



# 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 on Cisco 7600 series routers:

- The *Cisco IOS IPv6 Configuration Library*, “Implementing IPv6 Multicast”:  
<http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-multicast.html>
- The *Cisco IOS IPv6 Command Reference*:  
[http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6\\_book.html](http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6_book.html)

These sections provide additional information about IPv6 multicast support on Cisco 7600 series routers:

- [Features that Support IPv6 Multicast, page 30-1](#)
- [IPv6 Multicast Guidelines and Restrictions, page 30-2](#)
- [Configuring IPv6 Multicast Layer 3 Switching, page 30-3](#)
- [Using show Commands to Verify IPv6 Multicast Layer 3 Switching, page 30-3](#)

## Features that Support IPv6 Multicast

These features support IPv6 multicast:

- RPR and RPR+ redundancy mode—See [Chapter 7, “Configuring RPR and RPR+ Supervisor Engine Redundancy.”](#)
- Multicast Listener Discovery version 2 (MLDv2) snooping—See [Chapter 32, “Configuring MLDv2 Snooping for IPv6 Multicast Traffic.”](#)



**Note** MLDv1 snooping is not supported.

- IPv6 Multicast rate limiters—See [Chapter 43, “Configuring Denial of Service Protection.”](#)
- IPv6 Multicast: Bootstrap Router (BSR)—See the BSR information in the *Cisco IOS IPv6 Configuration Library* and *Cisco IOS IPv6 Command Reference*.
- IPv6 Access Services—See DHCPv6 Prefix Delegation—See this publication:  
[http://www.cisco.com/en/US/docs/ios/12\\_2t/ipv6/ipv6\\_vgf.html](http://www.cisco.com/en/US/docs/ios/12_2t/ipv6/ipv6_vgf.html)

- SSM mapping for IPv6—See this publication:  
[http://www.cisco.com/en/US/docs/ios/12\\_2t/ipv6/ipv6\\_vgf.html](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 on Cisco 7600 series routers:

- The PFC3 and DFC3 provide hardware support for the following:
  - Completely switched IPv6 multicast flows
  - IPv6 PIM-Sparse Mode (PIM-SM) (S,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 and RPR+ Supervisor Engine Redundancy”](#))
  - Ingress and egress PFC QoS (see [Chapter 48, “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
  - PIM-SM (\*,G) forwarding
  - 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

# Configuring IPv6 Multicast Layer 3 Switching

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

	Command	Purpose
Step 1	Router(config)# <b>ipv6 unicast-routing</b>	Enables unicast routing on all Layer 3 interfaces.
Step 2	Router(config)# <b>ipv6 multicast-routing</b>	Enables PIM-SM on all Layer 3 interfaces.

## 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 30-3](#)
- [Displaying the Switching Capability, page 30-4](#)
- [Verifying the \(S,G\) Forwarding Capability, page 30-4](#)
- [Verifying the \(\\*,G\) Forwarding Capability, page 30-4](#)
- [Verifying the Subnet Entry Support Status, page 30-4](#)
- [Displaying the Replication Mode Capabilities, page 30-4](#)
- [Displaying Subnet Entries, page 30-5](#)
- [Displaying the IPv6 Multicast Summary, page 30-5](#)
- [Displaying the NetFlow Hardware Forwarding Count, page 30-5](#)
- [Displaying the FIB Hardware Bridging and Drop Counts, page 30-6](#)
- [Displaying the Shared and Well-Known Hardware Adjacency Counters, page 30-6](#)



Note

The show commands in the following sections are for a router 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 MSFC:

```
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 mrib ipv6 rp agent:15 (connection id 3)
slot 6 mrib ipv6 rp agent:15 (connection id 4)
```

## Displaying the Switching Capability

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

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

Slot Replication-Capability Replication-Mode
 2 Egress Egress
 3 Egress Egress
 4 Egress Egress
 6 Egress Egress

PE1-7600#
```

## 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.
```

## Displaying the Replication Mode Capabilities

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

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

```
Slot Replication-Capability Replication-Mode
 2 Egress                    Egress
 3 Egress                    Egress
 4 Egress                    Egress
 6 Egress                    Egress
```

## Displaying Subnet Entries

This example shows how to display subnet entries:

```
Router# show platform software multicast ipv6 connected
IPv6 Multicast Subnet entries
Flags : H - Installed in ACL-TCAM
       X - Not installed in ACL-TCAM due to
         label-full exception
```

## Displaying the IPv6 Multicast Summary

This example shows how to display the IPv6 multicast summary:

```
Router# show platform software multicast ipv6 summary module 4
IPv6 Multicast Netflow SC summary on Slot[4]:
Shortcut Type                Shortcut count
-----+-----
(S, G)                       0
(*, G)                       0

IPv6 Multicast FIB SC summary on Slot[4]:
Shortcut Type                Shortcut count
-----+-----
(*, G/128)                   0
(*, G/m)                     3
```

## 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 MSFC3.

## 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 multicast ipv6 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 multicast ipv6 shared-adjacencies module 4
```

---- SLOT [4] ----

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] ----

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
Router
```

