Catalyst 2960-XR Switch IP Multicast Command Reference, Cisco IOS Release 15.0(2)EX1

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Preface

Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier font`	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier font`	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.

Convention	Description
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document uses the following conventions for reader alerts:

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Tip Means *the following information will help you solve a problem.*

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Timesaver Means *the described action saves time.* You can save time by performing the action described in the paragraph.

Warning **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

Related Documentation

Note Before installing or upgrading the switch, refer to the switch release notes.

- Catalyst 2960-XR Switch documentation, located at:

  http://www.cisco.com/go/cat2960xr_docs

- Cisco SFP and SFP+ modules documentation, including compatibility matrixes, located at:

  http://www.cisco.com/en/US/products/hw/modules/ps5455/tsd_products_support_series_home.html

- Cisco Validated Designs documents, located at:

  http://www.cisco.com/go/designzone

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http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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Using the Command-Line Interface

Information About Using the Command-Line Interface

Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. Enter a question mark (?) at the system prompt to obtain a list of commands available for each command mode.

You can start a CLI session through a console connection, through Telnet, a SSH, or by using the browser.

When you start a session, you begin in user mode, often called user EXEC mode. Only a limited subset of the commands are available in user EXEC mode. For example, most of the user EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The user EXEC commands are not saved when the switch reboots.

To have access to all commands, you must enter privileged EXEC mode. Normally, you must enter a password to enter privileged EXEC mode. From this mode, you can enter any privileged EXEC command or enter global configuration mode.

Using the configuration modes (global, interface, and line), you can make changes to the running configuration. If you save the configuration, these commands are stored and used when the switch reboots. To access the various configuration modes, you must start at global configuration mode. From global configuration mode, you can enter interface configuration mode and line configuration mode.

This table describes the main command modes, how to access each one, the prompt you see in that mode, and how to exit the mode.

Table 1: Command Mode Summary

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a session using Telnet, SSH, or console.	`Switch>`	Enter **logout** or **quit**.	Use this mode to • Change terminal settings. • Perform basic tests. • Display system information.
Privileged EXEC	While in user EXEC mode, enter the **enable** command.	`Switch#`	Enter **disable** to exit.	Use this mode to verify commands that you have entered. Use a password to protect access to this mode.
Global configuration	While in privileged EXEC mode, enter the **configure** command.	`Switch(config)#`	To exit to privileged EXEC mode, enter **exit** or **end**, or press **Ctrl-Z**.	Use this mode to configure parameters that apply to the entire switch.
VLAN configuration	While in global configuration mode, enter the **vlan** *vlan-id* command.	`Switch(config-vlan)#`	To exit to global configuration mode, enter the **exit** command. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure VLAN parameters. When VTP mode is transparent, you can create extended-range VLANs (VLAN IDs greater than 1005) and save configurations in the switch startup configuration file.
Interface configuration	While in global configuration mode, enter the **interface** command (with a specific interface).	`Switch(config-if)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the Ethernet ports.

Mode	Access Method	Prompt	Exit Method	About This Mode
Line configuration	While in global configuration mode, specify a line with the **line vty** or **line console** command.	`Switch(config-line)#`	To exit to global configuration mode, enter **exit**. To return to privileged EXEC mode, press **Ctrl-Z** or enter **end**.	Use this mode to configure parameters for the terminal line.

Using the Help System

You can enter a question mark (?) at the system prompt to display a list of commands available for each command mode. You can also obtain a list of associated keywords and arguments for any command.

SUMMARY STEPS

1. **help**
2. *abbreviated-command-entry* **?**
3. *abbreviated-command-entry* <Tab>
4. **?**
5. *command* **?**
6. *command keyword* **?**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**help** **Example:** `Switch# help`	Obtains a brief description of the help system in any command mode.

Step 2	*abbreviated-command-entry* **?**
	Example:
	`Switch# di?`
	`dir disable disconnect`
		Obtains a list of commands that begin with a particular character string.

Step 3	*abbreviated-command-entry* <Tab>
	Example:
	`Switch# sh conf<tab>`
	`Switch# show configuration`
		Completes a partial command name.

	Command or Action	Purpose
Step 4	**?** **Example:** `Switch> ?`	Lists all commands available for a particular command mode.
Step 5	*command* **?** **Example:** `Switch> show ?`	Lists the associated keywords for a command.

Step 6	*command keyword* **?**
	
	Example:
	`Switch(config)# cdp holdtime ?`
	`  <10-255> Length of time (in sec) that receiver must keep this packet`
		Lists the associated arguments for a keyword.

Understanding Abbreviated Commands

You need to enter only enough characters for the switch to recognize the command as unique.

This example shows how to enter the **show configuration** privileged EXEC command in an abbreviated form:

```
Switch# show conf
```

No and default Forms of Commands

Almost every configuration command also has a **no** form. In general, use the **no** form to disable a feature or function or reverse the action of a command. For example, the **no shutdown** interface configuration command reverses the shutdown of an interface. Use the command without the keyword **no** to reenable a disabled feature or to enable a feature that is disabled by default.

Configuration commands can also have a **default** form. The **default** form of a command returns the command setting to its default. Most commands are disabled by default, so the **default** form is the same as the **no** form. However, some commands are enabled by default and have variables set to certain default values. In these cases, the **default** command enables the command and sets variables to their default values.

CLI Error Messages

This table lists some error messages that you might encounter while using the CLI to configure your switch.

Table 2: Common CLI Error Messages

Error Message	Meaning	How to Get Help
`% Ambiguous command: "show con"`	You did not enter enough characters for your switch to recognize the command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Incomplete command.`	You did not enter all the keywords or values required by this command.	Reenter the command followed by a question mark (?) with a space between the command and the question mark. The possible keywords that you can enter with the command appear.
`% Invalid input detected at '^' marker.`	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all the commands that are available in this command mode. The possible keywords that you can enter with the command appear.

Configuration Logging

You can log and view changes to the switch configuration. You can use the Configuration Change Logging and Notification feature to track changes on a per-session and per-user basis. The logger tracks each configuration command that is applied, the user who entered the command, the time that the command was entered, and the parser return code for the command. This feature includes a mechanism for asynchronous notification to registered applications whenever the configuration changes. You can choose to have the notifications sent to the syslog.

Note Only CLI or HTTP changes are logged.

How to Use the CLI to Configure Features

Configuring the Command History

The software provides a history or record of commands that you have entered. The command history feature is particularly useful for recalling long or complex commands or entries, including access lists. You can customize this feature to suit your needs.

Changing the Command History Buffer Size

By default, the switch records ten command lines in its history buffer. You can alter this number for a current terminal session or for all sessions on a particular line. This procedure is optional.

SUMMARY STEPS

1. **terminal history** [**size** *number-of-lines*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal history** [**size** *number-of-lines*] **Example:** `Switch# terminal history size 200`	Changes the number of command lines that the switch records during the current terminal session in the privileged EXEC mode. You can configure the size from 0 through 256.

Recalling Commands

To recall commands from the history buffer, perform one of the actions listed in this table. These actions are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

SUMMARY STEPS

1. **Ctrl-P** or use the **up arrow** key
2. **Ctrl-N** or use the **down arrow** key
3. **show history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**Ctrl-P** or use the **up arrow** key	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Step 2	**Ctrl-N** or use the **down arrow** key	Returns to more recent commands in the history buffer after recalling commands with **Ctrl-P** or the up arrow key. Repeat the key sequence to recall successively more recent commands.

	Command or Action	Purpose
Step 3	**show history** **Example:** `Switch# show history`	Lists the last several commands that you just entered in privileged EXEC mode. The number of commands that appear is controlled by the setting of the **terminal history** global configuration command and the **history** line configuration command.

Disabling the Command History Feature

The command history feature is automatically enabled. You can disable it for the current terminal session or for the command line. This procedure is optional.

SUMMARY STEPS

1. **terminal no history**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal no history** **Example:** `Switch# terminal no history`	Disables the feature during the current terminal session in the privileged EXEC mode.

Enabling and Disabling Editing Features

Although enhanced editing mode is automatically enabled, you can disable it, and reenable it.

SUMMARY STEPS

1. **terminal editing**
2. **terminal no editing**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**terminal editing** **Example:** `Switch# terminal editing`	Reenables the enhanced editing mode for the current terminal session in the privileged EXEC mode.

	Command or Action	Purpose
Step 2	**terminal no editing** **Example:** `Switch# terminal no editing`	Disables the enhanced editing mode for the current terminal session in the privileged EXEC mode.

Editing Commands through Keystrokes

The keystrokes help you to edit the command lines. These keystrokes are optional.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

Table 3: Editing Commands

Editing Commands	Description
Ctrl-B or use the **left arrow** key	Moves the cursor back one character.
Ctrl-F or use the **right arrow** key	Moves the cursor forward one character.
Ctrl-A	Moves the cursor to the beginning of the command line.
Ctrl-E	Moves the cursor to the end of the command line.
Esc B	Moves the cursor back one word.
Esc F	Moves the cursor forward one word.
Ctrl-T	Transposes the character to the left of the cursor with the character located at the cursor.
Delete or **Backspace** key	Erases the character to the left of the cursor.
Ctrl-D	Deletes the character at the cursor.
Ctrl-K	Deletes all characters from the cursor to the end of the command line.
Ctrl-U or **Ctrl-X**	Deletes all characters from the cursor to the beginning of the command line.
Ctrl-W	Deletes the word to the left of the cursor.
Esc D	Deletes from the cursor to the end of the word.
Esc C	Capitalizes at the cursor.
Esc L	Changes the word at the cursor to lowercase.
Esc U	Capitalizes letters from the cursor to the end of the word.

Ctrl-V or **Esc Q**	Designates a particular keystroke as an executable command, perhaps as a shortcut.
Return key	Scrolls down a line or screen on displays that are longer than the terminal screen can display. **Note** The More prompt is used for any output that has more lines than can be displayed on the terminal screen, including **show** command output. You can use the **Return** and **Space** bar keystrokes whenever you see the More prompt.
Space bar	Scrolls down one screen.
Ctrl-L or **Ctrl-R**	Redisplays the current command line if the switch suddenly sends a message to your screen.

Editing Command Lines That Wrap

You can use a wraparound feature for commands that extend beyond a single line on the screen. When the cursor reaches the right margin, the command line shifts ten spaces to the left. You cannot see the first ten characters of the line, but you can scroll back and check the syntax at the beginning of the command. The keystroke actions are optional.

To scroll back to the beginning of the command entry, press **Ctrl-B** or the left arrow key repeatedly. You can also press **Ctrl-A** to immediately move to the beginning of the line.

Note The arrow keys function only on ANSI-compatible terminals such as VT100s.

The following example shows how to wrap a command line that extend beyond a single line on the screen.

SUMMARY STEPS

1. **access-list**
2. **Ctrl-A**
3. **Return** key

DETAILED STEPS

	Command or Action	Purpose
Step 1	**access-list** **Example:** `Switch(config)# access-list 101 permit tcp`	Displays the global configuration command entry that extends beyond one line. When the cursor first reaches the end of the line, the line is shifted ten spaces to the left and redisplayed. The dollar sign ($) shows that the

	Command or Action	Purpose
	10.15.22.25 255.255.255.0 10.15.22.35 Switch(config)# $ **101 permit tcp 10.15.22.25 255.255.255.0 10.15.22.35 255.25** Switch(config)# $**t tcp 10.15.22.25 255.255.255.0 131.108.1.20 255.255.255.0 eq** Switch(config)# $**15.22.25 255.255.255.0 10.15.22.35 255.255.255.0 eq 45**	line has been scrolled to the left. Each time the cursor reaches the end of the line, the line is again shifted ten spaces to the left.
Step 2	**Ctrl-A** **Example:** Switch(config)# **access-list 101 permit tcp 10.15.22.25 255.255.255.0 10.15.2$**	Checks the complete syntax. The dollar sign ($) appears at the end of the line to show that the line has been scrolled to the right.
Step 3	**Return** key	Execute the commands. The software assumes that you have a terminal screen that is 80 columns wide. If you have a different width, use the **terminal width** privileged EXEC command to set the width of your terminal. Use line wrapping with the command history feature to recall and modify previous complex command entries.

Searching and Filtering Output of show and more Commands

You can search and filter the output for **show** and **more** commands. This 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. Using these commands is optional.

SUMMARY STEPS

1. {**show** | **more**} *command* | {**begin** | **include** | **exclude**} *regular-expression*

DETAILED STEPS

	Command or Action	Purpose
Step 1	{**show**	**more**} *command*	{**begin**	**include**	**exclude**} *regular-expression* **Example:** Switch# **show interfaces	include protocol** Vlan1 is up, line protocol is up Vlan10 is up, line protocol is down GigabitEthernet1/0/1 is up, line protocol is down GigabitEthernet1/0/2 is up, line protocol is up	Searches and filters the output. Expressions are case sensitive. For example, if you enter **| exclude output**, the lines that contain **output** are not displayed, but the lines that contain **output** appear.

Accessing the CLI through a Console Connection or through Telnet

Before you can access the CLI, you must connect a terminal or a PC to the switch console or connect a PC to the Ethernet management port and then power on the switch, as described in the hardware installation guide that shipped with your switch.

If your switch is already configured, you can access the CLI through a local console connection or through a remote Telnet session, but your switch must first be configured for this type of access.

You can use one of these methods to establish a connection with the switch:

- Connect the switch console port to a management station or dial-up modem, or connect the Ethernet management port to a PC. For information about connecting to the console or Ethernet management port, see the switch hardware installation guide.
- Use any Telnet TCP/IP or encrypted Secure Shell (SSH) package from a remote management station. The switch must have network connectivity with the Telnet or SSH client, and the switch must have an enable secret password configured.
    - The switch supports up to 16 simultaneous Telnet sessions. Changes made by one Telnet user are reflected in all other Telnet sessions.
    - The switch supports up to five simultaneous secure SSH sessions.

  After you connect through the console port, through the Ethernet management port, through a Telnet session or through an SSH session, the user EXEC prompt appears on the management station.

IP Multicast Commands

This chapter contains product dependent IP Multicast commands.

debug platform ip multicast

To enable debugging of IP multicast routing, use the **debug platform ip multicast** command in EXEC mode. To disable debugging, use the **no** form of this command.

debug platform ip multicast {**all** | **mdb** | **mdfs-rp-retry** | **midb** | **mroute-rp** | **resources** | **retry** | **rpf-throttle** | **snoop-events** | **software-forward** | **swidb-events** | **vlan-locks**}

no debug platform ip multicast {**all** | **mdb** | **mdfs-rp-retry** | **midb** | **mroute-rp** | **resources** | **retry** | **rpf-throttle** | **snoop-events** | **software-forward** | **swidb-events** | **vlan-locks**}

Syntax Description

all	Displays all platform IP-multicast event debug messages. **Note** Using this command can degrade the performance of the switch.
mdb	Displays IP-multicast debug messages for multicast distributed fast switching (MDFS) multicast descriptor block (mdb) events.
mdfs-rp-retry	Displays IP-multicast MDFS rendezvous point (RP) retry event debug messages.
midb	Displays IP-multicast MDFS multicast interface descriptor block (MIDB) debug messages.
mroute-rp	Displays IP-multicast RP event debug messages.
resources	Displays IP-multicast hardware resource debug messages.
retry	Displays IP-multicast retry processing event debug messages.
rpf-throttle	Displays IP-multicast reverse path forwarding (RPF) throttle event debug messages.
snoop-events	Displays IP-multicast IGMP snooping event debug messages.
software-forward	Displays IP-multicast software forwarding event debug messages.
swidb-events	Displays IP-multicast MDFS software interface descriptor block (swidb) or global event debug messages.
vlan-locks	Displays IP-multicast VLAN lock and unlock event debug messages.

Command Default

Debugging is disabled.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **undebug platform ip multicast** command is the same as the **no debug platform ip multicast** command.

When you enable debugging on a switch stack, it is enabled only on the stack master. To enable debugging on a stack member, you can start a session from the stack master by using the **session** *switch-number* EXEC command, and then enter the **debug** command at the command-line prompt of the stack member. You also can use the **remote command** *stack-member-number LINE* EXEC command on the stack master switch to enable debugging on a member switch without first starting a session.

Related Commands

Command	Description
show debugging	Displays information about the types of debugging that are enabled.

ip igmp filter

To control whether or not all hosts on a Layer 2 interface can join one or more IP multicast groups by applying an Internet Group Management Protocol (IGMP) profile to the interface, use the **ip igmp filter** interface configuration command on the switch stack or on a standalone switch. To remove the specified profile from the interface, use the **no** form of this command.

ip igmp filter *profile number*

no ip igmp filter

Syntax Description

profile number	The IGMP profile number to be applied. The range is 1 to 4294967295.

Command Default

No IGMP filters are applied.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can apply IGMP filters only to Layer 2 physical interfaces; you cannot apply IGMP filters to routed ports, switch virtual interfaces (SVIs), or ports that belong to an EtherChannel group.

An IGMP profile can be applied to one or more switch port interfaces, but one port can have only one profile applied to it.

Examples

This example shows how to configure IGMP profile 40 to permit the specified range of IP multicast addresses, then shows how to apply that profile to a port as a filter:

```
Switch(config)# ip igmp profile 40
Switch(config-igmp-profile)# permit
Switch(config-igmp-profile)# range 233.1.1.1 233.255.255.255
Switch(config-igmp-profile)# exit
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# ip igmp filter 40
```

This example shows how to apply IGMP profile 22 to a port:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# ip igmp filter 22
```

You can verify your setting by using the **show running-config** privileged EXEC command and by specifying an interface.

Related Commands

Command	Description
ip igmp profile	Configures and enters IGMP Filter Profile configuration mode.
show ip dhcp snooping statistics	Displays DHCP snooping statistics.

ip igmp max-groups

To set the maximum number of Internet Group Management Protocol (IGMP) groups that a Layer 2 interface can join or to configure the IGMP throttling action when the maximum number of entries is in the forwarding table, use the **ip igmp max-groups** interface configuration command on the switch stack or on a standalone switch. To set the maximum back to the default, which is to have no maximum limit, or to return to the default throttling action, which is to drop the report, use the **no** form of this command.

ip igmp max-groups {*max number* | **action** { **deny** | **replace**}}

no ip igmp max-groups {*max number* | **action**}

Syntax Description

max number	The maximum number of IGMP groups that an interface can join. The range is 0 to 4294967294. The default is no limit.
action deny	Drops the next IGMP join report when the maximum number of entries is in the IGMP snooping forwarding table. This is the default action.
action replace	Replaces the existing group with the new group for which the IGMP report was received when the maximum number of entries is in the IGMP snooping forwarding table.

Command Default

The default maximum number of groups is no limit.

After the switch learns the maximum number of IGMP group entries on an interface, the default throttling action is to drop the next IGMP report that the interface receives and to not add an entry for the IGMP group to the interface.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can use this command only on Layer 2 physical interfaces and on logical EtherChannel interfaces. You cannot set IGMP maximum groups for routed ports, switch virtual interfaces (SVIs), or ports that belong to an EtherChannel group.

Follow these guidelines when configuring the IGMP throttling action:

- If you configure the throttling action as deny and set the maximum group limitation, the entries that were previously in the forwarding table are not removed but are aged out. After these entries are aged

out, when the maximum number of entries is in the forwarding table, the switch drops the next IGMP report received on the interface.

- If you configure the throttling action as replace and set the maximum group limitation, the entries that were previously in the forwarding table are removed. When the maximum number of entries is in the forwarding table, the switch replaces a randomly selected multicast entry with the received IGMP report.
- When the maximum group limitation is set to the default (no maximum), entering the **ip igmp max-groups {deny | replace}** command has no effect.

Examples

This example shows how to limit to 25 the number of IGMP groups that a port can join:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# ip igmp max-groups 25
```

This example shows how to configure the switch to replace the existing group with the new group for which the IGMP report was received when the maximum number of entries is in the forwarding table:

```
Switch(config)# interface gigabitethernet2/0/1
Switch(config-if)# ip igmp max-groups action replace
```

You can verify your setting by using the **show running-config** privileged EXEC command and by specifying an interface.

ip igmp profile

To create an Internet Group Management Protocol (IGMP) profile and enter IGMP profile configuration mode, use the **ip igmp profile** global configuration command on the switch stack or on a standalone switch. From this mode, you can specify the configuration of the IGMP profile to be used for filtering IGMP membership reports from a switchport. To delete the IGMP profile, use the **no** form of this command.

ip igmp profile *profile number*

no ip igmp profile *profile number*

Syntax Description

profile number	The IGMP profile number being configured. The range is from 1 to 4294967295.

Command Default

No IGMP profiles are defined. When configured, the default action for matching an IGMP profile is to deny matching addresses.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When you are in IGMP profile configuration mode, you can create the profile by using these commands:

- **deny—**Specifies that matching addresses are denied; this is the default condition.
- **exit—**Exits from igmp-profile configuration mode.
- **no—**Negates a command or resets to its defaults.
- **permit—**Specifies that matching addresses are permitted.
- **range—**Specifies a range of IP addresses for the profile. This can be a single IP address or a range with a start and an end address.

  When entering a range, enter the low IP multicast address, a space, and the high IP multicast address.

You can apply an IGMP profile to one or more Layer 2 interfaces, but each interface can have only one profile applied to it.

Examples

This example shows how to configure IGMP profile 40 that permits the specified range of IP multicast addresses:

```
Switch(config)# ip igmp profile 40
Switch(config-igmp-profile)# permit
Switch(config-igmp-profile)# range 233.1.1.1 233.255.255.255
```

You can verify your settings by using the **show ip igmp profile** privileged EXEC command.

Related Commands

Command	Description
ip igmp filter	Applies IGMP profile to the interface.
show ip igmp profile	Displays configured IGMP profiles specified by the command.

ip igmp snooping

To globally enable Internet Group Management Protocol (IGMP) snooping on the switch or to enable it on a per-VLAN basis, use the **ip igmp snooping** global configuration command on the switch stack or on a standalone switch. To return to the default setting, use the **no** form of this command.

ip igmp snooping [**vlan** *vlan-id*]

no ip igmp snooping [**vlan** *vlan-id*]

Syntax Description

vlan *vlan-id*	(Optional) Enables IGMP snooping on the specified VLAN. The range is 1 to 1001 and 1006 to 4094.

Command Default

IGMP snooping is globally enabled on the switch.

IGMP snooping is enabled on VLAN interfaces.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When IGMP snooping is enabled globally, it is enabled in all of the existing VLAN interfaces. When IGMP snooping is globally disabled, it is disabled on all of the existing VLAN interfaces.

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

Examples

This example shows how to globally enable IGMP snooping:

```
Switch(config)# ip igmp snooping
```

This example shows how to enable IGMP snooping on VLAN 1:

```
Switch(config)# ip igmp snooping vlan 1
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
ip igmp snooping report-suppression	Enables IGMP report suppression.
show ip igmp snooping	Displays IGMP snooping configurations.

Command	Description
show ip igmp snooping groups	Displays the IGMP snooping multicast table.
show ip igmp snooping mrouter	Displays the IGMP snooping multicast router ports.
show ip igmp snooping querier	Displays the configuration and operation information for the IGMP querier.

ip igmp snooping last-member-query-count

To configure how often Internet Group Management Protocol (IGMP) snooping will send query messages in response to receiving an IGMP leave message, use the **ip igmp snooping last-member-query-count** command in global configuration or bridge domain configuration mode. To set *count* to the default value, use the **no** form of the command.

ip igmp snooping [**vlan** *vlan-id*] **last-member-query-count** *count*

no ip igmp snooping [**vlan** *vlan-id*] **last-member-query-count** *count*

Syntax Description

vlan *vlan-id*	(Optional) Sets the count value on a specific VLAN ID. The range is from 1 to 1001. Do not enter leading zeroes.
count	The interval at which query messages are sent, in milliseconds. The range is from 1 to 7. The default is 2.

Command Default

A query is sent every 2 milliseconds.

Command Modes

Global configuration

Bridge domain configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When a multicast host leaves a group, the host sends an IGMP leave message. To check if this host is the last to leave the group, IGMP query messages are sent when the leave message is seen until the **last-member-query-interval** timeout period expires. If no response to the last-member queries are received before the timeout period expires, the group record is deleted.

Use the **ip igmp snooping last-member-query-interval** command to configure the timeout period.

When both IGMP snooping immediate-leave processing and the query count are configured, immediate-leave processing takes precedence.

Note Do not set the count to 1 because the loss of a single packet (the query packet from the switch to the host or the report packet from the host to the switch) may result in traffic forwarding being stopped even if there is still a receiver. Traffic continues to be forwarded after the next general query is sent by the switch, but the interval during which a receiver may not receive the query could be as long as 1 minute (with the default query interval).

The leave latency in Cisco IOS software may increase by up to one last-member-query-interval (LMQI) value when the switch is processing more than one leave within an LMQI. In this case, the average leave latency is determined by the (count + 0.5) * LMQI. The result is that the default leave latency can range from 2.0 to 3.0 seconds with an average of 2.5 seconds under a higher load of IGMP leave processing. The leave latency under load for the minimum LMQI value of 100 milliseconds and a count of 1 is from 100 to 200 milliseconds, with an average of 150 milliseconds. This is done to limit the impact of higher rates of IGMP leave messages.

Examples

The following example sets the last member query count to 5:

```
Switch(config)# ip igmp snooping last-member-query-count 5
```

ip igmp snooping last-member-query-interval

To enable the Internet Group Management Protocol (IGMP) configurable-leave timer globally or on a per-VLAN basis, use the **ip igmp snooping last-member-query-interval** command in global configuration mode. Use the **no** form of the command to return to the default setting.

ip igmp snooping [**vlan** *vlan-id*] **last-member-query-interval** *time*

no ip igmp snooping [**vlan** *vlan-id*] **last-member-query-interval** *time*

Syntax Description

vlan *vlan-id*	(Optional) Enables IGMP snooping and the leave timer on the specified VLAN. The range is 1 to 1001 and 1006 to 4094.
time	Interval time out in seconds. The range is 100 to 32767 milliseconds.

Command Default

The default timeout setting is 1000 milliseconds.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

When IGMP snooping is globally enabled, IGMP snooping is enabled on all the existing VLAN interfaces. When IGMP snooping is globally disabled, IGMP snooping is disabled on all the existing VLAN interfaces.

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

Configuring the leave timer on a VLAN overrides the global setting.

The IGMP configurable leave time is only supported on devices running IGMP Version 2.

The configuration is saved in NVRAM.

Examples

This example shows how to globally enable the IGMP leave timer for 2000 milliseconds:

```
Switch(config)# ip igmp snooping last-member-query-interval 2000
```

This example shows how to configure the IGMP leave timer for 3000 milliseconds on VLAN 1:

```
Switch(config)# ip igmp snooping vlan 1 last-member-query-interval 3000
```

This example shows how to configure the IGMP leave timer for 3000 milliseconds on VLAN 1:

```
Switch(config)# ip igmp snooping vlan 1 last-member-query-interval 3000
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
ip igmp snooping	Enables IGMP snooping.
ip igmp snooping vlan immediate-leave	enables IGMPv2 immediate leave processing
ip igmp snooping vlan mrouter	Adds a multicast router port or configures the multicast learning method.
ip igmp snooping vlan static	Enables IGMP snooping and statically adds a Layer 2 port.
show ip igmp snooping	Displays IGMP snooping configurations.

ip igmp snooping querier

To globally enable the Internet Group Management Protocol (IGMP) querier function in Layer 2 networks, use the **ip igmp snooping querier** global configuration command. Use the command with keywords to enable and configure the IGMP querier feature on a VLAN interface. To return to the default settings, use the **no** form of this command.

ip igmp snooping [**vlan** *vlan-id*] **querier** [**address** *ip-address* | **max-response-time** *response-time* | **query-interval** *interval-count* | **tcn query** {**count** *count* | **interval** *interval*} | **timer expiry** *expiry-time* | **version** *version*]

no ip igmp snooping [**vlan** *vlan-id*] **querier** [**address** | **max-response-time** | **query-interval** | **tcn query** {**count** | **interval**} | **timer expiry** | **version**]

Syntax Description

vlan *vlan-id*	(Optional) Enables IGMP snooping and the IGMP querier function on the specified VLAN. The range is 1 to 1001 and 1006 to 4094.
address *ip-address*	(Optional) Specifies a source IP address. If you do not specify an IP address, the querier tries to use the global IP address configured for the IGMP querier.
max-response-time *response-time*	(Optional) Sets the maximum time to wait for an IGMP querier report. The range is 1 to 25 seconds.
query-interval *interval-count*	(Optional) Sets the interval between IGMP queriers. The range is 1 to 18000 seconds.
tcn query	(Optional) Sets parameters related to Topology Change Notifications (TCNs).
count *count*	Sets the number of TCN queries to be executed during the TCN interval time. The range is 1 to 10.
interval *interval*	Sets the TCN query interval time. The range is 1 to 255.
timer expiry *expiry-time*	(Optional) Sets the length of time until the IGMP querier expires. The range is 60 to 300 seconds.
version *version*	(Optional) Selects the IGMP version number that the querier feature uses. Select 1 or 2.

Command Default

The IGMP snooping querier feature is globally disabled on the switch.

When enabled, the IGMP snooping querier disables itself if it detects IGMP traffic from a multicast-enabled device.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to enable IGMP snooping to detect the IGMP version and IP address of a device that sends IGMP query messages, which is also called a querier.

By default, the IGMP snooping querier is configured to detect devices that use IGMP Version 2 (IGMPv2) but does not detect clients that are using IGMP Version 1 (IGMPv1). You can manually configure the max-response-time value when devices use IGMPv2. You cannot configure the max-response-time when devices use IGMPv1. (The value cannot be configured and is set to zero).

Non-RFC compliant devices running IGMPv1 might reject IGMP general query messages that have a non-zero value as the max-response-time value. If you want the devices to accept the IGMP general query messages, configure the IGMP snooping querier to run IGMPv1.

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

Examples

This example shows how to globally enable the IGMP snooping querier feature:

```
Switch(config)# ip igmp snooping querier
```

This example shows how to set the IGMP snooping querier maximum response time to 25 seconds:

```
Switch(config)# ip igmp snooping querier max-response-time 25
```

This example shows how to set the IGMP snooping querier interval time to 60 seconds:

```
Switch(config)# ip igmp snooping querier query-interval 60
```

This example shows how to set the IGMP snooping querier TCN query count to 25:

```
Switch(config)# ip igmp snooping querier tcn count 25
```

This example shows how to set the IGMP snooping querier timeout to 60 seconds:

```
Switch(config)# ip igmp snooping querier timeout expiry 60
```

This example shows how to set the IGMP snooping querier feature to version 2:

```
Switch(config)# ip igmp snooping querier version 2
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
ip igmp snooping report-suppression	Enables IGMP report suppression.
show ip igmp snooping	Displays IGMP snooping configurations.
show ip igmp snooping groups	Displays the IGMP snooping multicast table.

ip igmp snooping report-suppression

To enable Internet Group Management Protocol (IGMP) report suppression, use the **ip igmp snooping report-suppression** global configuration command on the switch stack or on a standalone switch. To disable IGMP report suppression and to forward all IGMP reports to multicast routers, use the **no** form of this command.

ip igmp snooping report-suppression

no ip igmp snooping report-suppression

Syntax Description

This command has no arguments or keywords.

Command Default

IGMP report suppression is enabled.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

IGMP report suppression is supported only when the multicast query has IGMPv1 and IGMPv2 reports. This feature is not supported when the query includes IGMPv3 reports.

The switch uses IGMP report suppression to forward only one IGMP report per multicast router query to multicast devices. When IGMP router suppression is enabled (the default), the switch sends the first IGMP report from all hosts for a group to all the multicast routers. The switch does not send the remaining IGMP reports for the group to the multicast routers. This feature prevents duplicate reports from being sent to the multicast devices.

If the multicast router query includes requests only for IGMPv1 and IGMPv2 reports, the switch forwards only the first IGMPv1 or IGMPv2 report from all hosts for a group to all of the multicast routers. If the multicast router query also includes requests for IGMPv3 reports, the switch forwards all IGMPv1, IGMPv2, and IGMPv3 reports for a group to the multicast devices.

If you disable IGMP report suppression by entering the **no ip igmp snooping report-suppression** command, all IGMP reports are forwarded to all of the multicast routers.

Examples

This example shows how to disable report suppression:

```
Switch(config)# no ip igmp snooping report-suppression
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
show ip igmp snooping	Displays IGMP snooping configurations.

ip igmp snooping robustness-variable

To configure the IGMP robustness variable globally or on a per-VLAN basis, use the **ip igmp snooping robustness-variable** command in global configuration mode. Use the **no** form of the command to return to the default setting.

ip igmp snooping [**vlan** *vlan-id*] **robustness-variable** *number*

no ip igmp snooping [**vlan** *vlan-id*] **robustness-variable** *number*

Syntax Description

vlan *vlan-id*	(Optional) Enables IGMP snooping and the leave timer on the specified VLAN. The range is 1 to 1001 and 1006 to 4094.
number	Robustness variable number. The range is 1 to 3.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

ip igmp snooping vlan immediate-leave

To enable IGMPv2 immediate leave processing, use the **immediate-leave** global configuration command on the switch stack or on a standalone switch. To return to the default settings, use the **no** form of this command.

ip igmp snooping vlan *vlan-id* **immediate-leave**

no ip igmp snooping vlan *vlan-id* **immediate-leave**

Syntax Description

vlan-id	Enables IGMPv2 immediate leave processing in the specified VLAN. The range is 1 to 1001 and 1006 to 4094.

Command Default

By default, IGMPv2 immediate leave processing is off.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

ip igmp snooping vlan mrouter

To add a multicast router port or to configure the multicast learning method, use the **ip igmp snooping mrouter** global configuration command on the switch stack or on a standalone switch. To return to the default settings, use the **no** form of this command.

ip igmp snooping vlan *vlan-id* **mrouter** {**interface** *interface-id* | **learn** {**cgmp** | **pim-dvmrp**} }

no ip igmp snooping vlan *vlan-id* **mrouter** {**interface** *interface-id* | **learn** {**cgmp** | **pim-dvmrp**} }

Syntax Description

vlan-id	Enables IGMP snooping and adds the port in the specified VLAN as the multicast router port. The range is 1 to 1001 and 1006 to 4094.
interface *interface-id*	Specifies the next-hop interface to the multicast router. The *interface-id* value has these options: • *fastethernet interface number*—A Fast Ethernet IEEE 802.3 interface. • *gigabitethernet interface number*—A Gigabit Ethernet IEEE 802.3z interface. • *tengigabitethernet interface number*—A 10-Gigabit Ethernet IEEE 802.3z interface. • *port-channel interface number*—A channel interface. The range is 0 to 48.
learn	Specifies the multicast router learning method.
cgmp	Sets the switch to learn multicast router ports by snooping on Cisco Group Management Protocol (CGMP) packets.
pim-dvmrp	Sets the switch to learn multicast router ports by snooping on IGMP queries and Protocol-Independent Multicast-Distance Vector Multicast Routing Protocol (PIM-DVMRP) packets.

Command Default

By default, there are no multicast router ports.

The default learning method is pim-dvmrp to snoop IGMP queries and PIM-DVMRP packets.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

The CGMP learn method is useful for reducing control traffic.

The configuration is saved in NVRAM.

Examples

This example shows how to configure a port as a multicast router port:

```
Switch(config)# ip igmp snooping vlan 1 mrouter interface gigabitethernet1/0/2
```

This example shows how to specify the multicast router learning method as CGMP:

```
Switch(config)# ip igmp snooping vlan 1 mrouter learn cgmp
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
ip igmp snooping report-suppression	Enables IGMP report suppression.
show ip igmp snooping	Displays IGMP snooping configurations.
show ip igmp snooping groups	Displays the IGMP snooping multicast table.
show ip igmp snooping mrouter	Displays the IGMP snooping multicast router ports.
show ip igmp snooping querier	Displays the configuration and operation information for the IGMP querier.

ip igmp snooping vlan static

To enable Internet Group Management Protocol (IGMP) snooping and to statically add a Layer 2 port as a member of a multicast group, use the **ip igmp snooping vlan static** global configuration command on the switch stack or on a standalone switch. Use the **no** form of this command to remove ports specified as members of a static multicast group.

ip igmp snooping vlan *vlan-id* **static** *ip-address* **interface** *interface-id*

no ip igmp snooping vlan *vlan-id* **static** *ip-address* **interface** *interface-id*

Syntax Description

vlan-id	Enables IGMP snooping on the specified VLAN. The range is 1 to 1001 and 1006 to 4094.
ip-address	Adds a Layer 2 port as a member of a multicast group with the specified group IP address.
interface *interface-id*	Specifies the interface of the member port. The *interface-id* value has these options: • *fastethernet interface number*—A Fast Ethernet IEEE 802.3 interface. • *gigabitethernet interface number*—A Gigabit Ethernet IEEE 802.3z interface. • *tengigabitethernet interface number*—A 10-Gigabit Ethernet IEEE 802.3z interface. • *port-channel interface number*—A channel interface. The range is 0 to 48.

Command Default

By default, there are no ports statically configured as members of a multicast group.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

The configuration is saved in NVRAM.

Examples

This example shows how to statically configure a host on an interface:

```
Switch(config)# ip igmp snooping vlan 1 static 200.000.000.000 interface
gigabitEthernet1/0/1
Configuring port gigabitethernet1/0/1 on group 200.000.000.000
```

You can verify your settings by entering the **show ip igmp snooping** privileged EXEC command.

Related Commands

Command	Description
ip igmp snooping report-suppression	Enables IGMP report suppression.
show ip igmp snooping	Displays IGMP snooping configurations.
show ip igmp snooping groups	Displays the IGMP snooping multicast table.
show ip igmp snooping mrouter	Displays the IGMP snooping multicast router ports.
show ip igmp snooping querier	Displays the configuration and operation information for the IGMP querier.

ip multicast auto-enable

To support authentication, authorization, and accounting (AAA) enabling of IP multicast, use the **ip multicast auto-enable** command. This command allows multicast routing to be enabled dynamically on dialup interfaces using a AAA attributes from a RADIUS server. To disable IP multicast for AAA, use the **no** form of the command.

ip multicast auto-enable

no ip multicast auto-enable

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Examples

This example shows how to enable authentication, authorization, and accounting (AAA) on IP multicast:

```
Switch(config)# ip multicast auto-enable
```

ip pim accept-register

To configure a candidate rendezvous point (RP) switch to filter Protocol Independent Multicast (PIM) register messages, use the **ip pim accept-register** command in global configuration mode. To disable this function, use the **no** form of this command.

ip pim [**vrf** *vrf-name*] **accept-register** {**list** *access-list*}

no ip pim [**vrf** *vrf-name*] **accept-register**

Syntax Description

vrf *vrf-name*	(Optional) Configures a PIM register filter on candidate RPs for (S, G) traffic associated with the multicast Virtual Private Network (VPN) routing and forwarding (MVRF) instance specified for the *vrf-name* argument.
list *access-list*	Specifies the *access-list* argument as a number or name that defines the (S, G) traffic in PIM register messages to be permitted or denied. The range is 100 to 199 and an expanded range of 2000 to 2699. An IP-named access list can also be used.

Command Default

No PIM register filters are configured.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to prevent unauthorized sources from registering with the RP. If an unauthorized source sends a register message to the RP, the RP will immediately send back a register-stop message.

The access list provided for the **ip pim accept-register** command should only filter on IP source addresses and IP destination addresses. Filtering on other fields (for example, IP protocol or UDP port number) will not be effective and may cause undesired traffic to be forwarded from the RP down the shared tree to multicast group members. If more complex filtering is desired, use the **ip multicast boundary** command instead.

Examples

The following example shows how to permit register packets for any source address sending to any group range, with the exception of source address 172.16.10.1 sending to the SSM group range (232.0.0.0/8). These are denied. These statements should be configured on all candidate RPs because candidate RPs will receive PIM registers from first hop routers or switches.

```
Switch(config)# ip pim accept-register list ssm-range
Switch(config)# ip access-list extended ssm-range
Switch(config-ext-nacl)# deny ip any 232.0.0.0 0.255.255.255
Switch(config-ext-nacl)# permit ip any any
```

ip pim bsr-candidate

To configure the switch to be a candidate BSR, use the **ip pim bsr-candidate** command in global configuration mode. To remove the switch as a candidate BSR, use the **no** form of this command.

ip pim [**vrf** *vrf-name*] **bsr-candidate** *interface-id* [*hash-mask-length*] [*priority*]

no ip pim [**vrf** *vrf-name*] **bsr-candidate**

Syntax Description

vrf *vrf-name*	(Optional) Configures the switch to be a candidate BSR for the Multicast Virtual Private Network (MVPN) routing and forwarding (MVRF) instance specified for the vrf-name argument.
interface-id	ID of the interface on this switch from which the BSR address is derived to make it a candidate. This interface must be enabled for Protocol Independent Multicast (PIM) using the **ip pim** command. Valid interfaces include physical ports, port channels, and VLANs.
hash-mask-length	(Optional) Length of a mask (32 bits maximum) that is to be ANDed with the group address before the PIMv2 hash function is called. All groups with the same seed hash correspond to the same rendezvous point (RP). For example, if this value is 24, only the first 24 bits of the group addresses matter. The hash mask length allows one RP to be used for multiple groups. The default hash mask length is 0.
priority	(Optional) Priority of the candidate BSR (C-BSR). The range is from 0 to 255. The default priority is 0. The C-BSR with the highest priority value is preferred.

Command Default

The switch is not configured to announce itself as a candidate BSR.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The interface specified for this command must be enabled for Protocol Independent Multicast (PIM) using the **ip pim** command.

This command configures the switch to send BSR messages to all of its PIM neighbors, with the address of the designated interface as the BSR address.

This command should be configured on backbone switches that have good connectivity to all parts of the PIM domain.

The BSR mechanism is specified in RFC 2362. Candidate RP (C-RP) switches unicast C-RP advertisement packets to the BSR. The BSR then aggregates these advertisements in BSR messages, which it regularly multicasts with a TTL of 1 to the ALL-PIM-ROUTERS group address, 224.0.0.13. The multicasting of these messages is handled by hop-by-hop RPF flooding; so no preexisting IP multicast routing setup is required (unlike with AutoRP). In addition, the BSR does not preselect the designated RP for a particular group range (unlike AutoRP); instead, each switch that receives BSR messages will elect RPs for group ranges based on the information in the BSR messages.

Cisco switches always accept and process BSR messages. There is no command to disable this function.

Cisco switches perform the following steps to determine which C-RP is used for a group:

- A longest match lookup is performed on the group prefix that is announced by the BSR C-RPs.
- If more than one BSR-learned C-RP are found by the longest match lookup, the C-RP with the lowest priority (configured with the **ip pim rp-candidate** command) is preferred.
- If more than one BSR-learned C-RP have the same priority, the BSR hash function is used to select the RP for a group.
- If more than one BSR-learned C-RP return the same hash value derived from the BSR hash function, the BSR C-RP with the highest IP address is preferred.

Examples

The following example shows how to configure the IP address of the switch on Gigabit Ethernet interface 1/0/0 to be a BSR C-RP with a hash mask length of 0 and a priority of 192:

```
Switch(config)# ip pim bsr-candidate GigabitEthernet1/0/1 0 192
```

Related Commands

Command	Description
ip pim rp-candidate	Configures the switch to advertise itself to the BSR as PIM C-RP.

ip pim dm-fallback

To enable Protocol Independent Multicast (PIM) dense mode (DM) fallback, use the **ip pim dm-fallback** command in global configuration mode. To prevent PIM dense mode fallback, use the **no** form of this command.

ip pim dm-fallback

no ip pim dm-fallback

Syntax Description

This command has no arguments or keywords.

Command Default

PIM dense mode fallback is enabled for all interfaces on the switch that are configured with either the **ip pim dense-mode** or **ip pim sparse-dense-mode** commands.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If you use IP multicast in mission-critical networks, you should avoid the use of PIM-DM (dense mode).

Dense mode fallback describes the event of the PIM mode changing (falling back) from sparse mode (which requires an RP) to dense mode (which does not use an RP). Dense mode fallback occurs when RP information is lost.

If all interfaces are configured with the **ip pim sparse-mode** command, there is no dense mode fallback because dense mode groups cannot be created over interfaces configured for sparse mode.

Use the **no ip pim dm-fallback** command to disable PIM-DM flooding on sparse-dense interfaces.

Cause and Effect of Dense Mode Fallback

PIM determines whether a multicast group operates in PIM-DM or PIM-SM mode based solely on the existence of RP information in the group-to-RP mapping cache. If Auto-RP is configured or a bootstrap router (BSR) is used to distribute RP information, there is a risk that RP information can be lost if all RPs, Auto-RP, or the BSR for a group fails due to network congestion. This failure can lead to the network either partially or fully falling back into PIM-DM.

If a network falls back into PIM-DM and AutoRP or BSR is being used, dense mode flooding will occur. Switches that lose RP information will fallback into dense mode and any new states that must be created for the failed group will be created in dense mode.

Effects of Preventing Dense Mode Fallback

Prior to the introduction of PIM-DM fallback prevention, all multicast groups without a group-to-RP mapping would be treated as dense mode.

With the introduction of PIM-DM fallback prevention, the PIM-DM fallback behavior has been changed to prevent dense mode flooding. By default, if all of the interfaces are configured to operate in PIM sparse mode (using the **ip pim sparse-mode** command), there is no need to configure the **no ip pim dm-fallback** command (that is, the PIM-DM fallback behavior is enabled by default). If any interfaces are not configured using the **ip pim sparse-mode** command (for example, using the **ip pim sparse-dense-mode** command), then the PIM-DM fallback behavior can be explicitly disabled using the **no ip pim dm-fallback** command.

When the **no ip pim dm-fallback** command is configured or when **ip pim sparse-mode** is configured on all interfaces, any existing groups running in sparse mode will continue to operate in sparse mode but will use an RP address set to 0.0.0.0. Multicast entries with an RP address set to 0.0.0.0 will exhibit the following behavior:

- Existing (S, G) states will be maintained.
- No PIM Join or Prune messages for (*, G) or (S, G, RPbit) are sent.
- Received (*, G) or (S, G, RPbit) Joins or Prune messages are ignored.
- Received registers are answered with register stop.
- Asserts are unchanged.
- The (*, G) outgoing interface list (olist) is maintained only for the Internet Group Management Protocol (IGMP) state.
- Multicast Source Discovery Protocol (MSDP) source active (SA) messages for RP 0.0.0.0 groups are still accepted and forwarded.

Examples

The following example shows how to disable PIM-DM fallback:

```
Switch(config)# no ip pim dm-fallback
```

ip pim rp-candidate

To configure the switch to advertise itself to the BSR as a Protocol Independent Multicast (PIM) Version 2 (PIMv2) candidate rendezvous point (C-RP), use the **ip pim rp-candidate** command in global configuration mode. To remove this switch as a C-RP, use the **no** form of this command.

ip pim [**vrf** *vrf-name*] **rp-candidate** *interface-id* [**group-list** *access-list-number*]

no ip pim [**vrf** *vrf-name*] **rp-candidate** *interface-id* [**group-list** *access-list-number*]

Syntax Description

vrf *vrf-name*	(Optional) Configures the switch to advertise itself to the BSR as PIMv2 C-RP for the Multicast Virtual Private Network (MVPN) routing and forwarding (MVRF) instance specified for the vrf-name argument.
interface-id	ID of the interface whose associated IP address is advertised as a candidate RP address. Valid interfaces include physical ports, port channels, and VLANs.
group-list *access-list-number*	(Optional) Specifies the standard IP access list number that defines the group prefixes that are advertised in association with the RP address.

Command Default

The switch is not configured to announce itself to the BSR as a PIMv2 C-RP.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to configure the switch to send PIMv2 messages so that it advertises itself as a candidate RP to the BSR.

This command should be configured on backbone switches that have good connectivity to all parts of the PIM domain.

The IP address associated with the interface specified by *interface-id* will be advertised as the C-RP address.

The interface specified for this command must be enabled for Protocol Independent Multicast (PIM) using the **ip pim** command.

If the optional **group-list** keyword and *access-list-number* argument are configured, the group prefixes defined by the standard IP access list will also be advertised in association with the RP address.

Examples

The following example shows how to configure the switch to advertise itself as a C-RP to the BSR in its PIM domain. The standard access list number 4 specifies the group prefix associated with the RP that has the address identified by Gigabit Ethernet interface 1/0/1.

```
Switch(config)# ip pim rp-candidate GigabitEthernet1/0/1 group-list 4
```

Related Commands

Command	Description
ip pim bsr-candidate	Configures a switch to be a candidate BSR.

ip pim send-rp-announce

To use Auto-RP to configure groups for which the switch will act as a rendezvous point (RP), use the **ip pim send-rp-announce** command in global configuration mode. To unconfigure this switch as an RP, use the **no** form of this command.

ip pim [**vrf** *vrf-name*] **send-rp-announce** *interface-id* **scope** *ttl-value* [**group-list** *access-list-number*] [**interval** *seconds*]

no ip pim [**vrf** *vrf-name*] **send-rp-announce** *interface-id*

Syntax Description

vrf *vrf-name*	(Optional) Uses Auto-RP to configure groups for which the switch will act as a rendezvous point (RP) for the *vrf-name* argument.
interface-id	Enter the interface ID of the interface that identifies the RP address. Valid interfaces include physical ports, port channels, and VLANs.
scope *ttl-value*	Specifies the time-to-live (TTL) value in hops that limits the number of Auto-RP announcements. Enter a hop count that is high enough so that the RP-announce messages reach all mapping agents in the network. There is no default setting. The range is 1 to 255.
group-list *access-list-number*	(Optional) Specifies the standard IP access list number that defines the group prefixes that are advertised in association with the RP address. Enter an IP standard access list number from 1 to 99. If no access list is configured, the RP is used for all groups.
interval *seconds*	(Optional) Specifies the interval between RP announcements in seconds. The total holdtime of the RP announcements is automatically set to three times the value of the interval. The default interval is 60 seconds. The range is 1 to 16383.

Command Default

Auto-RP is disabled.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Enter this command on the switch that you want to be an RP. When you are using Auto-RP to distribute group-to-RP mappings, this command causes the router to send an Auto-RP announcement message to the

well-known group CISCO-RP-ANNOUNCE (224.0.1.39). This message announces the router as a candidate RP for the groups in the range described by the access list.

Examples

The following example shows how to configure the switch to send RP announcements out all Protocol Independent Multicast (PIM)-enabled interfaces for a maximum of 31 hops. The IP address by which the switch wants to be identified as RP is the IP address associated with Gigabit Ethernet interface 1/0/1 at an interval of 120 seconds:

```
Switch(config)# ip pim send-rp-announce GigabitEthernet1/0/1 scope 31 group-list 5 interval
 120
```

Related Commands

Command	Description
ip pim rp-candidate	Configures the switch to advertise itself to the BSR as PIM C-RP.

ip pim spt-threshold

To specify the threshold that must be reached before moving to shortest-path tree (spt), use the **ip pim spt-threshold** command in global configuration mode. To remove the threshold, use the **no** form of this command.

ip pim {*kbps* | **infinity**} [**group-list** *access-list*]

no ip pim {*kbps* | **infinity**} [**group-list** *access-list*]

Syntax Description

kbps	0 is the only valid entry even though the range is 0 to 4294967. A 0 entry always switches to the source-tree.
infinity	Specifies that all sources for the specified group use the shared tree, never switching to the source tree.
group-list *access-list*	(Optional) For *access-list*, specify an access list number or a specific access list you have created by name. If the value is 0 or if the **group-list** option is not used, the threshold applies to all groups.

Command Default

Switches to the PIM shortest-path tree (spt).

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

None

Examples

The following example makes all sources for access list 16 use the shared tree:

```
Switch(config)# ip pim spt-threshold infinity group-list 16
```

mrinfo

To query which neighboring multicast routers or multilayer switches are acting as peers, use the **mrinfo** command in user EXEC or privileged EXEC mode.

mrinfo [**vrf** *route-name*] [*hostname* | *address*][*interface-id*]

Syntax Description

vrf *route-name*	(Optional) Specifies the VPN routing or forwarding instance.
hostname | *address*	(Optional) The Domain Name System (DNS) name or IP address of the multicast router or multilayer switch to query. If omitted, the switch queries itself.
interface-id	Specifies the interface ID.

Command Default

The command is disabled.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **mrinfo** command is the original tool of the multicast backbone (MBONE) to determine which neighboring multicast routers or switches are peering with multicast routers or switches. Cisco routers have supported responding to mrinfo requests since Cisco IOS Release 10.2.

You can query a multicast router or multilayer switch using the **mrinfo** command. The output format is identical to the multicast routed version of the Distance Vector Multicast Routing Protocol (DVMRP). (The mrouted software is the UNIX software that implements DVMRP.)

Examples

The following is sample output from the **mrinfo** command:

```
Switch# mrinfo
 vrf 192.0.1.0
192.31.7.37 (barrnet-gw.cisco.com) [version cisco 11.1] [flags: PMSA]:
  192.31.7.37 -> 192.31.7.34 (sj-wall-2.cisco.com) [1/0/pim]
  192.31.7.37 -> 192.31.7.47 (dirtylab-gw-2.cisco.com) [1/0/pim]
  192.31.7.37 -> 192.31.7.44 (dirtylab-gw-1.cisco.com) [1/0/pim]
```

Note The flags indicate the following:

- P: prune-capable
- M: mtrace-capable
- S: Simple Network Management Protocol (SNMP)-capable
- A: Auto-Rendezvous Point (RP)-capable

mvr (global configuration)

To enable the multicast VLAN registration (MVR) feature on the switch, use the **mvr** global configuration command without keywords on the switch stack or on a standalone switch. To return to the default settings, use the **no** form of this command.

mvr [**group** *ip-address* [*count*] | **mode** [**compatible** | **dynamic**] | **querytime** *value* | **vlan** *vlan-id*]

no mvr [**group** *ip-address* [*count*] | **mode** [**compatible** | **dynamic**] | **querytime** *value* | **vlan** *vlan-id*]

Syntax Description

group *ip-address*	(Optional) Statically configures an MVR group IP multicast address on the switch. Use the **no** form of this command to remove a statically configured IP multicast address or contiguous addresses or, when no IP address is entered, to remove all statically configured MVR IP multicast addresses.
count	(Optional) Multiple contiguous MVR group addresses. The range is 1 to 256; the default is 0.
mode	(Optional) Specifies the MVR mode of operation. The default is compatible mode.
compatible	(Optional) Sets MVR mode to provide compatibility with Catalyst 2900 XL and Catalyst 3500 XL switches. This mode does not allow dynamic membership joins on source ports.
dynamic	(Optional) Sets MVR mode to allow dynamic MVR membership on source ports.
querytime *value*	(Optional) Sets the maximum time to wait for IGMP report memberships on a receiver port. This time applies only to receiver-port leave processing. When an IGMP query is sent from a receiver port, the switch waits for the default or configured MVR querytime for an IGMP group membership report before removing the port from multicast group membership. The value is the response time in units of tenths of a second. The range is 1 to 100; the default is 5 tenths or one-half second. Use the **no** form of the command to return to the default setting.
vlan *vlan-id*	(Optional) Specifies the VLAN on which MVR multicast data is expected to be received. This is also the VLAN to which all the source ports belong. The range is 1 to 4094; the default is VLAN 1.

Command Default

MVR is disabled by default.

The default MVR **mode** is compatible mode.

No IP multicast addresses are configured on the switch by default.

The default **group** *ip-address count* is 0.

The default query response time is five-tenths or one-half second.

The default multicast VLAN for MVR is VLAN 1.

Command Modes

Global configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

A maximum of 256 MVR multicast groups can be configured on a switch.

Use the command with keywords to set the MVR mode for a switch, configure the MVR IP multicast address, set the maximum time to wait for a query reply before removing a port from group membership, and to specify the MVR multicast VLAN.

Use the **mvr group** command to statically set up all the IP multicast addresses that will take part in MVR. Any multicast data sent to a configured multicast address is sent to all the source ports on the switch and to all receiver ports that have registered to receive data on that IP multicast address.

MVR supports aliased IP multicast addresses on the switch. However, if the switch is interoperating with Catalyst 3550 or Catalyst 3500 XL switches, you should not configure IP addresses that alias between themselves or with the reserved IP multicast addresses (in the range 224.0.0.xxx).

The **mvr querytime** command applies only to receiver ports.

If the switch MVR is interoperating with Catalyst 2900 XL or Catalyst 3500 XL switches, set the multicast mode to compatible.

When operating in compatible mode, MVR does not support IGMP dynamic joins on MVR source ports.

MVR can coexist with IGMP snooping on a switch.

Multicast routing and MVR cannot coexist on a switch. If you enable multicast routing and a multicast routing protocol while MVR is enabled, MVR is disabled and a warning message appears. If you try to enable MVR while multicast routing and a multicast routing protocol are enabled, the operation to enable MVR is cancelled with an error message.

Examples

This example shows how to enable MVR:

```
Switch(config)# mvr
```

Use the **show mvr** privileged EXEC command to display the current setting for maximum multicast groups.

This example shows how to configure 228.1.23.4 as an IP multicast address:

```
Switch(config)# mvr group 228.1.23.4
```

This example shows how to configure ten contiguous IP multicast groups with multicast addresses from 228.1.23.1 to 228.1.23.10:

```
Switch(config)# mvr group 228.1.23.1 10
```

Use the **show mvr members** privileged EXEC command to display the IP multicast group addresses configured on the switch.

This example shows how to set the maximum query response time as one second (10 tenths):

```
Switch(config)# mvr querytime 10
```

This example shows how to set VLAN 2 as the multicast VLAN:

```
Switch(config)# mvr vlan 2
```

You can verify your settings by entering the **show mvr** privileged EXEC command.

mvr (interface configuration)

To statically assign a port to an IP multicast VLAN and IP address, use the **mvr** interface configuration command on the switch stack or on a standalone switch. To return to the default settings, use the **no** form of this command.

mvr [**immediate** | **type** {**receiver** | **source**} | **vlan** *vlan-id* **group** [*ip-address*]]

no mvr [**immediate** | **type** | **vlan** *vlan-id* **group** [*ip-address*]]

Syntax Description

immediate	(Optional) Enables the Immediate Leave feature of MVR on a port. Use the **no mvr immediate** command to disable the feature.
type	(Optional) Configures the port as an MVR receiver port or a source port. The default port type is neither an MVR source nor a receiver port. The **no mvr type** command resets the port as neither a source or a receiver port.
receiver	Configures the port as a subscriber port that can only receive multicast data. Receiver ports cannot belong to the multicast VLAN.
source	Configures the port as an uplink port that can send and receive multicast data for the configured multicast groups. All source ports on a switch belong to a single multicast VLAN.
vlan *vlan-id* **group**	(Optional) Adds the port as a static member of the multicast group with the specified VLAN ID. The **no mvr vlan** *vlan-id* **group** command removes a port on a VLAN from membership in an IP multicast address group.
ip-address	(Optional) Statically configures the specified MVR IP multicast group address for the specified multicast VLAN ID. This is the IP address of the multicast group that the port is joining.

Command Default

A port is configured as neither a receiver nor a source.

The Immediate Leave feature is disabled on all ports.

No receiver port is a member of any configured multicast group.

Command Modes

Interface configuration

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Configure a port as a source port if that port should be able to both send and receive multicast data bound for the configured multicast groups. Multicast data is received on all ports configured as source ports.

Receiver ports cannot be trunk ports. Receiver ports on a switch can be in different VLANs, but should not belong to the multicast VLAN.

A port that is not taking part in MVR should not be configured as an MVR receiver port or a source port. A non-MVR port is a normal switch port, able to send and receive multicast data with normal switch behavior.

When Immediate Leave is enabled, a receiver port leaves a multicast group more quickly. Without Immediate Leave, when the switch receives an IGMP leave message from a group on a receiver port, it sends out an IGMP MAC-based query on that port and waits for IGMP group membership reports. If no reports are received in a configured time period, the receiver port is removed from multicast group membership. With Immediate Leave, an IGMP MAC-based query is not sent from the receiver port on which the IGMP leave was received. As soon as the leave message is received, the receiver port is removed from multicast group membership, which speeds up leave latency.

The Immediate Leave feature should be enabled only on receiver ports to which a single receiver device is connected.

The **mvr vlan group** command statically configures ports to receive multicast traffic sent to the IP multicast address. A port statically configured as a member of group remains a member of the group until statically removed. In compatible mode, this command applies only to receiver ports; in dynamic mode, it can also apply to source ports. Receiver ports can also dynamically join multicast groups by using IGMP join messages.

When operating in compatible mode, MVR does not support IGMP dynamic joins on MVR source ports.

An MVR port cannot be a private-VLAN port.

Examples

This example shows how to configure a port as an MVR receiver port:

```
Switch(config)# interface gigabitethernet1/0/1
Switch(config-if)# mvr type receiver
```

Use the **show mvr interface** privileged EXEC command to display configured receiver ports and source ports.

This example shows how to enable Immediate Leave on a port:

```
Switch(config)# interface gigabitethernet1/0/1
Switch(config-if)# mvr immediate
```

This example shows how to add a port on VLAN 1 as a static member of IP multicast group 228.1.23.4:

```
Switch(config)# interface gigabitethernet1/0/2
Switch(config-if)# mvr vlan1 group 230.1.23.4
```

You can verify your settings by entering the **show mvr members** privileged EXEC command.

show ip igmp filter

To display Internet Group Management Protocol (IGMP) filter information, use the **show ip igmp filter** command in privileged EXEC command mode.

show ip igmp [**vrf** *vrf-name*] **filter**

Syntax Description

vrf *vrf-name*	(Optional) Supports the multicast VPN routing and forwarding (VRF) instance.

Command Default

IGMP filters are enabled by default.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **show ip igmp filter** command displays information about all filters defined on the switch.

Examples

The following is sample output from the **show ip igmp filter** command:

```
Switch# show ip igmp filter
IGMP filter enabled
```

show ip igmp profile

To display all configured Internet Group Management Protocol (IGMP) profiles or a specified IGMP profile, use the **show ip igmp profile** privileged EXEC command.

show ip igmp [**vrf** *vrf-name*] **profile** [*profile number*]

Syntax Description

vrf *vrf-name*	(Optional) Supports the multicast VPN routing and forwarding (VRF) instance.
profile number	(Optional) The IGMP profile number to be displayed. The range is 1 to 4294967295. If no profile number is entered, all IGMP profiles are displayed.

Command Default

IGMP profiles undefined by default.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

None

Examples

The following example shows the output of the **show ip igmp profile** privileged EXEC command for profile number 40 on the switch:

```
Switch# show ip igmp profile 40
IGMP Profile 40
    permit
    range 233.1.1.1 233.255.255.255
```

This example shows the output of the **show ip igmp profile** privileged EXEC command for all profiles configured on the switch:

```
Switch# show ip igmp profile

IGMP Profile 3
    range 230.9.9.0 230.9.9.0
IGMP Profile 4
    permit
    range 229.9.9.0 229.255.255.255
```

Related Commands

Command	Description
ip igmp profile	Configures and enters IGMP Filter Profile configuration mode.

show ip igmp snooping

To display the Internet Group Management Protocol (IGMP) snooping configuration of the switch or the VLAN, use the **show ip igmp snooping** command in user or privileged EXEC command mode.

show ip igmp snooping [**groups** | **mrouter** | **querier**] [**vlan** *vlan-id*] [**detail**]

Syntax Description

groups	(Optional) Displays the IGMP snooping multicast table.
mrouter	(Optional) Displays the IGMP snooping multicast router ports.
querier	(Optional) Displays the configuration and operation information for the IGMP querier.
vlan *vlan-id*	(Optional) Specifies a VLAN; the range is 1 to 1001 and 1006 to 4094.
detail	(Optional) Displays operational state information.

Command Default

None

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to display snooping configuration for the switch or for a specific VLAN.

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

Expressions are case sensitive. For example, if you enter | exclude output, the lines that contain output do not appear, but the lines that contain Output appear.

Examples

This is an example of output from the **show ip igmp snooping vlan 1** command. It shows snooping characteristics for a specific VLAN:

```
Switch# show ip igmp snooping vlan 1

Global IGMP Snooping configuration:
-------------------------------------------
IGMP snooping                : Enabled
IGMPv3 snooping (minimal)    : Enabled
Report suppression           : Enabled
```

```
TCN solicit query            : Disabled
TCN flood query count        : 2
Robustness variable          : 2
Last member query count      : 2
Last member query interval   : 1000

Vlan 1:
--------
IGMP snooping                          : Enabled
IGMPv2 immediate leave                 : Disabled
Multicast router learning mode         : pim-dvmrp
CGMP interoperability mode             : IGMP_ONLY
Robustness variable                    : 2
Last member query count                : 2
Last member query interval             : 1000
```

This is an example of output from the **show ip igmp snooping** command. It displays snooping characteristics for all VLANs on the switch:

```
Switch# show ip igmp snooping
Global IGMP Snooping configuration:
-------------------------------------------
IGMP snooping                : Enabled
IGMPv3 snooping (minimal)    : Enabled
Report suppression           : Enabled
TCN solicit query            : Disabled
TCN flood query count        : 2
Robustness variable          : 2
Last member query count      : 2
Last member query interval   : 1000

Vlan 1:
--------
IGMP snooping                          : Enabled
IGMPv2 immediate leave                 : Disabled
Multicast router learning mode         : pim-dvmrp
CGMP interoperability mode             : IGMP_ONLY
Robustness variable                    : 2
Last member query count                : 2
Last member query interval             : 1000
Vlan 2:
--------
IGMP snooping                          : Enabled
IGMPv2 immediate leave                 : Disabled
Multicast router learning mode         : pim-dvmrp
CGMP interoperability mode             : IGMP_ONLY
Robustness variable                    : 2
Last member query count                : 2
Last member query interval             : 1000
<output truncated>
```

Related Commands

Command	Description
ip igmp snooping	Enables IGMP snooping.
show ip igmp snooping groups	Displays the IGMP snooping multicast table.
show ip igmp snooping mrouter	Displays the IGMP snooping multicast router ports.
show ip igmp snooping querier	Displays the configuration and operation information for the IGMP querier.

show ip igmp snooping groups

To display the Internet Group Management Protocol (IGMP) snooping multicast table for the switch or the multicast information, use the **show ip igmp snooping groups** privileged EXEC command.

show ip igmp snooping groups [**vlan** *vlan-id*] [[**dynamic** | **user**] [**count**] | *ip_address*]

Syntax Description

vlan *vlan-id*	(Optional) Specifies a VLAN; the range is 1 to 1001 and 1006 to 4094. Use this option to display the multicast table for a specified multicast VLAN or specific multicast information.
dynamic	(Optional) Displays IGMP Snooping learned group information.
user	(Optional) Displays user configured group information.
count	(Optional) Displays the total number of entries for the specified command options instead of the actual entries.
ip_address	(Optional) Characteristics of the multicast group with the specified group IP address.

Command Modes

Privileged EXEC

User EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to display multicast information or the multicast table.

Expressions are case sensitive. For example, if you enter | exclude output, the lines that contain output do not appear, but the lines that contain Output appear.

Examples

This is an example of output from the **show ip igmp snooping groups** command without any keywords. It displays the multicast table for the switch:

```
Switch# show ip igmp snooping groups
Vlan      Group           Type        Version     Port List
------------------------------------------------------------
1         224.1.4.4       igmp                    Gi1/0/11
1         224.1.4.5       igmp                    Gi1/0/11
2         224.0.1.40      igmp        v2          Gi1/0/15
104       224.1.4.2       igmp        v2          Gi2/0/1, Gi2/0/2
104       224.1.4.3       igmp        v2          Gi2/0/1, Gi2/0/2
```

This is an example of output from the **show ip igmp snooping groups count** command. It displays the total number of multicast groups on the switch:

```
Switch# show ip igmp snooping groups count
Total number of multicast groups: 2
```

This is an example of output from the **show ip igmp snooping groups vlan vlan-id ip-address** command. It shows the entries for the group with the specified IP address:

```
Switch# show ip igmp snooping groups vlan 104 224.1.4.2
Vlan      Group           Type        Version     Port List
------------------------------------------------------------
104       224.1.4.2       igmp        v2          Gi2/0/1, Gi1/0/15
```

Related Commands

Command	Description
ip igmp snooping	Enables IGMP snooping.
show ip igmp snooping	Displays IGMP snooping configurations.

show ip igmp snooping igmpv2-tracking

To display group and IP address entries, use the **show ip igmp snooping igmpv2-tracking** command in privileged EXEC mode.

Note The command displays group and IP address entries only for wireless multicast IGMP joins and not for wired joins. This command also displays output only if wireless multicast is enabled.

show ip igmp snooping igmpv2-tracking

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The command displays group and IP address entries only for wireless multicast IGMP joins and not for wired joins. This command also displays output only if wireless multicast is enabled.

show ip igmp snooping mrouter

To display the Internet Group Management Protocol (IGMP) snooping dynamically learned and manually configured multicast router ports for the switch or for the specified multicast VLAN, use the **show ip igmp snooping mrouter** privileged EXEC command.

show ip igmp snooping mrouter [**vlan** *vlan-id*]

Syntax Description

vlan *vlan-id*	(Optional) Specifies a VLAN; the range is 1 to 1001 and 1006 to 4094.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command to display multicast router ports on the switch or for a specific VLAN.

VLAN IDs 1002 to 1005 are reserved for Token Ring and FDDI VLANs and cannot be used in IGMP snooping.

When multicast VLAN registration (MVR) is enabled, the **show ip igmp snooping mrouter** command displays MVR multicast router information and IGMP snooping information.

Expressions are case sensitive. For example, if you enter | exclude output, the lines that contain output do not appear, but the lines that contain Output appear.

Examples

This is an example of output from the **show ip igmp snooping mrouter** command. It shows how to display multicast router ports on the switch:

```
Switch# show ip igmp snooping mrouter
Vlan    ports
----    -----
   1    Gi2/0/1(dynamic)
```

Related Commands

Command	Description
ip igmp snooping	Enables IGMP snooping.
show ip igmp snooping	Displays IGMP snooping configurations.
show ip igmp snooping groups	Displays the IGMP snooping multicast table.

show ip igmp snooping querier

To display the configuration and operation information for the IGMP querier configured on a switch, use the **show ip igmp snooping querier** user EXEC command.

show ip igmp snooping querier [**vlan** *vlan-id*] [**detail**]

Syntax Description

vlan *vlan-id*	(Optional) Specifies a VLAN; the range is 1 to 1001 and 1006 to 4094.
detail	(Optional) Displays detailed IGMP querier information.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use the **show ip igmp snooping querier** command to display the IGMP version and the IP address of a detected device, also called a querier, that sends IGMP query messages. A subnet can have multiple multicast routers but has only one IGMP querier. In a subnet running IGMPv2, one of the multicast routers is elected as the querier. The querier can be a Layer 3 switch.

The **show ip igmp snooping querier** command output also shows the VLAN and the interface on which the querier was detected. If the querier is the switch, the output shows the Port field as Router. If the querier is a router, the output shows the port number on which the querier is learned in the Port field.

The **show ip igmp snooping querier detail** user EXEC command is similar to the **show ip igmp snooping querier** command. However, the **show ip igmp snooping querier** command displays only the device IP address most recently detected by the switch querier.

The **show ip igmp snooping querier detail** command displays the device IP address most recently detected by the switch querier and this additional information:

- The elected IGMP querier in the VLAN
- The configuration and operational information pertaining to the switch querier (if any) that is configured in the VLAN

Expressions are case sensitive. For example, if you enter | exclude output, the lines that contain output do not appear, but the lines that contain Output appear.

Examples

This is an example of output from the **show ip igmp snooping querier** command:

```
Switch> show ip igmp snooping querier
Vlan      IP Address      IGMP Version        Port
-----------------------------------------------------
1         172.20.50.11    v3                  Gi1/0/1
2         172.20.40.20    v2                  Router
```

This is an example of output from the **show ip igmp snooping querier detail** command:

```
Switch> show ip igmp snooping querier detail
Vlan      IP Address      IGMP Version    Port
-----------------------------------------------------------------
1         1.1.1.1         v2              Fa8/0/1
Global IGMP switch querier status
-----------------------------------------------------
admin state                    : Enabled
admin version                  : 2
source IP address              : 0.0.0.0
query-interval (sec)           : 60
max-response-time (sec)        : 10
querier-timeout (sec)          : 120
tcn query count                : 2
tcn query interval (sec)       : 10
Vlan 1:   IGMP switch querier status
-----------------------------------------------------
elected querier is 1.1.1.1         on port Fa8/0/1
-----------------------------------------------------
admin state                    : Enabled
admin version                  : 2
source IP address              : 10.1.1.65
query-interval (sec)           : 60
max-response-time (sec)        : 10
querier-timeout (sec)          : 120
tcn query count                : 2
tcn query interval (sec)       : 10
operational state              : Non-Querier
operational version            : 2
tcn query pending count        : 0
```

Related Commands

Command	Description
ip igmp snooping	Enables IGMP snooping.
ip igmp snooping querier	Globally enables the IGMP querier function.
show ip igmp snooping	Displays IGMP snooping configurations.

show ip pim all-vrfs tunnel

To display information about the Protocol Independent Multicast (PIM) register encapsulation and decapsulation tunnels for all VRFs, use the **show ip pim all-vrfs tunnel** command in privileged EXEC mode.

show ip pim all-vrfs tunnel [**verbose** | **Tunnel** *tunnel-interface-number*]

Syntax Description

verbose	(Optional) Provides additional information, such as the MAC encapsulation header and platform-specific information.
Tunnel *tunnel-interface-number*	(Optional) Displays tunnel information for a specific tunnel interface specified by *tunnel-interface-number*.

Command Default

Displays tunnel information for all VRFs on all tunnel interfaces.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If you use the show ip pim all-vrfs tunnel command without the optional keywords, information about the PIM register encapsulation and de-encapsulation tunnel interfaces for all VRFs is displayed.

The PIM encapsulation tunnel is the register tunnel. An encapsulation tunnel is created for every known rendezvous point (RP) on every switch. The PIM decapsulation tunnel is the register decapsulation tunnel. A decapsulation tunnel is created on the RP for the address that is configured to be the RP address.

show ip pim autorp

To display global information about auto-rp, use the **show ip pim autorp** command in privileged EXEC mode.

show ip pim autorp

Syntax Description

This command has no arguments or keywords.

Command Default

auto-rp is enabled by default.

Command Modes

Privileged EXEC mode

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

This command displays whether auto-rp is enabled or disabled.

Examples

The following command output displays that auto-rp is enabled:

```
Switch# show ip pim autorp

AutoRP Information:
  AutoRP is enabled.
  RP Discovery packet MTU is 0.
  224.0.1.40 is joined on GigabitEthernet1/0/1.

PIM AutoRP Statistics: Sent/Received
  RP Announce: 0/0, RP Discovery: 0/0
```

show ip pim bsr-router

To display information related to Protocol Independent Multicast (PIM) bootstrap router (BSR) protocol processing, use the **show ip pim bsr-router** command in user EXEC or privileged EXEC mode.

show ip pim bsr-router

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Like auto-rp, the BSR RP method can be configured. Once the BSR RP method is configured, entering this command will display the BSR router information.

Examples

The following is sample output from the **show ip pim bsr-router** command:

```
Switch# show ip pim bsr-router

PIMv2 Bootstrap information
This system is the Bootstrap Router (BSR)
  BSR address: 172.16.143.28
  Uptime: 04:37:59, BSR Priority: 4, Hash mask length: 30
  Next bootstrap message in 00:00:03 seconds

Next Cand_RP_advertisement in 00:00:03 seconds.
  RP: 172.16.143.28(Ethernet0), Group acl: 6
```

show ip pim tunnel

To display information about the Protocol Independent Multicast (PIM) register encapsulation and decapsulation tunnels on an interface, use the **show ip pim tunnel** command.

show ip pim [**vrf** *vrf-name*] **tunnel** [**Tunnel** *interface-number* | **verbose**]

Syntax Description

vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding (VRF) configuration.
Tunnel *interface-number*	(Optional) Specifies the tunnel interface number.
verbose	(Optional) Provides additional information, such as the MAC encapsulation header and platform-specific information.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use the **show ip pim tunnel** to display information about PIM tunnel interfaces.

PIM tunnel interfaces are used by the IPv4 Multicast Forwarding Information Base (MFIB) for the PIM sparse mode (PIM-SM) registration process. Two types of PIM tunnel interfaces are used by the the IPv4 MFIB:

- A PIM encapsulation tunnel (PIM Encap Tunnel)
- A PIM decapsulation tunnel (PIM Decap Tunnel)

The PIM Encap Tunnel is dynamically created whenever a group-to-Rendezvous Point (RP) mapping is learned (via Auto-RP, bootstrap router (BSR), or static RP configuration). The PIM Encap Tunnel is used to encapsulate multicast packets sent by first-hop Designated Routers (DRs) that have directly connected sources.

Similar to the PIM Encap Tunnel, the PIM Decap Tunnel interface is dynamically created—with the exception that it is created only on the RP whenever a group-to-RP mapping is learned. The PIM Decap Tunnel interface is used by the RP to decapsulate PIM register messages.

Note PIM tunnels will not appear in the running configuration.

The following syslog message will appear when a PIM tunnel interface is created:

```
* %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel<interface_number>,
changed state to up
```

Examples

The following is sample output from the **show ip pim tunnel** taken from a RP. The output is used to verify the PIM Encap and Decap Tunnel on the RP:

```
Switch# show ip pim tunnel

Tunnel0
   Type  : PIM Encap
  RP    : 70.70.70.1*
  Source: 70.70.70.1
Tunnel1*
  Type  : PIM Decap
  RP    : 70.70.70.1*
  Source: -R2#
```

Note The asterisk (*) indicates that the router is the RP. The RP will always have a PIM Encap and Decap Tunnel interface.

show mvr

To display the current Multicast VLAN Registration (MVR) global parameter values, including whether or not MVR is enabled, the MVR multicast VLAN, the maximum query response time, the number of multicast groups, and the MVR mode (dynamic or compatible), use the **show mvr** privileged EXEC command without keywords.

show mvr

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Examples

This is an example of output from the **show mvr** command:

```
Switch# show mvr
MVR Running: TRUE
MVR multicast VLAN: 1
MVR Max Multicast Groups: 256
MVR Current multicast groups: 0
MVR Global query response time: 5 (tenths of sec)
MVR Mode: compatible
```

In the preceding display, the maximum number of multicast groups is fixed at 256. The MVR mode is either compatible (for interoperability with Catalyst 2900 XL and Catalyst 3500 XL switches) or dynamic (where operation is consistent with IGMP snooping operation and dynamic MVR membership on source ports is supported).

show mvr interface

To display the Multicast VLAN Registration (MVR) receiver and source ports, use the **show mvr interface** privileged EXEC command without keywords. To display MVR parameters for a specific receiver port, use the command with keywords.

show mvr interface [*interface-id* [**members** [**vlan** *vlan-id*]]]

Syntax Description

interface-id	(Optional) Displays MVR type, status, and Immediate Leave setting for the interface. Valid interfaces include physical ports (including type, stack member (stacking-capable switches only) module, and port number).
members	(Optional) Displays all MVR groups to which the specified interface belongs.
vlan *vlan-id*	(Optional) Displays all MVR group members on this VLAN. The range is 1 to 4094.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

If the entered port identification is a non-MVR port or a source port, the command returns an error message. For receiver ports, it displays the port type, per port status, and Immediate-Leave setting.

If you enter the **members** keyword, all MVR group members on the interface appear. If you enter a VLAN ID, all MVR group members in the VLAN appear.

Examples

This is an example of output from the **show mvr interface** command:

```
Switch# show mvr interface
Port        Type            Status          Immediate Leave
----        ----            -------         ---------------
Gi1/0/1     SOURCE          ACTIVE/UP       DISABLED
Gi1/0/2     RECEIVER        ACTIVE/DOWN     DISABLED
```

In the preceding display, Status is defined as follows:

- Active means the port is part of a VLAN.
- Up/Down means that the port is forwarding/nonforwarding.

- Inactive means that the port is not yet part of any VLAN.

This is an example of output from the **show mvr interface** command for a specified port:

```
Switch# show mvr interface gigabitethernet1/0/2
Type: RECEIVER Status: ACTIVE Immediate Leave: DISABLED
```

This is an example of output from the **show mvr interface** *interface-id* **members** command:

```
Switch# show mvr interface gigabitethernet1/0/2 members
239.255.0.0     DYNAMIC ACTIVE
239.255.0.1     DYNAMIC ACTIVE
239.255.0.2     DYNAMIC ACTIVE
239.255.0.3     DYNAMIC ACTIVE
239.255.0.4     DYNAMIC ACTIVE
239.255.0.5     DYNAMIC ACTIVE
239.255.0.6     DYNAMIC ACTIVE
239.255.0.7     DYNAMIC ACTIVE
239.255.0.8     DYNAMIC ACTIVE
239.255.0.9     DYNAMIC ACTIVE
```

show mvr members

To display all receiver and source ports that are currently members of an IP multicast group, use the **show mvr members** privileged EXEC command.

show mvr members [*ip-address*] [**vlan** *vlan-id*]

Syntax Description

ip-address	(Optional) The IP multicast address. If the address is entered, all receiver and source ports that are members of the multicast group appear. If no address is entered, all members of all Multicast VLAN Registration (MVR) groups are listed. If a group has no members, the group is listed as Inactive.
vlan *vlan-id*	(Optional) Displays all MVR group members on this VLAN. The range is 1 to 4094.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

The **show mvr members** command applies to receiver and source ports. For MVR-compatible mode, all source ports are members of all multicast groups.

Examples

This is an example of output from the **show mvr members** command:

```
Switch# show mvr members
MVR Group IP    Status          Members
------------    ------          -------
239.255.0.1     ACTIVE          Gi1/0/1(d), Gi1/0/5(s)
239.255.0.2     INACTIVE        None
239.255.0.3     INACTIVE        None
239.255.0.4     INACTIVE        None
239.255.0.5     INACTIVE        None
239.255.0.6     INACTIVE        None
239.255.0.7     INACTIVE        None
239.255.0.8     INACTIVE        None
239.255.0.9     INACTIVE        None
239.255.0.10    INACTIVE        None
<output truncated>
```

This is an example of output from the **show mvr members** *ip-address* command. It displays the members of the IP multicast group with that address:

```
Switch# show mvr members 239.255.0.2
239.255.003.--22    ACTIVE        Gi1//1(d), Gi1/0/2(d), Gi1/0/3(d), Gi1/0/4(d), Gi1/0/5(s)
```

show platform ip multicast

To display platform-dependent IP multicast tables and other information, use the **show platform ip multicast** privileged EXEC command.

show platform ip multicast {**acl-full-info | counters | groups** | **hardware [detail] | interfaces | locks | mdfs-routes | mroute-retry | retry | trace**}

Syntax Description

acl-full-info	Displays IP multicast routing access control list (ACL) information, in particular the number of outgoing VLANs for which router ACLs at the output cannot be applied in hardware.
counters	Displays IP multicast counters and statistics.
groups	Displays IP multicast routes per group.
hardware [**detail**]	Displays IP multicast routes loaded into hardware. The optional **detail** keyword is used to show port members in the destination index and route index.
interfaces	Displays IP multicast interfaces.
locks	Displays IP multicast destination-index locks.
mdfs-routes	Displays multicast distributed fast switching (MDFS) IP multicast routes.
mroute-retry	Displays the IP multicast route retry queue.
retry	Displays the IP multicast routes in the retry queue.
trace	Displays the IP multicast trace buffer.

Command Modes

Privileged EXEC

Command History

Release	Modification
Cisco IOS 15.0(2)EX1	This command was introduced.

Usage Guidelines

Use this command only when you are working directly with a technical support representative while troubleshooting a problem. Do not use this command unless a technical support representative asks you to do so.

Examples

This example shows how to display platform IP multicast information.

```
Switch# show platform ip multicast
```

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