

# Multicast Source Discovery Protocol

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This feature module describes the Multicast Source Discovery Protocol feature. It includes information on the benefits of the new feature, supported platforms, related documents, and so forth.

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## Feature Overview

Multicast Source Discovery Protocol (MSDP) is a mechanism to connect multiple PIM sparse-mode (SM) domains. MSDP allows multicast sources for a group to be known to all rendezvous point(s) (RPs) in different domains. Each PIM-SM domain uses its own RPs and need not depend on RPs in other domains. An RP runs MSDP over TCP to discover multicast sources in other domains.

An RP in a PIM-SM domain has an MSDP peering relationship with MSDP-enabled routers in another domain. The peering relationship occurs over a TCP connection, where primarily a list of sources sending to multicast groups is exchanged. The TCP connections between RPs are achieved by the underlying routing system. The receiving RP uses the source lists to establish a source path.

The purpose of this topology is to have domains discover multicast sources in other domains. If the multicast sources are of interest to a domain that has receivers, multicast data is delivered over the normal, source-tree building mechanism in PIM-SM.

MSDP is also used to announce sources sending to a group. These announcements must originate at the domain's RP.

MSDP depends heavily on (M)BGP for interdomain operation. It is recommended that you run MSDP in RPs in your domain that are RPs for sources sending to global groups to be announced to the internet.

## How MSDP Works

Figure 1 illustrates MSDP operating between two MSDP peers. PIM uses MSDP as the standard mechanism to register a source with the RP of a domain.

When MSDP is configured, the following sequence occurs. When a source's first data packet is registered by the first-hop router, that same data packet is decapsulated by the RP and forwarded down the shared tree. That packet is also re-encapsulated in a Source-Active (SA) message that is immediately forwarded to all MSDP peers. The SA message identifies the source, the group the source is sending to, and the RP's own address or the originator ID, if configured. If the peer is an RP and has a member of that multicast group, the data packet is decapsulated and forwarded down the shared-tree in the remote domain.

The PIM designated router (DR) directly connected to the source sends the data encapsulated in a PIM Register message to the RP in the domain.

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**Note** Note that this happens only once per source, when the source goes active. If the source times out, this process happens again when it goes active again. This is different from the periodic SA message that contains all sources that are registered to the originating RP. These messages have no data.

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Each MSDP peer receives and forwards the SA message away from the originating RP to achieve "peer-RPF flooding." The concept of peer-RPF flooding is with respect to forwarding SA messages. The router examines the BGP or MBGP routing table to determine which peer is the next hop toward the originating RP of the SA message. Such a peer is called an "RPF peer" (Reverse-Path Forwarding peer). The router forwards the message to all MSDP peers other than the RPF peer.

If the MSDP peer receives the same SA message from a non-RPF peer toward the originating RP, it drops the message. Otherwise, it forwards the message on to all its MSDP peers.

When an RP for a domain receives an SA message from an MSDP peer, it determines if it has any group members interested in the group the SA message describes. If the (\*,G) entry exists with a nonempty outgoing interface list, the domain is interested in the group, and the RP triggers an (S,G) join toward the source.

**Figure 1**      **MSDP Running Between RP Peers**

## Benefits

MSDP has the following benefits:

- It breaks up the shared multicast distribution tree. You can make the shared tree local to your domain. Your local members join the local tree, and Join messages for the shared tree never have to leave your domain.
- PIM sparse-mode domains can rely on their own RPs only, thus decreasing reliance on RPs in another domain. This increases security because you can prevent your sources from being known outside your domain.
- Domains with only receivers can receive data without globally advertising group membership.
- Global source multicast routing table state is not required, thus saving on memory.

## Supported Platforms

MSDP operates on all Cisco IOS platforms that run Cisco IOS Release 11.1 CC, 12.0(5)S, or 12.0(7)T.

## Prerequisites

Before configuring MSDP, the addresses of all MSDP peers must be known in BGP or MBGP. If that does not occur, you must configure MSDP default peering when you configure MSDP.

## Supported Standards, MIBs, and RFCs

### MIBs

No new or modified MIBs are supported by this feature.

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

### RFCs

None

### Standards

This feature supports Internet Engineering Task Force draft *Multicast Source Discovery Protocol (MSDP)*.

## Configuration Tasks

To configure an MSDP peer and various MSDP options, perform the following tasks. The first task is required; the remaining are optional.

- Configuring an MSDP Peer (Required)
- Caching Source-Active State (Optional)
- Requesting Source Information from an MSDP Peer (Optional)
- Controlling Source Information Your Router Originates (Optional)
- Controlling Source Information Your Router Forwards (Optional)
- Controlling Source Information Your Router Receives (Optional)
- Configuring a Default MSDP Peer (Optional)
- Configuring an MSDP Mesh Group (Optional)
- Shutting Down an MSDP Peer (Optional)
- Including a Bordering PIM Dense-Mode Region in MSDP (Optional)
- Configuring an Originating Address Other Than the RP Address (Optional)

## Configuring an MSDP Peer

You enable MSDP by configuring an MSDP peer to the local router.

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**Note** The router you specify by Domain Naming System (DNS) name or IP address as an MSDP peer is probably a BGP neighbor. If it is not, see the section “Configuring a Default MSDP Peer” later in this document.

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To configure an MSDP peer, use the following commands in global configuration mode. The second command is optional.

Command	Purpose
<b>ip msdp peer</b> { <i>peer-name</i>   <i>peer-address</i> } [ <b>connect-source</b> <i>type number</i> ] [ <b>remote-as</b> <i>as-number</i> ]	Enables MSDP and configures an MSDP peer as specified by the DNS name or IP address.  If you specify the <b>connect-source</b> keyword, the primary address of the specified local interface <i>type</i> and <i>number</i> is used as the source IP address for the TCP connection. The <b>connect-source</b> keyword is recommended, especially for MSDP peers on a border that peer with a router inside the remote domain.
<b>ip msdp description</b> { <i>peer-name</i>   <i>peer-address</i> } <i>text</i>	Configures a description for a specified peer to make it easier to identify in a configuration or in <b>show</b> command output.

## Caching Source-Active State

By default, the router does not cache source/group pairs from received SA messages. Once the router forwards the MSDP Source-Active information, it does not store it in memory. Therefore, if a member joins a group soon after a Source-Active message is received by the local RP, that member will have to wait until the next SA message to hear about the source. This delay is known as join latency.

If you want to sacrifice some memory in exchange for reducing the latency of the source information, you can configure the router to cache Source-Active messages. To have the router cache source/group pairs, use the following command in global configuration mode:

Command	Purpose
<b>ip msdp cache-sa-state</b> [ <b>list</b> <i>access-list-number</i> ]	Creates SA state (cache source/group pairs). Those pairs that pass the access list are cached.

An alternative to caching the source-active state is to request source information from a peer, which is described in the section “Requesting Source Information from an MSDP Peer.” If you cache the information, you don’t need to trigger a request for it.

## Requesting Source Information from an MSDP Peer

Local RPs can send Source-Active Requests and get immediate response for all active sources for a given group. By default, the router does not send any Source-Active Request messages to its MSDP peers when a new member joins a group and wants to receive multicast traffic. The new member just waits to receive the next periodic Source-Active message.

If you want a new member of a group to learn the current, active multicast sources in a connected PIM sparse-mode domain that are sending to a group, configure the router to send Source-Active Request messages to the specified MSDP peer when a new member joins a group. Doing so reduces join latency, but requires some memory.

Note that information can be requested only from caching peers.

To configure this feature, use the following command in global configuration mode:

Command	Purpose
<code>ip msdp sa-request {ip-address   name}</code>	Configures the router to send Source-Active Request messages to the specified MSDP peer when a receiver becomes active, so the receiver can learn about multicast sources in a group. The peer replies with the information it is SA cache. If the peer does not have a cache configured, this command provides nothing.

Repeat the preceding command for each MSDP peer that you want to supply you with Source-Active messages.

An alternative to requesting source information is to cache the source-active state, which is described in the earlier section “Caching Source-Active State.” If you cache the information, you don’t need to trigger a request for it.

## Controlling Source Information Your Router Originates

There are two ways to control the multicast source information that originates with your router. You can control the following:

- Which sources you will advertise (based on your sources)
- Whom you will provide source information to (based on knowing who is asking you for information)

To control which sources you will advertise, see the section “Redistributing Sources” later in this document. To control whom you will provide source information to, see the section “Controlling Source Information Your Router Forwards.”

## Redistributing Sources

Source-Active messages are originated on RPs to which sources have registered. By default, any source that registers with an RP will be advertised. The “A flag” is set in the RP when a source is registered. This means the source will be advertised in an SA unless it is filtered with the command below.

To further restrict which registered sources are advertised, use the following command in global configuration mode. The access list or autonomous system path access list determines which (S,G) pairs are advertised.

Command	Purpose
<code>ip msdp redistribute [list access-list-name] [asn aspath-access-list-number] [route-map map]</code>	Advertises (S,G) pairs that pass the access list or route map to other domains.

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**Note** The `ip msdp redistribute` command could also be used to advertise sources that are known to the RP but not registered. However, it is strongly recommended you NOT originate advertisements for sources that have not registered with the RP.

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## Filtering Source-Active Request Messages

By default, only routers that are caching Source-Active information can respond to Source-Active Requests. By default, such a router honors all Source-Active Request messages from its MSDP peers. That is, it will supply the IP addresses of the sources that are active.

However, you can configure the router to ignore all Source-Active Requests from an MSDP peer. Or, you can honor only those Source-Active Request messages from a peer for groups described by a standard access list. If the access list passes, Source-Active Request messages will be accepted. All other such messages from the peer for other groups will be ignored.

To configure one of these options, use the appropriate command in global configuration mode:

Command	Purpose
<b>ip msdp filter-sa-request</b> <i>ip-address   name</i>	Filters all Source-Active Request messages from the specified MSDP peer.
<b>ip msdp filter-sa-request</b> <i>ip-address   name list access-list-number</i>	Filters Source-Active Request messages from the specified MSDP peer for groups that pass the standard access list. The access list describes a multicast group address.

## Controlling Source Information Your Router Forwards

By default, the router forwards all Source-Active messages it receives to all of its MSDP peers. However, you can prevent outgoing messages from being forwarded to a peer by using a filter or by setting a time to live (TTL). These methods are described in the following sections.

### Using a Filter

By creating a filter, you can do one of the following:

- Filter all source/group pairs
- Specify an extended access list to pass only certain source/group pairs
- Filter based on match criteria in a route map

To apply a filter, use one of the following commands in global configuration mode:

Command	Purpose
<b>ip msdp sa-filter out</b> { <i>ip-address   name</i> }	Filters all Source-Active messages to the specified MSDP peer.
<b>ip msdp sa-filter out</b> { <i>ip-address   name</i> } <b>list</b> <i>access-list-name</i>	To the specified MSDP peer, passes only those Source-Active messages that pass the extended access list.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) pair in outgoing SA messages.

Command	Purpose
<b>ip msdp sa-filter out</b> { <i>ip-address</i>   <i>name</i> } <b>route-map</b> <i>map-tag</i>	To the specified MSDP peer, passes only those Source-Active messages that meet the match criteria in the route map <i>map-tag</i> .  If all match criteria are true, a <b>permit</b> from the route map will pass routes through the filter. A <b>deny</b> will filter routes.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) in outgoing SA messages.

## Using TTL to Limit the Multicast Data Sent in SA Messages

You can use TTL to control what data will be encapsulated in the first SA message for every source. For example, you could limit internal traffic to a TTL of 8. If you want other groups to go to external locations, you would have to send those packets with a TTL greater than 8.

To establish a TTL threshold, use the following command in global configuration mode:

Command	Purpose
<b>ip msdp ttl-threshold</b> { <i>ip-address</i>   <i>name</i> } <i>ttl</i>	Limits which multicast data will be encapsulated in the first Source-Active message to the specified MSDP peer.

## Controlling Source Information Your Router Receives

By default, the router receives all Source-Active messages its MSDP Reverse-Path Forwarding peers send to it. However, you can control the source information you receive from MSDP peers by filtering incoming Source-Active messages. In other words, you can configure the router not to accept them.

You can do one of the following:

- Filter all incoming Source-Active messages from an MSDP peer
- Specify an extended access list to pass certain source/group pairs
- Filter based on match criteria in a route map

To apply a filter, use one of the following commands in global configuration mode:

Command	Purpose
<b>ip msdp sa-filter in</b> <i>ip-address</i>   <i>name</i>	From the specified MSDP peer, filters all Source-Active messages received.
<b>ip msdp sa-filter in</b> <i>ip-address</i>   <i>name</i> <b>list</b> <i>access-list-name</i>	From the specified MSDP peer, passes incoming Source-Active messages that pass the extended access list.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) pair in incoming SA messages.

Command	Purpose
<code>ip msdp sa-filter in ip-address   name route-map map-tag</code>	<p>From the specified MSDP peer, passes only those Source-Active messages that meet the match criteria in the route-map <i>map-tag</i>.</p> <p>If all match criteria are true, a <b>permit</b> from the route-map will pass routes through the filter. A <b>deny</b> will filter routes.</p> <p>If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) in incoming SA messages.</p>

## Configuring a Default MSDP Peer

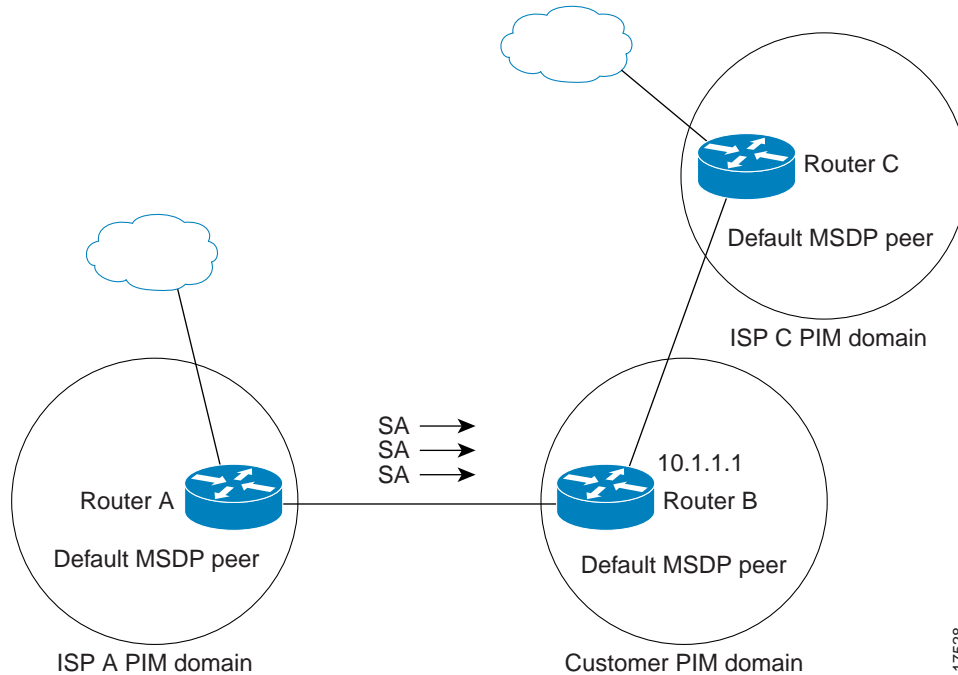
An MSDP peer of the local router is probably a BGP peer also. However, if you do not want to have or cannot have a BGP peer, you could define a default MSDP peer from which to accept all SA messages. The default MSDP peer must be a previously configured MSDP peer. Perform this task when you are not BGP- or MBGP-peering with an MSDP peer. If a single MSDP peer is configured, a router will always accept all SA messages sent to it from that peer.

Figure 2 illustrates a scenario where default MSDP peers might be used. In the figure, a customer who owns Router B is connected to the internet via two Internet Service Providers (ISPs), one who owns Router A and the other who owns Router C. They are not running BGP or MBGP between them. In order for the customer to learn about sources in the ISP's domain or in other domains, Router B identifies Router A as its default MSDP peer. Router B advertises SA messages to both Router A and Router C, but accepts SA messages either from Router A only or Router C only. If Router A is first in the configuration file, it will be used if it is up and running. If Router A isn't running, then and only then will Router B accept SA messages from Router C.

The ISP will also likely use a prefix list to define which prefixes it will accept from the customer's router. The customer will define multiple default peers, each having one or more prefixes associated with it.

The customer has two ISPs to use. He defines both ISPs as default peers. As long as the first default peer identified in the configuration is up and running, it will be the default peer and the customer will accept all SA messages it receives from that peer.

**Figure 2** Default MSDP Peer Scenario



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Router B advertises SAs to Router A and Router C, but uses only Router A or Router C to accept SA messages. If Router A is first in the configuration file, it will be used if it is up and running. If Router A isn't running, then, and only then, will Router B accept SAs from Router C. This is the behavior without a prefix list.

If you specify a prefix list, the peer will be a default peer only for the prefixes in the list. You can have multiple active default peers when you have a prefix list associated with each. When you do not have any prefix lists, you can configure multiple default peers, but only the first one is the active default peer as long as the router has connectivity to this peer and the peer is alive. If the first configured peer goes down or the connectivity to this peer goes down, the second configured peer becomes the active default, and so on.

To specify a default MSDP peer, use the following command in global configuration mode:

Command	Purpose
<code>ip msdp default-peer ip-address   name [prefix-list list]</code>	Defines a default MSDP peer.

See the section “Default MSDP Peer” for a sample configuration.

## Configuring an MSDP Mesh Group

An MSDP mesh group is a group of MSDP speakers that have fully meshed MSDP connectivity between one another. Any SA messages received from a peer in a mesh group are not forwarded to other peers in the same mesh group. Thus, you reduce SA message flooding and simplify peer-RPF flooding. The command below is used when there are multiple RPs within a domain. It is especially used to transit SA messages across a domain.

You can configure multiple mesh groups (with different names) in a single router.

To create a mesh group, use the following command in global configuration mode for each MSDP peer in the group:

Command	Purpose
<b>ip msdp mesh-group</b> <i>name</i> { <i>ip-address</i>   <i>name</i> }	Configures an MSDP mesh group and indicates that an MSDP peer belongs to that mesh group.

## Shutting Down an MSDP Peer

If you want to configure many MSDP commands for the same peer and you do not want the peer to go active, you can shut down the peer, configure it, and later bring it up.

You might also want to shut down an MSDP session without losing configuration information for the peer.

When in shutdown mode, the TCP connection is terminated and not restarted.

To shut down a peer, use the following command in global configuration mode:

Command	Purpose
<b>ip msdp shutdown</b> { <i>peer-name</i>   <i>peer address</i> }	Administratively shuts down the specified MSDP peer.

## Including a Bordering PIM Dense-Mode Region in MSDP

You might have a router that borders a PIM sparse-mode region with a dense-mode region. By default, sources in the dense-mode region are not included in MSDP. You could configure this border router to send SA messages for sources active in the dense-mode region. If you do so, it is very important to also configure the **ip msdp redistribute** command to apply to only local sources. This can result in (S, G) state remaining long after a source in the dense-mode domain has stopped sending.

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**Note** This command is not recommended. It is better to configure the border router in the sparse-mode domain to proxy-register sources in the dense-mode domain to the RP of the sparse-mode domain and have the sparse-mode domain use standard MSDP procedures to advertise these sources.

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To configure the border router to send SA messages for sources active in the dense-mode region, use the following command in global configuration mode:

Command	Purpose
<b>ip msdp border sa-address</b> <i>type number</i>	Configures the router on the border between a dense-mode and sparse-mode region to send SA messages about active sources in the dense-mode region. The IP address of the interface is used as the Originator-ID, which is the RP field in the SA message.

## Configuring an Originating Address Other Than the RP Address

If you want to change the Originator ID for any reason, use the **ip msdp originator-id** command in this section. For example, you might change the Originator ID in one of these cases:

- If you configure a logical RP on multiple routers in an MSDP mesh-group. For an example of a logical RP, see the section “Logical RP” later in this document.
- If you have a router that borders a PIM sparse-mode domain and a dense-mode domain. If a router borders a dense-mode domain for a site, and sparse-mode is being used externally, you might want dense-mode sources to be known to the outside world. Because this router is not an RP, it would not have an RP address to use in an SA message. Therefore, this command provides the RP address by specifying the address of the interface.

To allow an MSDP speaker that originates a Source-Active message to use its interface’s IP address as the RP address in the SA message, use the following command in global configuration mode:

Command	Purpose
<b>ip msdp originator-id</b> <i>type number</i>	Configures the RP address in SA messages to be the address of the originating router’s interface.

## Monitoring and Maintaining MSDP

To monitor MSDP Source-Active messages, peers, state, or peer status, use the following commands in EXEC mode:

Command	Purpose
<b>debug ip msdp</b> [ <i>peer-address</i>   <i>name</i> ] [ <b>detail</b> ] [ <i>routes</i> ]	Debugs an MSDP activity.
<b>debug ip msdp resets</b>	Debugs MSDP peer reset reasons.
<b>show ip msdp count</b> [ <i>autonomous-system-number</i> ]	Displays the number of sources and groups originated in SA messages from each autonomous system. The <b>ip msdp cache-sa-state</b> command must be configured for this command to produce any output.
<b>show ip msdp peer</b> [ <i>peer-address</i>   <i>name</i> ]	Displays detailed information about an MSDP peer.
<b>show ip msdp sa-cache</b> [ <i>group-address</i>   <i>source-address</i> ] [ <i>group-name</i>   <i>source-name</i> ] [ <i>autonomous-system-number</i> ]	Displays (S,G) state learned from MSDP peers.
<b>show ip msdp summary</b>	Displays MSDP peer status and SA message counts.

To clear MSDP connections, statistics, or SA cache entries, use the following commands in EXEC mode:

Command	Purpose
<b>clear ip msdp peer</b> [ <i>peer-address</i>   <i>name</i> ]	Clears the TCP connection to the specified MSDP peer, resetting all MSDP message counters.
<b>clear ip msdp statistics</b> [ <i>peer-address</i>   <i>name</i> ]	Clears the TCP connection to the specified MSDP peer, reset all MSDP message counters.
<b>clear ip msdp sa-cache</b> [ <i>group-address</i>   <i>name</i> ]	Clears the Source-Active cache entries for all entries, all sources for a specific group, or all entries for a specific source/group pair.

## Configuration Examples

This section contains the following MSDP configurations examples:

- Default MSDP Peer
- Logical RP

### Default MSDP Peer

The following example is a partial configuration of Router A and Router C in Figure 2. Each of these ISPs may have more than one customer like the customer in the figure who use default peering (no BGP or MBGP). In that case, they may have similar configurations. That is, they will only accept SAs from a default peer if the SA is permitted by the corresponding prefix list.

#### Router A

```
ip msdp default-peer 10.1.1.1
ip msdp default-peer 10.1.1.1 prefix-list site-a ge 32
ip prefix-list site-b permit 10.0.0.0/8
```

#### Router C

```
ip msdp default-peer 10.1.1.1 prefix-list site-a ge 32
ip prefix-list site-b permit 10.0.0.0/8
```

### Logical RP

The following example configures a logical RP using an MSDP mesh-group. The four routers that are logical RPs are RouterA, RouterB, RouterC, and RouterD. RouterE is an MSDP border router that is not an RP. Figure 3 illustrates the logical RP environment in this example; the configurations for routers A, B and E follow the figure.

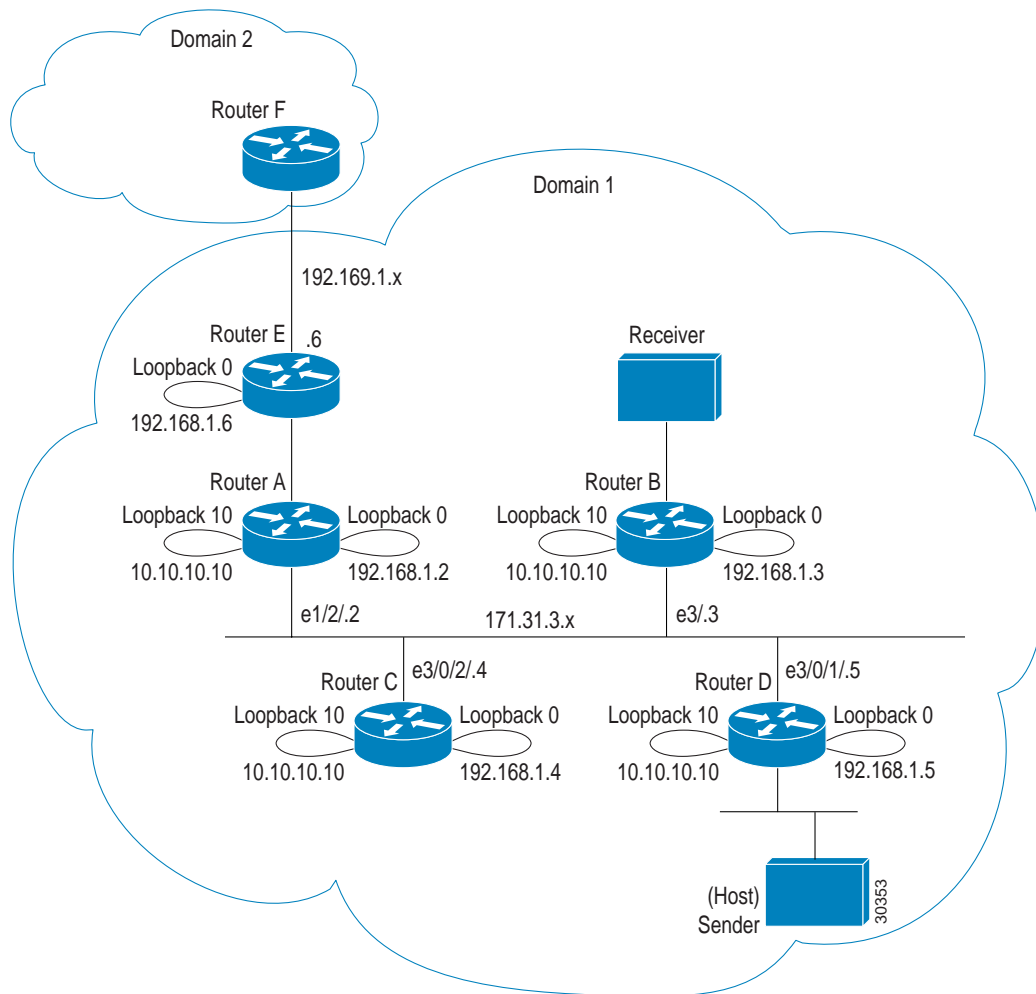
It is important to note the use of the loopback interface and how those host routes are advertised in OSPF. It is also important to carefully choose the OSPF router ID loopback so the ID does not use the logical RP address.

In this example, all the logical RPs are on the same LAN, but this is not typical. The host-route for the RP address is advertised throughout the domain and each PIM DR in the domain joins to the closest RP. The RPs each share (S,G) information with each other by sending SA messages. Each logical RP must use a separate Originator-ID.

Note there are two MSDP mesh-groups on RouterA. The routes for the loopback interfaces are in OSPF. Loopback 0 is the Router ID and is used as the connect-source/update-source for MBGP/MSDP. Loopback 10 is the same on all routers in the example.

All networks are 171.69.0.0. The RP address is 10.10.10.10 on Loopback 10 on all RPs. BGP connections are 192.168.1.x on Loopback 0. Loopback 0 is put into BGP with network 192.168.1.3 mask 255.255.255.255 nlrri unicast multicast.

**Figure 3 Logical RP using MSDP**



**RouterA**

```

!
hostname RouterA
!
ip routing
!
ip subnet-zero
ip multicast-routing
!
!
interface Loopback0
 ip address 192.168.1.2 255.255.255.255
 no shutdown
!
interface Loopback10
 ip address 10.10.10.10 255.255.255.255
 no ip directed-broadcast
 ip pim sparse-dense-mode
 no shutdown
!
interface Ethernet1/2
 description LANethernet2
    
```

```

    ip address 171.69.2.2 255.255.255.0
ip pim sparse-dense-mode
no shutdown
!
interface Ethernet4/0/0
    description LANEthernet3
    ip address 171.69.3.2 255.255.255.0
ip pim sparse-dense-mode
no shutdown
!
router ospf 10
    network 171.69.0.0 0.0.255.255 area 0
    network 10.10.10.10 0.0.0.0 area 0
    network 192.168.1.2 0.0.0.0 area 0
!
router bgp 1
    no synchronization
    network 171.69.0.0 nlri unicast multicast
    network 192.168.1.2 mask 255.255.255.255 nlri unicast multicast
    neighbor 192.168.1.3 remote-as 1 nlri unicast multicast
neighbor description routerB
    neighbor 192.168.1.3 next-hop-self
neighbor 192.168.1.3 update-source loopback0
neighbor 192.168.1.4 remote-as 1 nlri unicast multicast
neighbor description routerC
neighbor 192.168.1.4 update-source loopback0
neighbor 192.168.1.5 remote-as 1 nlri unicast multicast
neighbor description routerD
    neighbor 192.168.1.5 next-hop-self
neighbor 192.168.1.5 update-source loopback0
neighbor 192.168.1.6 remote-as 1 nlri unicast multicast
neighbor description routerE
    neighbor 192.168.1.6 update-source Loopback0
    neighbor 192.168.1.6 next-hop-self
!
!
ip msdp peer 192.168.1.3 connect-source loopback 0
ip msdp peer 192.168.1.5 connect-source loopback 0
ip msdp peer 192.168.1.4 connect-source loopback 0
ip msdp peer 192.168.1.6 connect-source Loopback0
ip msdp mesh-group inside-test 192.168.1.3
ip msdp mesh-group inside-test 192.168.1.4
ip msdp mesh-group inside-test 192.168.1.5
ip msdp mesh-group outside-test 192.168.1.6
ip msdp originator-id loopback0
!
ip classless
ip pim send-rp-disc scope 10
ip pim send-rp-anno loopback 10 scope 10
!

```

## RouterB

```

!
hostname RouterB
!
ip routing
!
ip multicast-routing
ip dvmrp route-limit 20000
!
interface Loopback0
    ip address 192.168.1.3 255.255.255.255
    no shutdown

```

```

!
interface Loopback10
 ip address 10.10.10.10 255.255.255.255
 ip pim sparse-dense-mode
 no shutdown
!
interface Ethernet2
 description LANEthernet 0
 ip address 171.69.0.3 255.255.255.0
 ip pim sparse-dense-mode
 no shutdown
!
interface Ethernet3
 description LANEthernet 2
 ip address 171.69.2.3 255.255.255.0
 ip pim sparse-dense
!
router ospf 10
 network 171.69.0.0 0.0.255.255 area 0
 network 10.10.10.10 0.0.0.0 area 0
 network 192.168.1.3 0.0.0.0 area 0
!
router bgp 1
 no synchronization
 network 171.69.0.0 nlri unicast multicast
 network 192.168.1.3 mask 255.255.255.255 nlri unicast multicast
 neighbor 192.168.1.2 remote-as 1 nlri unicast multicast
 neighbor description routerA
 neighbor 192.168.1.2 update-source loopback0
 neighbor 192.168.1.4 remote-as 1 nlri unicast multicast
 neighbor description routerC
 neighbor 192.168.1.4 update-source loopback0
 neighbor 192.168.1.5 remote-as 1 nlri unicast multicast
 neighbor description routerD
 neighbor 192.168.1.5 update-source loopback0
 neighbor 192.168.1.5 soft-recon in
!
 ip msdp peer 192.168.1.2 connect-source loopback 0
 ip msdp peer 192.168.1.5 connect-source loopback 0
 ip msdp peer 192.168.1.4 connect-source loopback 0
 ip msdp mesh-group inside-test 192.168.1.2
 ip msdp mesh-group inside-test 192.168.1.4
 ip msdp mesh-group inside-test 192.168.1.5
 ip msdp originator-id loopback0
!
 ip classless
 ip pim send-rp-disc scope 10
 ip pim send-rp-anno loopback 10 scope 10
!

```

## RouterE

```

!
hostname RouterE
!
 ip routing
!
 ip subnet-zero
 ip routing
 ip multicast-routing
 ip dvmrp route-limit 20000
!
interface Loopback0
 ip address 192.168.1.6 255.255.255.255

```

```
no shutdown
!
interface Ethernet2
  description LANethernet 3
  ip address 171.69.3.6 255.255.255.0
  ip pim sparse-dense-mode
  no shutdown
!
interface Ethernet5
  description LANethernet 6
  ip address 192.169.1.6 255.255.255.0
  ip pim sparse-dense-mode
  ip multicast boundary 20
  no shutdown
!
router ospf 10
  network 171.69.0.0 0.0.255.255 area 0
  network 192.168.1.6 0.0.0.0 area 0
  default-information originate metric-type 1
!
router bgp 1
  no synchronization
  network 171.69.0.0 nlri unicast multicast
  network 192.168.1.6 mask 255.255.255.255 nlri unicast multicast
  network 192.168.1.0
  neighbor 192.168.1.2 remote-as 1 nlri unicast multicast
  neighbor 192.168.1.2 update-source Loopback0
  neighbor 192.168.1.2 next-hop-self
  neighbor 192.168.1.2 route-map 2-intern out
  neighbor 192.169.1.7 remote-as 2 nlri unicast multicast
  neighbor 192.169.1.7 route-map 2-extern out
  neighbor 192.169.1.7 default-originate
!
ip classless
ip msdp peer 192.168.1.2 connect-source Loopback0
ip msdp peer 192.169.1.7
ip msdp mesh-group outside-test 192.168.1.2
ip msdp originator-id Loopback0
!
access-list 1 permit 192.168.1.0
access-list 1 deny 192.168.1.0 0.0.0.255
access-list 1 permit any
!
route-map 2-extern permit 10
  match ip address 1
!
route-map 2-intern deny 10
  match ip address 1
!
```

## Command Reference

This section documents the following new commands that configure MSDP. All other commands used in this document can be found in the Cisco IOS 12.0 command reference publications.

- **clear ip msdp peer**
- **clear ip msdp sa-cache**
- **clear ip msdp statistics**
- **ip msdp border**
- **ip msdp cache-sa-state**
- **ip msdp default-peer**
- **ip msdp description**
- **ip msdp filter-sa-request**
- **ip msdp mesh-group**
- **ip msdp originator-id**
- **ip msdp peer**
- **ip msdp redistribute**
- **ip msdp sa-filter in**
- **ip msdp sa-filter out**
- **ip msdp sa-request**
- **ip msdp shutdown**
- **ip msdp ttl-threshold**
- **show ip msdp count**
- **show ip msdp peer**
- **show ip msdp sa-cache**
- **show ip msdp summary**

---

**Note** For **show** and **more** commands: Required information. When **show** or **more** commands are documented for a feature, you must include the following standard text about the search and filter functionality (introduced in Release 12.0(1)T) immediately after the bulleted list of commands.

---

In Cisco IOS Release 12.0(1)T or later, you can search and filter the output for **show** and **more** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command followed by the “pipe” character (`|`), one of the keywords **begin**, **include**, or **exclude**, and an expression that you want to search or filter on:

```
command | { begin | include | exclude } regular-expression
```

Following is an example of the **show atm vc** command in which you want the command output to begin with the first line where the expression “PeakRate” appears:

```
show atm vc | begin PeakRate
```

For more information on the search and filter functionality, refer to the Cisco IOS Release 12.0(1)T feature module titled *CLI String Search*.

## clear ip msdp peer

To clear the TCP connection to the specified MSDP peer, use the **clear ip msdp peer** EXEC command.

```
clear ip msdp peer {ip-address | name}
```

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer to which the TCP connection is cleared.
---------------------------------	---

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

This command closes the TCP connection to the peer, resets all the MSDP peer statistics, and clears the input and output queues to and from the MSDP peer.

### Examples

The following example clears the TCP connection to the MSDP peer at 120.15.9.8:

```
clear ip msdp peer 120.15.9.8
```

### Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.

## clear ip msdp sa-cache

To clear MSDP Source-Active cache entries, use the **clear ip msdp sa-cache** EXEC command.

```
clear ip msdp sa-cache [group-address | name]
```

### Syntax Description

*group-address* | *name* (Optional) Multicast group address or name for which Source-Active entries are cleared from the Source-Active cache.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

In order to have any SA entries in the cache to clear, Source-Active caching must have been enabled with the **ip msdp cache-sa-state** command

If no multicast group is identified by group address or name, all SA cache entries are cleared.

### Examples

The following example clears the Source-Active entries for the multicast group 224.5.6.7 from the cache:

```
clear ip msdp sa-cache 224.5.6.7
```

### Related Commands

Command	Description
<b>ip msdp cache-sa-state</b>	Configures the router to create Source-Active state.
<b>show ip msdp sa-cache</b>	Displays (S,G) state learned by MSDP peers.

## clear ip msdp statistics

To clear statistics counters for one or all of the MSDP peers without resetting the sessions, use the **clear ip msdp statistics** EXEC command.

**clear ip msdp statistics** [*peer-address* | *name*]

### Syntax Description

*peer-address* | *name* (Optional) Address or name of the MSDP peers whose statistics counters, reset count, and input/output count are cleared.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Examples

The following example clears the counters for the peer named sanjose:

```
clear ip msdp statistics sanjose
```

## ip msdp border

To configure a router that borders a PIM sparse-mode region and dense-mode region to use MSDP, use the **ip msdp border** global configuration command. To prevent this action, use the **no** form of this command.

**ip msdp border sa-address** *type number*

**no ip msdp border sa-address** *type number*

### Syntax Description

<i>type number</i>	Interface type and number from which the IP address is derived and used as the RP address in Source-Active messages. Thus, MSDP peers can forward Source-Active messages away from this border. The IP address of the interface is used as the Originator-ID, which is the RP field in the MSDP Source-Active message.
--------------------	--

### Defaults

The active sources in the dense-mode region will not participate in MSDP.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

**Note** This command is not recommended. It is better to configure the border router in the sparse-mode domain to proxy-register sources in the dense-mode domain, and have the sparse-mode domain use standard MSDP procedures to advertise these sources.

Use this command if you want the router to send Source-Active messages for sources active in the PIM dense-mode region to MSDP peers.

**Note** If you use this command, you **MUST** constrain the sources advertised by using the **ip msdp redistribute** command. Configure the **ip msdp redistribute** command to apply to only local sources. Be aware that this can result in (S,G) state remaining long after a source in the dense-mode domain has stopped sending.

Note that the **ip msdp originator-id** command also identifies an interface type and number to be used as the RP address. If both the **ip msdp border** and the **ip msdp originator-id** command are configured, the latter command prevails. That is, the address derived from the **ip msdp originator-id** command determines the address of the RP.

### Examples

In the following example, the local router is not an RP. It borders a PIM sparse-mode region with a dense-mode region. It uses the IP address of Ethernet interface 0 as the “RP” address in SA messages.

```
ip msdp border sa-address ethernet0
```

### Related Commands

Command	Description
<b>ip msdp originator-id</b>	Allows an MSDP speaker that originates a Source-Active message to use its interface’s IP address as the RP address in the SA message
<b>ip msdp redistribute</b>	Configures which (S,G) entries from the multicast routing table are advertised in SA messages originated to MSDP peers

## ip msdp cache-sa-state

To have the router create Source-Active (SA) state, use the **ip msdp cache-sa-state** global configuration command. To prevent this action, use the **no** form of this command.

**ip msdp cache-sa-state** [**list** *access-list-number*]

**no ip msdp cache-sa-state**

### Syntax Description

**list** *access-list-number* (Optional) Extended IP access list number in the range from 100 to 199 that defines which source/group pairs to cache.

### Default

The router does not create SA state.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

Use this command if you prefer to sacrifice some memory in order to overcome the latency problem for a member who joins a group right after the Source-Active message arrives, and misses the message. If you configure this command, the router can supply Source-Active information to the late joiner from cache, instead of making the member wait until the next Source-Active message is received.

This command is not required in every MSDP speaker.

An alternative to this command is using the **ip msdp sa-request** command to have the router send Source-Active Request messages to the MSDP peer when a new joiner from the group becomes active.

### Examples

The following example caches state for all sources in 171.69.0.0/16 sending to groups 224.2.0.0/16:

```
ip msdp cache-sa-state 100
access-list 100 permit ip 171.69.0.0 0.0.255.255 224.2.0.0 0.0.255.255
```

### Related Commands

Command	Description
<b>clear ip msdp sa-cache</b>	Clears MSDP Source-Active cache entries.

## Command Reference

---

Command	Description
<b>ip msdp sa-request</b>	Configures the router to send Source-Active Request messages to the MSDP peer when a new joiner from the group becomes active
<b>show ip msdp sa-cache</b>	Displays (S,G) state learned from MSDP peers.

## ip msdp default-peer

To define a default peer from which to accept all MSDP Source-Active messages, use the **ip msdp default-peer** global configuration command. To remove the default peer, use the **no** form of this command.

```
ip msdp default-peer ip-address | name [prefix-list list]
```

```
no ip msdp default-peer
```

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or DNS name of the MSDP default peer.
<b>prefix-list</b> <i>list</i>	(Optional) BGP prefix-list that specifies the peer will be a default peer only for the prefixes listed in the list specified by the <i>list</i> argument. Of course, there must be a BGP prefix-list configured for this <b>prefix-list</b> <i>list</i> keyword and argument to have any effect.

### Default

No default MSDP peer exists.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

Use the **ip msdp default-peer** command if you do not want to configure your MSDP peer to be a BGP peer also.

If only one MSDP peer is configured (with the **ip msdp peer** command), that will be used as a default peer, no matter what. Therefore, you don't need to configure a default peer with this command.

If the **prefix-list** *list* keyword and argument are not specified, all SA messages received from the configured default peer are accepted.

Remember to configure a BGP prefix list if you intend to configure the **prefix-list** *list* keyword and argument with the **ip msdp default-peer** command.

If the **prefix-list** *list* keyword and argument are specified, SA messages originated from RPs covered by the **prefix-list** *list* keyword and argument will be accepted from the configured default peer. If the **prefix-list** *list* keyword and argument are specified but no prefix list is configured, the default peer will be used for all prefixes.

You can enter multiple **ip msdp default-peer** commands, with or without the **prefix-list** keyword . However, all commands must either have the keyword or all must not have the keyword.

- When you use multiple **ip msdp default-peer** commands with the **prefix-list** keyword, you use all the default peers at the same time for different RP prefixes. This syntax is typically used in a Service Provider cloud that connects stub site clouds.
- When you use multiple **ip msdp default-peer** commands without the **prefix-list** keyword, you use a single active peer to accept all SA messages. If that peer goes down, then you move to the next configured default peer to accept all SA messages. This syntax is typically used at a stub site.

### Examples

The following example configures the router named router.cisco.com as the default peer to the local router:

```
ip msdp peer 131.12.2.3
ip msdp peer 131.13.4.5
ip msdp default-peer router.cisco.com    !At a stub site
```

The following example configures two default peers:

```
ip msdp peer 131.12.2.3
ip msdp peer 131.13.4.5
ip msdp default-peer 131.12.2.3 prefix-list site-c
ip prefix-list site-a permit 131.12.0.0/16
ip msdp default-peer 131.13.4.5 prefix-list site-a
ip prefix-list site-a permit 131.13.0.0/16
```

### Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.
<b>ip prefix-list</b>	Creates and configures an entry to a prefix list for use in route filtering using prefixes.

## ip msdp description

To add descriptive text to the configuration for an MSDP peer, use the **ip msdp description** global configuration command. To remove the description, use the **no** form of this command.

**ip msdp description** {*peer-name* | *peer-address*} *text*

**no ip msdp description** {*peer-name* | *peer-address*}

### Syntax Description

<i>peer-name</i>   <i>peer-address</i>	Peer name or address to which this description applies.
<i>text</i>	Description of the MSDP peer.

### Default

No description is associated with an MSDP peer.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

Configure a description to make the MSDP peer easier to identify. This description is visible in the output of the **show ip msdp peer** command.

### Examples

The following example configures the router at the IP address 131.107.5.4 with a description indicating it is a router at customer A:

```
ip msdp description 131.107.5.4 router at customer a
```

## ip msdp filter-sa-request

To configure the router to send Source-Active Request (SA Request) messages to the MSDP peer when a new joiner from a group becomes active, use the **ip msdp filter-sa-request** global configuration command. To prevent this action, use the **no** form of this command.

**ip msdp filter-sa-request** {*ip-address* | *name*} [**list** *access-list-number*]

**no ip msdp filter-sa-request** {*ip-address* | *name*}

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer from which the local router requests Source-Active messages when a new joiner for the group becomes active.
<b>list</b> <i>access-list-number</i>	(Optional) Standard IP access list number that describes a multicast group address. The access list number is in the range 1 to 99. If no access list is specified, all Source-Active Request messages are ignored.

### Default

If this command is not configured, all Source-Active Request messages are honored. If this command is configured but no access list is specified, all SA Request messages are ignored.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

By default, the router honors all Source-Active Request messages from peers. Use this command if you want to control exactly which SA Request messages the router will honor.

If no access list is specified, all SA Request messages are ignored. If an access list is specified, only SA Request messages from those groups permitted will be honored, and all others will be ignored.

### Examples

The following example configures the router to filter Source-Active Request messages from the MSDP peer at 171.69.2.2. Source-Active Request messages from sources on the network 192.4.22.0 pass access list 1 and will be honored; all others will be ignored.

```
ip msdp filter sa-request 171.69.2.2 list 1
access-list 1 permit 192.4.22.0 0.0.0.255
```

Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.

## ip msdp mesh-group

To configure an MSDP peer to be a member of a mesh group, use the **ip msdp mesh-group** global configuration command. To remove an MSDP peer from a mesh group, use the **no** form of this command.

```
ip msdp mesh-group name {ip-address | name}
no ip msdp mesh-group name {ip-address | name}
```

### Syntax Description

<i>name</i>	Name of the mesh group.
<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer to be a member of the mesh group.

### Default

The MSDP peers do not belong to a mesh group.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

A mesh group is a group of MSDP speakers that have fully meshed MSDP connectivity among themselves. Any SA messages received from a peer in a mesh group are not forwarded to other peers in the same mesh group.

Mesh groups can be used to achieve two goals:

- To reduce SA message flooding
- To simplify peer-RPF flooding (no need to run BGP or MBGP among MSDP peers)

### Examples

The following example configures the MSDP peer at address 1.1.1.1 to be a member of the mesh group named internal:

```
ip msdp mesh-group internal 1.1.1.1
```

## ip msdp originator-id

To allow an MSDP speaker that originates a Source-Active message to use its interface's IP address as the RP address in the SA message, use the **ip msdp originator-id** global configuration command. To prevent the RP address from being derived in this way, use the **no** form of this command.

**ip msdp originator-id** *type number*

**no ip msdp originator-id** *type number*

### Syntax Description

*type number* Interface type and number on the local router, whose IP address is used as the RP address in Source-Active messages.

### Default

The RP address is used as the Originator ID.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

The **ip msdp originator-id** command identifies an interface type and number to be used as the RP address in a Source-Active message.

Use this command if you want to configure a logical RP. Because only RPs and MSDP border routers originate SAs, there are times when it is necessary to change the ID used for this purpose.

If both the **ip msdp border sa-address** and the **ip msdp originator-id** command are configured, the latter command prevails. That is, the address derived from the **ip msdp originator-id** command determines the address of the RP to be used in the SA message.

### Examples

The following example configures the IP address of Ethernet interface 1 as the RP address in SA messages:

```
ip msdp originator-id ethernet1
```

### Related Commands

Command	Description
<b>ip msdp border</b>	Configures a router that borders a PIM sparse-mode region and dense-mode region to use MSDP.

## ip msdp peer

To configure an MSDP peer, use the **ip msdp peer** global configuration command. To remove the peer relationship, use the **no** form of this command.

**ip msdp peer** {*peer-name* | *peer-address*} [**connect-source** *type number*] [**remote-as** *as-number*]

**no ip msdp peer** {*peer-name* | *peer-address*}

### Syntax Description

<i>peer-name</i>   <i>peer-address</i>	DNS name or IP address of the router that is to be the MSDP peer.
<b>connect-source</b> <i>type number</i>	(Optional) Interface type and number whose primary address becomes the source IP address for the TCP connection. This interface is on the router being configured.
<b>remote-as</b> <i>as-number</i>	(Optional) Autonomous system number of the MSDP peer. This is used for display purposes only.  There are cases where a peer might appear to be in another autonomous system (AS) (other than the one it really resides in) when you MSDP-peer but do not BGP-peer with that peer. In this case, if the prefix of the peer is injected by another AS, it is displayed as the peer's AS number (and is misleading).

### Default

No MSDP peer is configured.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

The router specified should also be configured as a BGP neighbor.

If you are also BGP peering with this MSDP peer, you should use the same IP address for MSDP as you do for BGP. However, you are not required to run BGP or MBGP with the MSDP peer, as long as there is a BGP or MBGP path between the MSDP peers. If there is not, you must configure the **ip msdp default-peer** command.

## Examples

The following example configures the router at the IP address 131.108.1.2 as an MSDP peer to the local router. The neighbor belongs to autonomous system 109.

```
ip msdp peer 131.108.1.2 connect-source ethernet 0
router bgp 110
 network 131.108.0.0
 neighbor 131.108.1.2 remote-as 109
 neighbor 131.108.1.2 update-source ethernet 0
```

The following example configures the router named router.cisco.com as an MSDP peer to the local router:

```
ip msdp peer router.cisco.com
```

The following example configures that the router named router.cisco.com is an MSDP peer in AS 109. The primary address of Ethernet interface 0 is used as the source address for the TCP connection.

```
ip msdp peer router.cisco.com connect-source ethernet0 remote-as 109
```

## Related Commands

Command	Description
<b>neighbor remote-as</b>	Adds an entry to the BGP neighbor table.

## ip msdp redistribute

To configure which (S,G) entries from the multicast routing table are advertised in SA messages originated to MSDP peers, use the **ip msdp redistribute** global configuration command. To remove the filter, use the **no** form of this command.

```
ip msdp redistribute [list access-list-name] [asn aspath-access-list-number] [route-map map]  
no ip msdp redistribute
```

### Syntax Description

<b>list</b> <i>access-list-name</i>	(Optional) Name or number of a standard or extended IP access list that controls which local sources are advertised and to which groups they send.
<b>asn</b> <i>aspath-access-list-number</i>	(Optional) Standard or extended IP access list number in the range 1 to 199. This access list number must also be configured in the <b>ip as-path</b> command.
<b>route-map</b> <i>map</i>	(Optional) Standard or extended IP access list number in the range 1 to 199. This access list number must also be configured in the <b>ip as-path</b> command.

### Defaults

- If no portion of this command is configured, only local sources are advertised, provided they send to groups for which this router is a rendezvous point (RP).
- If no portion of this command is configured and if the **ip msdp border sa-address** command is configured, all local sources are advertised.
- If the **ip msdp redistribute** command is configured with no keywords, no multicast sources are advertised.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

This command affects SA message origination, not SA message forwarding. If you want to filter which SA messages are forwarded to MSDP peers, use the **ip msdp sa-filter in** or **ip msdp sa-filter out** command.

The **ip msdp redistribute** command controls which (S,G) pairs the router advertises from the multicast routing table. By default, only sources within the local domain are advertised.

For the **ip msdp redistribute** command:

- If you specify the **list** *access-list-name* keyword and argument only, you filter which local sources are advertised and to what groups they send. The access list specifies a source address, source mask, group address, and group mask.
- If you specify the **asn** *aspath-access-list-number* keyword and argument only, you advertise all sources sending to any group, which sources pass the autonomous system path access list. The autonomous system path access list number refers to the **ip as-path** command, which specifies an access list. If the **asn 0** keyword is specified, sources from all autonomous systems are advertised. The **asn 0** keyword is useful when connecting dense-mode domains to a sparse-mode domain running MSDP, or when using MSDP in a router that is not configured with BGP (and, therefore you do not know if a source is local or not).
- If you specify **route-map** *map* only, you advertise all sources that satisfy the **match** criteria in the route map *map*.
- If you specify all three keywords (**list**, **asn**, and **route-map**), all conditions must be true before any multicast source is advertised in an SA message.
- If you specify the **ip multicast redistribute** command with no other keywords or arguments, no multicast sources are advertised.

## Examples

The following example configures which (S,G) entries from the multicast routing table are advertised in SA messages originated to MSDP peers:

```
ip msdp redistribute route-map customer-sources

route-map customer-sources permit
match as-path customer-as

ip as-path access-list ^109$
```

## Related Commands

Command	Description
<b>ip as-path</b>	Configures BGP path filtering.
<b>ip msdp border</b>	Configures a router that borders a PIM sparse-mode region and dense-mode region to use MSDP

## ip msdp sa-filter in

To configure an incoming filter list for Source-Active messages received from the specified MSDP peer, use the **ip msdp sa-filter in** global configuration command. To remove the filter, use the **no** form of this command.

```
ip msdp sa-filter in {ip-address | name} [list access-list-name] [route-map map-tag]  
no ip msdp sa-filter in {ip-address | name} [list access-list-name] [route-map map-tag]
```

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer from which the Source-Active messages are filtered.
<b>list</b> <i>access-list-name</i>	(Optional) IP access list name. If no access list is specified, all source/group pairs from the peer are filtered.
<b>route-map</b> <i>map-tag</i>	(Optional) Route map name. From the specified MSDP peer, passes only those Source-Active messages that meet the match criteria in the route map <i>map-tag</i> .  If all match criteria are true, a <b>permit</b> keyword from the route-map will pass routes through the filter. A <b>deny</b> keyword will filter routes.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) pair in incoming SA messages.

### Default

- If this command is not configured, no incoming messages are filtered; all SA messages are accepted from the peer.
- If the command is configured, but no access list or route map is specified, all source/group pairs from the peer are filtered.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Examples

The following example configures that all Source-Active messages from the peer named router.cisco.com are filtered:

```
ip msdp peer router.cisco.com connect-source ethernet 0  
ip msdp sa-filter in router.cisco.com
```

## Related Commands

<b>Command</b>	<b>Description</b>
<b>ip msdp peer</b>	Configures an MSDP peer.
<b>ip msdp sa-filter out</b>	Configures an outgoing filter list for Source-Active messages sent to the specified MSDP peer

## ip msdp sa-filter out

To configure an outgoing filter list for Source-Active messages sent to the specified MSDP peer, use the **ip msdp sa-filter out** global configuration command. To remove the filter, use the **no** form of this command.

```
ip msdp sa-filter out {ip-address | name} [list access-list-name] [route-map map-tag]  
no ip msdp sa-filter out {ip-address | name} [list access-list-name] [route-map map-tag]
```

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or DNS name of the MSDP peer to which the Source-Active messages are filtered.
<b>list</b> <i>access-list-name</i>	(Optional) Extended IP access list number or name. If no access list is specified, all source/group pairs are filtered. To the specified MSDP peer, passes only those Source-Active messages that pass the extended access list.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) pairs in outgoing SA messages.
<b>route-map</b> <i>map-tag</i>	(Optional) Route map name. To the specified MSDP peer, passes only those Source-Active messages that meet the match criteria in the route map <i>map-tag</i> .  If all match criteria are true, a <b>permit</b> from the route-map will pass routes through the filter. A <b>deny</b> will filter routes.  If both the <b>list</b> and the <b>route-map</b> keywords are used, all conditions must be true to pass any (S,G) pairs in outgoing SA messages.

### Default

- If this command is not configured, no outgoing messages are filtered; all SA messages received are forwarded to the peer.
- If the command is configured, but no access list or route map is specified, all source/group pairs are filtered.

### Command Modes

Global configuration

---

## Command History

Release	Modification
12.0(7)T	This command was introduced.

## Examples

The following example allows only (S,G) pairs that pass access list 100 to be forwarded in a Source-Active message to the peer named router.cisco.com:

```
ip msdp peer router.cisco.com connect-source ethernet 0
ip msdp sa-filter out router.cisco.com list 100
access-list 100 permit ip 171.69.0.0 0.0.255.255 224.2.0.0 0.0.255.255
```

## Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.
<b>ip msdp sa-filter in</b>	Configures an incoming filter list for Source-Active messages received from the specified MSDP peer

## ip msdp sa-request

To configure the router to send Source-Active Request messages to the MSDP peer when a new joiner from the group becomes active, use the **ip msdp sa-request** global configuration command. To prevent this action, use the **no** form of this command.

**ip msdp sa-request** {*ip-address* | *name*}

**no ip msdp sa-request** {*ip-address* | *name*}

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer from which the local router requests Source-Active messages when a new joiner for the group becomes active.
---------------------------------	---

### Default

The router does not send Source-Active Request messages to the MSDP peer.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

By default, the router does not send any Source-Active Request messages to its MSDP peers when a new member joins a group and wants to receive multicast traffic. The new member just waits to receive any Source-Active messages that eventually arrive.

Use this command if you want a new member of a group to learn the current, active multicast sources in a connected PIM sparse-mode domain that are sending to a group. The router will send Source-Active Request messages to the specified MSDP peer when a new member joins a group. The peer replies with the information it is SA cache. If the peer does not have a cache configured, this command provides nothing.

An alternative to this command is using the **ip msdp cache-sa-state** command to have the router cache messages.

### Examples

The following example configures the router to send Source-Active Request messages to the MSDP peer at 171.69.1.1:

```
ip msdp sa-request 171.69.1.1
```

## Related Commands

<b>Command</b>	<b>Description</b>
<b>ip msdp cache-sa-state</b>	Configures the router to create Source-Active (SA) state.
<b>ip msdp peer</b>	Configures an MSDP peer.

## ip msdp shutdown

To administratively shut down a configured MSDP peer, use the **ip msdp shutdown** global configuration command. To bring the peer back up, use the **no** form of this command.

**ip msdp shutdown** {*peer-address* | *peer-name*}

**no ip msdp shutdown** {*peer-address* | *peer-name*}

### Syntax Description

*peer-address* | *peer-name*      IP address or name of the MSDP peer to shut down.

### Default

No action is taken to shut down an MSDP peer.

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Examples

The following example shuts down the MSDP peer at IP address 136.5.7.20:

```
ip msdp shutdown 136.5.7.20
```

### Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.

## ip msdp ttl-threshold

To limit which multicast data packets are sent in SA messages to an MSDP peer, use the **ip msdp ttl-threshold** global configuration command. To restore the default value, use the **no** form of this command.

```
ip msdp ttl-threshold {ip-address | name} tvl
```

```
no ip msdp ttl-threshold {ip-address | name}
```

### Syntax Description

<i>ip-address</i>   <i>name</i>	IP address or name of the MSDP peer to which the <i>tvl</i> limitation applies. The default value of the <i>tvl</i> argument is 0, meaning all multicast data packets are forwarded to the peer until the TTL is exhausted.
<i>tvl</i>	Time-to-live (TTL) value.

### Default

*tvl* = 0

### Command Modes

Global configuration

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

This command limits which multicast data packets are sent in data-encapsulated SA messages. Only multicast packets with an IP-header TTL greater than or equal to the *tvl* argument are sent to the MSDP peer specified by the IP address or name.

Use this command if you want to use TTL to scope your multicast data traffic. For example, you could limit internal traffic to a TTL of 8. If you want other groups to go to external locations, you would need to send those packets with a TTL greater than 8.

### Examples

The following example configures a TTL threshold of 8 hops:

```
ip msdp ttl-threshold 8
```

### Related Commands

Command	Description
<b>ip msdp peer</b>	Configures an MSDP peer.

## show ip msdp count

To display the number of sources and groups originated in MSDP Source-Active messages, use the **show ip msdp count EXEC** command.

**show ip msdp count** [*autonomous-system-number*]

### Syntax Description

*autonomous-system-number* (Optional) Displays the number of sources and group originated in SA messages from the specified autonomous system.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

The **ip msdp cache-sa-state** command must be configured for this command to have any output.

### Examples

The following is sample output of the **show ip msdp count** command:

```
Router# show ip msdp count

SA State per ASN Counters, <asn>: <# sources>/<# groups>
Total entries: 2398
267: 1/1, 704: 1479/143, 3582: 236/28, 6461: 50/0
10876: 5/1, 10888: 627/88
```

Table 1 describes the fields in the display.

**Table 1 show ip msdp count Field Descriptions**

Field	Description
Total entries	Total number of SA entries in the SA cache.
267: 1/1	Autonomous system 267: 1 source / 1group

### Related Commands

Command	Description
<b>ip msdp cache-sa-state</b>	Configures the router to create Source-Active (SA) state.

## show ip msdp peer

To display detailed information about the MSDP peer, use the **show ip msdp peer** EXEC command.

```
show ip msdp peer peer-address | name
```

### Syntax Description

*peer-address | name* Address or name of the MSDP peer for which information is displayed.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Examples

The following is sample output of the **show ip msdp peer** command:

```
Router# show ip msdp peer 198.9.200.65

MSDP Peer Status Summary
Peer Address      AS          State      Uptime/      Msgs Sent/      Peer Name
                  AS          State      Downtime     Received
198.9.200.65     10888      Up         2d10h       50584/48022    ?

TCP connection source: Loopback 0
SA input filter: None
SA output filter: None
SA-Request filter: None
Sending SA-Requests to peer: Disabled
```

Table 2 describes the fields in the display.

**Table 2** show ip msdp peer Field Descriptions

Field	Description
Peer Address	IP address of the MSDP peer.
AS	Autonomous system to which the peer belongs.
State	State of the peer.
Uptime/Downtime	Days and hours the peer is up or down, per state shown in previous column. If the time is less than 24 hours, it is shown in terms of hours:minutes:seconds.
Msgs Sent / Received	Number of SA messages sent to peer / number of SA messages received from peer.
Peer Name	Name of peer.
TCP connection source	Interface used to obtain IP address for TCP local connection address.

**Table 2** show ip msdp peer Field Descriptions (continued)

<b>Field</b>	<b>Description</b>
SA input filter	Name of the access list filtering SA input, if any.
SA output filter	Name of the access list filtering SA output, if any.
SA-Request filter	Name of the access list filtering SA Requests, if any.
Sending SA-Requests to peer	There are no peers configured to send SA Requests to.

Related Commands

<b>Command</b>	<b>Description</b>
<b>ip msdp peer</b>	Configures an MSDP peer.

## show ip msdp sa-cache

To display (S,G) state learned from MSDP peers, use the **show ip msdp sa-cache EXEC** command.

```
show ip msdp sa-cache [group-address | source-address | group-name | source-name]
                    [group-address | source-address | group-name | source-name] [autonomous-system-number]
```

### Syntax Description

*group-address* | *source-address* | *group-name* | *source-name* (Optional) Group address, source address, group name, or source name of the group or source about which (source, group) information is displayed. If two address or names are specified, an (S, G) entry corresponding to those addresses is displayed. If only one group address is specified, all sources for that group are displayed.

If no options are specified, the entire SA cache is displayed.

*autonomous-system-number* (Optional) Only state originated by the autonomous system specified is displayed.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Usage Guidelines

State is cached only if the **ip msdp cache-sa-state** command is configured.

### Examples

The following is sample output of the **show ip msdp sa-cache** command:

```
Router# show ip msdp sa-cache

MSDP Source-Active Cache - 2398 entries
(137.39.41.33, 238.105.148.0), RP 137.39.3.111, MBGP/AS 704, 2d10h/00:05:33
(130.240.112.8, 224.2.0.1), RP 198.9.200.65, MBGP/AS 10888, 00:03:21/00:02:38
(171.69.10.13, 227.37.32.1), RP 137.39.3.92, MBGP/AS 704, 05:22:20/00:03:32
(134.67.66.18, 233.0.0.1), RP 137.39.3.111, MBGP/AS 704, 2d10h/00:05:35
(134.67.66.148, 233.0.0.1), RP 137.39.3.111, MBGP/AS 704, 2d10h/00:05:35
(171.69.10.13, 227.37.32.2), RP 137.39.3.92, MBGP/AS 704, 00:44:30/00:01:31
(128.223.70.203, 224.2.236.2), RP 128.223.253.7, MBGP/AS 3582, 02:34:16/00:05:49
(206.190.42.104, 236.195.56.2), RP 137.39.3.92, MBGP/AS 704, 04:21:13/00:05:22
(171.69.10.13, 227.37.32.3), RP 137.39.3.92, MBGP/AS 704, 00:44:30/00:02:31
(161.44.15.43, 224.0.92.3), RP 198.9.200.65, MBGP/AS 10888, 6d09h/00:05:35
(161.44.15.111, 224.0.92.3), RP 198.9.200.65, MBGP/AS 10888, 16:18:08/00:05:35
(161.44.21.45, 224.0.92.3), RP 198.9.200.65, MBGP/AS 10888, 16:18:08/00:05:35
(161.44.15.75, 224.0.92.3), RP 198.9.200.65, MBGP/AS 10888, 08:40:52/00:05:35
(161.44.15.100, 224.0.92.3), RP 198.9.200.65, MBGP/AS 10888, 08:40:52/00:05:35
(171.69.10.13, 227.37.32.6), RP 137.39.3.92, MBGP/AS 704, 00:45:30/00:05:31
```

```
(137.39.41.33, 224.247.228.10), RP 137.39.3.111, MBGP/AS 704, 2d10h/00:05:35
(128.146.222.210, 224.2.224.13), RP 137.39.3.92, MBGP/AS 704, 01:51:53/00:05:22
(137.39.41.33, 229.231.124.13), RP 137.39.3.111, MBGP/AS 704, 2d10h/00:05:33
(128.223.32.138, 224.2.200.23), RP 128.223.253.7, MBGP/AS 3582, 21:33:40/00:05:49
(128.223.75.244, 224.2.200.23), RP 128.223.253.7, MBGP/AS 3582, 21:33:40/00:05:49
```

Table 3 describes the significant fields in the display.

**Table 3 show ip msdp sa-cache Field Descriptions**

Field	Description
(137.39.41.33, 238.105.148.0)	The first address (source) is sending to the second address (group).
RP 137.39.3.111	RP address in the originating domain where the SA messages started.
MBGP/AS 704	RP is in AS 704 according to MBGP.
2d10h/00:05:33	The route has been cached for 2 days and 10 hours. If no SA message is received in 5 minutes and 33 seconds, it will be removed from the SA cache.

Related Commands

Command	Description
<b>clear ip msdp sa-cache</b>	Clears MSDP Source-Active cache entries.
<b>ip msdp cache-sa-state</b>	Configures the router to create Source-Active (SA) state.

## show ip msdp summary

To display MSDP peer status, use the **show ip msdp summary** EXEC command.

```
show ip msdp summary
```

### Syntax Description

This command has no arguments or keywords.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.

### Examples

The following is sample output of the **show ip msdp summary** command:

```
Router# show ip msdp summary

MSDP Peer Status Summary
Peer Address      AS      State    Uptime/  Msgs Sent/  Peer Name
                  AS      State    Downtime Received
198.9.200.65     10888  Up       2d10h    50569/48007 ?
198.9.201.122   6461   Up       3d13h    145892/11218?
198.9.200.34    704    Up       06:34:44 6118/6508 ?
198.9.201.113   3967   Listen   4d11h    0/0        ?
198.9.201.2     24     Up       02:27:03 4880/160   ?
```

Table 4 describes the significant fields in the display.

**Table 4** show ip msdp summary Field Descriptions

Field	Description
Peer Address	IP address of the MSDP peer.
AS	Autonomous system to which the peer belongs.
State	State of the peer.
Uptime/Downtime	Days and hours the peer is up or down, per state shown in previous column. If the time is less than 24 hours, it is shown in terms of hours:minutes:seconds.
Msgs Sent/Received	Number of SA messages sent to peer / number of SA messages received from peer.
Peer Name	Name of peer.

## Debug Commands

This section describes the following new **debug** commands:

- **debug ip msdp**
- **debug ip msdp resets**

### debug ip msdp

To debug MSDP activity, use the **debug ip msdp EXEC** command.

**[no] debug ip msdp** [*peer-address* | *name*] [**detail**] [**routes**]

#### Syntax Description

<i>peer-address</i>   <i>name</i>	(Optional) Logs debug events for that peer only.
<b>detail</b>	(Optional) Provides more detailed debugging information.
<b>routes</b>	(Optional) Displays the contents of Source-Active messages.

#### Command History

Release	Modification
12.0(7)T	This command was introduced.

#### Examples

The following is sample output of the **debug ip msdp** command:

```
Router# debug ip msdp

MSDP debugging is on
Router#
MSDP: 192.150.44.254: Received 1388-byte message from peer
MSDP: 192.150.44.254: SA TLV, len: 1388, ec: 115, RP: 137.39.3.92
MSDP: 192.150.44.254: Peer RPF check passed for 137.39.3.92, used EMBGP peer
MSDP: 192.150.44.250: Forward 1388-byte SA to peer
MSDP: 192.150.44.254: Received 1028-byte message from peer
MSDP: 192.150.44.254: SA TLV, len: 1028, ec: 85, RP: 137.39.3.92
MSDP: 192.150.44.254: Peer RPF check passed for 137.39.3.92, used EMBGP peer
MSDP: 192.150.44.250: Forward 1028-byte SA to peer
MSDP: 192.150.44.254: Received 1388-byte message from peer
MSDP: 192.150.44.254: SA TLV, len: 1388, ec: 115, RP: 137.39.3.111
MSDP: 192.150.44.254: Peer RPF check passed for 137.39.3.111, used EMBGP peer
MSDP: 192.150.44.250: Forward 1388-byte SA to peer
MSDP: 192.150.44.250: Received 56-byte message from peer
MSDP: 192.150.44.250: SA TLV, len: 56, ec: 4, RP: 205.167.76.241
MSDP: 192.150.44.250: Peer RPF check passed for 205.167.76.241, used EMBGP peer
MSDP: 192.150.44.254: Forward 56-byte SA to peer
MSDP: 192.150.44.254: Received 116-byte message from peer
MSDP: 192.150.44.254: SA TLV, len: 116, ec: 9, RP: 137.39.3.111
MSDP: 192.150.44.254: Peer RPF check passed for 137.39.3.111, used EMBGP peer
MSDP: 192.150.44.250: Forward 116-byte SA to peer
MSDP: 192.150.44.254: Received 32-byte message from peer
MSDP: 192.150.44.254: SA TLV, len: 32, ec: 2, RP: 137.39.3.78
```

---

```
MSDP: 192.150.44.254: Peer RPF check passed for 137.39.3.78, used EMBGP peer
MSDP: 192.150.44.250: Forward 32-byte SA to peer
```

Table 5 describes the significant fields in the display.

**Table 5**      **debug ip msdp Field Descriptions**

<b>Field</b>	<b>Description</b>
MSDP	Protocol being debugged.
192.150.44.254:	IP address of MSDP peer.
Received 1388-byte message from peer	MSDP event.

## debug ip msdp resets

To debug MSDP peer reset reasons, use the **debug ip msdp resets EXEC** command.

**[no] debug ip msdp resets**

### Syntax Description

This command has no keywords or arguments.

### Command Modes

EXEC

### Command History

Release	Modification
12.0(7)T	This command was introduced.