



# Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables

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This document contains information about and instructions for configuring epochs for Cisco Express Forwarding tables. You can use this functionality to clear and rebuild Cisco Express Forwarding tables for consistency purposes without the loss of table information.

Cisco Express Forwarding is an advanced Layer 3 IP switching technology. It optimizes network performance and scalability for all kinds of networks: those that carry small amounts of traffic and those that carry large amounts of traffic in complex patterns, such as the Internet and networks characterized by intensive web-based applications or interactive sessions.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [“Feature Information for Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables”](#) section on page 13.

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.

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**Americas Headquarters:**

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

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## Prerequisites for Configuring Basic Cisco Express Forwarding

Cisco Express Forwarding must be up and running on the router or switch for you to configure epochs for Cisco Express Forwarding FIB and adjacency tables.

## Information About Configuring Basic Cisco Express Forwarding

Tasks for configuring epochs for Cisco Express Forwarding Forwarding Information Base (FIB) tables were introduced with the Nonstop Forwarding Enhanced FIB Refresh feature in Cisco IOS Release 12.2(8)T.

Before you configure epochs for Cisco Express Forwarding tables, you should understand the following:

- [Cisco Platform Support for Central Cisco Express Forwarding and Distributed Cisco Express Forwarding](#), page 2
- [Nonstop Forwarding Enhanced FIB Refresh \(Cisco IOS 12.2\(8\)T\)](#), page 3
- [Epoch Numbering for Cisco Express Forwarding FIB and Adjacency Tables](#), page 3
- [Epoch Synchronization Between the RP and Line Cards](#), page 4
- [Epoch Numbering for Routers That Support High Availability](#), page 4
- [When to Refresh the Cisco Express Forwarding or Adjacency Tables](#), page 4

(See the “[Nonstop Forwarding Enhanced FIB Refresh \(Cisco IOS 12.2\(8\)T\)](#)” section on page 3 for an explanation of the term “epoch.”)

Tasks for configuring epochs for Cisco Express Forwarding tables were introduced with the Nonstop Forwarding Enhanced FIB Refresh feature in Cisco IOS Release 12.2(8)T.

For links to information about other Cisco Express Forwarding and distributed Cisco Express Forwarding features you can configure, refer to the “[Additional References](#)” section on page 10.

## Cisco Platform Support for Central Cisco Express Forwarding and Distributed Cisco Express Forwarding

Cisco Express Forwarding is enabled by default on most Cisco platforms running Cisco IOS software Release 12.0 or later. When Cisco Express Forwarding is enabled on a router, the Route Processor (RP) performs the express forwarding.

To find out if Cisco Express Forwarding is enabled on your platform, enter the **show ip cef** command. If Cisco Express Forwarding is enabled, you receive output that looks like this:

```
Router# show ip cef
```

```
Prefix                Next Hop              Interface
```

```
[...]  
10.2.61.8/24      192.168.100.1    FastEthernet1/0/0  
                  192.168.101.1    FastEthernet6/1  
[...]
```

If Cisco Express Forwarding is not enabled on your platform, the output for the **show ip cef** command looks like this:

```
Router# show ip cef  
  
%CEF not running
```

Distributed Cisco Express Forwarding is enabled by default on the Catalyst 6500 series switch, the Cisco 7500 series router, and the Cisco 12000 Series Internet Router. When Distributed Cisco Express Forwarding is enabled on your platform, the line cards perform the express forwarding.

If Cisco Express Forwarding is not enabled on your platform, use the **ip cef** command to enable (central) Cisco Express Forwarding or the **ip cef distributed** command to enable Distributed Cisco Express Forwarding.

## Nonstop Forwarding Enhanced FIB Refresh (Cisco IOS 12.2(8)T)

Networks must be configured to minimize traffic disruption and offer the most uptime possible. The Nonstop Forwarding (NSF) Enhanced FIB Refresh feature enables users to continue forwarding IP traffic while Cisco Express Forwarding database tables are being rebuilt. IP forwarding on the router is therefore uninterrupted.

NSF Enhanced FIB Refresh provides for the continuation of Cisco Express Forwarding forwarding by tracking epochs. The term “epoch” refers to a period of time. A new epoch for a Cisco Express Forwarding table begins when a table rebuild is initiated. The time after this instant is in an epoch different from the time before, and the different epochs are numbered between 0 and 255. Through the use of epochs, the software can distinguish between old and new forwarding information in the same database structure and can retain the old Cisco Express Forwarding database table while the software builds a new table. This is called epoch tracking and it allows Cisco Express Forwarding forwarding to continue uninterrupted while new Cisco Express Forwarding tables are being constructed, and it makes possible a seamless switchover when the new table becomes active.

## Epoch Numbering for Cisco Express Forwarding FIB and Adjacency Tables

A new epoch for a Cisco Express Forwarding table begins when a table rebuild is initiated. The time after this instant is in an epoch different from the time before. The first epoch is numbered 0, and it begins when the Cisco Express Forwarding table is created. The epoch number increases by 1 for each new revision of the Cisco Express Forwarding table until the epoch number reaches 255. The next epoch after 255 is 0. A new epoch cannot begin if any table entries remain from the last time the epoch number was used. The epoch number for a given table is the same for each instance of the table (for example, on each RP and on each line card where distributed Cisco Express Forwarding is active).

Each entry added to a FIB table or the adjacency table has a new field that records the current epoch for that table at the time the entry was added. When an entry is modified, the epoch of the entry is updated to record the table's current epoch. A record is kept of how many entries exist from each epoch. The epoch number cannot be incremented if any existing entries have the same epoch number as the next epoch value.

When the routing protocols signal that they have converged, all FIB and adjacency entries that have epoch numbers older than the current epoch number are removed from the FIB and adjacency tables.

When you need a Cisco Express Forwarding table to be rebuilt, the epoch number for that table is incremented, and the table is rebuilt in place. When rebuilding is complete, “stale” entries are removed from the table. You can increment the epoch of a single table or multiple tables at the same time when you enter the **clear ip cef epoch** [**all-vrfs** | **full** | **vrf** [*table*]] command. See the “[When to Refresh the Cisco Express Forwarding or Adjacency Tables](#)” section on page 4 for information on when you might need to rebuild a Cisco Express Forwarding table.

When you display information from a Cisco Express Forwarding table (for example, with the **show ip cef epoch** command), the table epoch is shown in the summary table. When detailed information is displayed for each table entry, the epoch number of each entry is shown.

## Epoch Synchronization Between the RP and Line Cards

When FIB or adjacency entries are distributed from the central tables on the RP, the updates contain the epoch of the entry, ensuring that the distinction between old and new entries is maintained in distributed systems.

When a table is initialized on a line card, the current epoch of the table on the RP is sent to the line card. When the epoch is incremented on the RP, an event indicating that a new epoch has begun is sent to each line card.

## Epoch Numbering for Routers That Support High Availability

In a router that supports high availability (HA), the epoch numbers for all Cisco Express Forwarding tables are incremented when an RP transitions from standby mode to active. After switchover, the active secondary RP initially has FIB and adjacency databases that are the same as those of the primary RP. When the epoch number for each table is incremented, all existing entries are considered stale. However, forwarding continues as normal. As the routing protocols start to repopulate the FIB and adjacency databases, existing and new entries receive the new epoch number, indicating that the entries have been refreshed.

## When to Refresh the Cisco Express Forwarding or Adjacency Tables

You refresh or rebuild the Cisco Express Forwarding or adjacency tables when the tables contain inconsistencies.

Cisco 7500 series and Cisco 12000 Series Internet routers support distributed Cisco Express Forwarding, in which line cards make forwarding decisions based on stored copies of the same FIB and adjacency tables that are found on the RP. The tables on the line cards and the RP must remain synchronized.

Inconsistencies occur when forwarding information (a prefix) is missing on a line card, or the next-hop IP address on the line card is not the same as the next-hop IP address on the RP. Because updates to the RP and line card databases are not synchronous, fleeting inconsistencies can result.

Cisco Express Forwarding consistency checkers detect when forwarding information on the line cards and the RP lose synchronization. For more information on consistency checkers, see the [Configuring Cisco Express Forwarding Consistency Checkers for Route Processors and Line Cards](#) module.

# How to Configure Epochs and Verify Epoch Information for Cisco Express Forwarding Tables

This section contains instructions on how to configure epochs for Cisco Express Forwarding tables. Perform the following tasks to begin new epochs and increment the epoch number of the adjacency and Cisco Express Forwarding tables:

- [Beginning a New Epoch and Incrementing the Epoch Number of the Adjacency Table, page 5](#) (optional)
- [Beginning a New Epoch and Incrementing the Epoch Number of One or All Cisco Express Forwarding Tables, page 6](#) (optional)
- [Verifying Epoch Information for Cisco Express Forwarding and Adjacency Tables, page 7](#) (optional)

## Beginning a New Epoch and Incrementing the Epoch Number of the Adjacency Table

Perform the following task to begin a new epoch and increment the epoch number of the adjacency table.

Use this task when you need to rebuild the adjacency table. A new adjacency table might be required because you need to remove inconsistencies from the table.

### SUMMARY STEPS

1. `enable`
2. `show ip cef epoch`
3. `clear adjacency table`
4. `show ip cef epoch`
5. `exit`

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code>  <b>Example:</b> Router> <code>enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<code>show ip cef epoch</code>  <b>Example:</b> Router# <code>show ip cef epoch</code>	Displays entries in the forwarding information base (FIB) or displays a summary of the FIB. <ul style="list-style-type: none"> <li>• The <b>epoch</b> keyword displays the table epochs of the adjacency table and all FIB tables.</li> </ul>
Step 3	<code>clear adjacency table</code>  <b>Example:</b> Router# <code>clear adjacency table</code>	Begins a new epoch and increments the epoch number of the adjacency table.

	Command or Action	Purpose
Step 4	<b>show ip cef epoch</b>  <b>Example:</b> Router# show ip cef epoch	Displays entries in the FIB or displays a summary of the FIB. <ul style="list-style-type: none"> <li>The <b>epoch</b> keyword displays the table epochs of the adjacency table and all FIB tables.</li> </ul>
Step 5	<b>exit</b>  <b>Example:</b> Router# exit	Exits to user EXEC mode.

## Beginning a New Epoch and Incrementing the Epoch Number of One or All Cisco Express Forwarding Tables

Perform the following task to begin a new epoch and increment the epoch number of one or all of the Cisco Express Forwarding tables.

Use the **clear ip cef epoch** command when you want to rebuild a Cisco Express Forwarding table. This command increments the epoch and flushes entries associated with the old epoch. This command also clears any inconsistencies that might exist between Cisco Express Forwarding tables on the PR and Cisco Express Forwarding tables on the line cards. If everything in the system is working correctly, the command has no effect on the Cisco Express Forwarding forwarding tables, other than changing the current epoch values.

### SUMMARY STEPS

- enable
- show ip cef epoch]
- clear ip cef epoch [all-vrfs | full | vrf [table]]
- show ip cef epoch
- exit

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>show ip cef epoch</b>  <b>Example:</b> Router# show ip cef epoch	Displays entries in the FIB or displays a summary of the FIB. <ul style="list-style-type: none"> <li>The <b>epoch</b> keyword displays the table epochs of the adjacency table and all FIB tables.</li> </ul>

	Command or Action	Purpose
Step 3	<pre>clear ip cef epoch [all-vrfs   full   vrf [table]]</pre> <p><b>Example:</b> Router# clear ip cef epoch full</p>	<p>Begins a new epoch and increments the epoch number of one or all Cisco Express Forwarding tables.</p> <ul style="list-style-type: none"> <li>The <b>all-vrfs</b> keyword begins a new epoch for all FIB tables.</li> <li>The <b>full</b> keyword begins a new epoch for all tables, including adjacency tables.</li> <li>The <b>vrf</b> keyword begins a new epoch for the specified FIB table.</li> <li>The <i>table</i> argument is the name of a specific Virtual Private Network (VPN) routing and forwarding instance (VRF).</li> </ul>
Step 4	<pre>show ip cef epoch</pre> <p><b>Example:</b> Router# show ip cef epoch</p>	<p>Displays entries in the FIB or displays a summary of the FIB.</p> <ul style="list-style-type: none"> <li>The <b>epoch</b> keyword displays the epochs of the adjacency table and all FIB tables.</li> </ul>
Step 5	<pre>exit</pre> <p><b>Example:</b> Router# exit</p>	<p>Exits to user EXEC mode.</p>

## Verifying Epoch Information for Cisco Express Forwarding and Adjacency Tables

Perform the following task to verify epoch information for Cisco Express Forwarding and adjacency tables.

### SUMMARY STEPS

1. **enable**
2. **show adjacency detail**
3. **show adjacency summary**
4. **show ip cef epoch**
5. **exit**

### DETAILED STEPS

#### Step 1 **enable**

Use this command to enable privileged EXEC mode. For example:

```
Router> enable
```

Enter your password if prompted.

#### Step 2 **show adjacency summary detail**

Use this command to verify that the epoch number is displayed for each entry in the adjacency table as you expect. For example:

```
Router# show adjacency detail

Protocol Interface          Address
IP        Serial5/0/0/1:1          point2point(7)
                                0 packets, 0 bytes
                                0F000800
                                CEF   expires: 00:02:09
                                refresh: 00:00:09
                                Epoch: 14
IP        Serial5/0/1/1:1          point2point(7)
                                0 packets, 0 bytes
                                0F000800
                                CEF   expires: 00:02:09
                                refresh: 00:00:09
                                Epoch: 14
```

The epoch number is displayed for each entry in the adjacency table. In this example, the epoch number of each entry is 14.

### Step 3 show adjacency summary

Use this command to verify that the epoch number for each adjacency in the adjacency table is as you expect. For example:

```
Router# show adjacency summary

Adjacency Table has 2 adjacencies
  Table epoch: 14 (2 entries at this epoch)

  Interface          Adjacency Count
Serial5/0/0/1:1      1
Serial5/0/1/1:1      1
```

Use the epoch information in the summary section to verify that the epoch number for each adjacency in the adjacency table is as expected. The epoch number is 14 in this example, the same as the epoch number displayed in the **show adjacency detail** command in the previous step.

### Step 4 show ip cef epoch

Use this command to verify that Cisco Express Forwarding information in all FIB tables, including the adjacency table, is as you expect.

In the following example, Cisco Express Forwarding epoch information is verified for all FIB tables, including the adjacency table:

```
Router# show ip cef epoch

CEF epoch information:

Table: Default-table
  Table epoch: 77 (19 entries at this epoch)

Adjacency table
  Table epoch: 16 (2 entries at this epoch)
```

### Step 5 exit

Use this command to exit to user EXEC mode. For example:

```
Router# exit
Router>
```

---

# Configuration Examples for Configuring Basic Cisco Express Forwarding

This section contains the following epoch configuration examples:

- [Beginning a New Epoch and Incrementing the Epoch Number of the Adjacency Table: Example, page 9](#)
- [Beginning a New Epoch and Incrementing the Epoch Number of One or All Cisco Express Forwarding Tables: Examples, page 9](#)

## Beginning a New Epoch and Incrementing the Epoch Number of the Adjacency Table: Example

The following example shows how to begin a new epoch and increment the epoch number of the adjacency table:

```
Router# show ip cef epoch
```

```
CEF epoch information:
```

```
Table: Default-table  
Table epoch: 2 (43 entries at this epoch)
```

```
Adjacency table  
Table epoch: 2 (5 entries at this epoch)
```

```
Router# clear adjacency table
```

After clearing:

```
Router# show ip cef epoch
```

```
CEF epoch information:
```

```
Table: Default-table  
Table epoch: 3 (43 entries at this epoch)
```

```
Adjacency table  
Table epoch: 3 (5 entries at this epoch)
```

## Beginning a New Epoch and Incrementing the Epoch Number of One or All Cisco Express Forwarding Tables: Examples

The following example shows how to begin a new epoch and increment the epoch number of all Cisco Express Forwarding tables:

```
Router# clear ip cef epoch full
```

The following example shows the output before and after you clear the epoch table and increment the epoch number. Before clearing:

```
router# show ip cef epoch

CEF epoch information:

Table: Default-table
    Table epoch: 3 (43 entries at this epoch)

Adjacency table
    Table epoch: 3 (5 entries at this epoch)
```

After clearing:

```
router# clear ip cef epoch full

router# show ip cef epoch

CEF epoch information:

Table: Default-table
    Table epoch: 4 (43 entries at this epoch)

Adjacency table
    Table epoch: 4 (5 entries at this epoch)
```

## Additional References

The following sections provide references related to configuring epochs for Cisco Express Forwarding tables.

## Related Documents

Related Topic	Document Title
IP switching commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples.	<a href="#">Cisco IOS IP Switching Command Reference</a>
List of the features documented in the Cisco Express Forwarding modules	<a href="#">Cisco Express Forwarding Features Roadmap</a>
Overview of the Cisco Express Forwarding feature	<a href="#">Cisco Express Forwarding Overview</a>
Tasks for verifying basic Cisco Express Forwarding and distributed Cisco Express Forwarding operation	<a href="#">Configuring Basic Cisco Express Forwarding for Improved Performance, Scalability, and Resiliency in Dynamic Networks</a>
Tasks for enabling or disabling Cisco Express Forwarding or distributed Cisco Express Forwarding	<a href="#">Enabling or Disabling Cisco Express Forwarding or Distributed Cisco Express Forwarding to Customize Switching and Forwarding for Dynamic Networks</a>
Tasks for configuring a load-balancing scheme for Cisco Express Forwarding	<a href="#">Configuring a Load-Balancing Scheme for Cisco Express Forwarding Traffic</a>
Tasks for configuring Cisco Express Forwarding consistency checkers	<a href="#">Configuring Cisco Express Forwarding Consistency Checkers for Route Processors and Line Cards</a>

Related Topic	Document Title
Tasks for configuring and verifying Cisco Express Forwarding network accounting	<i><a href="#">Configuring Cisco Express Forwarding Network Accounting</a></i>
Tasks for customizing the display of recorded Cisco Express Forwarding events	<i><a href="#">Customizing the Display of Recorded Cisco Express Forwarding Events</a></i>
Troubleshooting tips for incomplete adjacencies	<i><a href="#">Troubleshooting Incomplete Adjacencies with CEF</a></i>
Description and use of the Cisco Express Forwarding consistency checkers available for the Cisco 7500 and 12000 series routers	<i><a href="#">Troubleshooting Prefix Inconsistencies with Cisco Express Forwarding</a></i>
Explanation of and troubleshooting information for the Cisco IOS software implementation of Layer 3 load balancing across multiple parallel links when Cisco Express Forwarding is used	<i><a href="#">Troubleshooting Load Balancing Over Parallel Links Using Cisco Express Forwarding</a></i>
Causes of common Cisco Express Forwarding-related error messages on platforms running distributed Cisco Express Forwarding switching (Cisco 7500 series routers and Cisco 12000 Series Internet routers) and how to troubleshoot them	<i><a href="#">Troubleshooting Cisco Express Forwarding-Related Error Messages</a></i>

## Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

## MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	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>

## RFCs

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

## Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p><a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a></p>

# Feature Information for Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables

Table 1 lists the release history for this feature.

For information on a feature in this technology that is not documented here, see the [Cisco Express Forwarding Features Roadmap](#).

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



## Note

Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

**Table 1** Feature Information for Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables

Feature Name	Releases	Feature Configuration Information
Nonstop Forwarding Enhanced FIB Refresh	12.2(8)T	<p>This feature allows you to clear the forwarding table on demand and to continue forwarding through the use of the old entries in the table while the new forwarding table is being built.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">Nonstop Forwarding Enhanced FIB Refresh (Cisco IOS 12.2(8)T)</a>, page 3</li> <li>• <a href="#">Epoch Numbering for Cisco Express Forwarding FIB and Adjacency Tables</a>, page 3</li> <li>• <a href="#">Epoch Synchronization Between the RP and Line Cards</a>, page 4</li> <li>• <a href="#">Epoch Numbering for Routers That Support High Availability</a>, page 4</li> <li>• <a href="#">When to Refresh the Cisco Express Forwarding or Adjacency Tables</a>, page 4</li> <li>• <a href="#">Beginning a New Epoch and Incrementing the Epoch Number of the Adjacency Table</a>, page 5</li> <li>• <a href="#">Beginning a New Epoch and Incrementing the Epoch Number of One or All Cisco Express Forwarding Tables</a>, page 6</li> <li>• <a href="#">Verifying Epoch Information for Cisco Express Forwarding and Adjacency Tables</a>, page 7</li> </ul>

# Glossary

**adjacency**—A relationship formed between selected neighboring routers and end nodes for the purpose of exchanging routing information. Adjacency is based upon the use of a common media segment by the routers and nodes involved.

**Cisco Express Forwarding**—A Layer 3 switching technology. Cisco Express Forwarding can also refer to central Cisco Express Forwarding mode, one of two modes of Cisco Express Forwarding operation. Cisco Express Forwarding enables a Route Processor to perform express forwarding. Distributed Cisco Express Forwarding is the other mode of Cisco Express Forwarding operation.

**distributed Cisco Express Forwarding**—A mode of Cisco Express Forwarding operation in which line cards (such as Versatile Interface Processor (VIP) line cards) maintain identical copies of the forwarding information base (FIB) and adjacency tables. The line cards perform the express forwarding between port adapters; this relieves the Route Switch Processor of involvement in the switching operation.

**FIB**—forwarding information base. A component of Cisco Express Forwarding that is conceptually similar to a routing table or information base. The router uses the FIB lookup table to make destination-based switching decisions during Cisco Express Forwarding operation. The router maintains a mirror image of the forwarding information in an IP routing table.

**LIB**—label information base. A database used by a label switch router (LSR) to store labels learned from other LSRs, as well as labels assigned by the local LSR.

**line card**—A general term for an interface processor that can be used in various Cisco products. For example, a Versatile Interface Processor (VIP) is a line card for the Cisco 7500 series router.

**prefix**—The network address portion of an IP address. A prefix is specified by a network and mask and is generally represented in the format network/mask. The mask indicates which bits are the network bits. For example, 1.0.0.0/16 means that the first 16 bits of the IP address are masked, making them the network bits. The remaining bits are the host bits. In this example, the network number is 10.0.

**RIB**—Routing Information Base. A central repository of routes that contains Layer 3 reachability information and destination IP addresses or prefixes. The RIB is also known as the routing table.

**RP**—Route Processor. The processor module in the Cisco 7000 series routers that contains the CPU, system software, and most of the memory components that are used in the router. It is sometimes called a supervisory processor.

**RSP**—Route Switch Processor. The processor module used in the Cisco 7500 series routers that integrates the functions of the Route Processor (RP) and the Switch Processor (SP).

**SP**—Switch Processor. Cisco 7000-series processor module that acts as the administrator for all CxBus activities. Sometimes called CiscoBus controller.

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