IPv6 Multicast Support

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

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Prerequisites for IPv6 Multicast

None.

Restrictions for IPv6 Multicast

- The PFC and DFCs provide hardware support for the following:
    - Completely switched IPv6 multicast flows
    - IPv6 PIM-Sparse Mode (PIM-SM) (S,G) and (*,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 10, "Route Processor Redundancy (RPR)")
- Ingress and egress PFC QoS (see Chapter 64, "PFC QoS Overview")
- Input and output Cisco access-control lists (ACLs)
- The PFC and DFCs 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

Information About IPv6 Multicast Support

- Hardware-Supported IPv6 Layer 3 Multicast Features, page 52-2
- Partially Hardware-Supported IPv6 Layer 3 Multicast Features, page 52-3
- Software-Supported IPv6 Layer 3 Multicast Features, page 52-3
- Unsupported IPv6 Layer 3 Multicast Features, page 52-3

Hardware-Supported IPv6 Layer 3 Multicast Features

- Control plane policing (CoPP)
- Egress forced replication mode
- Egress replication local
- Egress replication mode
- HW assisted SPT switchover
- Input ACL logging
- Input and output ACL filtering
- IPv6 Multicast over P2P IPv4 GRE/IP-in-IP tunnel (6over4)
- Load-Balancing of multicast packets on port-channels
- Multicast Layer 3 forwarding on routed ports
- Multicast Layer 3 forwarding on subinterfaces

- Multicast Layer 3 forwarding on SVI
- Multicast load-splitting across parallel links
- Netflow accounting
- Non-RPF protection
- PIM register decapsulation over IPv6
- PIM register encapsulation over IPv6
- PIM-SM (S,G) and (*,G) forwarding
- PIM-SSM
- QoS ingress mode marking
- QoS ingress mode policing
- Rate limiters
- Scope checking
- Statistics

Partially Hardware-Supported IPv6 Layer 3 Multicast Features

- Egress replication mode and QoS marking

Software-Supported IPv6 Layer 3 Multicast Features

- SSM mapping
- MET sharing
- MLDv1/v2

Unsupported IPv6 Layer 3 Multicast Features

- BIDIR PIM over P2P GRE tunnel
- Destination IP NAT multicast
- IPv4 multicast over P2P IPv6 GRE tunnel (4over6)
- IPv6 multicast over multipoint IPv4 GRE tunnel (6over4 mGRE)
- IPv6 multicast over multipoint IPv6 GRE tunnel
- IPv6 multicast over P2P IPv6 GRE tunnel
- IPv6 multicast over P2P IPv6 GRE tunnel with tunnel endpoints in VRF
- IPv6 multicast over P2P IPv6 VRF GRE tunnel
- MTR multicast: TOS based lookup
- Multicast VPN for IPv6 extranet support
- Multicast VPN for IPv6 intranet support
- Multicast VRF-lite

- MVPN over P2P IPv6 GRE tunnel

- PIM-BIDIR

- PIM-DM (S,G) forwarding

- Source IP NAT multicast

- Egress replication mode and QoS policing

- QoS ingress and egress: shaping support

- MIB support

- Multicast boundary

- Multicast helper map

- Output ACL logging

- PGM router assist

- PGM router assist in VRF

- QoS Marking for multicast bridged frames undergoing routing

How to Configure IPv6 Multicast Support

The PFC and DFCs provide hardware support for IPv6 multicast traffic. Use these publications to configure IPv6 multicast in Cisco IOS Release 15.4SY:

- The *Cisco IOS IPv6 Configuration Library*, "Implementing IPv6 Multicast":

  http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/15-2mt/ip6-15-2mt-book.html

- The *Cisco IOS IPv6 Command Reference*:

  http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6_book.html

Verifying the IPv6 Multicast Layer 3 Configuration

Verifying MFIB Clients

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

```
Router# show ipv6 mrib client
```

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
```

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] ----

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
```

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