10.0.0.1
Router(config-if)# mpls ip
!
Router(config)# interface POS0/1
Router(config-if)# ip address 10.0.1.1
Router(config-if)# mpls ip
!
Router(config)# interface POS1/1
Router(config-if)# ip address 10.1.1.1
Router(config-if)# mpls ip
!
Router(config)# interface POS1/0
Router(config-if)# ip address 10.1.0.1
Router(config-if)# mpls ip
!
```
MPLS LDP-IGP Synchronization with IS-IS Examples

In Cisco IOS Release 12.2(33)SRB, the MPLS LDP-IGP Synchronization is not supported with IS-IS. Only OSPF is supported.

The following examples show the configuration commands you can use to configure LDP-IGP Synchronization on interfaces, POS0/2 and POS0/3, which are running IS-IS processes:

```bash
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface POS0/2
Router(config-if)# ip router isis
Router(config-if)# router isis
Router(config-router)# mpls ldp sync
.
.
.
Router(config)# interface POS0/3
Router(config-if)# ip router isis
Router(config-if)# router isis
Router(config-router)# mpls ldp sync
```

Additional References

The following sections provide references related to the MPLS LDP-IGP Synchronization feature.

### Related Documents

<table>
<thead>
<tr>
<th>Related Topic</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPLS LDP</td>
<td><strong>MPLS Label Distribution Protocol</strong></td>
</tr>
<tr>
<td>MPLS LDP Autoconfiguration</td>
<td><strong>MPLS LDP Autoconfiguration</strong></td>
</tr>
<tr>
<td>MPLS LDP Session Protection</td>
<td><strong>MPLS LDP Session Protection</strong></td>
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</tbody>
</table>

### Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.</td>
<td>——</td>
</tr>
</tbody>
</table>

**Note**

In Cisco IOS Release 12.2(33)SRB, the MPLS LDP-IGP Synchronization is not supported with IS-IS. Only OSPF is supported.
MIBs

<table>
<thead>
<tr>
<th>MIBs</th>
<th>MIBs Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPLS LDP MIB</td>
<td>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a></td>
</tr>
</tbody>
</table>

RFCs

<table>
<thead>
<tr>
<th>RFCs</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFC 3036</td>
<td>LDP Specification</td>
</tr>
<tr>
<td>RFC 3037</td>
<td>LDP Applicability</td>
</tr>
</tbody>
</table>

Technical Assistance

<table>
<thead>
<tr>
<th>Description</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register on Cisco.com.</td>
<td><a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a></td>
</tr>
</tbody>
</table>

Command Reference

This section documents only commands that are new or modified.
- `debug mpls ldp igp sync`
- `mpls ldp igp sync`
- `mpls ldp igp sync holddown`
- `mpls ldp sync`
- `show ip ospf mpls ldp interface`
- `show isis mpls ldp`
- `show mpls ldp igp sync`
debug mpls ldp igp sync

To enable the display of events related to the Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP) Synchronization feature, use the `debug mpls ldp igp sync` command in privileged EXEC mode. To disable this feature, use the `no` form of this command.

```
dep mpls ldp igp sync [interface interface] [peer acl]
```

**Syntax Description**

- `interface interface` (Optional) Enables the display of LDP-IGP Synchronization events for the specified interface.
- `peer acl` (Optional) Enables the display of LDP-IGP Synchronization events for the specified peer access control list (ACL).

**Command Modes**

Privileged EXEC

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.0(32)S</td>
<td>The command output was modified to display events related to the delay timer on interfaces running Open Shortest Path First (OSPF) processes, if the delay timer is configured.</td>
</tr>
<tr>
<td>12.0(32)SY</td>
<td>The command output was modified to display events related to synchronization on interfaces running Intermediate System-to-Intermediate System (IS-IS) processes.</td>
</tr>
<tr>
<td>12.4(12)</td>
<td>This command was integrated into Cisco IOS Release 12.4(12).</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This command was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

**Examples**

The following example shows events related to MPLS LDP-IGP Synchronization on interfaces running OSPF:

```text
Router# debug mpls ldp igp sync

LDP-SYNC: Et0/0, OSPF 1: notify status (required, not achieved, no delay, holddown infinite) internal status (achieved, timer running)
LDP-SYNC: E1/0, 10.0.0.1: Adj being deleted, sync_achieved goes down
LDP-SYNC: E1/0, OSPF 1: notify status (required, not achieved, delay, holddown infinite)
LDP-SYNC: Et0/0: Session already up and interface address advertised, sync_achieved comes up.
LDP-SYNC: Et0/0, OSPF 1: notify status (required, achieved, no delay, holddown infinite)
```

The following example shows events associated when an IS-IS instance, ISIS-1, is configured for Synchronization:

```text
Router# debug mpls ldp igp sync
```

Cisco IOS Release: Multiple releases
Table 1 describes the significant fields shown in the displays.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sync_achieved</td>
<td>The first line of the output for an interface shows the status of the MPLS LDP-IGP Synchronization in relation to the status of the interface.</td>
</tr>
</tbody>
</table>
| notify status | The notify status shows the following MPLS LDP-IGP Synchronization information for each interface:  
  - If LDP-IGP Synchronization is required.  
  - If LDP-IGP Synchronization has been achieved.  
  - If the IGP should wait for LDP Synchronization to be achieved.  
  - The length of time the IGP should wait for the LDP Synchronization to be achieved. |
| internal status | The internal status displays LDP internal synchronization status and the state of the timer. The internal status can be achieved or not achieved. The timer state can be running or not running. |

The following example shows events associated with MPLS LDP-IGP Synchronization on interfaces running OSPF when you have configured a delay timer:

```
Router# debug mpls ldp igp sync
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: notify status (required, not achieved, no delay, holddown infinite) internal status (achieved, timer running)
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: notify status (required, not achieved, delay, holddown infinite)
```

Table 1 debug mpls ldp igp sync Field Descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>sync_achieved</td>
<td>The first line of the output for an interface shows the status of the MPLS LDP-IGP Synchronization in relation to the status of the interface.</td>
</tr>
</tbody>
</table>
| notify status | The notify status shows the following MPLS LDP-IGP Synchronization information for each interface:  
  - If LDP-IGP Synchronization is required.  
  - If LDP-IGP Synchronization has been achieved.  
  - If the IGP should wait for LDP Synchronization to be achieved.  
  - The length of time the IGP should wait for the LDP Synchronization to be achieved. |
| internal status | The internal status displays LDP internal synchronization status and the state of the timer. The internal status can be achieved or not achieved. The timer state can be running or not running. |

The following example shows events associated with MPLS LDP-IGP Synchronization on interfaces running OSPF when you have configured a delay timer:

```
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: notify status (required, not achieved, no delay, holddown infinite) internal status (achieved, timer running)
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Sync disabled by IGP. Stop delay timer
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: TAGSW subblock destroyed. Stop delay timer
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Sync down. Stop delay timer
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Delay notifying IGP of sync achieved for 60 seconds
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Delay timer expired, notify IGP of sync achieved
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Delay timer expired but sync is no longer required won't notify IGP of sync achieved
*Jan 3 04:38:49.571: LDP-SYNC: Et0/0, OSPF 1: Delay timer expired but sync is down won't notify IGP of sync achieved
```
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mpls ldp sync</td>
<td>Enables LDP-IGP Synchronization on all interfaces that belong to an OSPF process or IS-IS process.</td>
</tr>
<tr>
<td>show mpls ldp igp sync</td>
<td>Displays information about interfaces configured for LDP-IGP Synchronization.</td>
</tr>
</tbody>
</table>
mpls ldp igp sync

To enable Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP) Interior Gateway Protocol (IGP) synchronization on an interface that belongs to an Open Shortest Path First (OSPF) process, use the `mpls ldp igp sync` command in interface configuration mode. To disable MPLS LDP synchronization, use the `no` form of the command.

```
mpls ldp igp sync [delay delay-time]
no mpls ldp igp sync [delay]
```

### Syntax Description

- **delay** (Optional) Sets a delay timer for MPLS LDP Interior Gateway Protocol (IGP) synchronization.
- **delay-time** (Optional) Delay time in seconds. The range is from 5 to 60 seconds.

### Command Default

If MPLS LDP synchronization is enable on an OSPF process, MPLS LDP synchronization is enabled on all interfaces configured for the process by default. A delay timer is not set.

### Command Modes

Interface configuration

### Command History

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.0(32)S</td>
<td>The optional <code>delay delay-time</code> keyword and argument were added.</td>
</tr>
<tr>
<td>12.4(12)</td>
<td>This command was integrated into Cisco IOS Release 12.4(12).</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This command was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

### Usage Guidelines

This command works with the `mpls ldp sync` command, which enables MPLS LDP synchronization on all interfaces that belong to an OSPF process. To disable MPLS LDP synchronization on a selected interface, use the `no mpls ldp igp sync` command in the configuration for that interface.

Use the `mpls ldp igp sync delay delay-time` command to configure a delay time for MPLS LDP and IGP synchronization on an interface-by-interface basis. To remove the delay timer from a specified interface, enter the `no mpls ldp igp sync delay` command. This command sets the delay time to 0 seconds, but leaves MPLS LDP IGP synchronization enabled.

When LDP is fully established and synchronized, LDP checks the delay timer:

- If you configured a delay time, LDP starts the timer. When the timer expires, LDP checks that synchronization is still valid and notifies the OSPF process.
- If you did not configure a delay time, or if synchronization is disabled or down, or if an interface was removed from an IGP process, LDP stops the timer and immediately notifies the OSPF process.

If you configure a new delay time while a timer is running, LDP saves the new delay time but does not reconfigure the running timer.
The following example shows how to disable MPLS LDP synchronization on POS interface 1/0:

```
Router(config)# interface pos1/0
Router(config-if)# no mpls ldp igp sync
```

The following example shows how to set a delay timer of 45 seconds for MPLS LDP-IGP synchronization on FastEthernet interface 0/0:

```
Router(config)# interface FastEthernet 0/0
Router(config-if)# mpls ldp igp sync delay 45
```
**mpls ldp igp sync holddown**

To specify how long an Interior Gateway Protocol (IGP) should wait for Label Distribution Protocol (LDP) Synchronization to be achieved, use the `mpls ldp igp sync holddown` command in global configuration mode. To disable the holddown timer, use the `no` form of this command.

```
mpls ldp igp sync holddown milliseconds
no mpls ldp igp sync holddown
```

**Syntax Description**

| milliseconds | The number of milliseconds an IGP should wait for an LDP session to be established. The valid range of values is 1 to 2,147,483,647. |

**Defaults**

An IGP will wait indefinitely for LDP synchronization to be achieved.

**Command Modes**

Global configuration

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This command was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

This command enables you to limit the amount of time an IGP waits for LDP synchronization to be achieved.

**Examples**

In the following example, the IGP is limited to 10,000 milliseconds (10 seconds):

```
Router(config)# mpls ldp igp holddown 10000
```
**mpls ldp sync**

To enable Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP) Synchronization on interfaces for an Open Shortest Path First (OSPF) process or an Intermediate System-to-Intermediate System (IS-IS) process, use the `mpls ldp sync` command in router configuration mode. To disable this feature, use the **no** form of this command.

```
    mpls ldp sync

    no mpls ldp sync
```

**Syntax Description**

This command has no arguments or keywords.

**Defaults**

MPLS LDP-IGP Synchronization is not enabled on interfaces belonging to the OSPF or IS-IS processes.

**Command Modes**

Router configuration

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.0(32)SY</td>
<td>This command is supported on interfaces running IS-IS processes in Cisco IOS Release 12.0(32)SY.</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This command was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

- If the `mpls ldp sync` command is configured, you cannot issue the global **no mpls ip** command. If you want to disable LDP Synchronization, you must issue the `no mpls ldp igp sync` command first.
- The `mpls ldp sync` command is supported with OSPF or IS-IS. Other IGPs are not supported.

**Examples**

In the following example, MPLS LDP Synchronization is enabled for an OSPF process or an IS-IS process:

```
Router(config-router)# mpls ldp sync
```

**Related Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>mpls ldp igp sync</strong></td>
<td>Enables LDP-IGP Synchronization on an interface running an OSPF process.</td>
</tr>
<tr>
<td><strong>show isis mpls ldp</strong></td>
<td>Displays LDP-IGP Synchronization and LDP Autoconfiguration information for interfaces running IS-IS processes.</td>
</tr>
<tr>
<td><strong>show mpls ldp igp sync</strong></td>
<td>Displays information about interfaces configured for LDP-IGP Synchronization.</td>
</tr>
</tbody>
</table>
**show ip ospf mpls ldp interface**

To display information about interfaces belonging to an Open Shortest Path First (OSPF) process that are configured for Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP), use the `show ip ospf mpls ldp interface` command in privileged EXEC mode.

```
show ip ospf [process-id] mpls ldp interface [interface]
```

**Syntax Description**

- `process-id` (Optional) Process ID. If this argument is included, only information for the specified routing process is included.
- `interface` (Optional) Defines the interface about which to display LDP IGP-synchronization information.

**Defaults**

If you do not specify a keyword or argument, information is displayed for each interface that has been configured for MPLS LDP IGP-synchronization.

**Command Modes**

Privileged EXEC

**Command History**

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0(30)S</td>
<td>This command was introduced.</td>
</tr>
<tr>
<td>12.3(14)T</td>
<td>This command was integrated into Cisco IOS Release 12.3(14)T.</td>
</tr>
<tr>
<td>12.2(33)SRB</td>
<td>This command was integrated into Cisco IOS Release 12.2(33)SRB.</td>
</tr>
</tbody>
</table>

**Usage Guidelines**

This command shows MPLS LDP IGP-synchronization information for specified interfaces or OSPF processes.

**Examples**

The following shows sample output generated by the `show ip ospf mpls ldp interface` command:

```
Router# show ip ospf mpls ldp interface

Serial1/2.4
  Process ID 2, Area 0
  LDP is configured through LDP autoconfig
  LDP-IGP Synchronization : Not required
  Holddown timer is disabled
  Interface is up
Serial1/2.11
  Process ID 6, VRF VFR1, Area 2
  LDP is configured through LDP autoconfig
  LDP-IGP Synchronization : Not required
  Holddown timer is disabled
  Interface is up
Ethernet2/0
  Process ID 1, Area 0
  LDP is configured through LDP autoconfig
  LDP-IGP Synchronization : Required
```
Holddown timer is configured: 1 msecs
Holddown timer is not running
Interface is up
Loopback1
  Process ID 1, Area 0
  LDP is not configured through LDP autoconfig
  LDP-IGP Synchronization: Not required
  Holddown timer is disabled
  Interface is up
Serial1/2.1
  Process ID 1, Area 10.0.1.44
  LDP is configured through LDP autoconfig
  LDP-IGP Synchronization: Required
  Holddown timer is configured: 1 msecs
  Holddown timer is not running
  Interface is up

Table 2 describes the significant fields shown in the display.

Table 2  
show ip ospf mpls ldp interface Field Descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process ID</td>
<td>The number of the OSPF process to which the interface belongs.</td>
</tr>
<tr>
<td>Area</td>
<td>The OSPF area to which the interface belongs.</td>
</tr>
<tr>
<td>LDP is configured through</td>
<td>The means by which LDP was configured on the interface. LDP can be configured on the interface by the mpls ip or mpls ldp command.</td>
</tr>
<tr>
<td>LDP-IGP Synchronization</td>
<td>Indicates whether LDP-IGP synchronization has been enabled on this interface.</td>
</tr>
<tr>
<td>Holddown timer</td>
<td>Indicates whether the holddown timer was specified for this interface.</td>
</tr>
<tr>
<td>Timer</td>
<td>Indicates whether the timer is running on this interface.</td>
</tr>
</tbody>
</table>

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug mpls ldp igp sync</td>
<td>Displays events related to MPLS LDP-IGP synchronization.</td>
</tr>
<tr>
<td>show mpls ldp igp sync</td>
<td>Displays information about interfaces enabled for MPLS LDP-IGP synchronization.</td>
</tr>
</tbody>
</table>
show isis mpls ldq

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

```
show isis [process-tag] mpls ldq [interface interface]
```

**Syntax Description**

- `process-tag` (Optional) Process ID. If this argument is included, only information for the specified routing process appears.
- `interface interface` (Optional) Defines the interface about which to display Label Distribution Protocol (LDP)-Interior Gateway Protocol (IGP) Synchronization and LDP Autoconfiguration information.

**Defaults**

If you do not specify a keyword or argument for this command, information appears for each interface that is configured for MPLS LDP Synchronization and Autoconfiguration.

**Command Modes**

- User EXEC
- Privileged EXEC

**Command History**

- **Release**
  - 12.0(32)SY: This command was introduced.
  - 12.2(33)SRB: This command was integrated into Cisco IOS Release 12.2(33)SRB.

**Usage Guidelines**

This command shows MPLS LDP Synchronization and Autoconfiguration information for interfaces that are running IS-IS processes.

**Examples**

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

```
Router# show isis mpls ldq

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

This command returns information for interfaces that are configured for IS-IS which are indicated by the message ISIS is UP on interface.
```
Table 3 describes the fields shown in the display.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOCONFIG</td>
<td>LDP enabled—Indicates whether or not LDP Autoconfiguration is enabled on this interface. Value is either Yes or No.</td>
</tr>
<tr>
<td>Information</td>
<td></td>
</tr>
<tr>
<td>SYNC Information</td>
<td>Required—Indicates whether or not synchronization is required on the interface. Achieved—Indicates whether or not synchronization has been achieved with LDP. If IS-IS has been configured on an interface but synchronization is not achieved, the Achieved field indicates No. The Required field still indicates Yes. See the following example: Interface: POS0/3; ISIS tag null enabled ISIS is UP on interface AUTOCONFIG Information: LDP enabled: NO SYNC Information: Required: YES Achieved: NO IGP Delay: YES Holddown time: Infinite State: Holding down until SYNC IGP Delay—Indicates whether the IS-IS process is required to wait for synchronization with LDP before bringing up the interface adjacency. Holddown Time—Indicates a finite or infinite. The finite value is equal to the holddown delay that you configured using the \texttt{mpls ldp igp sync holddown} command. If this field indicates Infinite, holddown time was not configured. Therefore, IS-IS waits until synchronization is achieved before bringing adjacency UP. Note This field is significant only if the IGP Delay field indicates YES. State—Indicates information about the state of synchronization on the interface. If synchronization is achieved, the output shows the following: SYNC achieved—Synchronization was required and has been achieved. If synchronization is not achieved, the output shows one of the following: • Holding down until SYNCR—No holddown timer has been configured, so IS-IS continues to hold down adjacency until synchronization is achieved. • Holding down with timer—A holddown timer has been configured, and IS-IS is holding down adjacency until the timer, indicated in the IGP Delay field, expires. • Maximum metric in effect—Although synchronization was not achieved, the IGP brought UP adjacency with maximum metric.</td>
</tr>
</tbody>
</table>
### Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>mpls ldp autoconfig</code></td>
<td>Globally enables LDP Autoconfiguration on all interfaces that belong to an OSPF or IS-IS process.</td>
</tr>
<tr>
<td><code>mpls ldp sync</code></td>
<td>Globally enables LDP Synchronization on all interfaces that belong to an OSPF or IS-IS process.</td>
</tr>
</tbody>
</table>
show mpls ldp igp sync

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

```
show mpls ldp igp sync [interface interface | vpn vpn-name]
```

**Syntax Description**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>interface interface</code></td>
<td>(Optional) Displays the MPLS LDP synchronization information for the specified interface.</td>
</tr>
<tr>
<td><code>vpn vpn-name</code></td>
<td>(Optional) Displays the MPLS LDP synchronization information for the specified Virtual Private Network (VPN) routing and forwarding instance (<code>vpn-name</code>).</td>
</tr>
</tbody>
</table>

**Defaults**

This command displays LDP synchronization for all interfaces enabled for MPLS LDP synchronization if an optional argument is not specified.

**Command Modes**

User EXEC

Privileged EXEC

**Command History**

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

**Examples**

The following shows sample output from the `show mpls ldp igp sync` command:

```
Router# show mpls ldp igp sync

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

Table 4 describes the significant fields shown in the display.
Table 4  show mpls ldp igp sync Field Descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet0/0</td>
<td>Interface name and type.</td>
</tr>
<tr>
<td>LDP configured</td>
<td>Label Distribution Protocol is configured.</td>
</tr>
<tr>
<td>SYNC enabled</td>
<td>Synchronization is active.</td>
</tr>
<tr>
<td>SYNC status</td>
<td>Synchronization is successful.</td>
</tr>
<tr>
<td>Note</td>
<td>Peer reachable is an LDP internal state used only for MPLS LDP synchronization. It should not be used to verify that LDP can reach the peer or to troubleshoot LDP functionality.</td>
</tr>
<tr>
<td>IGP holddown time</td>
<td>Interior Gateway Protocol hold-down time. Infinite—No specific time is set.</td>
</tr>
<tr>
<td>Peer LDP Ident</td>
<td>IP address of the peer.</td>
</tr>
<tr>
<td>IGP enabled</td>
<td>Interior Gateway Protocol is enabled for Open Shortest Path First (OSPF) 1.</td>
</tr>
</tbody>
</table>

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

Router# show mpls ldp igp sync

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

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

Router# show mpls ldp igp sync

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

Related Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
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<tbody>
<tr>
<td>debug mpls ldp igp sync</td>
<td>Displays events related to MPLS LDP synchronization.</td>
</tr>
<tr>
<td>mpls ldp igp sync</td>
<td>Enables MPLS LDP synchronization on an interface that belongs to an OSPF process.</td>
</tr>
<tr>
<td>mpls ldp igp sync holddown</td>
<td>Specifies how long an IGP should wait for LDP synchronization to be achieved.</td>
</tr>
<tr>
<td>mpls ldp sync</td>
<td>Globally enables LDP on all interfaces that belong to an OSPF process.</td>
</tr>
</tbody>
</table>
show mpls ldp igp sync
show mpls ldp igp sync