

Enabling or Disabling CEF or dCEF

This module contains information about Cisco Express Forwarding and describes the required and optional tasks for enabling or disabling Cisco Express Forwarding and distributed Cisco Express Forwarding. 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.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and 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 table.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to https://cfnng.cisco.com/. An account on Cisco.com is not required.

Prerequisites for Enabling or Disabling CEF or dCEF

Cisco Express Forwarding requires a software image that includes Cisco Express Forwarding and IP routing enabled on the switch or router.

Restrictions for Enabling or Disabling CEF or dCEF

- The Cisco ASR 1000 Series Aggregation Services Router operates only in distributed Cisco Express Forwarding mode.
- If you enable Cisco Express Forwarding and then create an access list that uses the **log**keyword, the packets that match the access list are not Cisco Express Forwarding switched. They are process switched. Logging disables Cisco Express Forwarding.

Information About Enabling or Disabling CEF or dCEF

Cisco Platform Support for Central CEF and dCEF

Cisco Express Forwarding is enable by default on the Cisco ASR 1000 Series Aggregation Services Routers.

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       FastEthernet2/1/0
[...]
```

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
```

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.

When to Enable or Disable Central CEF on a Router

Enable central Cisco Express Forwarding operation when line cards are not available for Cisco Express Forwarding switching or when you need to use features not compatible with distributed Cisco Express Forwarding switching. When central Cisco Express Forwarding operation is enabled, the Cisco Express Forwarding Forwarding Information Base (FIB) and adjacency tables reside on the RP, and the RP performs express forwarding.

Disable central Cisco Express Forwarding on a router when you want to turn off central Cisco Express Forwarding on the router and on all interfaces on the router. You might want to do this if your router and router interfaces are configured with a feature that central Cisco Express Forwarding or distributed Cisco Express Forwarding does not support.

To disable central Cisco Express Forwarding on a router and on all interfaces on the router, use the **no ip cef** command.

When to Enable dCEF on a Line Card

Enable distributed Cisco Express Forwarding on a line card when you want the line card to perform express forwarding so that the RP can handle routing protocols or switch packets from legacy interface processors. When distributed Cisco Express Forwarding is enabled, line cards maintain an identical copy of the FIB and adjacency tables. The line cards perform express forwarding between port adapters, thus relieving the RP of involvement in the switching operation. distributed Cisco Express Forwarding uses an interprocess communication (IPC) mechanism to ensure synchronization of FIB tables and adjacency tables on the RP and line cards.

The Cisco ASR 1000 Series Routers operate only in distributed Cisco Express Forwarding mode. In other routers you can mix various types of line cards in the same router, and all of the line cards you are using need not support Cisco Express Forwarding. When a line card that does not support Cisco Express Forwarding receives a packet, the line card forwards the packet to the next higher switching layer (the RP) or forwards the packet to the next hop for processing. This structure allows legacy interface processors to exist in the router with newer interface processors.



Note When you enable distributed Cisco Express Forwarding globally, all interfaces that support distributed Cisco Express Forwarding are enabled by default.

When to Enable or Disable CEF on an Interface

You need to decide whether or not you want Cisco Express Forwarding operation on an interface. In some instances, you might want to disable Cisco Express Forwarding or distributed Cisco Express Forwarding on a particular interface because that interface is configured with a feature that Cisco Express Forwarding or distributed Cisco Express Forwarding does not support. Because all interfaces that support Cisco Express Forwarding or distributed Cisco Express Forwarding are enabled by default when you enable Cisco Express Forwarding operation globally, you must use the **no** form of the **ip route-cache cef**command to turn off Cisco Express Forwarding operation on a particular interface. To reenable Cisco Express Forwarding, use the **ip route-cache cef** command. To reenable distributed Cisco Express Forwarding, use the **ip route-cache distributed** command.

Disabling Cisco Express Forwarding or distributed Cisco Express Forwarding on an interface disables Cisco Express Forwarding switching for packets forwarded to the interface, but has no effect on packets forwarded out of the interface.

When you disable Cisco Express Forwarding or distributed Cisco Express Forwarding, Cisco IOS XE software switches packets received on the interface using the next fastest switching path. For Cisco Express Forwarding, the next fastest switching path is switching on the RP. For distributed Cisco Express Forwarding, the next fastest switching path is Cisco Express Forwarding on the RP.

The input interface determines the Cisco IOS XE switching path that a packet takes. Consider the following when enabling or disabling switching methods on a particular interface:

- You need Cisco Express Forwarding to be enabled on the incoming interface for packets to be Cisco Express Forwarding switched.
- Because Cisco Express Forwarding makes the forwarding decision on input, you need to use the **no ip route-cache cef**command on the ingress interface if you want to disable Cisco Express Forwarding.

How to Enable or Disable Central CEF or dCEF

To enable or disable Cisco Express Forwarding or distributed Cisco Express Forwarding, perform either of the following tasks depending on whether you want to enable or disable Cisco Express Forwarding or distributed Cisco Express Forwarding on the router or to enable or disable Cisco Express Forwarding or distributed Cisco Express Forwarding on an interface:

Enabling or Disabling CEF or dCEF on a Router

Perform the following task to enable or disable Cisco Express Forwarding or distributed Cisco Express Forwarding operation on a router. Cisco Express Forwarding can optimize your network performance and scalability.

SUMMARY STEPS

1. **enable**
2. **show ip cef** [**vrf** *vrf-name*] [*interface-type interface-number* [**checksum** | [**detail** | **internal** [**checksum**] | **platform**]]
3. **configure terminal**
4. **ip cef distributed**
5. **exit**
6. **show ip cef** [**vrf** *vrf-name*] [*interface-type interface-number* [**checksum** | [**detail** | **internal** [**checksum**] | **platform**]]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show ip cef** [**vrf** *vrf-name*] [*interface-type interface-number* [**checksum**	[**detail**	**internal** [**checksum**]	**platform**]] **Example:** `Router# show ip cef`	Displays entries in the forwarding information base (FIB). Use this command to determine if Cisco Express Forwarding is enabled globally and on a particular interface. If Cisco Express Forwarding is not enabled, the output displays: `%CEF not running`
Step 3	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command or Action	Purpose
Step 4	**ip cef distributed** **Example:** `Router(config)# ip cef distributed`	Enables distributed Cisco Express Forwarding operation. Cisco Express Forwarding information is distributed to line cards. Line cards perform express forwarding.
Step 5	**exit** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.
Step 6	**show ip cef** [**vrf** *vrf-name*] [*interface-type interface-number* [**checksum** | [**detail** | **internal** [**checksum**] | **platform**]] **Example:** `Router# show ip cef`	Displays entries in the FIB. Use this command to verify that Cisco Express Forwarding is enabled. If Cisco Express Forwarding is enabled, the output displays destination prefixes, next-hop IP addresses, and next-hop interfaces.

Enabling or Disabling CEF or dCEF on an Interface

Perform the following task to enable or disable Cisco Express Forwarding or distributed Cisco Express Forwarding operation on an interface. Cisco Express Forwarding can optimize your network performance and scalability.

SUMMARY STEPS

1. **enable**
2. **show cef interface** [*type slot* / *subslot* / *port*[**.** *subinterface-number*]] [**statistics**] [**detail**]
3. **configure terminal**
4. **interface** type *slot* / *subslot* / *port*[**.** *subinterface-number*]
5. **no ip route-cache cef**
6. **end**
7. **show cef interface** [*type slot* / *subslot* / *port*[**.** *subinterface-number*]] [**statistics**] [**detail**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show cef interface** [*type slot* / *subslot* / *port*[**.** *subinterface-number*]] [**statistics**] [**detail**] **Example:** `Router# show cef interface fastethernet 1/0/0`	Displays detailed Cisco Express Forwarding information for a specified interface or for all interfaces. Look for "IP CEF switching enabled" or "IP Distributed CEF switching enabled" in the output.

	Command or Action	Purpose
Step 3	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 4	**interface** type *slot* / *subslot* / *port*[**.** *subinterface-number*] **Example:** `Router(config)# interface fastethernet 1/0/0`	Configures an interface type and enters interface configuration mode. • The *type* argument is the type of interface to be configured. • The *slot* argument is the chassis slot number. Refer to the appropriate hardware manual for slot information. For SIPs, refer to the platform-specific SPA hardware installation guide or the corresponding "Identifying Slots and Subslots for SIPs and SPAs" topic in the platform-specific SPA software configuration guide. • The / *subslot* keyword and argument pair is the secondary slot number on a SIP where a SPA is installed. The slash (/) is required. Refer to the platform-specific SPA hardware installation guide and the corresponding "Specifying the Interface Address on a SPA" topic in the platform-specific SPA software configuration guide for subslot information. • The / *port* keyword and argument pair is the port or interface number. The slash (/) is required. Refer to the appropriate hardware manual for port information. For SPAs, refer to the corresponding "Specifying the Interface Address on a SPA" topics in the platform-specific SPA software configuration guide • The **.** *subinterface-number*keyword and argument pair is the subinterface number in the range 1 to 4294967293. The number that precedes the period (.) must match the number to which this subinterface belongs.
Step 5	**no ip route-cache cef** **Example:** `Router(config-if)# no ip route-cache cef`	Disables Cisco Express Forwarding operation on an interface. • The **ip cef route-cache cef** command enables distributed Cisco Express Forwarding operation on an interface after distributed Cisco Express Forwarding operation was disabled.
Step 6	**end** **Example:**	Exits to privileged EXEC mode.

	Command or Action	Purpose
	`Router(config)# end`	
Step 7	**show cef interface** [*type slot / subslot / port*[**.** *subinterface-number*]] [**statistics**] [**detail**] **Example:** `Router# show cef interface fastethernet 1/0/0`	Displays detailed Cisco Express Forwarding information for a specified interface or for all interfaces. Verify that "IP CEF switching enabled" or "IP Distributed CEF switching enabled" is displayed in the output.

Configuration Examples for Central CEF or dCEF

Example Enabling or Disabling CEF or dCEF on a Router

You might want to disable distributed Cisco Express Forwarding if your router and router interfaces are configured with a feature that distributed Cisco Express Forwarding does not support. The following example shows how to disable distributed Cisco Express Forwarding on a router:

```
configure terminal
!

no ip cef distributed

end
```

Example Enabling or Disabling Central CEF or dCEF on an Interface

All interfaces that support Cisco Express Forwarding operation (central Cisco Express Forwarding or distributed Cisco Express Forwarding) are enabled by default when you enable Cisco Express Forwarding operation globally. You might want to disable central Cisco Express Forwarding or distributed Cisco Express Forwarding on a particular interface if that interface is configured with a feature that central Cisco Express Forwarding or distributed Cisco Express Forwarding does not support.

The following example shows how to disable central Cisco Express Forwarding on a particular interface:

```
configure terminal
!
interface ethernet 1/1/0
 no ip route-cache cef
 end
```

The following example shows how to disable distributed Cisco Express Forwarding on FastEthernet interface 0/0/0:

```
configure terminal
!
interface fe0/0/0
 no ip route-cache cef
 end
```

The following example shows how to reenable distributed Cisco Express Forwarding operation on FastEthernet interface 0/0/0:

```
configure terminal
!
ip cef distributed
!
interface fe0/0/0
# ip route-cache cef
 end
```

The following example shows how to enable distributed Cisco Express Forwarding operation on the router (globally) and turn off Cisco Express Forwarding operation on FastEthernet interface 0/0/0:

```
configure terminal
!
ip cef distributed
interface fe0/0/0
 no ip route-cache cef
 end
```

The following example shows how to reenable distributed Cisco Express Forwarding operation on FastEthernet interface 0/0/0:

```
configure terminal
!
ip cef distributed
!
interface fe0/0/0
 ip route-cache cef
 end
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Commands for configuring and managing Cisco Express Forwarding	*Cisco IOS IP Switching Command Reference*
Overview of the Cisco Express Forwarding feature	Cisco Express Forwarding Overview
Tasks for verifying Cisco Express Forwarding information on your router	Configuring Basic Cisco Express Forwarding for Improved Performance, Scalability, and Resiliency in Dynamic Networks
Tasks for configuring a load-balancing scheme for Cisco Express Forwarding	Configuring a Load-Balancing Scheme for Cisco Express Forwarding Traffic
Tasks for configuring Cisco Express Forwarding consistency checkers	Configuring Cisco Express Forwarding Consistency Checkers for Route Processors and Line Cards

Related Topic	Document Title
Tasks for configuring epochs for Cisco Express Forwarding tables	Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables
Tasks for configuring and verifying Cisco Express Forwarding network accounting	Configuring Cisco Express Forwarding Network Accounting
Tasks for customizing the display of Cisco Express Forwarding event trace messages	Customizing the Display of Cisco Express Forwarding Event Trace Messages

Standards

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

MIBs

MIB	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 XE software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	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
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Enabling or Disabling CEF or dCEF

Table 1: Feature Information for Enabling or Disabling Cisco Express Forwarding or Distributed Cisco Express Forwarding

Feature Name	Releases	Feature Configuration Information
This table is intentionally left blank because no features were introduced or modified in Cisco IOS XE Release 2.1or later. This table will be updated when feature information is added to this module.	--	--

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 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 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.

GRE --generic routing encapsulation. A tunneling protocol developed by Cisco that enables encapsulation of a wide variety of protocol packet types inside IP tunnels. GRE creates a virtual point-to-point link to Cisco routers at remote points over an IP internetwork. By connecting multiprotocol subnetworks in a single-protocol backbone environment, IP tunneling using GRE allows the expansion of a network across a single-protocol backbone environment.

IPC --interprocess communication. The mechanism that enables the distribution of Cisco Express Forwarding tables from the Route Processor (RP) to the line card when the router is operating in distributed Cisco Express Forwarding mode.

label disposition --The removal of Multiprotocol Label Switching (MPLS) headers at the edge of a network. In MPLS label disposition, packets arrive on a router as MPLS packets and, with the header removed, are transmitted as IP packets.

label imposition --The action of putting a label on a packet.

LER --label edge router. A router that performs label imposition.

LFIB --Label Forwarding Information Base. The data structure used by switching functions to switch labeled packets.

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.

LSP --label switched path. A sequence of hops (Router 0...Router n). A packet travels from R0 to Rn by means of label switching mechanisms. An LSP can be chosen dynamically, based on normal routing mechanisms, or you can configure the LSP manually.

LSR --label switch router. A Layer 3 router that forwards a packet based on the value of a label encapsulated in the packet.

MPLS --Multiprotocol Label Switching. An emerging industry standard for the forwarding of packets along the normal routing paths (sometimes called MPLS hop-by-hop forwarding).

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 router 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.

VPN --Virtual Private Network. The result of a router configuration that enables IP traffic to use tunneling to travel securely over a public TCP/IP network.

VRF --A Virtual Private Network (VPN) routing/forwarding instance. A VRF 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. In general, a VRF includes the routing information that defines a customer VPN site that is attached to a PE router.