IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

The Cisco Express Forwarding feature is Layer 3 IP switching technology for the forwarding of IPv6 packets. Distributed Cisco Express Forwarding performs the same functions as Cisco Express Forwarding but for distributed architecture platforms.

- Finding Feature Information, page 1
- Prerequisites for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support, page 2
- Information About IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support, page 2
- How to Configure IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support, page 3
- Configuration Examples for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support, page 5
- Additional References, page 5
- Feature Information for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support, page 6

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 at the end of this module.

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

Prerequisites for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

- To forward IPv6 traffic using Cisco Express Forwarding or distributed Cisco Express Forwarding, you must configure forwarding of IPv6 unicast datagrams globally on the device, and you must configure an IPv6 address on an interface.
- You must enable Cisco Express Forwarding for IPv4 globally on the device before enabling Cisco Express Forwarding for IPv6 globally on the device.
- On distributed architecture platforms that support both Cisco Express Forwarding and distributed Cisco Express Forwarding, you must enable distributed Cisco Express Forwarding for IPv4 globally on the device before enabling distributed Cisco Express Forwarding for IPv6 globally on the device.
- Nondistributed platforms do not support distributed Cisco Express Forwarding; however, some distributed platforms support both Cisco Express Forwarding and distributed Cisco Express Forwarding.
- To use Unicast Reverse Path Forwarding (uRPF), enable Cisco Express Forwarding switching or distributed Cisco Express Forwarding switching in the device. There is no need to configure the input interface for Cisco Express Forwarding switching. As long as Cisco Express Forwarding is running on the device, individual interfaces can be configured with other switching modes.

The following restrictions apply to nondistributed and distributed architecture platforms configured for Cisco Express Forwarding and distributed Cisco Express Forwarding:

- IPv6 packets that have global source and destination addresses are Cisco Express Forwarding-switched or distributed Cisco Express Forwarding-switched.
- IPv6 packets that have link-local source and destination addresses are process-switched.
- IPv6 packets that are tunneled within manually configured IPv6 tunnels are Cisco Express Forwarding-switched.

Information About IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

Cisco Express Forwarding and Distributed Cisco Express Forwarding Switching for IPv6

Cisco Express Forwarding is advanced, Layer 3 IP switching technology for the forwarding of IPv6 packets. Distributed Cisco Express Forwarding performs the same functions as Cisco Express Forwarding but for distributed architecture platforms. Distributed Cisco Express Forwarding for IPv6 and Cisco Express Forwarding for IPv6 function the same and offer the same benefits as for distributed Cisco Express Forwarding for IPv4 and Cisco Express Forwarding for IPv4--network entries that are added, removed, or modified in the IPv6 Routing Information Base (RIB), as dictated by the routing protocols in use, are reflected in the Forwarding

Information Bases (FIBs), and the IPv6 adjacency tables maintain Layer 2 next-hop addresses for all entries in each FIB.

Each IPv6 router interface has an association to one IPv6 global FIB and one IPv6 link-local FIB (multiple interfaces can have an association to the same FIB). All IPv6 router interfaces that are attached to the same IPv6 link share the same IPv6 link-local FIB. IPv6 packets that have an IPv6 global destination address are processed by the IPv6 global FIB; however, packets that have an IPv6 global destination address and an IPv6 link-local source address are sent to the RP for process switching and scope-error handling. Packets that have a link-local source address are not forwarded off of the local link and are sent to the RP for process switching and scope-error handling.

How to Configure IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

Configuring Cisco Express Forwarding Switching on Distributed and Nondistributed Architecture Platforms

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. Do one of the following:
   - **ipv6 cef**
   - **ipv6 cef distributed**
4. **ipv6 cef accounting** [**non-recursive** | **per-prefix** | **prefix-length**]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	Do one of the following:	Enables Cisco Express Forwarding globally on the device.

	Command or Action	Purpose

	• **ipv6 cef**
	• **ipv6 cef distributed**
	
	Example:
	`Device(config)# ipv6 cef`
	
	Example:
	`Device(config)# ipv6 cef distributed`
		or
		Enables distributed Cisco Express Forwarding globally on the device.

Step 4	**ipv6 cef accounting** [**non-recursive** | **per-prefix** | **prefix-length**] **Example:** `Device(config)# ipv6 cef accounting`	Enables Cisco Express Forwarding and distributed Cisco Express Forwarding network accounting globally on the device. • Network accounting for Cisco Express Forwarding and distributed Cisco Express Forwarding enables you to better understand Cisco Express Forwarding traffic patterns within your network by collecting statistics specific to Cisco Express Forwarding and distributed Cisco Express Forwarding traffic. For example, network accounting for Cisco Express Forwarding and distributed Cisco Express Forwarding enables you to collect information such as the number of packets and bytes switched to a destination or the number of packets switched through a destination. • The optional **per-prefix** keyword enables the collection of the number of packets and bytes express forwarded to an IPv6 destination (or IPv6 prefix). • The optional **prefix-length** keyword enables the collection of the number of packets and bytes express forwarded to an IPv6 prefix length. **Note** When Cisco Express Forwarding is enabled globally on the device, accounting information is collected at the RP; when distributed Cisco Express Forwarding is enabled globally on the device, accounting information is collected at the line cards.

Configuration Examples for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

Example: Cisco Express Forwarding and Distributed Cisco Express Forwarding Configuration

In the following example, both Cisco Express Forwarding for IPv6 and network accounting for Cisco Express Forwarding for IPv6 have been enabled globally on a nondistributed architecture device, and Cisco Express Forwarding for IPv6 has been enabled on Ethernet interface 0. The example also shows that the forwarding of IPv6 unicast datagrams has been configured globally on the device with the **ipv6 unicast-routing** command, an IPv6 address has been configured on Ethernet interface 0 with the **ipv6 address** command, and Cisco Express Forwarding for IPv4 has been configured globally on the device with the **ip cef** command.

```
ip cef
ipv6 unicast-routing
ipv6 cef
ipv6 cef accounting prefix-length
interface Ethernet0
 ip address 10.4.9.11 255.0.0.0
 media-type 10BaseT
 ipv6 address 2001:DB8:C18:1::/64 eui-64
```

In the following example, both distributed Cisco Express Forwarding for IPv6 and network accounting for distributed Cisco Express Forwarding for IPv6 have been enabled globally on a distributed architecture device. The forwarding of IPv6 unicast datagrams has been configured globally on the device with the **ipv6 unicast-routing** command and distributed Cisco Express Forwarding for IPv4 has been configured globally on the device with the **ip cef distributed** command.

```
ip cef distributed
ipv6 unicast-routing
ipv6 cef distributed
ipv6 cef accounting prefix-length
```

Additional References

Related Documents

Related Topic	Document Title
Cisco Express Forwarding for IPv6	Implementing IPv6 Addressing and Basic Connectivity Guide, *IPv6 Configuration Guide*
Cisco IOS voice configuration	Cisco IOS Voice Configuration Library
Cisco IOS commands	Cisco IOS Master Commands List, All Releases

Related Topic	Document Title
IPv6 commands, including voice commands	Cisco IOS IPv6 Command Reference
Cisco Unified Border Element configuration	Cisco Unified Border Element Configuration Guide
SIP Configuration Guide	SIP Configuration Guide
Troubleshooting and debugging guides	Cisco IOS Debug Command Reference Troubleshooting and Debugging VoIP Call Basics

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

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 IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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Table 1: Feature Information for IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support

Feature Name	Releases	Feature Information
IPv6 Switching: Cisco Express Forwarding and Distributed Cisco Express Forwarding Support	12.2(13)T 12.2(17a)SX1 12.2(25)SEA 12.2(25)SG 12.2(33)SRA 15.0(2)SG 15.3(1)S Cisco IOS XE Release 2.1 3.2.0SG	Cisco Express Forwarding for IPv6 is advanced, Layer 3 IP switching technology for the forwarding of IPv6 packets. Distributed Cisco Express Forwarding for IPv6 performs the same functions as Cisco Express Forwarding for IPv6 but for distributed architecture platforms. The following commands were introduced or modified: **ipv6 cef**, **ipv6 cef accounting**, **ipv6 cef distributed**.