Multicast Source Discovery Protocol

Multicast Source Discovery Protocol (MSDP) describes a topology that connects multiple IPv4 Protocol Independent Multicast Sparse-Mode (PIM-SM) domains. Each PIM-SM domain uses its independent Rendezvous Point (RP) without depending on RPs in other domains.

These sections describe the Arista MSDP implementation.

- Section 41.1: MSDP Introduction
- Section 41.2: MSDP Description
- Section 41.3: MSDP Configuration
- Section 41.4: MSDP Commands

### 41.1 MSDP Introduction

Arista switches support these MSDP features:

- Basic MSDP speaker functions.
- MSDP peer configuration: description, connect-source interface, keepalive time, and hold time.
- ACL filtering of inbound and outbound Source-Active (SA) messages.
- Mesh groups.
- Display of peer status.
- Display of filtered SA messages received from MSDP peers.

These MSDP features are not supported:

- MSDP is not supported with Anycast-RP (RFC4610).
- IP packet encapsulation.
41.2 **MSDP Description**

The Multicast Source Discovery Protocol (MSDP) defines a topology connecting Protocol Independent Multicast sparse mode (PIM-SM) domains. MSDP provides inter-domain access to multicast sources in all domains by enabling all rendezvous points (RPs) to discover multicast sources outside of their domains. RPs also use MSDP to announce sources that are sending to a multicast group.

41.2.1 **MSDP Speakers**

An MSDP speaker is a router in a PIM-SM domain that has MSDP peering sessions with MSDP peers in other domains. An MSDP peering session is a TCP connection through which peers exchange MSDP control information. An MSDP peer is a router that is connected to the speaker through a peering session.

PIM uses MSDP to register a local source with remote domain RPs through Source Active (SA) messages, which originate at the local domain’s RP. Receivers in remote PIM-SM domains depend only on RPs in their domains to learn of multicast data sources in other domains. Multicast data is subsequently delivered from a source to receivers in different domains through a PIM-SM source tree. Section 41.3.1: MSDP Speaker Configuration describes the process of configuring MSDP speakers.

41.2.2 **Network Configuration**

The TCP connections between RPs are defined either through an underlying unicast routing table or by configuring a default MSDP peer. A typical MSDP configuration utilizes a BGP specified routing table. SA messages are MSDP control messages that peers exchange during peering sessions.

41.2.2.1 **Source Active Messages**

A Source Active (SA) message is a message that an RP creates and sends to MSDP peers when it learns of a new multicast source through a PIM register message. RPs that intend to originate or receive SA messages must establish MSDP peering with other RPs, either directly or through intermediate MSDP peers. An RP that is not a DR on a shared network should only originate SAs in response to register messages it receives from the DR. It does not originate SA’s for directly connected sources in its domain.

SA messages contain the following fields:

- Source address of the data source.
- Group address that receives data sent by the source.
- IP address of the RP.

The SA Cache is the repository of SA messages received by the MSDP speaker. The switch always stores received SA messages. Section 41.3.4: Managing the SA Cache describes procedures that limit the size of the SA cache and options for displaying the cache.

41.2.2.2 **Reverse Path Forwarding**

Reverse path forwarding (RPF) is a multicast packet transport technique that ensures loop-free packet forwarding by using a router’s unicast routing table. Traffic forwarding is based on source addresses instead of destination addresses. RPF is implemented as defined in RFC 3618.

Packet forwarding is based on the packet’s unicast reverse path. An RPF router prevents network loops by only forwarding a packet when it enters through the interface holding its source routing entry.
When a multicast packet enters a router's interface, the router checks the reverse path of the packet by examining the list of networks that are reachable through the input interface. If the list contains a matching routing entry for the multicast packet's source IP address, the packet is forwarded to all other interfaces that are participants in the multicast group. Otherwise, the packet is dropped.

RPF requires that the unicast routing table is correct and converged. It also assumes that the use of symmetric forward and reverse paths between router and sender. RPF fails on uni-directional links.

Section 41.3.3.1: Displaying RPF Peers describes commands that display RPF peers.

41.2.2.3 Default MSDP Peers

The default peer is the MSDP peer from which the MSDP speaker accepts SA messages. If there is only one MSDP peer, all of its SA messages will be accepted. When multiple default peers are configured the switch uses the first default peer to appear in `running-config`. Default MSDP peers invalidate the use of RPF over unicast routing tables.

Each default peer may be associated with a prefix list. The prefix list specifies the RPs from where the speaker accepts SA messages. When `running-config` contains multiple default peers with prefix lists, an SA is accepted from the first default peer in `running-config` whose prefix list contains the RP in the SA. The speaker accepts all remaining SAs from the first default peer that is not associated with a prefix list.

Section 41.3.3.2: Configuring the Default Peer describes commands that configure default peers.

41.2.3 MSDP Exchange Processes

41.2.3.1 Control Information Exchange

An RP originates an SA message when a source registers with the RP to send data to a multicast group. RPs periodically originate SA messages while its registered sources send data to maintain messages in SA caches of its MSDP peers. RPs that have no registered sources periodically send keepalive messages to maintain TCP connections with its peers.

MSDP defines the following timers that specify the transmission frequency of control messages:

- **SA Advertisement Time**: Duration of SA Advertisement intervals. An RP sends periodic SA messages to reference each registered source once per interval. SA advertisement time is 60 seconds.
- **Keepalive Time**: Period between the transmission of consecutive keepalive messages. Default keepalive time is 60 seconds. Minimum keepalive time is one second.
- **Hold Timer**: Period an MSDP speaker maintains a peer TCP connection after receiving an SA or keepalive message from the peer. Default time is 75 seconds. Minimum hold time is three seconds.

41.2.3.2 MSDP Data Exchange

This sequence describes the exchange of multicast data across PIM domains through MSDP:

**Step 1** When a source’s first data packet is registered by the first hop router, the RP extracts the data from the packet and forwards it down the shared tree in the PIM domain.

**Step 2** The RP informs MSDP peers of the new source by sending a Source-Active (SA) message that identifies the source, the recipient group, and the RP’s address or originator ID.

**Step 3** Upon receiving the SA message, an MSDP peer which is the RP for a multicast tree that includes members interested in the multicast sends a PIM join message (S,G) toward the data source.
**Step 4** The PIM designated router (DR) sends subsequent data encapsulated in PIM register messages directly to the remote domain’s RP when the source becomes active.

**Step 5** If the source times out, this process repeats when the source goes active again.
41.3 MSDP Configuration

These sections describe the configuration of the switch as an MSDP speaker and the establishment of MSDP peering sessions.

- Section 41.3.1: MSDP Speaker Configuration
- Section 41.3.2: Establishing MSDP Peers
- Section 41.3.3: MSDP Network Configuration
- Section 41.3.4: Managing the SA Cache
- Section 41.3.5: Configuring MSDP in a non-default VRF

MSDP requires that TCP port 639 (MSDP) is open on the control plane. The default control-plane ACL includes a permit rule that allows TCP packets access through the MSDP port.

41.3.1 MSDP Speaker Configuration

The switch is configured as an MSDP speaker when MSDP is enabled. MSDP is enabled by configuring an MSDP peer. Section 41.3.2.1 describes the process of configuring an MSDP peer.

Source-Address (SA) messages that an MSDP speaker originates contain the speaker’s rendezvous point (RP) address, as configured through PIM statements and processes. MSDP provides a method of assigning an originator ID address, which the speaker uses in place of its RP address when advertising SA messages. The `originator-id local-interface` command configures the switch to set the RP address to the specified interface’s IP address in SA messages that it originates as an MSDP speaker.

Only RPs originate SA messages and only for its registered sources. RPs do not originate periodic SA messages for sources in other PIM domains. MSDP speakers that are not RPs do not originate periodic SA messages. Intermediate MSDP speakers forward SA messages received from other domains. Intermediate speakers are not required to be RPs.

Example

- This command configures the switch to use the IP address assigned to loopback interface 100 as the RP address in SA messages that it originates.
  ```
  switch(config)#originator-id local-interface loopback 100
  switch(config)#
  ```

41.3.2 Establishing MSDP Peers

These sections describe MSDP Peer configuration tasks.

- Section 41.3.2.1: Configuring an MSDP Peer
- Section 41.3.2.2: Mesh Groups
- Section 41.3.2.3: Filtering SA Messages
- Section 41.3.2.4: Keep-alive, Hold Time, and Reset Time Configuration
- Section 41.3.2.5: Displaying Peer Information

41.3.2.1 Configuring an MSDP Peer

The switch attempts to establish MSDP peering sessions through IP addresses configured as MSDP peers. The `peer` command configures a specified address as an MSDP peer and enables the switch as an MSDP speaker if no other peers are configured. The peering session with the device at the
specified network is established over a TCP connection. The local-interface command can be used to specify an interface through which the switch establishes the TCP session. When no interface is specified, the connection is established through an interface determined by existing routing algorithms.

To display MSDP peer information, enter `show ip msdp peer`.

**Example**

- These commands assign an IP address to loopback interface 100, then configure 10.4.4.12 as an MSDP peer and establish the TCP peer session through the loopback.

```plaintext
switch(config)#router msdp
switch(config-router-msdp)#interface loopback 100
switch(config-if-Lo100)#ip address 10.6.8.6/24
switch(config-if-Lo100)#exit
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#local-interface loopback 100
```

To associate descriptive text with the specified MSDP peer, use the `description (MSDP)` command.

**Example**

- These commands associate the string NORTH with the MSDP peer located at 10.4.4.12.

```plaintext
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#description NORTH
```

To close the peering session with the specified MSDP peer, use the `disabled (MSDP)` command. This terminates the TCP connection between the switch and the peer. The peer remains configured and the peer session can be resumed by removing the `disabled` command from `running-config`.

```plaintext
switch(config-router-msdp-peer-10.4.4.12)#
```

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Examples

- This command closes the peering session with the MSDP peer at 10.4.4.12.

```plaintext
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#disabled
switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Description: NORTH
  Connection status:
    State: Disabled
    Resets: 0
    Connection Source: Loopback100 ( 10.6.8.6 )
  SAs accepted:
switch(config-router-msdp-peer-10.4.4.12)#
```

- This command reopens the peering session with the peer at 10.4.4.12.

```plaintext
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#no disabled
switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Description: NORTH
  Connection status:
    State: Connect
    Resets: 0
    Connection Source: Loopback100 ( 10.6.8.6 )
  SAs accepted:
switch(config-router-msdp-peer-10.4.4.12)#
```

41.3.2.2 Mesh Groups

Each node in a fully meshed network is directly connected to every other node in the network. Each peer in a fully meshed MSDP speaker network can be configured as a member of a mesh group. SA messages received from a mesh group peer are not forwarded to other members of the mesh group.

To configure an MSDP peer connection as an MSDP mesh group member, use the `mesh-group` command. An MSDP peer can be assigned to multiple mesh groups. Multiple peer connections can be assigned to the same mesh group.

**Note**

Peer-specific mesh-group configuration is performed in Router MSDP Peer Configuration or Router MSDP Peer VRF Configuration Mode. To remove all configured connections from a mesh group, use the `no mesh-group` command in Router MSDP Configuration Mode.

To display the mesh group membership of configured MSDP peers, enter `show msdp mesh-group`. 
Example

- These commands configure the MSDP peer connection to 10.1.1.14 as a member of the AREA-1 mesh group, then displays members of mesh groups to which configured MSDP peers belong.

  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.1.1.14
  switch(config-router-msdp-peer-10.1.1.14)#mesh-group AREA-1
  switch(config-router-msdp-peer-10.1.1.14)#show msdp mesh-group
  Mesh Group: AREA-1
    10.1.1.14
  Mesh Group: tier_01
    10.24.18.13
  Mesh Group: tier_02
    10.26.101.18
  switch(config-router-msdp-peer-10.1.1.14)#

41.3.2.3 Filtering SA Messages

The switch can filter Source-Active (SA) messages that it sends and receives with access control lists (ACLs). The commands accept standard and extended ACLs. The address field in standard ACLs filter an SA message on its group address.

The `sa-filter in` command assigns an ACL to filter inbound SA messages from the MSDP peer connection being configured. The switch only accepts SA messages from the peer that pass the ACL. The switch accepts all SA messages from peers that are not assigned an input ACL. A peer can be assigned only one input filter ACL. Subsequent `sa-filter in` commands for a peer replace the existing command.

The `sa-filter out` command assigns an ACL as a filter for outbound SA messages to the MSDP peer connection being configured. The switch only sends SA messages to the peer that pass the ACL. The switch sends all specified SA messages to peers not assigned an output filter ACL. A peer can be assigned only one output ACL. Subsequent `sa-filter out` commands for a peer replace the existing command.

Example

- These commands assign the IP ACLs named LIST-IN as the inbound SA message filter and LIST-OUT as the outbound SA message filter for the MSDP peer connection to 10.4.4.12.

  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.4.4.12
  switch(config-router-msdp-peer-10.4.4.12)#sa-filter in list LIST-IN
  switch(config-router-msdp-peer-10.4.4.12)#sa-filter out list LIST-OUT
  switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Connection status:
    State: Listen
    Connection Source: Loopback100 (10.6.8.6)
  SA Filtering:
    Input Filter: LIST-IN
    Output Filter: LIST-OUT
  switch(config-router-msdp-peer-10.4.4.12)#

41.3.2.4 Keep-alive, Hold Time, and Reset Time Configuration

To configure the MSDP keep-alive and hold time intervals for a specified MSDP peer connection, use the `keepalive (MSDP)` command.
• Keep-alive time interval is the period between the transmission of consecutive keep-alive messages. The default keep-alive time interval is 60 seconds.

• Hold time interval is the period the switch waits for a KEEPALIVE or UPDATE message before it disables peering. The default hold time interval is 75 seconds.

The hold time interval must be longer than or equal to the keep-alive time interval.

Example
• This command sets the keep-alive time to 45 seconds and the hold time to 80 seconds for the MSDP peer connection to 10.4.4.12.

```
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#keepalive 45 80
```

To specify the period that the switch waits after an MSDP peering session is reset before attempting to reestablish the session, enter connection retry interval. The default period is 30 seconds.

Example
• This command configures the switch to wait 45 seconds after an MSDP peering session is reset before attempting to reestablish the session.

```
switch(config)#router msdp
switch(config-router-msdp)#connection retry interval 45
```

41.3.2.5 Displaying Peer Information

To display the MSDP peers, enter `show ip msdp summary`. The command also displays the operational status of each peer and the number of messages from the peers in the SA cache.

Example
• This command displays the configured peers, the status of the peers, and the number of SA messages received from those peers.

```
switch(config)#show ip msdp summary
MSDP Peer Status Summary
<table>
<thead>
<tr>
<th>Peer Address</th>
<th>State</th>
<th>SA Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.3.18</td>
<td>Up</td>
<td>0</td>
</tr>
<tr>
<td>192.168.3.16</td>
<td>Up</td>
<td>0</td>
</tr>
<tr>
<td>192.168.3.37</td>
<td>Listen</td>
<td>0</td>
</tr>
<tr>
<td>192.168.3.46</td>
<td>Up</td>
<td>0</td>
</tr>
<tr>
<td>192.168.3.47</td>
<td>Up</td>
<td>0</td>
</tr>
</tbody>
</table>
```

41.3.3 MSDP Network Configuration

41.3.3.1 Displaying RPF Peers

The switch uses the unicast routing table to define TCP connections between RPs by selecting the next hop peer toward the originating RP of an SA message as the reverse path forwarding (RPF) peer. The switch forwards SA messages that it receives from the RPF peer to all other MSDP peers. The switch rejects SA messages that it receives from non-RPF peers.

To display MSDP information for the peer from which the switch accepts SA messages for a specified rendezvous point (RP), enter `show msdp rpf-peer`.
41.3.2 Configuring the Default Peer

The default peer is the MSDP peer from which the MSDP speaker is configured to accept all SA messages. A default peer may be associated with a prefix list. The prefix list specifies the RPs from where the speaker accepts SA messages.

The switch can designate multiple default peers:

- Switch defines one peer: A default peer statement is not required; the switch accepts SA traffic from the configured peer.
- Switch defines one default peer (no prefix list): The switch accepts all SA messages from only the default peer.
- Switch defines multiple default peers (no prefix lists): The switch accepts all SA messages from only the first default peer listed in running-config. Other listed default peers take effect only if the peer named in the first default-peer statement is not accessible.
- First default-peer statement includes a prefix list: The switch accepts all SA messages from the default peer whose originating RP is covered in the prefix list. The disposition of SA messages originating from other RPs is determined by subsequent default-peer statements.

To configure the specified MSDP peer connection as a default peer on the switch, use the default-peer command. The default peer address must be a previously configured MSDP peer (configured using the peer command).

Example

These commands configure an MSDP default peer.

```
switch(config)#router msdp
switch(config-router-msdp)#peer 10.5.2.2
switch(config-router-msdp-peer-10.5.2.2)#default-peer
```

41.3.4 Managing the SA Cache

The switch stores Source Active (SA) messages after forwarding the information. This allows new group members to learn about the source before the next SA message is received. The caching action is not configurable and cannot be disabled.

SA messages have an expiration period of 90 seconds and remain in the SA cache until they expire. A peer’s SA limit defines the number of SA messages the switch stores from the peer. The switch does not store SA messages from a peer whose SA limit is reached until its cached messages start expiring.

41.3.4.1 Limiting SA Cache Contents

To configure the maximum number of SA messages from a specified MSDP peer that the switch stores in the SA cache, use the sa-limit command. The default limit of SA messages that the switch can store from a specified peer is 40000.
Example

- This command sets the SA limit of 500 for the MSDP peer at 10.1.1.5.

  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.1.1.5
  switch(config-router-msdp-peer-10.1.1.5)#sa-limit 500
  switch(config-router-msdp-peer-10.1.1.5)#

The maximum number of SA messages that the switch can store in the SA cache for a specified multicast group address is configured by the `group-limit` command. The default limit of SA messages that the switch can store from a specified group is 40000.

Example

- This command sets the maximum number of 1000 SAs for multicast group 225.13.15.8/29

  switch(config)#router msdp
  switch(config-router-msdp)#group-limit 1000 source 225.13.15.8/29

The maximum number of rejected SA messages that the switch can store in the SA cache is configured by the `ip msdp rejected-limit` command. The default limit of rejected SA messages that the switch can store is 40000.

Example

- This command sets 5000 as the maximum number of rejected SAs that the SA cache can contain.

  switch(config)#router msdp
  switch(config-router-msdp)#ip msdp rejected-limit 5000

Contents of the SA message cache are removed by the `clear ip msdp sa-cache` command. The command provides options for removing all cache contents or only contents of a specific multicast group.

Example

- This command deletes all SA message cache contents.

  switch(config)#router msdp
  switch(config-router-msdp)#clear ip msdp sa-cache

41.3.4.2 Displaying SA Cache Contents

SA message cache contents are displayed by the `show ip msdp sa-cache` command. Filter options provided by the command for displaying partial cache contents include:

- multicast group address: multicast group
- source address and group address

The command can also display unexpired SAs rejected by ACL filters or cache limit exceeded conditions.
Example

- This command displays the contents of the SA message cache.

```
switch(config)#show ip msdp sa-cache
MSDP Source Active Cache
  (10.61.71.29, 234.1.4.2), RP 10.5.29.4, heard from 10.5.29.4
  (10.51.71.23, 234.1.4.1), RP 10.5.29.4, heard from 10.5.29.4
  (10.53.71.27, 234.1.4.2), RP 10.3.25.4, heard from 10.3.25.4
  (10.10.101.24, 234.1.4.1), RP 10.2.44.4, heard from 10.2.44.4
  (10.10.151.22, 234.1.4.1), RP 10.1.12.4, heard from 10.1.12.4
```

Information about specified MSDP peers, including SAs accepted from the peer is displayed by the
`show ip msdp peer` command.

Example

- This command displays data for the peer at 10.2.42.4, including SAs accepted from the peer.

```
switch(config)#show ip msdp peer 10.2.42.4 accepted-sas
MSDP Peer 10.2.42.4
  Connection status:
    State: Up
    Connection Source: Loopback4 (10.2.43.4)
  SA Filtering:
    Input Filter: allow-multicast-for-msdp
    Output Filter: allow-multicast-for-msdp
  SAs accepted:
    (10.62.79.30, 234.1.4.2), RP 10.2.42.4
    (10.61.79.29, 234.1.4.1), RP 10.2.42.4
    (10.62.79.30, 234.1.4.1), RP 10.2.42.4
```

The SA cache for the local PIM domain is displayed by the `show ip msdp pim sa-cache` command.

Example

- This command displays the SA cache for the local PIM domain.

```
switch(config)#show ip msdp pim sa-cache
MSDP Source Active Messages for local Pim RP
  (10.51.71.23, 234.1.4.1), RP 10.2.43.4
  (10.20.91.26, 234.1.4.1), RP 10.2.43.4
  (10.20.91.26, 234.1.4.2), RP 10.2.43.4
  (10.20.91.24, 234.1.4.1), RP 10.2.43.4
```

41.3.4.3 Verifying Consistency Between the SA Cache and the Routing Table

To check the consistency between the multicast routing table and the MSDP Source-Address (SA) caches, enter `show ip msdp sanity`. When the command detects inconsistencies, it displays the cache entries that are not in the table.
**Example**

- This command displays a sanity check that detects inconsistencies between the SA cache and the multicast routing table.

```plaintext
switch(config)#show ip msdp sanity
  PIM SA cache entries not in the MRT
  Msdp-learnt MRT entries not in the SA cache
  SA cache entries not in the MRT
  (192.168.3.8, 224.1.154.1)
  (192.168.3.35, 224.1.167.1)
  (192.168.3.16, 224.1.226.1)
  (192.168.3.12, 224.1.182.1)
  (192.168.3.33, 224.1.150.1)
  May-Notify-MSDP entries not in the PIM SA cache
  (need not be an error condition)
  4.1), RP 10.2.42.4
```

**41.3.5 Configuring MSDP in a non-default VRF**

The MSDP can also be configured in a non-default VRF, when the default VRF used does not have a name. The following commands configure MSDP in a non-default VRF.

**Example**

- These commands configure MSDP peer 1.1.1.1 in a non-default VRF blue.

```plaintext
switch(config)#router msdp
switch(config-router-msdp)#vrf blue
switch(config-router-msdp-vrf-blue)#peer 1.1.1.1
```
41.4 MSDP Commands

MSDP Configuration Commands (Global)
- connection retry interval
- group-limit
- ip msdp rejected-limit
- originator-id local-interface
- peer
- router msdp

MSDP Peer Configuration Commands
- default-peer
- description (MSDP)
- disabled (MSDP)
- keepalive (MSDP)
- local-interface
- mesh-group
- sa-filter in
- sa-filter out
- sa-limit

MSDP SA Cache Commands
- clear ip msdp sa-cache

MSDP Display Commands
- show ip msdp peer
- show ip msdp pim sa-cache
- show ip msdp sa-cache
- show ip msdp sanity
- show ip msdp summary
- show msdp mesh-group
- show msdp rpf-peer
clear ip msdp sa-cache

The clear ip msdp sa-cache command removes contents of the Source-Active (SA) message cache. The command provides these filter options for removing partial cache contents:

- contents of a multicast group by specifying its group address
- all cache contents

**Command Mode**
- Router MSDP Configuration
- Router MSDP VRF Configuration

**Command Syntax**
```
clear ip msdp sa-cache [ADDRESS_FILTER]
```

**Parameters**
- **ADDRESS_FILTER**  IPv4 address used to select table entries for removal.
  - <no parameter>  All SA messages
  - `grp_addr`  Multicast group address (IPv4 address). The `grp_addr` must be a valid multicast address.

**Example**
- This command deletes all SA message cache contents.
  ```
switch(config)#router msdp
switch(config-router-msdp)#clear ip msdp sa-cache
  ```
**connection retry interval**

The `connection retry interval` command specifies the period that the switch waits after an MSDP peering session is reset before trying to reestablish the session. The default period is 30 seconds.

The `no connection retry interval` and `default connection retry interval` commands reset the timer interval to the default period of 30 seconds by removing the `connection retry interval` command from `running-config`.

**Command Mode**
- Router MSDP Configuration
- Router MSDP VRF Configuration

**Command Syntax**

```
connection retry interval connect_retry
no connection retry interval connect_retry
default connection retry interval connect_retry
```

**Parameter**
- `connect_retry` Reconnect period (seconds). Value ranges from 1 to 65535. Default is 30.

**Example**
- This command configures the switch to wait 45 seconds after an MSDP peering session is reset before attempting to reestablish the session.

```
switch(config)#router msdp
switch(config-router-msdp)#connection retry interval 45
```
default-peer

The `default-peer` command configures the specified MSDP peer connection as a default peer on the switch. The default peer configuration defines the peers from which the switch accepts Source-Active (SA) messages. When the command includes a `prefix list` parameter, the specified peer is the default peer for only SA messages originating from rendezvous points (RPs) covered by prefix list entries. The default peer address must be a previously configured MSDP peer (configured using the `peer` command).

Default peers provide an alternative to reverse packet forwarding (RPF) typically used by MSDP to specify the peers from which a switch accepts SA messages. However, RPF requires a unicast routing table that is correct and converged. RPF also assumes symmetric forward and reverse paths between router and sender. RPF fails on uni-directional links. Default MSDP peers invalidate the use of RPF over unicast routing tables.

The switch can designate multiple default peers:

- Switch defines one peer: A default peer statement is not required; the switch accepts SA traffic from the configured peer.
- Switch defines one default peer (no prefix list): The switch accepts all SA messages from only the default peer.
- Switch defines multiple default peers (no prefix lists): The switch accepts all SA messages from only the first default peer listed in `running-config`. Other listed default peers are used only when peers listed before them in `running-config` are not accessible.
- First default-peer statement includes a prefix list: The switch accepts all SA messages from the default peer whose originating RP is covered in the prefix list. The disposition of SA messages originating from other RPs is determined by subsequent `default-peer` statements.

The `no default-peer` and `default default-peer` commands remove the corresponding `default-peer` command from `running-config`.

**Command Mode**

- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**

```
default-peer [PREFIX]
no default-peer
default default-peer
```

**Parameters**

- `PREFIX` List of RPs from the SA messages originate for which the default peer is valid.
  - `<no parameter>` default peer is valid for SAs from all originating RPs.
  - `prefix-list list_name` name of the prefix list that defines affected originating RP prefixes.
Example

- These commands configure two MSDP peers and configure the peer at 10.5.2.2 as the default peer.

```shell
switch(config)#router msdp
switch(config-router-mdsp)#peer 10.6.2.2
switch(config-router-mdsp-peer-10.6.2.2)#exit
switch(config-router-mdsp)#peer 10.5.2.2
switch(config-router-mdsp-peer-10.5.2.2)#default-peer
switch(config-router-mdsp-peer-10.5.2.2)#
```
description (MSDP)

The `description` command associates descriptive text with the configuration-mode MSDP peer. The `no description` and `default description` commands remove the text association from the specified peer.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**
- `description description_string`
- `no description`
- `default description`

**Parameters**
- `description_string` text string that is associated with the peer.

**Example**
- These commands associate the string NORTH with the MSDP peer located at 10.4.4.12.

```bash
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#description NORTH
switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
MSDP Peer 10.4.4.12
Description: NORTH
Connection status:
  State: Connect
  Resets: 0
  Connection Source: Loopback100 (10.6.8.6)
SAs accepted:
switch(config-router-msdp-peer-10.4.4.12)#
```
disabled (MSDP)

The `disabled` command closes the peering session with the specified MSDP peer by terminating the TCP connection between the switch and the peer. The connection is not resumed until the shutdown command is removed from `running-config`.

The `no disabled` and `default disabled` commands establish an MSDP peering session with the specified peer by removing the corresponding `disabled` command from `running-config`.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**
- `disabled`
- `no disabled`
- `default disabled`

**Examples**
- This command closes the peering session with the MSDP peer at 10.4.4.12.
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.4.4.12
  switch(config-router-msdp-peer-10.4.4.12)#disabled
  switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Description: NORTH
  Connection status:
  State: Disabled
  Resets: 0
  Connection Source: Loopback100 ( 10.6.8.6 )
  SAs accepted:
  switch(config-router-msdp-peer-10.4.4.12)#
  ```

- This command reopens the peering session with the peer at 10.4.4.12.
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.4.4.12
  switch(config-router-msdp-peer-10.4.4.12)#no disabled
  switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Description: NORTH
  Connection status:
  State: Connect
  Resets: 0
  Connection Source: Loopback100 ( 10.6.8.6 )
  SAs accepted:
  switch(config-router-msdp-peer-10.4.4.12)#
  ```
group-limit

The `group-limit` command specifies the maximum number of Source-Active (SA) messages that the switch allows in the SA cache for a specified multicast group address.

SA messages have an expiration period of 90 seconds and remain in the SA cache until they expire. The switch does not accept SA messages for a group whose cache limit is reached until its cached messages start expiring.

The `no group-limit` and `default group-limit` command removes the maximum group limit for the specified prefix by removing the corresponding `group-limit` statement from `running-config`.

**Command Mode**
- Router MSDP Configuration
- Router MSDP VRF Configuration

**Command Syntax**

```
grup-limit quantity source src_subnet
no group-limit quantity source src_subnet
default group-limit quantity source src_subnet
```

**Parameters**

- *quantity*  maximum number of groups that can access the interface. Value ranges from 1 to 40000.
- *src_subnet*  Source IPv4 subnet (CIDR or address-mask notation).

**Example**

- This command sets the maximum number of 1000 SAs for multicast group 10.13.15.8/29.
  
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#group-limit 1000 source 10.13.15.8/29
  ```
ip msdp rejected-limit

The `ip msdp rejected-limit` command specifies the maximum number of rejected Source-Active messages that the switch allows in the SA cache.

SA messages have an expiration period of 90 seconds. They remain in the SA cache during this time. The default limit of rejected SA messages that the switch can store is 40000.

The `no ip msdp rejected-limit` and `default ip msdp rejected-limit` commands restore the rejected SA limit of 40000 by removing the `ip msdp rejected-limit` statement from `running-config`.

Command Mode
- Router MSDP Configuration
- Router MSDP VRF Configuration

Command Syntax

```
ip msdp rejected-limit quantity
no ip msdp rejected-limit
default ip msdp rejected-limit
```

Parameter
- `quantity` maximum rejected SA messages the SA cache can store. Value ranges from 0 to 40000.

Example
- This command sets 5000 as the maximum number of rejected SAs that the SA cache can contain.

```
switch(config)#router msdp
switch(config-router-msdp)#ip msdp rejected-limit 5000
```
keepalive (MSDP)

The `keepalive` command configures the MSDP keep-alive and hold time intervals for a specified MSDP peer connection.

- Keep-alive time interval is the period between the transmission of consecutive keep-alive messages. The default keep-alive time interval is 60 seconds.
- Hold time interval is the period the switch waits for a KEEPALIVE or UPDATE message before it disables peering. The default hold time interval is 75 seconds.

The `no keepalive` and `default keepalive` commands restore the default keep-alive and hold time intervals for the specified MSDP peer connection by removing the corresponding `keepalive` command from `running-config`.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**
```
keepalive keep_alive hold_time
no keepalive
default keepalive
```

**Parameters**
- `keep_alive` keep-alive period in seconds. Value ranges from 1 to 65535. Default value is 60.
- `hold_time` hold time in seconds. Value ranges from 1 to 65535. Default value is 75.

**Note**
The hold time interval must be longer than or equal to the keep-alive time interval.

**Example**
- This command sets the keep-alive time to 45 seconds and the hold time to 80 seconds for the connection with the MSDP peer at 10.4.4.12.
  ```
switch(config)#router msdp
  switch(config-router-msdp)#peer 10.4.4.12
  switch(config-router-msdp)#peer 10.4.4.12 keepalive 45 80
  switch(config-router-msdp)#
  ```
local-interface

MSDP peering sessions are established over a TCP connection. The `local-interface` command specifies the interface through which the TCP connection is established with the configuration-mode MSDP peer. When the `local-interface` command is not used to specify an interface, the connection is established through an interface determined by existing routing algorithms.

The `no local-interface` and `default local-interface` commands remove the corresponding `local-interface` command from `running-config`, returning selection of the connecting interface to the routing algorithm.

**Command Mode**

Router MSDP Peer Configuration
Router MSDP VRF Peer Configuration

**Command Syntax**

```
local-interface interface
no local-interface
default local-interface
```

**Parameters**

- `interface` local interface through which the TCP connection is established. Options include:
  - `ethernet e_num` Ethernet interface.
  - `loopback l_num` Loopback interface.
  - `management m_num` Management interface.
  - `port-channel p_num` Port-Channel Interface.
  - `vlan v_num` VLAN interface.
  - `vxlan vx_num` VXLAN interface.

**Example**

- These commands assign an IP address to loopback interface 100, then establish the TCP peer session to the MSDP peer at 10.4.4.12 through the loopback in the default VRF.

```
switch(config)#interface loopback 100
switch(config-if-Lo100)#ip address 10.6.8.6/24
switch(config-if-Lo100)#exit
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#local-interface loopback 100
switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
MSDP Peer 10.4.4.12
Connection status:
  State: Connect
  Resets: 0
  Connection Source: Loopback100 (10.6.8.6)
SAs accepted:
switch(config-router-msdp-peer-10.4.4.12)#
```
mesh-group

The mesh-group command configures the configuration-mode MSDP peer connection as an MSDP mesh group member. A peer can be assigned to multiple mesh groups. Multiple MSDP peers can be assigned to a common mesh group.

An MSDP mesh group is a network of MSDP speakers where each speaker directly connects to every other speaker. The switch does not forward Source-Active (SA) messages that it receives from a mesh group peer to other peers of the same group.

The no mesh-group and default mesh-group commands delete the configuration-mode peer connection from a mesh group by removing the corresponding mesh-group command from running-config when issued in Router MSDP Peer Configuration or Router MSDP Peer VRF Configuration Mode.

Note To delete all configured connections from a specified mesh group, use the no mesh-group command in Router MSDP Configuration mode.

Command Mode

Router MSDP Configuration
Router MSDP Peer Configuration
Router MSDP Peer VRF Configuration

Command Syntax

mesh-group group_name
no mesh-group group_name
default mesh-group group_name

Parameters

- group_name name of mesh group.

Related Command

- show msdp mesh-group

Example

- These commands configure the MSDP peer connection to 10.1.1.14 as a member of the AREA-1 mesh group, then display members of mesh groups to which configured MSDP peers belong.

  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.1.1.14
  switch(config-router-msdp-peer-10.1.1.14)#mesh-group AREA-1
  switch(config-router-msdp-peer-10.1.1.14)#show msdp mesh-group
  Mesh Group: AREA-1
          10.1.1.14
  Mesh Group: tier_01
          10.24.18.13
  Mesh Group: tier_02
          10.26.101.18
  switch(config-router-msdp-peer-10.1.1.14)#

- These commands delete all configured connections from the AREA-1 mesh group.

  switch(config)#router msdp
  switch(config-router-msdp)#no mesh-group AREA-1
  switch(config-router-msdp)#
originator-id local-interface

The **originator-id local-interface** command configures an originator ID to replace the rendezvous point (RP) address in source-address (SA) messages that it originates as an MSDP speaker.

SA messages that an MSDP speaker originates contain the speaker’s rendezvous point (RP) address, as configured through PIM statements and processes. An originator ID is an alternative IPv4 address that a speaker uses in place of its RP address when advertising SA messages. This command configures the switch to use the specified interface’s IP address as the RP address in SA messages that it originates.

The **no originator-id local-interface** and **default originator-id local-interface** commands configure the switch to use its RP address in SA messages that it sends by removing the **originator-id local-interface** command from **running-config**.

**Command Mode**
- Router MSDP Configuration
- Router MSDP VRF Configuration

**Command Syntax**
```
originator-id local-interface INTERFACE
no originator-id local-interface INTERFACE
default originator-id local-interface INTERFACE
```

**Parameters**
- **INTERFACE** Specifies the interface from which the IP address is derived. Options include:
  - **ethernet e_num** Ethernet interface.
  - **loopback l_num** Loopback interface.
  - **management m_num** Management interface.
  - **port-channel p_num** Port-Channel Interface.
  - **vlan v_num** VLAN interface.
  - **vxlan vx_num** VXLAN interface.

**Example**
- This command configures the switch to use the IP address assigned to loopback 100 as the RP address in SA messages that it originates.
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#originator-id local-interface loopback 100
  ```
**peer**

The `peer` command configures the specified address as an MSDP peer, enables MSDP on the switch if it was not previously enabled, and places the switch in Router MSDP Peer Configuration Mode for the specified peer.

The peering session with the device at the specified network is established over a TCP connection. The `local-interface` command can specify an interface through which the TCP connection is established. When the `local-interface` command is not used to specify an interface, the connection is established through an interface determined by existing routing algorithms.

The `no peer` and `default peer` commands remove the specified MSDP peer configuration by deleting the corresponding `peer` command from `running-config`. MSDP is disabled when the last `peer` command is removed.

**Command Mode**

Router MSDP Configuration

**Command Syntax**

```
peer ip_address
```

**Parameters**

`ip_address` IP address of the MSDP peer to be configured.

**Commands Available in Router MSDP Peer Configuration Mode**

- `default-peer`
- `description (MSDP)`
- `disabled (MSDP)`
- `keepalive (MSDP)`
- `local-interface`
- `mesh-group`
- `sa-filter in`
- `sa-filter out`
- `sa-limit`

**Example**

These commands establish an MSDP peer relationship with the peer at 192.168.3.17 and place the switch in the Router MSDP Peer Configuration Mode for that peer.

```
switch(config)#router msdp
switch(config-router-msdp)#peer 192.168.3.17
switch(config-router-msdp-peer-192.168.3.17)#
```
**router msdp**

The `router msdp` command places the switch in the router MSDP configuration mode, and allows to configure the global IP configuration commands and VRF commands in this mode.

The `no router msdp` and `default router msdp` commands removes the corresponding `router msdp` command from *running-config*.

**Command Mode**

Global Configuration

**Command Syntax**

```
router msdp
no router msdp
default router msdp
```

**Example**

- This command places the switch in the router MSDP configuration mode.
  
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#
  ```

**Related Commands**

- `connection retry interval`
- `default-peer`
- `description (MSDP)`
- `disabled (MSDP)`
- `group-limit`
- `ip msdp rejected-limit`
- `keepalive (MSDP)`
- `mesh-group`
- `originator-id local-interface`
- `peer`
- `sa-filter in`
- `sa-filter out`
- `sa-limit`
sa-filter in

The **sa-filter in** command assigns an IP access control list (ACL) as a filter for inbound Source-Active (SA) messages from the configuration-mode MSDP peer connection. The switch only accepts SA messages from the peer that are accepted by the assigned ACL. The switch accepts all SA messages from the peer when an ACL is not assigned as an inbound filter.

Only one ACL can be assigned as an inbound filter to an MSDP peer. Any subsequent **sa-filter in** commands for the peer replace the existing command.

The **no sa-filter in** and **default sa-filter in** commands remove the ACL assignment as an inbound filter by removing the corresponding **sa-filter in** command from **running-config**.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**

```bash
sa-filter in list list_name
no sa-filter in
default sa-filter in
```

**Parameters**
- **peer_id** MSDP peer address (IPv4 address).
- **list_name** name of ACL that filters SA messages.

**Related Command**
- **sa-filter out**

**Guideline**
- The command accepts standard and extended ACLs. The address field in a standard ACL filters an SA message on its group address.

**Example**
- These commands create an IP ACL named LIST-IN as the inbound SA message filter for the MSDP peer connection to 10.4.4.12. The ACL permits SAs from the multicast group 239.14.4.2/28.

```
switch(config)#ip access-list LIST-IN
switch(config-acl-LIST-IN)#permit ip any 239.14.4.2/28
switch(config-acl-LIST-IN)#exit
switch(config)#router msdp
switch(config-router-msdp)#peer 10.4.4.12
switch(config-router-msdp-peer-10.4.4.12)#sa-filter in list LIST-IN
switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
  MSDP Peer 10.4.4.12
  Connection status:
    State: Listen
    Connection Source: Loopback100 (10.6.8.6)
  SA Filtering:
    Input Filter: LIST-IN
```
**sa-filter out**

The `sa-filter out` command assigns an IP access control list (ACL) as a filter for outbound Source-Active (SA) messages to the configuration-mode MSDP peer connection, after which the switch only sends SA messages to the peer that are accepted by the assigned ACL. The switch sends all SA messages to the peer when an ACL is not assigned as an output filter to the peer.

Only one ACL can be assigned as an outbound filter to an MSDP peer. Any subsequent `sa-filter out` commands for the peer replace the existing command.

The `no sa-filter out` and `default sa-filter out` commands remove the ACL assignment as an outbound filter by removing the corresponding `sa-filter out` command from `running-config`.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**

```
 sa-filter out list  list_name
 no sa-filter out
 default sa-filter out
```

**Parameters**

- `peer_id` MSDP peer address (IPv4 address).
- `list_name` name of ACL that filters SA messages.

**Related Commands**

- `sa-filter in` assigns an IP ACL to filter inbound SA messages from the MSDP peer being configured.

**Guidelines**

The command accepts standard and extended ACLs. The address field in a standard ACLs filters an SA message on its group address.

**Example**

```
 These commands assign the IP ACL named LIST-OUT as the outbound SA message filter for the MSDP peer connection to 10.4.4.12.

 switch(config)#router msdp
 switch(config-router-msdp)#ip access-list LIST-OUT
 switch(config-acl-LIST-OUT)#permit ip any 239.14.4.2/28
 switch(config-acl-LIST-OUT)#exit
 switch(config)#router msdp
 switch(config-router-msdp)#peer 10.4.4.12
 switch(config-router-msdp-peer-10.4.4.12)#sa-filter out list LIST-OUT
 switch(config-router-msdp-peer-10.4.4.12)#show ip msdp peer
 MSDP Peer 10.4.4.12
 Connection status:
 State: Listen
 Connection Source: Loopback100 ( 10.6.8.6 )
 SA Filtering:
 Output Filter: LIST-OUT
 switch(config-router-msdp-peer-10.4.4.12)#
```
sa-limit

The **sa-limit** command specifies the maximum number of Source-Active messages from a specified MSDP peer that the switch allows in the SA cache. SA messages have an expiration period of 90 seconds, during which time they remain in the SA cache. The switch does not accept SA messages from a peer after the peer's SA limit is reached. By default, the limit to the number of SA messages that the switch can store from a specified peer is 40000, by default.

The **no sa-limit** and **default sa-limit** commands restore the SA limit of 40000 for the specified MSDP peer by removing the corresponding **sa-limit** statement from **running-config**.

**Command Mode**
- Router MSDP Peer Configuration
- Router MSDP Peer VRF Configuration

**Command Syntax**
```
sa-limit quantity
no sa-limit
default sa-limit
```

**Parameters**
- **peer_id** MSDP peer (IPv4 address).
- **quantity** maximum number of SA messages that the switch can store. Value ranges from 0 to 40000.

**Example**
- This command sets the SA limit of 500 for the MSDP peer at 10.1.1.5
  ```
  switch(config)#router msdp
  switch(config-router-msdp)#peer 10.1.1.5
  switch(config-router-msdp-peer-10.1.1.5)#sa-limit 500
  switch(config-router-msdp-peer-10.1.1.5)#
  ```
**show ip msdp peer**

The `show ip msdp peer` command displays information about specified MSDP peers. The command includes an optional parameter for displaying SAs accepted from the peer.

**Command Mode**

EXEC

**Command Syntax**

```
show ip msdp peer [PEER_ADDR] [SA_ACCEPT]
```

**Parameters**

- **PEER_ADDR** Peers for which command displays information.
  - <no parameter> All peers configured on the switch.
  - `ipv4_addr` Address of specified MSDP peer.
- **SA_ACCEPT** Command displays SAs accepted from the specified peers.
  - <no parameter> Accepted SAs are not displayed.
  - `accepted-sas` Accepted SAs are displayed.

**Example**

- This command displays MSDP information concerning the peer located at 10.2.42.4, including SAs that the switch accepted from this peer.

```
switch(config)#show ip msdp peer 10.2.42.4 accepted-sas
MSDP Peer 10.2.42.4
Connection status:
  State: Up
  Connection Source: Loopback4 ( 10.2.43.4 )
SA Filtering:
  Input Filter: allow-multicast-for-msdp
  Output Filter: allow-multicast-for-msdp
SAs accepted:
  (10.62.79.30, 234.1.4.2), RP 10.2.42.4
  (10.61.79.29, 234.1.4.1), RP 10.2.42.4
  (10.62.79.30, 234.1.4.1), RP 10.2.42.4
```
**show ip msdp pim sa-cache**

The `show ip msdp pim sa-cache` command displays the SA cache for the local PIM domain configured on the switch. An SA cache is a table of Source-Active messages that are generated or accepted by the PIM domain.

**Command Mode**

EXEC

**Command Syntax**

```
show ip msdp pim sa-cache
```

**Example**

- This command displays the SA cache for the local PIM domain.

```
switch(config)#show ip msdp pim sa-cache
    MSDP Source Active Messages for local Pim RP
    (10.51.71.23, 234.1.4.1), RP 10.2.43.4
    (10.20.91.26, 234.1.4.1), RP 10.2.43.4
    (10.51.71.23, 234.1.4.2), RP 10.2.43.4
    (10.20.91.21, 234.1.4.1), RP 10.2.43.4
    (10.51.79.23, 234.1.4.1), RP 10.2.43.4
    (10.20.91.24, 234.1.4.2), RP 10.2.43.4
    (10.51.79.23, 234.1.4.2), RP 10.2.43.4
    (10.20.91.21, 234.1.4.2), RP 10.2.43.4
    (10.20.91.26, 234.1.4.2), RP 10.2.43.4
    (10.20.91.24, 234.1.4.1), RP 10.2.43.4
```
**show ip msdp sa-cache**

The `show ip msdp sa-cache` command displays contents of the Source-Active (SA) message cache. The command provides these filter options for displaying partial cache contents:

- multicast group address: multicast group
- source address and group address

The command can also display unexpired SAs that were rejected by ACL filters or cache limit exceeded conditions.

**Command Mode**

EXEC

**Command Syntax**

```
show ip msdp sa-cache [ADDRESS_FILTER] [CONTENTS]
```

**Parameters**

- **ADDRESS_FILTER**  IPv4 address used to filter SA messages.
  - <no parameter>  All SA messages.
  - `grp_addr`  Multicast group address (IPv4 address).
  - `src_addr grp_addr`  Source and multicast group addresses (two IPv4 addresses).
    - `grp_addr`  must be a valid multicast address.
- **CONTENTS**  type of SAs that the command displays.
  - <no parameter>  Displays contents of SA Cache.
  - `rejected`  Displays rejected SAs in addition to the SA cache contents.

**Example**

- This command displays the contents of the SA message cache.

```
switch(config)#show ip msdp sa-cache
MSDP Source Active Cache
(10.61.71.29, 234.1.4.2), RP 10.5.29.4, heard from 10.5.29.4
(10.51.71.23, 234.1.4.1), RP 10.5.29.4, heard from 10.5.29.4
(10.61.79.29, 234.1.4.2), RP 10.5.29.4, heard from 10.5.29.4
(10.53.71.27, 234.1.4.2), RP 10.3.25.4, heard from 10.3.25.4
(10.10.101.24, 234.1.4.1), RP 10.2.44.4, heard from 10.2.44.4
(10.10.151.22, 234.1.4.2), RP 10.1.12.4, heard from 10.1.12.4
(10.61.71.29, 234.1.4.1), RP 10.5.29.4, heard from 10.5.29.4
(10.20.91.21, 234.1.4.1), RP 10.2.44.4, heard from 10.2.44.4
(10.61.79.29, 234.1.4.1), RP 10.2.42.4, heard from 10.2.42.4
(10.53.79.27, 234.1.4.2), RP 10.3.25.4, heard from 10.3.25.4
(10.10.151.28, 234.1.4.2), RP 10.3.25.4, heard from 10.3.25.4
(10.52.79.25, 234.1.4.2), RP 10.2.44.4, heard from 10.2.44.4
(10.52.71.25, 234.1.4.2), RP 10.2.44.4, heard from 10.2.44.4
(10.20.91.24, 234.1.4.1), RP 10.5.29.4, heard from 10.5.29.4
(10.10.151.22, 234.1.4.1), RP 10.1.12.4, heard from 10.1.12.4
```
show ip msdp sanity

The `show ip msdp sanity` command performs a consistency check between the multicast routing table and the MSDP Source-Address (SA) caches. When the command detects inconsistencies, it displays the cache entries that are not in the table.

**Command Mode**

**EXEC**

**Command Syntax**

`show ip msdp sanity`

**Examples**

- This command displays a sanity check that detects no inconsistencies between the SA cache and the multicast routing table.

```
switch(config)#show ip msdp sanity
  PIM SA cache entries not in the MRT
  Msdp-learnt MRT entries not in the SA cache
  SA cache entries not in the MRT
  May-Notify-MSDP entries not in the PIM SA cache
  (need not be an error condition)
```

- This command displays inconsistencies between the SA cache and the multicast routing table.

```
switch(config)#show ip msdp sanity
  PIM SA cache entries not in the MRT
  Msdp-learnt MRT entries not in the SA cache
  SA cache entries not in the MRT
  (192.168.3.8, 224.1.154.1)
  (192.168.3.35, 224.1.167.1)
  (192.168.3.16, 224.1.226.1)
  (192.168.3.19, 224.1.246.1)
  (192.168.3.17, 224.1.204.1)
  (192.168.3.12, 224.1.182.1)
  (192.168.3.33, 224.1.150.1)
  (192.168.3.26, 224.1.198.1)
  (192.168.3.33, 224.1.195.1)
  (192.168.3.4, 224.1.246.1)
  (192.168.3.37, 224.1.188.1)
  (192.168.3.12, 224.1.245.1)
  (192.168.3.31, 224.1.206.1)
  (192.168.3.35, 224.1.178.1)
  (192.168.3.6, 224.1.155.1)
  May-Notify-MSDP entries not in the PIM SA cache
  (need not be an error condition)
  4.1), RP 10.2.42.4
show ip msdp summary

The `show ip msdp summary` command displays a list of peer addresses, the operational status of the peer, and the number of Source-Active messages in the SA cache from that peer.

**Command Mode**

EXEC

**Command Syntax**

`show ip msdp summary`

**Example**

- This command displays the configured peers, the status of the peers, and the number of SA message received from those peers.

```
switch(config)#show ip msdp summary
MSDP Peer Status Summary
Peer Address       State  SA Count
192.168.3.18       Up      0
192.168.3.16       Up      0
192.168.3.37       Listen 0
192.168.3.46       Up      0
192.168.3.47       Up      0
```
show msdp mesh-group

The `show msdp mesh-group` command displays the mesh group membership of MSDP peers that are configured on the switch. An MSDP mesh group is a network of MSDP speakers where each speaker is directly connected to every other speaker. The switch does not forward Source-Active (SA) messages that it receives from a mesh group peer to other peers of the same group.

**Command Mode**
EXEC

**Command Syntax**
```
show msdp mesh-group
```

**Related Command**
- `mesh-group` configures the MSDP peer connection as an MSDP mesh group member.

**Example**
- This command displays the mesh group membership of configured MSDP peers.

```
switch(config)#show msdp mesh-group
  Mesh Group: tier_01
    10.24.18.13
  Mesh Group: tier_02
    10.26.101.18
```
**show msdp rpf-peer**

The `show msdp rpf-peer` command displays MSDP information for the peer from which the switch accepts SA messages for a specified rendezvous point (RP).

The switch examines the BGP routing table to determine the next hop peer toward the originating RP of an SA message. This next hop peer is the reverse path forwarding (RPF) peer. Because the switch receives SA messages from the RPF peer, it forwards the message to all other MSDP peers. The switch rejects identical SA messages that it receives from a non-RPF peer.

**Command Mode**

EXEC

**Command Syntax**

`show msdp rpf-peer rp_addr`

**Parameter**

- `rp_addr` PIM RP IPv4 address.

**Example**

- This command displays MSDP information for the peer from which the switch accepts SA messages for the RP at 10.5.29.4.

  ```
  switch(config)#show msdp rpf-peer 10.5.29.4
  Rpf Peer is 10.5.29.4 for RP 10.5.29.4
  ```