MPLS LDP Inbound Label Binding Filtering

Multiprotocol Label Switching (MPLS) Label Distribution Protocol (LDP) supports inbound label binding filtering. You can use the MPLS LDP feature to configure access control lists (ACLs) for controlling the label bindings a label switch router (LSR) accepts from its peer LSRs.

History for the MPLS LDP Inbound Label Binding Filtering Feature

Release	Modification
12.0(26)S	This feature was introduced.
12.2(25)S	This feature was integrated into Cisco IOS Release 12.2(25)S for the Cisco 7500 series router.
12.3(14)T	This feature was integrated into Cisco IOS Release 12.3(14)T.
12.2(18)SXE	This feature was integrated into Cisco IOS Release 12.2(18)SXE for the Cisco 7600 series router.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

Corporate Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Information about MPLS LDP Inbound Label Binding Filtering

The MPLS LDP Inbound Label Binding Filtering feature may be used to control the amount of memory used to store LDP label bindings advertised by other routers. For example, in a simple MPLS Virtual Private Network (VPN) environment, the VPN provider edge (PE) routers may require LSPs only to their peer PE routers (that is, they do not need LSPs to core routers). Inbound label binding filtering enables a PE router to accept labels only from other PE routers.

How to Configure MPLS LDP Inbound Label Binding Filtering

This section includes the following tasks:

- Configuring MPLS LDP Inbound Label Binding Filtering, page 2 (Required)
- Verifying that MPLS LDP Inbound Label Bindings are Filtered, page 4 (Optional)

Configuring MPLS LDP Inbound Label Binding Filtering

Perform this task to configure a router for inbound label filtering. The following configuration allows the router to accept only the label for prefix 25.0.0.2 from LDP neighbor router 10.12.12.12.

Restrictions

Inbound label binding filtering does not support extended ACLs; it only supports standard ACLs.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip access-list standard** *access-list-number*
4. **permit** {*source* [*source-wildcard*] | **any**} [**log**]
5. **exit**
6. **mpls ldp neighbor** [**vrf** *vpn-name*] *nbr-address* **labels accept** *acl*
7. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip access-list standard** *access-list-number* **Example:** `Router(config)# ip access-list standard 1`	Defines a standard IP access list with a number.
Step 4	**permit** {*source* [*source-wildcard*] | **any**} [**log**] **Example:** `Router(config-std-nacl)# permit 10.0.0.0`	Specifies one or more prefixes permitted by the access list.
Step 5	**exit** **Example:** `Router(config-std-nacl)# exit`	Exits the current mode and goes to the next higher level.
Step 6	**mpls ldp neighbor** [**vrf** *vpn-name*] *nbr-address* **labels accept** *acl* **Example:** `Router(config)# mpls ldp neighbor 10.12.12.12 labels accept 1`	Specifies the ACL to be used to filter label bindings for the specified LDP neighbor.
Step 7	**end** **Example:** `Router(config)# end`	Exits the current mode and enters privileged Exec mode.

Verifying that MPLS LDP Inbound Label Bindings are Filtered

If inbound filtering is enabled, perform the following steps to verify that inbound label bindings are filtered:

Step 1 Enter the **show mpls ldp neighbor** command to show the status of the LDP session, including the name or number of the ACL configured for inbound filtering.

show mpls ldp neighbor [**vrf** *vpn-name*][*address* | *interface*] [**detail**]

Note To display information about inbound label binding filtering, you must enter the **detail** keyword.

Following is sample output from the **show mpls ldp neighbor** command.

```
Router# show mpls ldp neighbor 10.12.12.12 detail

 Peer LDP Ident: 10.12.12.12:0; Local LDP Ident 10.13.13.13:0
   TCP connection: 10.12.12.12.646 - 10.13.13.13.12592
   State: Oper; Msgs sent/rcvd: 49/45; Downstream; Last TIB rev sent 1257
   Up time: 00:32:41; UID: 1015; Peer Id 0;
   LDP discovery sources:
    Serial1/0; Src IP addr: 25.0.0.2
     holdtime: 15000 ms, hello interval: 5000 ms
   Addresses bound to peer LDP Ident:
    10.0.0.129       10.12.12.12     10.0.0.2
   Peer holdtime: 180000 ms; KA interval: 60000 ms; Peer state: estab
   LDP inbound filtering accept acl: 1
```

Step 2 Enter the **show ip access-list** command to display the contents of all current IP access lists or of a specified access list.

show ip access-list [*access-list-number* | *access-list-name*]

Note It is important that you enter this command to see how the access list is defined; otherwise, you cannot verify inbound label binding filtering.

The following command output shows the contents of IP access list 1:

```
Router# show ip access 1

Standard IP access list 1
  permit 10.0.0.0, wildcard bits 0.0.0.255 (1 match)
```

Step 3 Enter the **show mpls ldp bindings** command to verify that the LSR has remote bindings only from a specified peer for prefixes permitted by the access list.

```
Router# show mpls ldp bindings

 tib entry: 10.0.0.0/8, rev 4
     local binding:  tag: imp-null
 tib entry: 10.2.0.0/16, rev 1137
     local binding:  tag: 16
 tib entry: 10.2.0.0/16, rev 1139
     local binding:  tag: 17
 tib entry: 10.12.12.12/32, rev 1257
     local binding:  tag: 18
 tib entry: 10.13.13.13/32, rev 14
     local binding:  tag: imp-null
```

```
 tib entry: 10.10.0.0/16, rev 711
     local binding:  tag: imp-null
 tib entry: 10.0.0.0/8, rev 1135
     local binding:  tag: imp-null
     remote binding: tsr: 12.12.12.12:0, tag: imp-null
 tib entry: 10.0.0.0/8, rev 8
     local binding:  tag: imp-null
Router#
```

Configuration Examples for MPLS LDP Inbound Label Binding Filtering

In the following example, the **mpls ldp neighbor labels accept** command is configured with an access control list to filter label bindings received on sessions with the neighbor 10.110.0.10.

Label bindings for prefixes that match 10.b.c.d are accepted, where b is less than or equal to 63, and c and d can be any integer between 0 and 128. Other label bindings received from 10.110.0.10 are rejected.

```
Router# configure terminal
Router(config)# access-list 1 permit 10.63.0.0 0.63.255.255
Router(config)# mpls ldp neighbor 10.110.0.10 labels accept 1
Router(config)# end
```

In the following example, the **show mpls ldp bindings neighbor** command displays label bindings that were learned from 10.110.0.10. This example verifies that the LIB does not contain label bindings for prefixes that have been excluded.

```
Router# show mpls ldp bindings neighbor 10.110.0.10

tib entry: 10.2.0.0/16, rev 4
    remote binding: tsr: 10.110.0.10:0, tag: imp-null
tib entry: 10.43.0.0/16, rev 6
    remote binding: tsr: 10.110.0.10:0, tag: 16
tib entry: 10.52.0.0/16, rev 8
    remote binding: tsr: 10.110.0.10:0, tag: imp-null
```

Additional References

The following sections provide additional references related to MPLS LDP inbound label binding filters.

Related Documents

Related Topic	Document Title
MPLS Label Distribution Protocol (LDP)	*MPLS Label Distribution Protocol (LDP),* Release 12.0(23)S *Cisco IOS Switching Services Command Reference*, Release 12.0 *Cisco IOS Release Switching Services Configuration Guide,* Release 12.0

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
LDP Specification, draft-ietf-mpls-ldp-08.txt	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 3036	*LDP Specification*
RFC 3037	*LDP Applicability*

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents new and modified commands only.

New Commands

- **clear mpls ldp neighbor**
- **mpls ldp neighbor labels accept**

Modified Commands

- **show mpls ldp neighbor**

clear mpls ldp neighbor

To forcibly reset a label distribution protocol (LDP) session, use the **clear mpls ldp neighbor** command in privileged EXEC mode.

clear mpls ldp neighbor [**vrf** *vpn-name*] {*nbr-address* | *****}

Syntax Description

vrf *vpn-name*	(Optional) Specifies the VPN routing and forwarding instance (*vpn-name*) for resetting an LDP session.
nbr-address	Specifies the address of the LDP neighbor whose session will be reset. The neighbor address is treated as <nbr-address>:0, which means it pertains to the LDP session for the LSR's platform-wide label space.
*	Designates that all LDP sessions will be reset.

Defaults

No default behavior or values

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.

Usage Guidelines

The **clear mpls ldp neighbor** command terminates the specified LDP sessions. The LDP sessions should be reestablished if the LDP configuration remains unchanged.

You can clear an LDP session for an interface-specific label space of an LSR by issuing the **no mpls ip** command and then the **mpls ip** command on the interface associated with the LDP session.

Examples

The following example resets an LDP session:

```
Router# clear mpls ldp neighbor 10.12.12.12
```

To verify the results of the **clear mpls ldp neighbor** command, enter the **show mpls ldp neighbor** command. Notice the value in the “Up time” field.

```
Router# show mpls ldp neighbor 10.12.12.12

 Peer LDP Ident: 10.12.12.12:0; Local LDP Ident 10.13.13.13:0
   TCP connection: 10.12.12.12.646 - 10.13.13.13.15093
   State: Oper; Msgs sent/rcvd: 142/138; Downstream
   Up time: 02:16:28
   LDP discovery sources:
    Serial1/0, Src IP addr: 10.0.0.2
```

```
   Addresses bound to peer LDP Ident:
    10.0.0.129       10.12.12.12     10.0.0.2        10.1.0.5
    10.7.0.1
```

Then enter the following **clear mpls ldp neighbor 12.12.12.12** command. With mpls ldp logging configured, the easiest way to verify the **clear mpls ldp neighbor** command is to monitor the LDP log messages.

```
Router# clear mpls ldp neighbor 10.12.12.12

1w1d: %LDP-5-CLEAR_NBRS: Clear LDP neighbors (10.12.12.12) by console
1w1d: %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is DOWN
1w1d: %LDP-5-NBRCHG: LDP Neighbor 10.12.12.12:0 is UP
```

Reenter the **show mpls ldp neighbor 10.12.12.12** command. Notice that the "Up time" value has been reset.

```
Router# show mpls ldp neighbor 10.12.12.12

  Peer LDP Ident: 10.12.12.12:0; Local LDP Ident 10.13.13.13:0
    TCP connection: 10.12.12.12.646 - 10.13.13.13.15095
    State: Oper; Msgs sent/rcvd: 125/121; Downstream
    Up time: 00:00:05
    LDP discovery sources:
     Serial1/0, Src IP addr: 10.0.0.2
    Addresses bound to peer LDP Ident:
     10.0.0.129       10.12.12.12     10.0.0.2        10.1.0.5
     10.7.0.1
```

The following example resets all LDP sessions:

```
Router# clear mpls ldp neighbor *
```

Related Commands

Command	Description
show mpls ldp neighbor	Displays the status of the LDP sessions.

mpls ldp neighbor labels accept

To configure a label switching router (LSR) to filter label distribution protocol (LDP) inbound label bindings from a particular LDP peer, use the **mpls ldp neighbor labels accept** command in global configuration mode. To disable this feature, use the **no** form of this command.

mpls ldp neighbor [**vrf** *vpn-name*] *nbr-address* **labels accept** *acl*

no mpls ldp neighbor [**vrf** *vpn-name*] *nbr-address* **labels accept** *acl*

Syntax Description

vrf *vpn-name*	(Optional) Specifies VPN routing and forwarding instance (*vpn-name*) for accepting labels.
nbr-address	Specifies address of the LDP peer whose advertisements are to be filtered.
labels accept *acl*	Specifies the prefixes (access control list) that are acceptable (permitted).

Defaults

If the **vrf** keyword is not specified, the specified LDP neighbor is configured in the default routing domain.

Command Modes

Global configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.

Usage Guidelines

The specified ACL is used to filter label bindings advertised by the specified neighbor. If the prefix part of the label binding is permitted by the ACL, the router will accept the binding. If the prefix is denied, the router will not accept or store the binding.

This functionality is particularly useful when two different entities manage peer LSRs; that is, the recipient cannot perform filtering by altering the configuration of the sender. This is likely to occur in an MPLS virtual private network (VPN) that is using the LDP-based Carrier Supporting Carrier (CSC) feature. In that situation, the backbone carrier may want to restrict the set of label bindings that its provider edge (PE) router may learn from an adjacent customer edge (CE) router that a customer carrier operates.

When inbound label binding filtering is configured, certain configuration changes may require a router to retain bindings that it previously discarded. For example:

- Inbound filtering is disabled.
- An inbound filtering ACL is redefined to be less restrictive.

A router does not maintain a record of the set of bindings it previously discarded. Therefore, it cannot ask its neighbors to readvertise just those bindings. In addition, LDP (as defined by RFC 3036) does not provide a means for a router to signal its neighbors to readvertise all label bindings. Consequently, to relearn label bindings following such configuration changes, you must reset the LDP session or sessions by using the **clear mpls ldp neighbor** command.

Note The **mpls ldp neighbor labels accept** command has no effect on an LC-ATM interface. Such an interface behaves as though this command had not been executed. The **mpls ldp request-labels** ACL command, which is supported for LC-ATM, controls which label bindings are requested (accepted) from neighbors.

Examples

The following example specifies that the LSR accepts inbound label bindings from neighbor 19.19.19.19 in vrf vpn1 for prefixes permitted by the ACL named aclone:

```
Router(config)# mpls ldp neighbor vrf vpn1 19.19.19.19 label accept aclone
```

Related Commands

Command	Description
clear mpls ldp neighbor	Forcibly resets an LDP session.
mpls ldp advertise-labels	Controls the distribution of locally assigned (incoming) labels by means of LDP.
show ip access list	Displays the list of configured access lists and their definitions.
show mpls ldp neighbor	Displays the status of the LDP sessions.

show mpls ldp neighbor

To display the status of label distribution protocol (LDP) sessions, use the **show mpls ldp neighbor** command in privileged EXEC mode.

show mpls ldp neighbor [**vrf** *vpn-name*] [*address* | *interface*] [**detail**]

show mpls ldp neighbor [**all**]

Syntax Description

vrf *vpn-name*	(Optional) Displays the LDP neighbors for the specified VPN routing/forwarding instance (*vpn-name*).
address	(Optional) Identifies the neighbor with this IP address.
interface	(Optional) Defines the LDP neighbors accessible over this interface.
detail	(Optional) Displays information in long form.
all	(Optional) When the **all** keyword is specified alone in this command, the command displays LDP neighbor information for all VPNs, including those in the default routing domain.

Defaults

This command displays information about LDP neighbors for the default routing domain if the optional **vrf** keyword is not specified.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1CT	This command was introduced.
12.0(10)ST	This command was modified to reflect MPLS IETF command syntax and terminology.
12.0(14)ST	This command was modified to reflect MPLS VPN support for LDP.
12.1(2)T	This command was integrated into Cisco IOS Release 12.1(2)T.
12.1(8a)E	This command was integrated into Cisco IOS Release 12.1(8a)E.
12.2(2)T	This command was integrated into Cisco IOS Release 12.2(2)T.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

The **show mpls ldp neighbor** command can provide information about all LDP neighbors, or the information can be limited to the following:

- Neighbor with specific IP address
- LDP neighbors known to be accessible over a specific interface

Note This command displays information about LDP and Tag Distribution Protocol (TDP) neighbor sessions.

Examples

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

```
Router# show mpls ldp neighbor

Peer LDP Ident: 10.0.7.7:2; Local LDP Ident 10.1.1.1:1
        TCP connection: 10.0.7.7.11032 - 10.1.1.1.646
        State: Oper; Msgs sent/rcvd: 5855/6371; Downstream on demand
        Up time: 13:15:09
        LDP discovery sources:
          ATM3/0.1
Peer LDP Ident: 10.1.1.1:0; Local LDP Ident 10.1.1.1:0
        TCP connection: 10.1.1.1.646 - 10.1.1.1.11006
        State: Oper; Msgs sent/rcvd: 4/411; Downstream
        Up time: 00:00:52
        LDP discovery sources:
          Ethernet1/0/0
        Addresses bound to peer LDP Ident:
          10.0.0.29        10.1.1.1         10.0.0.199      10.10.1.1
          10.205.0.9
```

The following shows sample output from the **show mpls ldp neighbor vrf vpn10** command, which displays the LDP neighbor information for the specified VPN routing/forwarding instance named vpn10:

```
Router# show mpls ldp neighbor vrf vpn10

Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.29.0.2:0
        TCP connection:10.14.14.14.646 - 10.29.0.2.11384
        State:Oper; Msgs sent/rcvd:1423/800; Downstream
        Up time:02:38:11
        LDP discovery sources:
          ATM3/0/0.10
        Addresses bound to peer LDP Ident:
          10.3.36.9       10.7.0.1        10.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
Router#
```

The following shows sample output from the **show mpls ldp neighbor all** command, which displays the LDP neighbor information for all VPN routing/forwarding instances, including those in the default routing domain. In this example, note that the same neighbor LDP ID (14.14.14.14) appears in all the listed VRF interfaces, highlighting the fact that the same IP address can coexist in different VPN routing/forwarding instances.

```
Router# show mpls ldp neighbor all

Peer TDP Ident:101.11.11.11:0; Local TDP Ident 10.12.12.12:0
        TCP connection:10.11.11.11.711 - 10.12.12.12.11003
        State:Oper; PIEs sent/rcvd:185/187; Downstream
        Up time:02:40:02
        TDP discovery sources:
          ATM1/1/0.1
        Addresses bound to peer TDP Ident:
          10.3.38.3        10.1.0.2        10.11.11.11
VRF vpn1:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.7.0.2:0
        TCP connection:10.14.14.14.646 - 10.7.0.2.11359
        State:Oper; Msgs sent/rcvd:952/801; Downstream
        Up time:02:38:49
        LDP discovery sources:
          ATM3/0/0.1
        Addresses bound to peer LDP Ident:
          3.3.36.9        10.7.0.1        14.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
VRF vpn2:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.13.0.2:0
        TCP connection:10.14.14.14.646 - 10.13.0.2.11361
        State:Oper; Msgs sent/rcvd:964/803; Downstream
        Up time:02:38:50
        LDP discovery sources:
          ATM3/0/0.2
        Addresses bound to peer LDP Ident:
          3.3.36.9        10.7.0.1        14.14.14.14     10.13.0.1
          10.15.0.1       10.17.0.1       10.19.0.1       10.21.0.1
          10.23.0.1       10.25.0.1       10.27.0.1       10.29.0.1
          10.31.0.1       10.33.0.1       10.35.0.1       10.37.0.1
          10.39.0.1       10.41.0.1       10.43.0.1       10.45.0.1
          10.47.0.1       10.49.0.1       10.51.0.1       10.53.0.1
          10.55.0.1       10.57.0.1       10.59.0.1       10.61.0.1
          10.63.0.1       10.65.0.1       10.67.0.1       10.69.0.1
          10.71.0.1       10.73.0.1       10.75.0.1       10.77.0.1
          10.79.0.1       10.81.0.1       10.83.0.1       10.85.0.1
          10.87.0.1       10.89.0.1       10.91.0.1       10.93.0.1
          10.95.0.1       10.97.0.1       10.99.0.1       10.101.0.1
          10.103.0.1      10.105.0.1      10.107.0.1      10.109.0.1
          10.4.0.2        10.3.0.2
VRF vpn3:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.15.0.2:0
        TCP connection:10.14.14.14.646 - 10.15.0.2.11364
```

```
        State:Oper; Msgs sent/rcvd:1069/800; Downstream
        Up time:02:38:52
        LDP discovery sources:
          ATM3/0/0.3
        Addresses bound to peer LDP Ident:
          10.3.36.9        10.7.0.1       10.14.14.14     10.13.0.1
          10.15.0.1        10.17.0.1      10.19.0.1       10.21.0.1
          10.23.0.1        10.25.0.1      10.27.0.1       10.29.0.1
          10.31.0.1        10.33.0.1      10.35.0.1       10.37.0.1
          10.39.0.1        10.41.0.1      10.43.0.1       10.45.0.1
          10.47.0.1        10.49.0.1      10.51.0.1       10.53.0.1
          10.55.0.1        10.57.0.1      10.59.0.1       10.61.0.1
          10.63.0.1        10.65.0.1      10.67.0.1       10.69.0.1
          10.71.0.1        10.73.0.1      10.75.0.1       10.77.0.1
          10.79.0.1        10.81.0.1      10.83.0.1       10.85.0.1
          10.87.0.1        10.89.0.1      10.91.0.1       10.93.0.1
          10.95.0.1        10.97.0.1      10.99.0.1       10.101.0.1
          10.103.0.1       10.105.0.1     10.107.0.1      10.109.0.1
          10.4.0.2         10.3.0.2
VRF vpn4:
    Peer LDP Ident:10.14.14.14:0; Local LDP Ident 10.17.0.2:0
        TCP connection:10.14.14.14.646 - 10.17.0.2.11366
        State:Oper; Msgs sent/rcvd:1199/802; Downstream

Router#
```

Table 1 describes the significant fields shown in the display.

Table 1 show mpls ldp neighbor Field Descriptions

Field	Description
Peer LDP Ident	LDP identifier of the neighbor (peer) for this session.
Local LDP Ident	LDP identifier for the local label switch router (LSR) for this session.
TCP connection	TCP connection used to support the LDP session, shown in the following format: • peer 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.
Downstream on demand	Indicates that the Downstream on Demand method of label distribution is being used for this LDP session. When the Downstream on Demand method is used, an LSR advertises its locally assigned (incoming) labels to its LDP peer only when the peer requests them.
Downstream	Indicates that the downstream method of label distribution is being used for this LDP session. When the downstream method is used, an LSR advertises all of its locally assigned (incoming) labels to its LDP peer (subject to any configured access list restrictions).
Up time	Length of time the LDP session has existed.

Table 1 show mpls ldp neighbor Field Descriptions (continued)

Field	Description
LDP discovery sources	Source(s) of LDP discovery activity that led to the establishment of this LDP session.
Addresses bound to peer LDP Ident	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 Label Forwarding Information Base (LFIB).

Related Commands

Command	Description
show mpls ldp discovery	Displays the status of the LDP discovery process.

Glossary

carrier supporting carrier—A situation where one service provider allows another service provider to use a segment of its backbone network. The service provider that provides the segment of the backbone network to the other provider is called the backbone carrier. The service provider that uses the segment of the backbone network is called the customer carrier.

CE router—customer edge router. A router that is part of a customer network and that interfaces to a provider edge (PE) router.

inbound label binding filtering—Allows LSRs to control which label bindings it will accept from its neighboring LSRs. Consequently, an LSR does not accept or store some label bindings that its neighbors advertise.

label—A short fixed-length identifier that tells switching nodes how to forward data (packets or cells).

label binding—An association between a destination prefix and a label.

LDP—label distribution protocol. The protocol used to distribute label bindings to LSRs.

LFIB—label forwarding information base. The data structure used by switching functions to switch labeled packets.

LIB—label information base. A database used by an LSR to store labels learned from other LSRs, as well as labels assigned by the local LSR.

LSP—label-switched path. A sequence of hops in which a packet travels from one router to another router by means of label switching mechanisms. A label-switched path can be established dynamically, based on normal routing mechanisms, or through configuration.

LSR—label switch router. A Multiprotocol Label Switching (MPLS) node that can forward native Layer 3 packets. The LSR forwards a packet based on the value of a label attached to the packet.

LVC—label VC. An ATM virtual circuit that is set up through ATM LSR label distribution procedures.

MPLS—Multiprotocol Label Switching. A switching method that forwards IP traffic using a label. This label instructs the routers and the switches in the network where to forward the packets based on preestablished IP routing information.

PE router—provider edge router. A router that is part of a service provider's network connected to a customer edge (CE) router. All MPLS VPN processing occurs in the PE router.

VCI—virtual channel identifier. A 16-bit field in the header of an ATM cell. The VCI, together with the VPI, is used to identify the next destination of a cell as it passes through a series of ATM switches on its way to its destination. ATM switches use the VPI/VCI fields to identify the next network VCL that a cell needs to transit on its way to its final destination.

VCL—virtual channel link. A connection between two ATM devices.

VPI—virtual path identifier. An 8-bit field in the header of an ATM cell. The VPI, together with the VCI, identifies the next destination of a cell as it passes through a series of ATM switches on its way to its destination. ATM switches use the VPI/VCI fields to identify the next VCL that a cell needs to transit on its way to its final destination.

VPN—virtual private network. Enables IP traffic to use tunneling to travel securely over a public TCP/IP network.

VRF—VPN routing and forwarding instance. An instance that consists of an IP routing table, a derived forwarding table, a set of interfaces that use the forwarding table, and a set of rules and routing protocols that determine what goes into the forwarding table.

Note Refer to the *Internetworking Terms and Acronyms* for terms not included in this glossary.