

**Inspur**  
**CN6000 Series**  
**INOS-CN U**  
k # 8



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# Preface

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## Objectives

This guide describes main functions of the CN6000 Series. To have a quick grasp of the CN6000 Series, please read this manual carefully.

## Versions





The following table lists the product versions related to this document.

Product name	Version
CN6000 Series	

## Conventions

### Symbol conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 <b>Warning</b>	Indicates a hazard with a medium or low level of risk which, if not avoided, could result in minor or moderate injury.
 <b>Caution</b>	Indicates a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
 <b>Note</b>	Provides additional information to emphasize or supplement important points of the main text.
 <b>Tip</b>	Indicates a tip that may help you solve a problem or save time.

## General conventions

Convention	Description
Boldface	Names of files, directories, folders, and users are in <b>boldface</b> . For example, log in as user <b>root</b> .
Italic	Book titles are in <i>italics</i> .
Lucida Console	Terminal display is in <code>Lucida Console</code> .

## Command conventions

Convention	Description
Boldface	The keywords of a command line are in <b>boldface</b> .
Italic	Command arguments are in <i>italics</i> .
[ ]	Items (keywords or arguments) in square brackets [ ] are optional.
{ x   y   ... }	Alternative items are grouped in braces and separated by vertical bars. One is selected.
[ x   y   ... ]	Optional alternative items are grouped in square brackets and separated by vertical bars. One or none is selected.
{ x   y   ... } *	Alternative items are grouped in braces and separated by vertical bars. A minimum of one or a maximum of all can be selected.
[ x   y   ... ] *	The parameter before the & sign can be repeated 1 to n times.

## GUI conventions

Convention	Description
Boldface	Buttons, menus, parameters, tabs, windows, and dialog titles are in <b>boldface</b> . For example, click <b>OK</b> .
>	Multi-level menus are in boldface and separated by the ">" signs. For example, choose <b>File &gt; Create &gt; Folder</b> .

## Keyboard operation

Format	Description
Key	Press the key. For example, press <b>Enter</b> and press <b>Tab</b> .

<b>Format</b>	<b>Description</b>
Key 1+Key 2	Press the keys concurrently. For example, pressing <b>Ctrl+C</b> means the two keys should be pressed concurrently.
Key 1, Key 2	Press the keys in turn. For example, pressing <b>Alt, A</b> means the two keys should be pressed in turn.

## Mouse operation

<b>Action</b>	<b>Description</b>
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

## Change history

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

### Issue 01 (2020-02-24)

Initial commercial release

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Command	Purpose
<pre>[no] ip igmp snooping report-flood {all   interface ethernet slot/port}</pre> <p><b>Example:</b>  switch(config-vlan-config)# ip igmp snooping report-flood interface ethernet 1/2 ip igmp snooping report-flood interface ethernet 1/3</p>	<p>Floods IGMP reports on all active interfaces of the VLAN or only on specific interfaces and leaves.</p> <p>IGMP reports typically are forwarded to multicast router ports as detected by the IGMP snooping module and are not flooded in the VLAN. However, this command forces the switch to send IGMP reports to custom ports belonging to the VLAN in addition to the multicast router ports. You should implement this configuration if your multicast applications require the ability to view IGMP reports in order to transmit traffic.</p>
<pre>ip igmp snooping querier ip-address</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping querier 172.20.52.106</p>	<p>Configures a snooping querier when you do not enable PIM because multicast traffic does not need to be routed. The IP address is used as the source in messages.</p>
<pre>ip igmp snooping report-suppression</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping report-suppression</p>	<p>Limits the membership report traffic sent to multicast-capable routers. When you disable report suppression, all IGMP reports are sent as is to multicast-capable routers. The default is enabled.</p> <p><b>Note</b> This command can also be entered in global configuration mode to affect all interfaces.</p>
<pre>ip igmp snooping mrouter interface interface</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping mrouter interface ethernet 2/1</p>	<p>Configures a static connection to a multicast router. The interface to the router must be in the selected VLAN. You can specify the interface by the type and the number, such as <b>ethernet slot/port</b>.</p>
<pre>ip igmp snooping static-group group-ip-addr [source source-ip-addr] interface interface</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping static-group 230.0.0.1 interface ethernet 2/1</p>	<p>Configures a Layer 2 port of a VLAN as a static member of a multicast group. You can specify the interface by the type and the number, such as <b>ethernet slot/port</b>.</p>
<pre>ip igmp snooping link-local-groups-suppression</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping link-local-groups-suppression</p>	<p>Configures link-local groups suppression. The default is enabled.</p> <p><b>Note</b> This command can also be entered in global configuration mode to affect all interfaces.</p>
<pre>ip igmp snooping v3-report-suppression</pre> <p><b>Example:</b>  switch(config-vlan)# ip igmp snooping v3-report-suppression</p>	<p>Configures IGMPv3 report suppression and proxy reporting. The default is disabled for the global command for the entire switch and enabled per VLAN.</p> <p><b>Note</b> This command can also be entered in global configuration mode to affect all interfaces.</p>
<p><b>Step 6</b></p> <pre>copy running-config startup-config</pre> <p><b>Example:</b>  switch(config)# copy running-config startup-config</p>	<p>(Optional) Saves configuration changes.</p>

## Verifying the IGMP Snooping Configuration

To display the IGMP snooping configuration information, perform one of the following tasks:

Command	Purpose
<code>show ip igmp snooping [vlan <i>vlan-id</i>]</code>	Displays IGMP snooping configuration by VLAN.
<code>show ip igmp snooping groups [source <i>group</i>]   group [source]] [vlan <i>vlan-id</i>] [detail]</code>	Displays IGMP snooping information about groups by VLAN.
<code>show ip igmp snooping querier [vlan <i>vlan-id</i>]</code>	Displays IGMP snooping queriers by VLAN.
<code>show ip igmp snooping mroute [vlan <i>vlan-id</i>]</code>	Displays multicast router ports by VLAN.
<code>show ip igmp snooping explicit-tracking [vlan <i>vlan-id</i>]</code>	Displays IGMP snooping explicit tracking information by VLAN.

## Setting Interval for Multicast Routes

When the Inspur CN6000 Series switch has high multicast route creation or deletion rates (for example, too many IGMP join or leave requests), the switch cannot program the multicast routes into the hardware as fast as the requests are made. To resolve this problem, you can now configure an interval after which multicast routes are programmed into the hardware.

When you have very low multicast route creations or deletions per second, configure a low interval (up to 50 milliseconds). A low interval enables the hardware to be programmed faster than it would be by using the default interval of 1 second.

When you have very high multicast route creations or deletions per second, configure a high interval (up to 2 seconds). A high interval enables the hardware to be programmed over a longer period of time without dropping the requests.

## Displaying IGMP Snooping Statistics

Use the `show ip igmp snooping statistics vlan` command to display IGMP snooping statistics.

Use the `clear ip igmp snooping statistics vlan` command to clear IGMP snooping statistics.



See the following example:

```
switch(config)# clear ip igmp snooping ?
*** No matching command found in currentmode, matching in (exec) mode ***
  access-group          IGMP access-group
  event-history         Clear event historybuffers
  explicit-tracking     Clear Explicit Host tracking information
  groups               Clear snooped groups
```

proxy	Clear IGMP snooping proxy
report-policy	IGMP Report Policy
statistics	Packet/internal counter statistics

## Configuration Examples for IGMP Snooping

This example shows how to configure the IGMP snooping parameters:

```
configure terminal
ip igmp snooping
vlan 2
  ip igmp snooping
  ip igmp snooping explicit-tracking
  ip igmp snooping fast-leave
  ip igmp snooping last-member-query-interval 3
  ip igmp snooping querier 172.20.52.106
  ip igmp snooping report-suppression
  ip igmp snooping mrouter interface ethernet 2/1
  ip igmp snooping static-group 230.0.0.1 interface ethernet
  2/1 ip igmp snooping link-local-groups-suppression
  ip igmp snooping v3-report-suppression
```

## Where to Go Next

You can enable the following features that work with PIM:

- [Chapter 2, “Configuring IGMP”](#)
- [Chapter 5, “Configuring MSDP”](#)





## Configuring MSDP

---

This chapter describes how to configure Multicast Source Discovery Protocol (MSDP) on an Inspur INOS-CN switch.

This chapter includes the following sections:

- [Information About MSDP, page 5-99](#)
- [Prerequisites for MSDP, page 5-102](#)
- [Default Settings, page 5-102](#)
- [Configuring MSDP, page 5-102](#)
- [Verifying the MSDP Configuration, page 5-112](#)
- [Displaying Statistics, page 5-112](#)
- [Configuration Examples for MSDP, page 5-113](#)
- [Additional References, page 5-115](#)

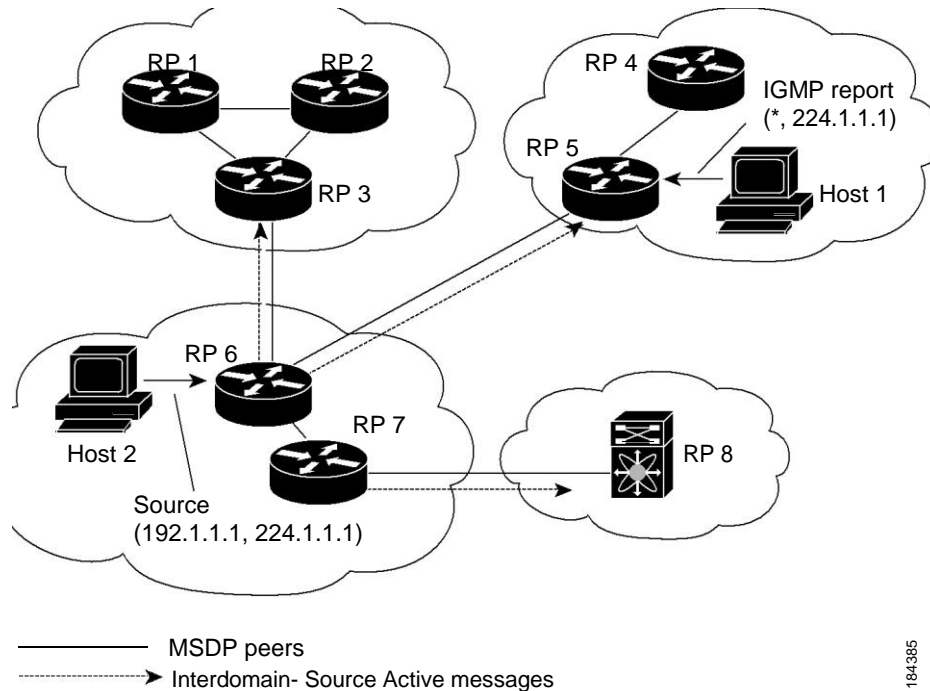
### Information About MSDP

You can use MSDP to exchange multicast source information between multiple BGP-enabled Protocol Independent Multicast (PIM) sparse-mode domains. For information about PIM, see [Chapter 3, “Configuring PIM and PIM6.”](#) For information about BGP, see the *Inspur CN6000 Series INOS-CN Unicast Routing Configuration Guide*.

When a receiver for a group matches the group transmitted by a source in another domain, the rendezvous point (RP) sends PIM join messages in the direction of the source to build a shortest path tree. The designated router (DR) sends packets on the source-tree within the source domain, which may travel through the RP in the source domain and along the branches of the source-tree to other domains. In domains where there are receivers, RPs in those domains can be on the source-tree. The peering relationship is conducted over a TCP connection.

[Figure 5-1](#) shows four PIM domains. The connected RPs (routers) are called MSDP peers because each RP maintains its own set of multicast sources. Source host 1 sends the multicast data to group 224.1.1.1. On RP 6, the MSDP process learns about the source through PIM register messages and generates Source-Active (SA) messages to its MSDP peers that contain information about the sources in its domain. When RP 3 and RP 5 receive the SA messages, they forward them to their MSDP peers. When RP 5 receives the request from host 2 for the multicast data on group 224.1.1.1, it builds a shortest path tree to the source by sending a PIM join message in the direction of host 1 at 192.1.1.1.

Figure 5-1 MSDP Peering Between RPs in Different PIM Domains



When you configure MSDP peering between each RP, you create a full mesh. Full MSDP meshing is typically done within an autonomous system, as shown between RPs 1, 2, and 3, but not across autonomous systems. You use BGP to do loop suppression and MSDP peer-RPF to suppress looping SA messages. For more information about mesh groups, see the “[MSDP Mesh Groups](#)” section on page 5-101.

**Note**

You do not need to configure MSDP in order to use Anycast-RP (a set of RPs that can perform load balancing and failover) within a PIM domain. For more information, see the “[Configuring a PIM Anycast-RP Set](#)” section on page 3-55.

For detailed information about MSDP, see [RFC 3618](#).

This section includes the following topics:

- [SA Messages and Caching](#), page 5-100
- [MSDP Peer-RPF Forwarding](#), page 5-101
- [MSDP Mesh Groups](#), page 5-101
- [Virtualization Support](#), page 5-101

## SA Messages and Caching

MSDP peers exchange Source-Active (SA) messages that the MSDP software uses to propagate information about active sources. SA messages contain the following information:

- Source address of the data source
- Group address that the data source uses



- IP address of the RP or the configured originator ID

When a PIM register message advertises a new source, the MSDP process reencapsulates the message in an SA message that is immediately forwarded to all MSDP peers.

The SA cache holds the information for all sources learned through SA messages. Caching reduces the join latency for new receivers of a group because the information for all known groups can be found in the cache. You can limit the number of cached source entries by configuring the SA limit peer parameter. You can limit the number of cached source entries for a specific group prefix by configuring the group limit global parameter.

The MSDP software sends SA messages for each group in the SA cache every 60 seconds or at the configured SA interval global parameter. An entry in the SA cache is removed if an SA message for that source and group is not received within SA interval plus 3 seconds.

## MSDP Peer-RPF Forwarding

MSDP peers forward the SA messages that they receive away from the originating RP. This action is called peer-RPF flooding. The router examines the BGP routing table to determine which peer is the next hop in the direction of the originating RP of the SA message. This peer is called a reverse path forwarding (RPF) peer.

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

## MSDP Mesh Groups

You can use MSDP mesh groups to reduce the number of SA messages that are generated by peer-RPF flooding. In [Figure 5-1](#), RPs 1, 2, and 3 receive SA messages from RP 6. By configuring a peering relationship between all the routers in a mesh and then configuring a mesh group of these routers, the SA messages that originate at a peer are sent by that peer to all other peers. SA messages received by peers in the mesh are not forwarded. An SA message that originates at RP 3 is forwarded to RP 1 and RP 2, but these RPs do not forward those messages to other RPs in the mesh.

A router can participate in multiple mesh groups. By default, no mesh groups are configured.

## Virtualization Support

You can define multiple virtual routing and forwarding (VRF) instances. The MSDP configuration applies to the selected VRF.

You can use the **show** commands with a VRF argument to provide a context for the information displayed. The default VRF is used if no VRF argument is supplied.

For information about configuring VRFs, see the *Inspur CN6000 Series INOS-CN Unicast Routing Configuration Guide*.

## Prerequisites for MSDP

MSDP has the following prerequisites:

- You are logged onto the switch.
- For global commands, you are in the correct virtual routing and forwarding (VRF) mode. The default configuration mode shown in the examples in this chapter applies to the default VRF.
- You configured PIM for the networks where you want to configure MSDP.
- You configured BGP for the PIM domains where you want to configure MSDP.

## Default Settings

Table 5-1 lists the default settings for MSDP parameters.

**Table 5-1**      *Default MSDP Parameters*

Parameters	Default
Description	Peer has no description
Administrative shutdown	Peer is enabled when it is defined
MD5 password	No MD5 password is enabled
SA policy IN	All SA messages are received
SA policy OUT	All registered sources are sent in SA messages
SA limit	No limit is defined
Originator interface name	RP address of the local system
Group limit	No group limit is defined
SA interval	60 seconds

## Configuring MSDP

You can establish MSDP peering by configuring the MSDP peers within each PIM domain.

To configure MSDP peering, follow these steps:

- 
- Step 1** Select the routers to act as MSDP peers.
- Step 2** Enable the MSDP feature. See the “[Enabling the MSDP Feature](#)” section on page 5-103.
- Step 3** Configure the MSDP peers for each router identified in Step 1. See the “[Configuring MSDP Peers](#)” section on page 5-104.
- Step 4** Configure the optional MSDP peer parameters for each MSDP peer. See the “[Configuring MSDP Peer Parameters](#)” section on page 5-105.
- Step 5** Configure the optional global parameters for each MSDP peer. See the “[Configuring MSDP Global Parameters](#)” section on page 5-108.
- Step 6** Configure the optional mesh groups for each MSDP peer. See the “[Configuring MSDP Mesh Groups](#)” section on page 5-110.
- 



**Note** The MSDP commands that you enter before you enable MSDP are cached and then run when MSDP is enabled. Use the **ip msdp peer** or **ip msdp originator-id** command to enable MSDP.

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This section includes the following topics:

- [Enabling the MSDP Feature](#), page 5-103
- [Configuring MSDP Peers](#), page 5-104
- [Configuring MSDP Peer Parameters](#), page 5-105
- [Configuring MSDP Global Parameters](#), page 5-108
- [Remote Multicast Source Support](#), page 5-109
- [Configuring MSDP Mesh Groups](#), page 5-110
- [Restarting the MSDP Process](#), page 5-111

## Enabling the MSDP Feature

Before you can access the MSDP commands, you must enable the MSDP feature.

### SUMMARY STEPS

1. **configure terminal**
2. **feature msdp**
3. (Optional) **show running-configuration | grep feature**
4. (Optional) **copy running-config startup-config**

## DETAILED STEPS

	Command	Purpose
Step 1	<code>configure terminal</code>  <b>Example:</b> switch# configure terminal switch(config)#	Enters configuration mode.
Step 2	<code>feature msdp</code>  <b>Example:</b> switch# feature msdp	Enables the MSDP feature so that you can enter MSDP commands. By default, the MSDP feature is disabled.
Step 3	<code>show running-configuration   grep feature</code>  <b>Example:</b> switch# show running-configuration   grep feature	(Optional) Shows <b>feature</b> commands that you specified.
Step 4	<code>copy running-config startup-config</code>  <b>Example:</b> switch(config)# copy running-config startup-config	(Optional) Saves configuration changes.

## Configuring MSDP Peers

You can configure an MSDP peer when you configure a peering relationship with each MSDP peer that resides either within the current PIM domain or in another PIM domain. MSDP is enabled on the router when you configure the first MSDP peering relationship.

## BEFORE YOU BEGIN

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM and MSDP.

Ensure that you configured BGP and PIM in the domains of the routers that you will configure as MSDP peers.

## SUMMARY STEPS

1. `configure terminal`
2. `ip msdp peer peer-ip-address connect-source interface [remote-as as-number]`
3. Repeat Step 2 for each MSDP peering relationship.
4. (Optional) `show ip msdp summary [vrf vrf-name | known-vrf-name | all]`
5. (Optional) `copy running-config startup-config`



## DETAILED STEPS

	Command	Purpose
Step 1	<pre>configure terminal</pre> <p><b>Example:</b>  <pre>switch# configure terminal switch(config)#</pre></p>	Enters configuration mode.
Step 2	<pre>ip msdp peer peer-ip-address connect-source interface [remote-as as-number]</pre> <p><b>Example:</b>  <pre>switch(config)# ip msdp peer 192.168.1.10 connect-source ethernet 2/1 remote-as 8</pre></p>	<p>Configures an MSDP peer with the specified peer IP address. The software uses the source IP address of the interface for the TCP connection with the peer. The interface can take the form of <i>type slot/port</i>. If the AS number is the same as the local AS, then the peer is within the PIM domain; otherwise, this peer is external to the PIM domain. By default, MSDP peering is disabled.</p> <p><b>Note</b> MSDP peering is enabled when you use this command.</p>
Step 3	Repeat Step 2 for each MSDP peering relationship by changing the peer IP address, the interface, and the AS number as appropriate.	—
Step 4	<pre>show ip msdp summary [vrf vrf-name   known-vrf-name   all]</pre> <p><b>Example:</b>  <pre>switch# show ip msdp summary</pre></p>	(Optional) Displays a summary of MDSP peers.
Step 5	<pre>copy running-config startup-config</pre> <p><b>Example:</b>  <pre>switch(config)# copy running-config startup-config</pre></p>	(Optional) Saves configuration changes.

## Configuring MSDP Peer Parameters

You can configure the optional MSDP peer parameters described in [Table 5-2](#). You configure these parameters in global configuration mode for each peer based on its IP address.

**Table 5-2 MSDP Peer Parameters**

Parameter	Description
Description	Description string for the peer. By default, the peer has no description.
Administrative shutdown	Method to shut down the MSDP peer. The configuration settings are not affected by this command. You can use this parameter to allow configuration of multiple parameters to occur before making the peer active. The TCP connection with other peers is terminated by the shutdown. By default, a peer is enabled when it is defined.
MD5 password	MD5-shared password key used for authenticating the peer. By default, no MD5 password is enabled.
SA policy IN	Route-map policy <sup>1</sup> for incoming SA messages. By default, all SA messages are received.
SA policy OUT	Route-map policy <sup>1</sup> for outgoing SA messages. By default, all registered sources are sent in SA messages.
SA limit	Number of (S, G) entries accepted from the peer and stored in the SA cache. By default, there is no limit.

1. To configure route-map policies, see the *Inspur CN6000 Series INOS-CN Unicast Routing Configuration Guide*.

For information about configuring multicast route maps, see the “[Configuring Route Maps to Control RP Information Distribution](#)” section on page 3-68.

**Note**

For information about configuring mesh groups, see the “[Configuring MSDP Mesh Groups](#)” section on page 5-110.

**BEFORE YOU BEGIN**

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM and MSDP.

**SUMMARY STEPS**

1. **configure terminal**
2. **ip msdp description** *peer-ip-address string*  
**ip msdp shutdown** *peer-ip-address*  
**ip msdp password** *peer-ip-address password*  
**ip msdp sa-policy** *peer-ip-address policy-name in ip*  
**msdp sa-policy** *peer-ip-address policy-name out ip*  
**msdp sa-limit** *peer-ip-address limit*
3. (Optional) **show ip msdp peer** [*peer-address*] [**vrf** *vrf-name* | *known-vrf-name* | **all**]
4. (Optional) **copy running-config startup-config**





## DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters configuration mode.
Step 2	<b>ip msdp description</b> <i>peer-ip-address</i> <i>string</i>  <b>Example:</b> switch(config)# ip msdp description 192.168.1.10 peer in Engineering network	Sets a description string for the peer. By default, the peer has no description.
	<b>ip msdp shutdown</b> <i>peer-ip-address</i>  <b>Example:</b> switch(config)# ip msdp shutdown 192.168.1.10	Shuts down the peer. By default, the peer is enabled when it is defined.
	<b>ip msdp password</b> <i>peer-ip-address</i> <i>password</i>  <b>Example:</b> switch(config)# ip msdp password 192.168.1.10 my_md5_password	Enables an MD5 password for the peer. By default, no MD5 password is enabled.
	<b>ip msdp sa-policy</b> <i>peer-ip-address</i> <i>policy-name</i> <b>in</b>  <b>Example:</b> switch(config)# ip msdp sa-policy 192.168.1.10 my_incoming_sa_policy in	Enables a route-map policy for incoming SA messages. By default, all SA messages are received.
	<b>ip msdp sa-policy</b> <i>peer-ip-address</i> <i>policy-name</i> <b>out</b>  <b>Example:</b> switch(config)# ip msdp sa-policy 192.168.1.10 my_outgoing_sa_policy out	Enables a route-map policy for outgoing SA messages. By default, all registered sources are sent in SA messages.
	<b>ip msdp sa-limit</b> <i>peer-ip-address</i> <i>limit</i>  <b>Example:</b> switch(config)# ip msdp sa-limit 192.168.1.10 5000	Sets a limit on the number of (S, G) entries accepted from the peer. By default, there is no limit.
Step 3	<b>show ip msdp peer</b> [ <i>peer-address</i> ] [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]  <b>Example:</b> switch# show ip msdp peer 1.1.1.1	(Optional) Displays detailed MDSP peer information.
Step 4	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config)# copy running-config startup-config	(Optional) Saves configuration changes.

# Configuring MSDP Global Parameters

You can configure the optional MSDP global parameters described in [Table 5-3](#).

**Table 5-3** *MSDP Global Parameters*

Parameter	Description
Originator interface name	IP address used in the RP field of an SA message entry. When Anycast RPs are used, all RPs use the same IP address. You can use this parameter to define a unique IP address for the RP of each MSDP peer. By default, the software uses the RP address of the local system.
Group limit	Maximum number of (S, G) entries that the software creates for the specified prefix. The software ignores groups when the group limit is exceeded and logs a violation. By default, no group limit is defined.
SA interval	Interval at which the software transmits Source-Active (SA) messages. The range is from 60 to 65,535 seconds. The default is 60 seconds.

## BEFORE YOU BEGIN

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM and MSDP.

## SUMMARY STEPS

1. **configure terminal**
2. **ip msdp originator-id** *interface*  
**ip msdp group-limit** *limit source source-prefix*  
**ip msdp sa-interval** *seconds*
3. (Optional) **show ip msdp summary** [**vrf** *vrf-name* | *known-vrf-name* | **all**]
4. (Optional) **copy running-config startup-config**





## DETAILED STEPS

	Command	Purpose
Step 1	<code>configure terminal</code>  <b>Example:</b> switch# configure terminal switch(config)#	Enters configuration mode.
Step 2	<code>ip msdp originator-id interface</code>  <b>Example:</b> switch(config)# ip msdp originator-id loopback0	Sets the IP address used in the RP field of an SA message entry. The interface can take the form of <i>type slot/port</i> . By default, the software uses the RP address of the local system.  <b>Note</b> We recommend that you use a loopback interface for the RP address.
	<code>ip msdp group-limit limit source source-prefix</code>  <b>Example:</b> switch(config)# ip msdp group-limit 1000 source 192.168.1.0/24	Maximum number of (S, G) entries that the software creates for the specified prefix. The software ignores groups when the group limit is exceeded and logs a violation. By default, no group limit is defined.
	<code>ip msdp sa-interval seconds</code>  <b>Example:</b> switch(config)# ip msdp sa-interval 80	Interval at which the software transmits Source-Active (SA) messages. The range is from 60 to 65,535 seconds. The default is 60 seconds.
Step 3	<code>show ip msdp summary [vrf vrf-name   known-vrf-name   all]</code>  <b>Example:</b> switch# show ip msdp summary	(Optional) Displays a summary of the MSDP configuration.
Step 4	<code>copy running-config startup-config</code>  <b>Example:</b> switch(config)# copy running-config startup-config	(Optional) Saves configuration changes.

## Remote Multicast Source Support

If multicast traffic is received from a source which is not attached, the (S,G) route is not formed and all traffic continuously hits the CPU. You can enable the remote multicast source support to redirect the traffic.

When this feature is enabled, static mroute to the source is configured using the `ip mroute src-ip next-hop` command and when the prebuild spt is enabled using the `ip pim pre-build-spt` command, the (S,G) route is formed without traffic hitting the CPU. Also, for these sources, register messages are sent periodically and MSDP SA messages are sent to the peer.

## SUMMARY STEPS

1. `configure terminal`
2. `ip mfw mstatic register`
3. (Optional) `copy running-config startup-config`

## DETAILED STEPS

	Command	Purpose
Step 1	<code>configure terminal</code>  <b>Example:</b> switch# configure terminal switch(config)#	Enters configuration mode.
Step 2	<code>ip mfw mstatic register</code>  <b>Example:</b> switch(config)# ip mfw mstatic register	Enables the remote multicast source support.
Step 3	<code>copy running-config startup-config</code>  <b>Example:</b> switch(config)# copy running-config startup-config	(Optional) Saves configuration changes.

## Configuring MSDP Mesh Groups

You can configure optional MSDP mesh groups in global configuration mode by specifying each peer in the mesh. You can configure multiple mesh groups on the same router and multiple peers per mesh group.

## BEFORE YOU BEGIN

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM and MSDP.

## SUMMARY STEPS

1. `configure terminal`
2. `ip msdp mesh-group peer-ip-addr mesh-name`
3. Repeat Step 2 for each MSDP peer in the mesh.
4. (Optional) `show ip msdp mesh-group [mesh-group] [vrf vrf-name | known-vrf-name | all]`
5. (Optional) `copy running-config startup-config`

## DETAILED STEPS

	Command	Purpose
Step 1	<code>configure terminal</code>  <b>Example:</b> switch# configure terminal switch(config)#	Enters configuration mode.
Step 2	<code>ip msdp mesh-group peer-ip-addr mesh-name</code>  <b>Example:</b> switch(config)# ip msdp mesh-group 192.168.1.10 my_mesh_1	Configures an MSDP mesh with the peer IP address specified. You can configure multiple meshes on the same router and multiple peers per mesh group. By default, no mesh groups are configured.



	Command	Purpose
Step 3	Repeat Step 2 for each MSDP peer in the mesh by changing the peer IP address.	—
Step 4	<pre>show ip msdp mesh-group [mesh-group] [vrf vrf-name   known-vrf-name   all]</pre> <p><b>Example:</b> switch# show ip msdp summary</p>	(Optional) Displays information about the MSDP mesh group configuration.
Step 5	<pre>copy running-config startup-config</pre> <p><b>Example:</b> switch(config)# copy running-config startup-config</p>	(Optional) Saves configuration changes.

## Restarting the MSDP Process

You can restart the MSDP process and optionally flush all routes.

### BEFORE YOU BEGIN

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM and MSDP.

### SUMMARY STEPS

1. **restart msdp**
2. **configure terminal**
3. **ip msdp flush-routes**
4. (Optional) **show running-configuration | include flush-routes**
5. (Optional) **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<pre>restart msdp</pre> <p><b>Example:</b> switch# restart msdp</p>	Restarts the MSDP process.
Step 2	<pre>configure terminal</pre> <p><b>Example:</b> switch# configure terminal switch(config)#</p>	Enters configuration mode.
Step 3	<pre>ip msdp flush-routes</pre> <p><b>Example:</b> switch(config)# ip msdp flush-routes</p>	Removes routes when the MSDP process is restarted. By default, routes are not flushed.





	Command	Purpose
Step 4	<pre>show running-configuration   include flush-routes</pre> <p><b>Example:</b></p> <pre>switch(config)# show running-configuration   include flush-routes</pre>	(Optional) Shows flush-routes configuration lines in the running configuration.
Step 5	<pre>copy running-config startup-config</pre> <p><b>Example:</b></p> <pre>switch(config)# copy running-config startup-config</pre>	(Optional) Saves configuration changes.

## Verifying the MSDP Configuration

To display the MSDP configuration information, perform one of the following tasks:

Command	Purpose
<code>show ip msdp count</code> [ <i>as-number</i> ] [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays MSDP (S, G) entry and group counts by the AS number.
<code>show ip msdp mesh-group</code> [ <i>mesh-group</i> ] [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays the MSDP mesh group configuration.
<code>show ip msdp peer</code> [ <i>peer-address</i> ] [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays MSDP information for the MSDP peer.
<code>show ip msdp rpf</code> [ <i>rp-address</i> ] [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays next-hop AS on the BGP path to an RP address.
<code>show ip msdp sources</code> [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays the MSDP-learned sources and violations of configured group limits.
<code>show ip msdp summary</code> [ <b>vrf</b> <i>vrf-name</i>   <i>known-vrf-name</i>   <b>all</b> ]	Displays a summary of the MSDP peer configuration.
<code>show ip igmp snooping</code>	Displays whether vPC multicast optimization is enabled or disabled.

## Displaying Statistics

You can display and clear MSDP statistics by using the features in this section.

This section has the following topics:

- [Displaying Statistics, page 5-113](#)
- [Clearing Statistics, page 5-113](#)

## Displaying Statistics

You can display MSDP statistics using the commands listed in [Table 5-4](#).

**Table 5-4** MSDP Statistics Commands

Command	Purpose
<code>show ip msdp policy statistics sa-policy peer-address {in   out} [vrf vrf-name   known-vrf-name   all]</code>	Displays the MSDP policy statistics for the MSDP peer.
<code>show ip msdp {sa-cache   route} [source-address] [group-address] [vrf vrf-name   known-vrf-name   all] [asn-number] [peer peer-address]</code>	Displays the MSDP SA route cache. If you specify the source address, all groups for that source are displayed. If you specify a group address, all sources for that group are displayed.

## Clearing Statistics

You can clear the MSDP statistics using the commands listed in [Table 5-5](#).

**Table 5-5** MSDP Clear Statistics Commands

Command	Description
<code>clear ip msdp peer [peer-address] [vrf vrf-name   known-vrf-name]</code>	Clears the TCP connection to an MSDP peer.
<code>clear ip msdp policy statistics sa-policy peer-address {in   out} [vrf vrf-name   known-vrf-name]</code>	Clears statistics counters for MSDP peer SA policies.
<code>clear ip msdp statistics [peer-address] [vrf vrf-name   known-vrf-name]</code>	Clears statistics for MSDP peers.
<code>clear ip msdp {sa-cache   route} [group-address] [vrf vrf-name   known-vrf-name   all]</code>	Clears the group entries in the SA cache.

## Configuration Examples for MSDP

To configure MSDP peers, some of the optional parameters, and a mesh group, follow these steps for each MSDP peer:

**Step 1** Configure the MSDP peering relationship with other routers.

```
switch# configure terminal
switch(config)# ip msdp peer 192.168.1.10 connect-source ethernet 1/0 remote-as 8
```

**Step 2** Configure the optional peer parameters.

```
switch# configure terminal
switch(config)# ip msdp password 192.168.1.10 my_peer_password_AB
```

**Step 3** Configure the optional global parameters.

```
switch# configure terminal
```

```
switch(config)# ip msdp sa-interval 80
```

**Step 4** Configure the peers in each mesh group.

```
switch# configure terminal
switch(config)# ip msdp mesh-group 192.168.1.10 mesh_group_1
```

This example shows how to configure a subset of the MSDP peering that is shown in [Figure 5-1](#).

- RP 3: 192.168.3.10 (AS 7)

```
configure terminal
ip msdp peer 192.168.1.10 connect-source ethernet 1/1
ip msdp peer 192.168.2.10 connect-source ethernet 1/2
ip msdp peer 192.168.6.10 connect-source ethernet 1/3 remote-as 9
ip msdp password 192.168.6.10 my_peer_password_36
ip msdp sa-interval 80
ip msdp mesh-group 192.168.1.10 mesh_group_123
ip msdp mesh-group 192.168.2.10 mesh_group_123
ip msdp mesh-group 192.168.3.10 mesh_group_123
```

- RP 5: 192.168.5.10 (AS 8)

```
configure terminal
ip msdp peer 192.168.4.10 connect-source ethernet 1/1
ip msdp peer 192.168.6.10 connect-source ethernet 1/2 remote-as 9
ip msdp password 192.168.6.10 my_peer_password_56
ip msdp sa-interval 80
```

- RP 6: 192.168.6.10 (AS 9)

```
configure terminal
ip msdp peer 192.168.7.10 connect-source ethernet 1/1
ip msdp peer 192.168.3.10 connect-source ethernet 1/2 remote-as 7
ip msdp peer 192.168.5.10 connect-source ethernet 1/3 remote-as 8
ip msdp password 192.168.3.10 my_peer_password_36
ip msdp password 192.168.5.10
my_peer_password_56 ip msdp sa-interval 80
```

This example shows how to display information about IGMP snooping information and shows the status of multicast optimization on a virtual Port Channel (vPC):

```
switch# show ip igmp snooping
Global IGMP Snooping Information:
  IGMP Snooping enabled
  Optimised Multicast Flood (OMF) disabled
  IGMPv1/v2 Report Suppression enabled
  IGMPv3 Report Suppression disabled
  Link Local Groups Suppression enabled
  VPC Multicast optimization disabled
IGMP Snooping information for vlan 1
  IGMP snooping enabled
  Optimised Multicast Flood (OMF) disabled
  IGMP querier present, address: 10.1.1.7, version: 2, interface Ethernet1/13
  Switch-querier disabled
  IGMPv3 Explicit tracking enabled
  IGMPv2 Fast leave disabled
  IGMPv1/v2 Report suppression enabled
  IGMPv3 Report suppression disabled
  Link Local Groups suppression enabled
  Router port detection using PIM Hellos, IGMP Queries
  Number of router-ports: 1
```

```
Number of groups:
0 Active ports:
  Eth1/11 Eth1/13
switch#
```

## Additional References

For additional information related to implementing MSDP, see the following sections:

- [Standards, page 5-115](#)
- [Appendix A, “IETF RFCs for IP Multicast”](#)

## Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—



## Configuring Multicast VRF-Lite Route Leaking

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This chapter describes how to configure Multicast VRF-Lite Route leaking on Inspur INOS-CN switches.

This chapter includes the following sections:

- [About Multicast VRF-Lite Route Leaking, page 6-1](#)
- [Guidelines and Limitations for Multicast VRF-Lite Route Leaking, page 6-1](#)
- [Configuring Multicast VRF-Lite Route Leaking, page 6-2](#)
- [Verifying the Multicast VRF-Lite Route Leaking Configuration, page 6-3](#)
- [Configuration Examples for Multicast VRF-Lite Route Leaking, page 6-3](#)

### About Multicast VRF-Lite Route Leaking

Multicast receivers can forward IPv4 traffic across VRFs.

With multicast VRF-lit route leaking, Reverse Path Forwarding (RPF) lookup for multicast routes in the receiver VRF can be performed in the source VRF. Therefore, traffic originating from the source VRF can be forwarded to the receiver VRF.

When a route processor reloads, multicast traffic across VRFs behaves the same as traffic forwarded within the same VRF.

To support RPF selection in a different VRF, use the **ip multicast rpf select vrf** command.

### Guidelines and Limitations for Multicast VRF-Lite Route Leaking

Multicast VRF-Lite Route Leaking has the following guidelines and limitations:

- The source and RP should be in the same VRF.
- Multicast NAT and multicast extranet should not co-exist for the same group on the same box.
- Auto RP is not supported on multicast extranet.
- PIM spare mode and PIM SSM are supported with multicast VRF-lite route leaking. However, PIM SSM with vPC is not supported with multicast VRF-lite route leaking.

- Only static rendezvous points (RPs) are supported with multicast VRF-lite route leaking.
- The number of multicast routes and VRFs required determine the memory consumption by multicast.
- Multicast VPN (MVPN) extranet is not supported on multicast extranet.
- The RPF lookup is performed on the VRF specified by the **ip multicast rpf select vrf** command. The fallback mode is not supported. The source and RP should be in the same VRF.

## Configuring Multicast VRF-Lite Route Leaking

You can configure multicast VRF-lite route leaking, which allows IPv4 multicast traffic across VRFs.

Ensure that you have installed the Base license for Inspur CN6048TP switches and the LAN Enterprise license for Inspur CN6100 platform switches and enabled PIM or PIM6.

### SUMMARY STEPS

1. **configure terminal**
2. **ip multicast rpf select vrf *src-vrf-name* *group-list***
3. (Optional) **show ip mroute**
4. (Optional) **copy running-config startup-config**

### DETAILED STEPS

	Command	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> switch# configure terminal switch(config)#	Enters global configuration mode.
Step 2	<b>ip multicast rpf select vrf <i>src-vrf-name</i> <i>group-list</i></b>  <b>Example:</b> switch(config)# ip multicast rpf select vrf red group-list 224.1.1.0/24	Specifies which VRF to use for RPF lookup for a particular multicast group. To disable the support, use the <b>no</b> form of this command.  <i>src-vrf-name</i> is the source VRF name. The name can be a maximum of 32 alphanumeric characters and is case sensitive.  <i>group-list</i> is the group range for the RPF select. The format is A.B.C.D/LEN with a maximum length of 32.
Step 3	<b>show ip mroute</b>  <b>Example:</b> switch(config)# show ip mroute	(Optional) Shows the running-configuration information for IPv4 multicast routes.
Step 4	<b>copy running-config startup-config</b>  <b>Example:</b> switch(config)# copy running-config startup-config	(Optional) Saves configuration changes.

## Verifying the Multicast VRF-Lite Route Leaking Configuration

To display the multicast extranet configuration information, perform the following task:

Command	Purpose
<code>show ip mroute</code>	Displays the running-configuration information for IPv4 multicast routes.

## Configuration Examples for Multicast VRF-Lite Route Leaking

This example shows how to display information about running-configuration for IPv4 multicast routes:

```
switch(config)# show ip mroute
IP Multicast Routing Table for VRF "default"

(*, 225.1.1.207/32), uptime: 00:13:33, ip pim
Incoming interface: Vlan147, RPF nbr: 147.147.147.2, uptime: 00:13:33
Outgoing interface list: (count: 0)

Extranet receiver in vrf blue:
(*, 225.1.1.207/32) OIF count: 1

(40.1.1.2/32, 225.1.1.207/32), uptime: 00:00:06, mrib ip pim
Incoming interface: Vlan147, RPF nbr: 147.147.147.2, uptime: 00:00:06
Outgoing interface list: (count: 0)

Extranet receiver in vrf blue: (40.1.1.2/32,
225.1.1.207/32) OIF count: 1

switch(config)#
```



# Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

## IETF RFCs for IP Multicast

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This appendix contains Internet Engineering Task Force (IETF) RFCs related to IP multicast. For information about IETF RFCs, see <http://www.ietf.org/rfc.html>.

RFCs	Title
<a href="#">RFC 2236</a>	<i>Internet Group Management Protocol, Version 2</i>
<a href="#">RFC 2365</a>	<i>Administratively Scoped IP Multicast</i>
<a href="#">RFC 2858</a>	<i>Multiprotocol Extensions for BGP-4</i>
<a href="#">RFC 3376</a>	<i>Internet Group Management Protocol, Version 3</i>
<a href="#">RFC 3446</a>	<i>Anycast Rendezvous Point (RP) mechanism using Protocol Independent Multicast (PIM) and Multicast Source Discovery Protocol (MSDP)</i>
<a href="#">RFC 3569</a>	<i>An Overview of Source-Specific Multicast (SSM)</i>
<a href="#">RFC 3618</a>	<i>Multicast Source Discovery Protocol (MSDP)</i>
<a href="#">RFC 4541</a>	<i>Considerations for Internet Group Management Protocol (IGMP) Snooping Switches</i>
<a href="#">RFC 4601</a>	<i>Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised)</i>
<a href="#">RFC 4610</a>	<i>Anycast-RP Using Protocol Independent Multicast (PIM)</i>
<a href="#">RFC 5059</a>	<i>Bootstrap Router (BSR) Mechanism for Protocol Independent Multicast (PIM)</i>
<a href="#">RFC 5132</a>	<i>IP Multicast MIB</i>



