



CHAPTER 29

Configuring IPv6 Multicast PFC3 and DFC3 Layer 3 Switching

The PFC3 and DFC3 provide hardware support for IPv6 multicast traffic. Use these publications to configure IPv6 multicast in Cisco IOS Release 12.2SX:

- The *Cisco IOS IPv6 Configuration Library*, “Implementing IPv6 Multicast”:
http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/12_2sx/ipv6_12_2sx_book.html
- The *Cisco IOS IPv6 Command Reference*:
http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6_book.html



Tip

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html

These sections provide additional information about IPv6 multicast support in Cisco IOS Release 12.2SX:

- [Features that Support IPv6 Multicast, page 29-1](#)
- [IPv6 Multicast Guidelines and Restrictions, page 29-2](#)
- [New or Changed IPv6 Multicast Commands, page 29-3](#)
- [Configuring IPv6 Multicast Layer 3 Switching, page 29-3](#)
- [Using show Commands to Verify IPv6 Multicast Layer 3 Switching, page 29-3](#)

Features that Support IPv6 Multicast

These features support IPv6 multicast:

- RPR redundancy mode—See [Chapter 7, “Configuring RPR Supervisor Engine Redundancy.”](#)
- Multicast Listener Discovery version 2 (MLDv2) snooping—See [Chapter 30, “Configuring MLD Snooping for IPv6 Multicast Traffic.”](#)



Note

MLDv1 snooping is not supported.

- IPv6 Multicast rate limiters—See [Chapter 44, “Configuring Denial of Service Protection.”](#)
- IPv6 Multicast: Bootstrap Router (BSR)—See the BSR information in the *Cisco IOS IPv6 Configuration Library* and the *Cisco IOS IPv6 Command Reference*.
- IPv6 Access Services—See DHCPv6 Prefix Delegation—See this publication for more information: http://www.cisco.com/en/US/docs/ios/12_2t/ipv6/ipv6_vgf.html
- SSM mapping for IPv6—See this publication for more information: http://www.cisco.com/en/US/docs/ios/12_2t/ipv6/ipv6_vgf.html

IPv6 Multicast Guidelines and Restrictions

These guidelines and restrictions apply to IPv6 multicast support in Cisco IOS Release 12.2SX:

- The PFC3 and DFC3 provide hardware support for the following:
 - Completely switched IPv6 multicast flows
 - IPv6 PIM-Sparse Mode (PIM-SM) (S,G) and (*,G) forwarding



Note Release 12.2(33)SXH provides initial support for IPv6 PIM-SM (*,G) forwarding.

- Multicast RPF check for IPv6 PIM-SM (S,G) traffic using the NetFlow table
- Rate limiting of IPv6 PIM-SM (S,G) traffic that fails the multicast RPF check
- Static IPv6 multicast routes
- SSM Mapping for IPv6 (PIM-SSM)
- IPv6 multicast forwarding information base (MFIB) using the NetFlow table
- IPv6 distributed MFIB (dMFIB) using the NetFlow table
- Link-local and link-global IPv6 multicast scopes
- Egress multicast replication with the **ipv6 mfib hardware-switching** command
- Ingress interface statistics for multicast routes (egress interface statistics not available)
- RPR and RPR+ redundancy mode (see [Chapter 7, “Configuring RPR Supervisor Engine Redundancy”](#))
- Ingress and egress PFC QoS (see [Chapter 36, “Configuring PFC QoS”](#))
- Input and output Cisco access-control lists (ACLs)
- The PFC3 and DFC3 do not provide hardware support for the following:
 - Partially switched IPv6 multicast flows
 - Multicast RPF check for PIM-SM (*,G) traffic
 - Multicast helper maps
 - Site-local multicast scopes
 - Manually configured IPv6 over IPv4 tunnels
 - IPv6 multicast 6to4 tunnels
 - IPv6 multicast automatic tunnels
 - IPv6 over GRE tunnels

- IPv6-in-IPv6 PIM register tunnels
- IPv6 multicast basic ISATAP tunnels
- ISATAP tunnels with embedded 6to4 tunnels

New or Changed IPv6 Multicast Commands

See the Cisco IOS Master Command List, Release 12.2SX for information about these IPv6 multicast commands:

- **ipv6 mfib hardware-switching**
- **mls rate-limit multicast ipv6** (see [Chapter 44, “Configuring Denial of Service Protection”](#))
- **show ipv6 mfib**
- **show mls rate-limit** (see [Chapter 44, “Configuring Denial of Service Protection”](#))
- **show platform software ipv6-multicast**
- **show tcam interface**

Configuring IPv6 Multicast Layer 3 Switching

To configure IPv6 multicast Layer 3 switching, perform this task:

	Command	Purpose
Step 1	Router(config)# ipv6 unicast-routing	Enables unicast routing on all Layer 3 interfaces.
Step 2	Router(config)# ipv6 multicast-routing	Enables PIM-SM on all Layer 3 interfaces.
Step 3	Router(config)# ipv6 mfib hardware-switching	Enables MFIB hardware switching globally.

Using show Commands to Verify IPv6 Multicast Layer 3 Switching

These sections describe how to use **show** commands to verify IPv6 multicast Layer 3 switching:

- [Verifying MFIB Clients, page 29-4](#)
- [Displaying the Switching Capability, page 29-4](#)
- [Verifying the \(S,G\) Forwarding Capability, page 29-5](#)
- [Verifying the \(*,G\) Forwarding Capability, page 29-5](#)
- [Verifying the Subnet Entry Support Status, page 29-5](#)
- [Verifying the Current Replication Mode, page 29-5](#)
- [Displaying the Replication Mode Auto-Detection Status, page 29-5](#)
- [Displaying the Replication Mode Capabilities, page 29-5](#)
- [Displaying Subnet Entries, page 29-6](#)
- [Displaying the IPv6 Multicast Summary, page 29-6](#)

- [Displaying the NetFlow Hardware Forwarding Count, page 29-6](#)
- [Displaying the FIB Hardware Bridging and Drop Counts, page 29-7](#)
- [Displaying the Shared and Well-Known Hardware Adjacency Counters, page 29-7](#)

**Note**

The **show** commands in the following sections are for a switch with a DFC3-equipped switching module in slot 1 and a Supervisor Engine 720 with a PFC3 in slot 6.

Verifying MFIB Clients

This example shows the complete output of the **show ipv6 mrib client** command:

```
Router# show ipv6 mrib client
IP MRIB client-connections
mfib ipv6:81      (connection id 0)
igmp:124         (connection id 1)
pim:281 (connection id 2)
slot 1 mfib ipv6 rp agent:15 (connection id 3)
slot 6 mfib ipv6 rp agent:15 (connection id 4)
```

This example shows how to display the MFIB client running on the route processor (RP):

```
Router# show ipv6 mrib client | include ^mfib ipv6
mfib ipv6:81      (connection id 0)
```

This example shows how to display the MFIB clients running on the PFC3 and any DFC3s:

```
Router# show ipv6 mrib client | include slot
slot 1 mfib ipv6 rp agent:15 (connection id 3)
slot 6 mfib ipv6 rp agent:15 (connection id 4)
```

Displaying the Switching Capability

This example displays the complete output of the **show platform software ipv6-multicast capability** command:

```
Router# show platform software ipv6-multicast capability

Hardware switching for IPv6 is enabled
(S,G) forwarding for IPv6 supported using Netflow
(*,G) bridging for IPv6 is supported using FIB
Directly-connected entries for IPv6 is supported using ACL-TCAM.

Current System HW Replication Mode : Ingress
Auto-detection of Replication Mode : ON

Slot Replication-Capability Replication-Mode
 1 Ingress                    Ingress
 2 Egress                     Ingress
 6 Egress                     Ingress
 8 Ingress                    Ingress
```

Verifying the (S,G) Forwarding Capability

This example shows how to verify the (S,G) forwarding:

```
Router# show platform software ipv6-multicast capability | include (S,G)
(S,G) forwarding for IPv6 supported using Netflow
```

Verifying the (*,G) Forwarding Capability

This example shows how to verify the (*,G) forwarding:

```
Router# show platform software ipv6-multicast capability | include (\*,G)
(*,G) bridging for IPv6 is supported using FIB
```

Verifying the Subnet Entry Support Status

This example shows how to verify the subnet entry support status:

```
Router# show platform software ipv6-multicast capability | include entries
Directly-connected entries for IPv6 is supported using ACL-TCAM.
```

Verifying the Current Replication Mode

This example shows how to verify the current replication mode:

```
Router# show platform software ipv6-multicast capability | include Current
Current System HW Replication Mode : Ingress
```



Note

Enter the `no ipv6 mfib hardware-switching replication-mode ingress` command to enable replication mode auto-detection.

Displaying the Replication Mode Auto-Detection Status

This example shows how to display the replication mode auto-detection status:

```
Router# show platform software ipv6-multicast capability | include detection
Auto-detection of Replication Mode : ON
```

Displaying the Replication Mode Capabilities

This example shows how to display the replication mode capabilities of the installed modules:

```
Router# show platform software ipv6-multicast capability | begin ^Slot
Slot Replication-Capability Replication-Mode
  1 Ingress                    Ingress
  2 Egress                      Ingress
  6 Egress                      Ingress
  8 Ingress                    Ingress
```

Displaying Subnet Entries

This example shows how to display subnet entries:

```
Router# show platform software ipv6-multicast connected
IPv6 Multicast Subnet entries
Flags : H - Installed in ACL-TCAM
        X - Not installed in ACL-TCAM due to
            label-full exception
Interface: Vlan20 [ H ]
           S:20::1 G:FF00::
Interface: Vlan10 [ H ]
           S:10::1 G:FF00::
```



Note In this example, there are subnet entries for VLAN 10 and VLAN 20.

Displaying the IPv6 Multicast Summary

This example shows how to display the IPv6 multicast summary:

```
Router# show platform software ipv6-multicast summary
IPv6 Multicast Netflow SC summary on Slot[1]:
Shortcut Type          Shortcut count
-----+-----
(S, G)                 100
(*, G)                 0
IPv6 Multicast FIB SC summary on Slot[1]:
Shortcut Type          Shortcut count
-----+-----
(*, G/128)             10
(*, G/m)               47

IPv6 Multicast Netflow SC summary on Slot[6]:
Shortcut Type          Shortcut count
-----+-----
(S, G)                 100
(*, G)                 0
IPv6 Multicast FIB SC summary on Slot[6]:
Shortcut Type          Shortcut count
-----+-----
(*, G/128)             10
(*, G/m)               47
```

Displaying the NetFlow Hardware Forwarding Count

This example shows how to display the NetFlow hardware forwarding count:

```
Router# show platform software ipv6-multicast summary
IPv6 Multicast Netflow SC summary on Slot[1]:
Shortcut Type          Shortcut count
-----+-----
(S, G)                 100
(*, G)                 0

<...Output deleted...>
```

```
IPv6 Multicast Netflow SC summary on Slot[6]:
Shortcut Type                Shortcut count
-----+-----
(S, G)                       100
(*, G)                       0
<...Output truncated...>
```

**Note**

The NetFlow (*, G) count is always zero because PIM-SM (*,G) forwarding is supported in software on the RP.

Displaying the FIB Hardware Bridging and Drop Counts

This example shows how to display the FIB hardware bridging and drop hardware counts:

```
Router# show platform software ipv6-multicast summary | begin FIB
IPv6 Multicast FIB SC summary on Slot[1]:
Shortcut Type                Shortcut count
-----+-----
(*, G/128)                   10
(*, G/m)                     47
<...Output deleted...>

IPv6 Multicast FIB SC summary on Slot[6]:
Shortcut Type                Shortcut count
-----+-----
(*, G/128)                   10
(*, G/m)                     47
```

**Note**

- The (*, G/128) value is a hardware bridge entry count.
- The (*, G/m) value is a hardware bridge/drop entry count.

Displaying the Shared and Well-Known Hardware Adjacency Counters

The `show platform software ipv6-multicast shared-adjacencies` command displays the shared and well-known hardware adjacency counters used for IPv6 multicast by entries in FIB and ACL-TCAM.

```
Router# show platform software ipv6-multicast shared-adjacencies

---- SLOT [1] ----

Shared IPv6 Mcast Adjacencies Index  Packets      Bytes
-----+-----
Subnet bridge adjacency      0x7F802      0             0
Control bridge adjacency     0x7           0             0
StarG_M bridge adjacency     0x8           0             0
S_G bridge adjacency         0x9           0             0
Default drop adjacency       0xA           0             0
StarG (spt == INF) adjacency 0xB           0             0
StarG (spt != INF) adjacency 0xC           0             0

---- SLOT [6] ----
```

Using show Commands to Verify IPv6 Multicast Layer 3 Switching

Shared IPv6 Mcast Adjacencies	Index	Packets	Bytes
Subnet bridge adjacency	0x7F802	0	0
Control bridge adjacency	0x7	0	0
StarG_M bridge adjacency	0x8	0	0
S_G bridge adjacency	0x9	0	0
Default drop adjacency	0xA	28237	3146058
StarG (spt == INF) adjacency	0xB	0	0
StarG (spt != INF) adjacency	0xC	0	0

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

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