

HP Switch Software

Multicast and Routing Guide for YA/YB.15.16

Abstract

This switch software guide is intended for network administrators and support personnel, and applies to the switch models listed on this page unless otherwise noted. This guide does not provide information about upgrading or replacing switch hardware. The information in this guide is subject to change without notice.

Applicable Products

HP Switch 2530-series:

J9772A	J9775A	J9778A	J9781A
J9773A	J9776A	J9779A	J9782A
J9774A	J9777A	J9780A	J9783A



© Copyright 2014 Hewlett-Packard Development Company, L.P.

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Acknowledgments

Microsoft®, Windows®, Windows® XP, and Windows NT® are U.S. registered trademarks of Microsoft Corporation.

Adobe® and Acrobat® are trademarks of Adobe Systems Incorporated.

Java and Oracle are registered trademarks of Oracle and/or its affiliates.

Warranty

For the software end user license agreement and the hardware limited warranty information for HP Networking products, visit www.hp.com/networking.

Contents

1 Multimedia Traffic Control with IP Multicast (IGMP)	5
Overview.....	5
IGMP general operation and features.....	5
IGMP operating features.....	5
Basic operation.....	5
Enhancements.....	5
Number of IP multicast addresses allowed.....	6
Configuring and displaying IGMP (CLI).....	6
Viewing IGMP configuration for VLANs.....	6
Viewing the current IGMP configuration.....	7
Viewing IGMP high level statistics for all VLANs on the switch.....	8
Viewing IGMP historical counters for a VLAN.....	9
Viewing IGMP group address information.....	9
Viewing IGMP group information for a VLAN with a filtered address.....	10
Enabling or disabling IGMP on a VLAN.....	10
Configuring per-port IGMP traffic filters.....	11
Configuring the querier function.....	11
Configuring the querier interval.....	12
Configuring static multicast groups.....	12
How IGMP operates.....	12
Operation with or without IP addressing.....	13
Automatic fast-leave IGMP.....	14
Default (enabled) IGMP operation solves the "delayed leave" problem.....	15
Configuring fast-leave IGMP.....	15
Forced fast-leave IGMP.....	16
Configuring forced fast-leave IGMP.....	16
Configuring delayed group flush.....	16
Unjoined multicast traffic.....	17
IGMP proxy forwarding.....	19
How IGMP proxy forwarding works.....	19
Configuring IGMP proxy (CLI).....	20
Adding or leaving a multicast domain.....	20
VLAN context command.....	21
IGMP proxy show command.....	22
Operating notes for IGMP proxy forwarding.....	22
Using the switch as querier.....	24
Well-known or reserved multicast addresses excluded from IP multicast filtering.....	25
IP multicast filters.....	25
Reserved addresses excluded from IP multicast filtering.....	25
2 Multimedia Traffic Control with IP Multicast (IGMP) v2 NG	26
IGMP V2 NG Overview.....	26
Features overview.....	26
IGMP Context Commands.....	26
Enabling delayed flush on IGMP.....	26
Configuring Fast-Learn IGMP.....	27
VLAN Context Commands.....	27
Enabling or Disabling IGMP on a VLAN.....	27
Configuring the Querier Function.....	27
Configuring the IGMP Query Interval.....	27
Configuring Per-Port IGMP Traffic Filters.....	27
Configuring Fast-Leave IGMP.....	28

Configuring Forced Fast-Leave IGMP.....	28
Configuring Static Multicast Groups.....	28
Show Commands.....	28
Viewing the current IGMP configuration and status.....	28
Statistics and State commands.....	31
Help function commands.....	32
Index.....	36

1 Multimedia Traffic Control with IP Multicast (IGMP)

Overview

This chapter describes multimedia traffic control with IP multicast-Internet Group Management Protocol (IGMP) controls to reduce unnecessary bandwidth usage on a per-port basis, and how to configure it with the switch's built-in interfaces. For general information about IGMP, see ["IGMP general operation and features"](#) (page 5).

NOTE: The use of static multicast filters is described in the chapter titled "Traffic/Security Filters" in the *Access Security Guide* for your HP switch.

IGMP general operation and features

In a network where IP multicast traffic is transmitted for various multimedia applications, you can use the switch to reduce unnecessary bandwidth usage on a per-port basis by configuring IGMP. In the factory default state (IGMP disabled), the switch simply floods all IP multicast traffic it receives on a given VLAN through all ports on that VLAN (except the port on which it received the traffic.) This can result in significant and unnecessary bandwidth usage in networks where IP multicast traffic is a factor. Enabling IGMP allows the ports to detect IGMP queries and report packets and manage IP multicast traffic through the switch.

IGMP is useful in multimedia applications such as LAN TV, desktop conferencing, and collaborative computing, where there is multipoint communication, that is, communication from one to many hosts, or communication originating from many hosts and destined for many other hosts. In such multipoint applications, IGMP is configured on the hosts, and multicast traffic is generated by one or more servers (inside or outside of the local network.) Switches in the network (that support IGMP) can then be configured to direct the multicast traffic to only the ports where needed. If multiple VLANs are configured, you can configure IGMP on a per-VLAN basis.

Enabling IGMP allows detection of IGMP queries and report packets used to manage IP multicast traffic through the switch. If no other querier is detected, the switch then also functions as the querier. If you need to disable the querier feature, do so through the IGMP configuration MIB, see ["Configuring the querier function"](#) (page 11).

NOTE: IGMP configuration on the switches operates at the VLAN context level. If you are not using VLANs, configure IGMP in VLAN 1 (the default VLAN) context.

IGMP operating features

Basic operation

In the factory default configuration, IGMP is disabled. To enable IGMP

- If multiple VLANs are not configured:
Configure IGMP on the default VLAN (DEFAULT_VLAN; VID=1.)
- If multiple VLANs are configured:
Configure IGMP on a per-VLAN basis for every VLAN where this feature is to be used.

Enhancements

With the CLI, you can configure these additional options:

Auto/blocked/forward	You can use the console to configure individual ports to any of the following states:
Auto	(Default) Causes the switch to interpret IGMP packets and to filter IP multicast traffic based on the IGMP packet information for ports belonging to a multicast

	<p>group. This means that IGMP traffic will be forwarded on a specific port only if an IGMP host or multicast router is connected to the port.</p> <p>Blocked Causes the switch to drop all IGMP transmissions received from a specific port. Outgoing queries are not blocked on the port.</p> <p>Forward Causes the switch to forward all IGMP and IP multicast transmissions through the port.</p>
Operation with or without IP addressing	This feature helps to conserve IP addresses by enabling IGMP to run on VLANs that do not have an IP address. See “Operation with or without IP addressing” (page 13) .
Querier capability	The switch performs this function for IGMP on VLANs having an IP address when there is no other device in the VLAN acting as querier. See “Using the switch as querier” (page 24) .

To configure high priority settings for traffic, see [“Quality of Service: managing bandwidth more effectively”](#) in the *Advanced Traffic Management Guide*.

NOTE: Whenever IGMP is enabled, the switch generates an Event Log message indicating whether querier functionality is enabled.

IP multicast traffic groups are identified by IP addresses in the range of 224.0.0.0 to 239.255.255.255. Also, incoming IGMP packets intended for reserved, or "well-known" multicast addresses, automatically flood through all ports (except the port on which the packets entered the switch.) For more on this topic, see [“Well-known or reserved multicast addresses excluded from IP multicast filtering” \(page 25\)](#).

For more information about IGMP, see [“How IGMP operates” \(page 12\)](#).

Number of IP multicast addresses allowed

The number of IGMP filters (addresses) and static multicast filters available is 2,038. Additionally, 16 static multicast filters are allowed. If multiple VLANs are configured, then each filter is counted once per VLAN in which it is used.

Configuring and displaying IGMP (CLI)

Viewing IGMP configuration for VLANs

Syntax:

```
show ip igmp [vlan <vid>]
```

Displays IGMP configuration for a specified VLAN or for all VLANs on the switch.

Example 1 Displaying IGMP status for a VLAN

```
HP Switch(config)# show ip igmp vlan 1
```

```
IGMP Service Protocol Info
```

```
Total VLANs with IGMP enabled           : 30
Current count of multicast groups joined  : 20
VLAN ID : 2
VLAN Name : VLAN2
IGMP version : 2
Querier Address : 10.255.128.2
Querier Port : 1
Querier UpTime : 1h 51m 59s
Querier Expiration Time : 2min 5sec
Ports with multicast routers: 1, 5-6
```

Active Group	Addresses	Type	Expires	Ports	Reports	Queries
226.0.6.7		Filter	2min 5sec	1	10	10
226.0.6.8		Standard	3min 20sec	2	20	20

Viewing the current IGMP configuration

Syntax:

```
show ip igmp config
```

Displays IGMP configuration for all VLANs on the switch.

Syntax:

```
show ip igmp vlan <vid> config
```

Displays IGMP configuration for a specific VLAN on the switch, including per-port data.

For IGMP operating status, see the section "Internet Group Management Protocol (IGMP) status" in the chapter "Monitoring and Analyzing Switch Operation" of the *Management and Configuration Guide* for your switch.

Example:

Suppose you have the following VLAN and IGMP configurations on the switch:

VLAN ID	VLAN name	IGMP enabled	Querier
1	DEFAULT_VLAN	Yes	No
22	VLAN-2	Yes	Yes
33	VLAN-3	No	Yes

You could use the CLI to display this data as follows:

Example 2 Listing of IGMP configuration for all VLANs in the switch

```
HP Switch(config)# show ip igmp config

IGMP Service Config

Control unknown multicast [Yes] : Yes
Forced fast leave timeout [0] : 4
Delayed flush timeout [0] : 0

VLAN ID VLAN Name      IGMP Enabled Querier Allowed Querier Interval
-----
1        DEFAULT_VLAN Yes          No             125
22       VLAN-2         Yes          Yes            125
33       VLAN-3         No           Yes            125
```

The following version of the `show ip igmp` command includes the VLAN ID (*vid*) designation, and combines the above data with the IGMP per-port configuration:

Example 3 Listing of IGMP configuration for a specific VLAN

```
HP Switch(config)# show ip igmp vlan 2 config

IGMP Service VLAN Config 1

VLAN ID : 22
VLAN Name : VLAN-2
IGMP Enabled [No] : Yes
Querier Allowed [Yes] : Yes

Port Type          | Port Mode Forced Fast Leave Fast Leave
-----+-----
1  100/1000T       | Auto      No             Yes 2
2  100/1000T       | Forward   No             Yes
3  100/1000T       | Blocked   No             Yes
4  100/1000T       | Auto      No             Yes
5  100/1000T       | Auto      No             Yes
6  100/1000T       | Auto      No             Yes
```

- 1** IGMP configuration for the selected VLAN. **2** IGMP configuration on the individual ports in the VLAN.
-

Viewing IGMP high level statistics for all VLANs on the switch

Syntax:

```
show ip igmp statistics
```

Example 4 Displaying statistics for IGMP joined groups

```
HP Switch(config)# show ip igmp statistics
```

```
IGMP Service Statistics
```

```
Total VLAN's with IGMP enabled:      33
Current count of multicast groups joined: 21
```

```
IGMP Joined Group Statistics
```

VLAN ID	VLAN Name	Total	Filtered	Standard	Static
1	DEFAULT_VLAN	52	50	0	2
22	VLAN-2	80	75	5	0
33	VLAN-3	1100	1000	99	1

Viewing IGMP historical counters for a VLAN

Syntax:

```
show ip igmp vlan <vid> counters
```

Example 5 Display of IGMP historical counters for a VLAN

```
HP Switch(config)# show ip igmp vlan 1 counters
```

```
IGMP service Vlan counters
```

```
VLAN ID : 1
VLAN Name : DEFAULT_VLAN
```

```
General Query Rx           : 58
General Query Tx           : 58
Group Specific Query Rx    : 3
Group Specific Query Tx    : 3
V1 Member Report Rx       : 0
V2 Member Report Rx       : 2
V3 Member Report Rx       : 0
Leave Rx                    : 0
Unknown IGMP Type Rx      : 0
Unknown Pkt Rx            : 0
Forward to Routers Tx Counter : 0
Forward to Vlan Tx Counter : 0
Port Fast Leave Counter   : 0
Port Forced Fast Leave Counter : 0
Port Membership Timeout Counter : 0
```

Viewing IGMP group address information

Syntax:

```
show ip igmp groups
```

Example 6 Displaying IGMP groups address information

```
HP Switch(vlan-2)# show ip igmp groups
```

```
IGMP Group Address Information
```

VLAN ID	Group Address	Expires	UpTime	Last Reporter	Type
22	239.20.255.7	1h 2m 5s	1h 14m 5s	192.168.0.2	Filter
22	239.20.255.8	1h 2m 5s	1h 14m 5s	192.168.0.2	Standard
22	239.20.255.9	1h 2m 5s	1h 14m 5s	192.168.0.2	Static

Viewing IGMP group information for a VLAN with a filtered address

Syntax:

```
show ip igmp vlan <vid> group <ip-addr>
```

Example 7 Group information for a VLAN with a filtered address group

```
HP Switch(config)# show ip igmp vlan 22 group 239.20.255.7
```

```
IGMP Service Protocol Group Info
```

```
VLAN ID: 22
```

```
VLAN NAME: VLAN-2
```

```
Filtered Group Address: 239.20.255.7
```

```
Last Reporter: 192.168.0.2
```

```
Up Time: 1 hr 14 min 5 sec
```

Port	Port Type	Port Mode	Expires	Access
A1	100/1000T	Auto	1hr 2min 5sec	Host

Enabling or disabling IGMP on a VLAN

You can enable IGMP on a VLAN, along with the last-saved or default IGMP configuration (whichever was most recently set), or you can disable IGMP on a selected VLAN.

Syntax:

```
[no] ip igmp
```

Enables IGMP on a VLAN. This command must be executed in a VLAN context.

Example 8 Enabling IGMP on VLAN 1

```
HP Switch(vlan-1)# vlan 1 ip igmp
```

– or –

```
HP Switch(vlan-1)# ip igmp
```

Example 9 Disabling IGMP on VLAN 1

```
HP Switch(config)# no vlan 1 ip igmp
```

NOTE: If you disable IGMP on a VLAN and then later re-enable IGMP on that VLAN, the switch restores the last-saved IGMP configuration for that VLAN. For more information on how switch memory operates, see the chapter "Switch Memory and Configuration" in the *Management and Configuration Guide* for your switch.

You can also combine the `ip igmp` command with other IGMP-related commands, as described in the following sections.

Configuring per-port IGMP traffic filters

Syntax:

```
vlan <vid> ip igmp [ auto <port-list> | blocked <port-list>
| forward <port-list> ]
```

Used in the VLAN context, specifies how each port should handle IGMP traffic.

Default: auto.

NOTE: Where a static multicast filter is configured on a port, and an IGMP filter created by this command applies to the same port, the IGMP filter overrides the static multicast filter for any inbound multicast traffic carrying the same multicast address as is configured in the static filter. See section "Filter Types and Operation" in the "Port Traffic Controls" chapter of the *Management and Configuration Guide* for your switch.

Example:

Suppose you want to configure IGMP as follows for VLAN 1 on the 100/1000T ports on a module in slot 1:

Ports 1-2	auto	Filter multicast traffic. Forward IGMP traffic to hosts on these ports that belong to the multicast group for which the traffic is intended. (Also forward any multicast traffic through any of these ports that is connected to a multicast router.)
Ports 3-4	forward	Forward all multicast traffic through this port.
Ports 5-6	blocked	Drop all multicast traffic received from devices on these ports.

For a description of the default behavior of data-driven switches, see ["Automatic fast-leave IGMP" \(page 14\)](#).

Depending on the privilege level, you could use one of the following commands to configure IGMP on VLAN 1 with the above settings:

```
HP Switch(config)# vlan 1 ip igmp auto 1,2 forward 3,4
blocked 5,6
```

```
HP Switch(vlan-1)# ip igmp auto 1,2 forward 3,4
blocked 5,6
```

The following command displays the VLAN and per-port configuration resulting from the above commands.

```
HP Switch> show igmp vlan 1 config
```

Configuring the querier function

Syntax:

```
[no] vlan <vid> ip igmp querier
```

This command disables or re-enables the ability for the switch to become querier if necessary.

The `no` version of the command disables the querier function on the switch. The `show ip igmp config` command displays the current querier command.

Default querier capability: Enabled

Configuring the querier interval

To specify the number of seconds between membership queries, enter this command with the desired interval.

Syntax:

```
[no] ip igmp querier interval <5-300>
```

NOTE: This command must be issued in a VLAN context.

Specifies the number of seconds between membership queries. The no form of the command sets the interval to the default of 125 seconds.

Default: 125 seconds

For example, to set the querier interval to 300 seconds on ports in VLAN 8:

```
HP Switch(vlan-8)# ip igmp querier interval 300
```

Configuring static multicast groups

Use this command to configure a group on the switch so that multicast traffic for that group can be forwarded with a receiver host. Traffic will be flooded for this group.

Syntax:

```
[no] ip igmp static-group <group-address>
```

NOTE: This command must be issued in a VLAN context.

Creates the IGMP static group with the specified <group address> on the selected VLAN. The no form of the command deletes the static group on the selected VLAN.

How IGMP operates

IGMP is an internal protocol of the IP suite. IP manages multicast traffic by using switches, multicast routers, and hosts that support IGMP. A multicasterouter is not necessary as long as a switch is configured to support IGMP with the `querier` feature enabled. A set of hosts, routers, and/or switches that send or receive multicast data streams to or from the same sources is called a *multicast group*, and all devices in the group use the same multicast group address. The multicast group running version 2 of IGMP uses three fundamental types of messages to communicate:

Query	A message sent from the querier (multicast router or switch) asking for a response from each host belonging to the multicast group. If a multicast router supporting IGMP is not present, the switch must assume this function to elicit group membership information from the hosts on the network. If you need to disable the querier feature, do so through the CLI using the IGMP configuration MIB, see “Configuring the querier function” (page 11) .
Report (Join)	A message sent by a host to the querier to indicate that the host wants to be or is a member of a given group indicated in the report message.
Leave group	A message sent by a host to the querier to indicate that the host has ceased to be a member of a specific multicast group.

NOTE:

IGMP version 3 support: When an IGMPv3 Join is received by the switch, it accepts the host request and begins to forward the IGMP traffic. This means that ports that have not joined the group and are not connected to routers or the IGMP Querier will not receive the group's multicast traffic.

The switch does not support the IGMPv3 "Exclude Source" or "Include Source" options in the Join Reports. Rather, the group is simply joined from all sources.

The switch does not support becoming a version 3 Querier. It becomes a version 2 Querier in the absence of any other Querier on the network.

An IP multicast packet includes the multicast group (address) to which the packet belongs. When an IGMP client connected to a switch port needs to receive multicast traffic from a specific group, it joins the group by sending an IGMP report (join request) to the network. (The multicast group specified in the join request is determined by the requesting application running on the IGMP client.) When a networking device with IGMP enabled receives the join request for a specific group, it forwards any IP multicast traffic it receives for that group through the port on which the join request was received. When the client is ready to leave the multicast group, it sends a Leave Group message to the network and ceases to be a group member. When the leave request is detected, the appropriate IGMP device ceases transmitting traffic for the designated multicast group through the port on which the leave request was received (as long as there are no other current members of that group on the affected port.)

Thus, IGMP identifies members of a multicast group (within a subnet) and allows IGMP-configured hosts (and routers) to join or leave multicast groups.

To display IGMP data showing active group addresses, reports, queries, querier access port, and active group address data (port, type, and access), see section "Internet Group Management Protocol (IGMP) Status" in appendix B, "Monitoring and Analyzing Switch Operation" of the *Management and Configuration Guide* for your switch.

Operation with or without IP addressing

You can configure IGMP on VLANs that do not have IP addressing. The benefit of IGMP without IP addressing is a reduction in the number of IP addresses you have to use and configure. This can be significant in a network with a large number of VLANs. The limitation on IGMP without IP addressing is that the switch cannot become Querier on any VLANs for which it has no IP address—so the network administrator must ensure that another IGMP device will act as Querier. It is also advisable to have an additional IGMP device available as a backup Querier. See [Table 1](#).

Table 1 Comparison of IGMP operation with and without IP addressing

IGMP function available with IP addressing configured on the VLAN	Available without IP addressing?	Operating differences without an IP address
Forward multicast group traffic to any port on the VLAN that has received a join request for that multicast group.	Yes	None
Forward join requests (reports) to the Querier.	Yes	None
Configure individual ports in the VLAN to Auto (the default)/Blocked, or Forward.	Yes	None
Configure IGMP traffic forwarding to normal or high-priority forwarding.	Yes	None
Age-out IGMP group addresses when the last IGMP client on a port in the VLAN leaves the group.	Yes	Requires that another IGMP device in the VLAN has an IP address and can operate as Querier. This can be a multicast router or another switch configured for IGMP operation. (HP recommends that the VLAN also include a device operating as a backup Querier in case
Support Fast-Leave IGMP and Forced Fast-Leave IGMP (below.)	Yes	

Table 1 Comparison of IGMP operation with and without IP addressing *(continued)*

IGMP function available with IP addressing configured on the VLAN	Available <i>without</i> IP addressing?	Operating differences without an IP address
		the device operating as the primary Querier fails for any reason.)
Support automatic Querier election.	No	Querier operation not available.
Operate as the Querier.	No	Querier operation not available.
Available as a backup Querier.	No	Querier operation not available.

Automatic fast-leave IGMP

Depending on the switch model, fast-leave is enabled or disabled in the default configuration.

Switch model or series	Data-driven IGMP included?	IGMP fast-leave setting	Default IGMP behavior
Switch 8200zl Switch 6600 Switch 6400cl Switch 6200yl Switch 5400zl Switch 5300xl Switch 4200vl Switch 3500 Switch 3500yl Switch 3400cl Switch 2910 Switch 2900 Switch 2610 Switch 2510 Switch 2500	Yes	Always Enabled	Drops unjoined multicast traffic except for always-forwarded traffic toward the Querier or multicast routers and out of IGMP-forward ports. Selectively forwards joined multicast traffic, except on IGMP-forward ports, which forward all multicast traffic.
Switch 2600 Switch 2600-PWR Switch 4100gl Switch 6108	No	Disabled in the default configuration	IGMP fast-leave disabled in the default configuration. Floods unjoined multicast traffic to all ports. Selectively forwards joined multicast traffic, except on IGMP-forward ports, which forward all multicast traffic.

On switches that do not support data-driven IGMP, unregistered multicast groups are flooded to the VLAN rather than pruned. In this scenario, fast-leave IGMP can actually increase the problem of multicast flooding by removing the IGMP group filter before the Querier has recognized the IGMP leave. The Querier will continue to transmit the multicast group during this short time, and because the group is no longer registered, the switch will then flood the multicast group to all ports.

On HP switches that do support data-driven IGMP ("Smart" IGMP), when unregistered multicasts are received the switch automatically filters (drops) them. Thus, the sooner the IGMP leave is processed, the sooner this multicast traffic stops flowing.

Because of the multicast flooding problem mentioned above, the IGMP fast-leave feature is disabled by default on all HP switches that do not support data-driven IGMP (see the table above.) The feature can be enabled on these switches via an SNMP set of this object:

```
hpSwitchIcmpPortForceLeaveState.<vid>.<port number>
```

However, HP does not recommend this because it will increase the amount of multicast flooding during the period between the client's IGMP leave and the Querier's processing of that leave. For more information on this topic, see ["Forced fast-leave IGMP" \(page 16\)](#).

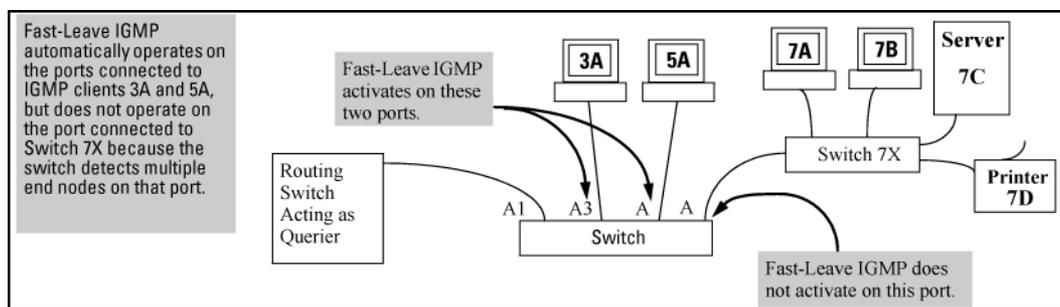
If a switch port has the following characteristics, the fast-leave operation will apply:

- Connected to only one end node.
- The end node currently belongs to a multicast group, that is, is an IGMP client.
- The end node subsequently leaves the multicast group.

Then the switch does not need to wait for the Querier status update interval, but instead immediately removes the IGMP client from its IGMP table and ceases transmitting IGMP traffic to the client. (If the switch detects multiple end nodes on the port, automatic fast-leave does not activate—regardless of whether one or more of these end nodes are IGMP clients.)

In [Figure 1](#), automatic fast-leave operates on the switch ports for IGMP clients "3A" and "5A," but not on the switch port for IGMP clients "7A" and "7B," server "7C," and printer "7D."

Figure 1 Example of automatic fast-leave IGMP criteria



When client "3A" running IGMP is ready to leave the multicast group, it transmits a Leave Group message. Because the switch knows that there is only one end node on port A3, it removes the client from its IGMP table and halts multicast traffic (for that group) to port A3. If the switch is not the Querier, it does not wait for the actual Querier to verify that there are no other group members on port A3. If the switch itself is the Querier, it does not query port A3 for the presence of other group members.

Fast-leave operation does not distinguish between end nodes on the same port that belong to different VLANs. Thus, for example, even if all of the devices on port A6 in [Figure 1](#) belong to different VLANs, fast-leave does not operate on port A6.

Default (enabled) IGMP operation solves the "delayed leave" problem

Fast-leave IGMP is enabled by default. When fast-leave is disabled and multiple IGMP clients are connected to the same port on an IGMP device (switch or router), if only one IGMP client joins a given multicast group, then later sends a Leave Group message and ceases to belong to that group, the switch automatically retains that IGMP client in its IGMP table and continues forwarding IGMP traffic to the IGMP client until the Querier triggers confirmation that no other group members exist on the same port. This delayed leave operation means that the switch continues to transmit unnecessary multicast traffic through the port until the Querier renews multicast group status.

Configuring fast-leave IGMP

For information about fast-leave IGMP, see ["Automatic fast-leave IGMP" \(page 14\)](#).

Syntax:

```
[no] ip igmp fastleave <port-list>
```

Enables IGMP fast-leaves on the specified ports in the selected VLAN.

The `no` form of the command disables IGMP fast-leave on the specified ports in the selected VLAN.

Use `show running` to display the ports per-VLAN on which fast-leave is disabled.

Default: Enabled

Forced fast-leave IGMP

When enabled, forced fast-leave IGMP speeds up the process of blocking unnecessary IGMP traffic to a switch port that is connected to multiple end nodes. (This feature does not activate on ports where the switch detects only one end node.) For example, in [Figure 1 \(page 15\)](#), even if you configured forced fast-leave on all ports in the switch, the feature would activate only on port A6 (which has multiple end nodes) when a Leave Group request arrived on that port.

When a port having multiple end nodes receives a Leave Group request from one end node for a given multicast group "X," forced fast-leave activates and waits a small amount of time to receive a join request from any other group "X" member on that port. If the port does not receive a join request for that group within the forced-leave interval, the switch then blocks any further group "X" traffic to the port.

Configuring forced fast-leave IGMP

For information about forced fast-leave, see ["Forced fast-leave IGMP" \(page 16\)](#).

Syntax:

```
[no] vlan <vid> ip igmp forcedfastleave <port-list>
```

Enables IGMP forced fast-leave on the specified ports in the selected VLAN, even if they are cascaded.

The `no` form of the command disables forced fast-leave on the specified ports in the selected VLAN.

Use `show running` to display the ports per-VLAN on which forced fast-leave is enabled.

Default: Disabled

<code>show running-config</code>	Displays a non-default IGMP forced fast-leave configuration on a VLAN. The <code>show running-config</code> output does not include forced fast-leave if it is set to the default of 0.
<code>forcedfastleave</code>	Can be used when there are multiple devices attached to a port.

Configuring delayed group flush

When enabled, this feature continues to filter IGMP groups for a specified additional period of time after IGMP leaves have been sent. The delay in flushing the group filter prevents unregistered traffic from being forwarded by the server during the delay period. In practice, this is rarely necessary on the switches, which support data-driven IGMP. (Data-driven IGMP, which is enabled by default, prunes off any unregistered IGMP streams detected on the switch.)

Syntax:

```
igmp delayed-flush <0-255>
```

Where leaves have been sent for IGMP groups, enables the switch to continue to flush the groups for a specified period of time. This command is applied globally to all IGMP-configured VLANs on the switch.

Range: 0 - 255; Default: Disabled (0)

Syntax:

```
show igmp delayed-flush
```

Displays the current `igmp delayed-flush` setting.

Unjoined multicast traffic

This feature adds a global IGMP multicast configuration option to the switch that results in each VLAN having a multicast filter. The filter prevents unjoined multicast traffic from being forwarded on interfaces associated with IGMP queriers. Each filter only contains interfaces that are queriers on the same VLAN, so multicast traffic is only flooded on interfaces that contain queriers that are on the same VLAN as the multicast traffic.

On switch bootup, all VLANs that are IGMP-enabled are guaranteed one multicast filter. You can always reboot the switch to recreate this configuration where each IGMP-enabled VLAN has a multicast filter.

NOTE: Joined multicast traffic continues to be forwarded as usual.

You must reboot the switch after configuring the per-VLAN filter.

Syntax:

```
[no] igmp filter-unknown-mcast
```

Enables interface isolation for unjoined multicast groups. IGMP is configured so that each interface with IGMP enabled will have a data-driven multicast filter associated with it, preventing unjoined IP multicast packets from being flooded. A reboot is required for the change to take effect.

Default: Disabled

Example 10 Enabling the IGMP multicast filter

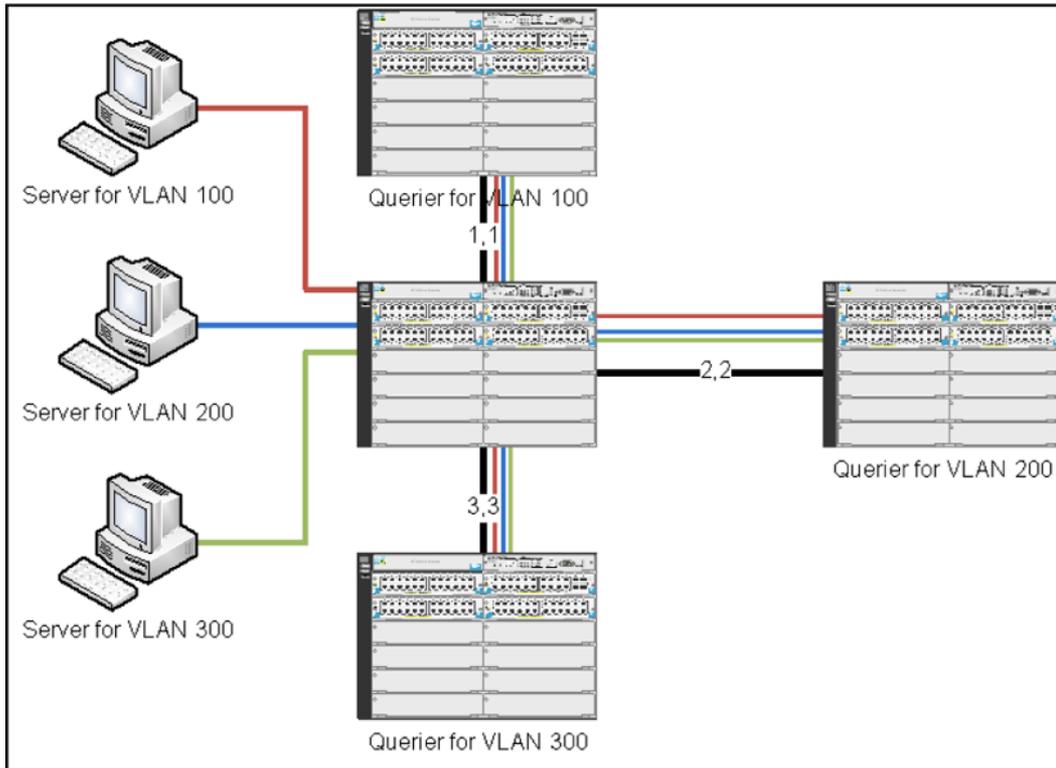
```
HP Switch(config)# igmp filter-unknown-mcast
Command will take effect after saving configuration
and reboot.
```

Figure 2 shows the multicast traffic being flooded to all queriers on all VLANs; this is the default behavior. The `igmp filter-unknown-mcast` command has not been executed.

Table 2 Multicast filter table on distribution switch

VLAN ID	Member Ports
0 (all VLANs)	1, 2, 3

Figure 2 Example of unknown multicast traffic flooding on all ports connected to a querier for any VLAN

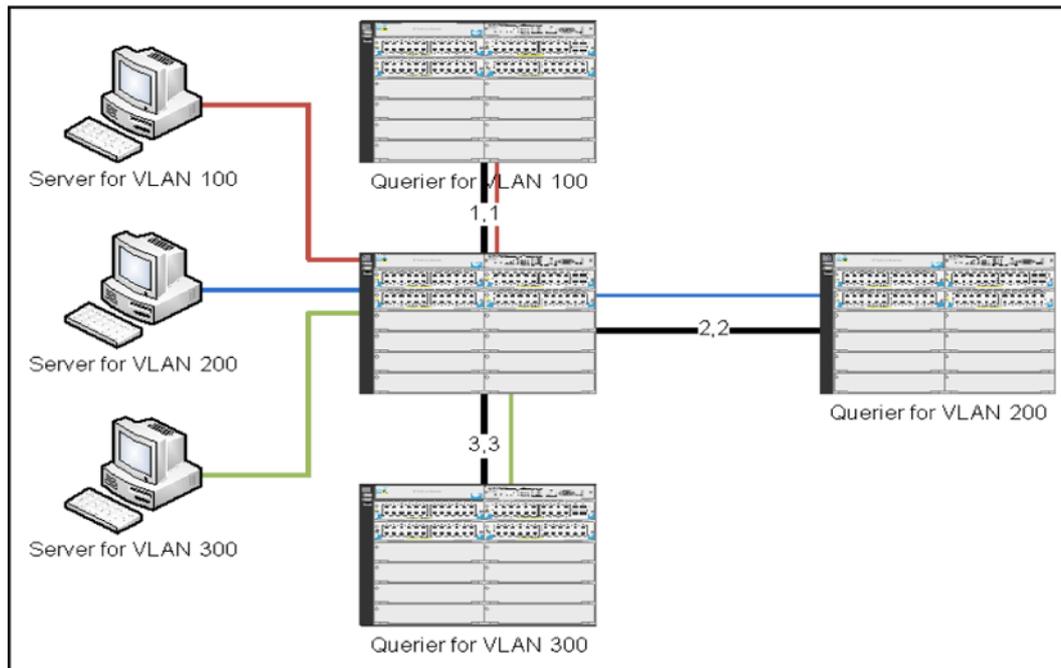


In [Figure 3](#), `igmp filter-unknown-mcast` has been configured. The multicast traffic only goes to the querier on the same VLAN as the multicast server.

Table 3 Multicast filter table on distribution switch

VLAN ID	Member Ports
100	1
200	2
300	3

Figure 3 Example of unknown multicast traffic not flooding out ports connected to queriers in separate VLANs



To display the status of IGMP multicast filtering use the `show ip igmp` command. If the IGMP Filter Unknown Multicast setting is different from the IGMP Filter Unknown Multicast status, a reboot is required to activate the desired setting. This setting will then be reflected in the status.

Example 11 IGMP unknown multicast filter setting being enabled but not yet activated

```
HP Switch(config)# show igmp filter-unknown-mcast
```

```
IGMP Filter Unknown Multicast: Enabled  
IGMP Filter Unknown Multicast Status: Disabled
```

To display information about IGMP multicast filtering by interface, use the `show ip igmp` command.

IGMP proxy forwarding

When a network has a border router connecting a PIM-SM domain to a PIM-DM domain, the routers that are completely within the PIM-DM domain have no way to discover multicast flows in the PIM-SM domain. When an IGMP join occurs on a router entirely within the PIM-DM domain for a flow that originates within the PIM-SM domain, it is never forwarded to the PIM-SM domain.

The IGMP proxy is a way to propagate IGMP joins across router boundaries. The proxy triggers the boundary router connected to a PIM-SM domain to query for multicast flows and forward them to the PIM-DM domain. IGMP needs to be configured on all VLAN interfaces on which the proxy is to be forwarded or received, and PIM-DM must be running for the traffic to be forwarded.

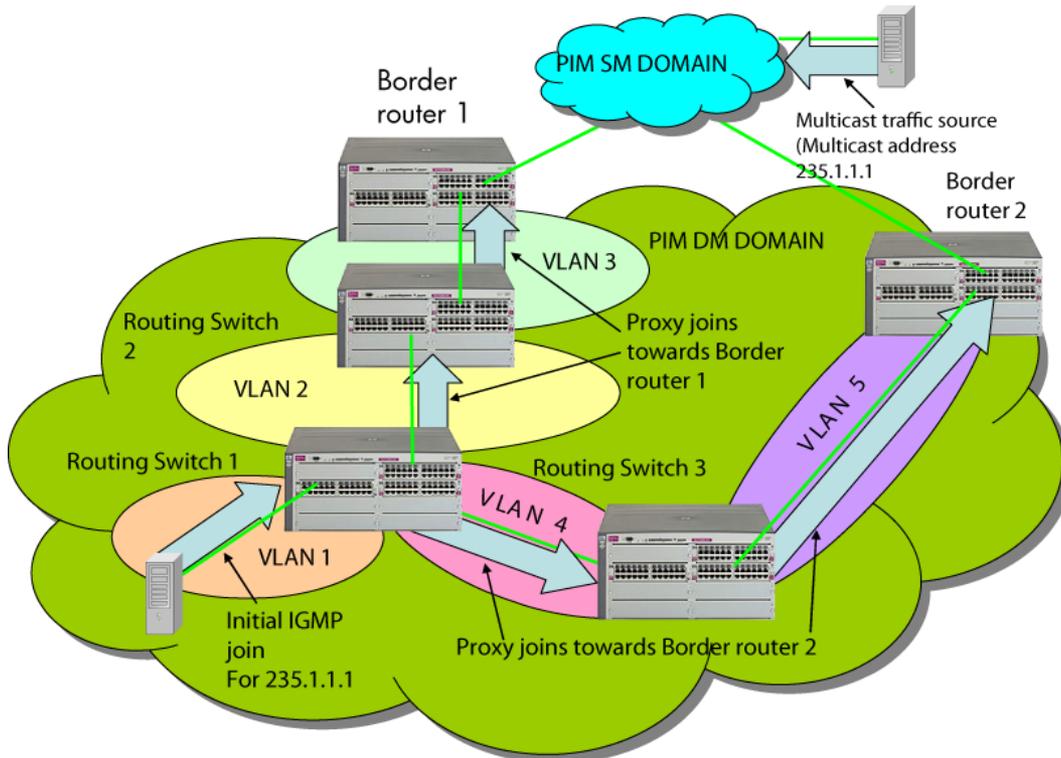
You can configure an IGMP proxy on a selected VLAN that will forward IP joins (reports) and IGMP leaves to the upstream border router between the two multicast domains. You must specify the VLANs on which the proxy is enabled as well as the address of the border router to which the joins are forwarded.

How IGMP proxy forwarding works

The following steps illustrate how to flood a flow from the PIM-SM domain into the PIM-DM domain when an IGMP join for that flow occurs in the PIM-DM domain. See [Figure 4](#).

1. Configure Routing Switch 1 with the IGMP proxy forwarding function to forward joins toward Border Router 1; in addition, configure Routing Switch 1 to forward joins from VLAN 1 toward Border Router 2, as is VLAN 4 on Routing Switch 3.
2. Configure VLAN 2 on Routing Switch 2 to forward joins toward Border Router 1.
3. When the host connected in VLAN 1 issues an IGMP join for multicast address 235.1.1.1, the join is proxied by Routing Switch 1 onto VLAN 2 and onto VLAN 4. The routing information table in Routing Switch 1 indicates that the packet to Border Router 1 and Border Router 2 is on VLAN 2 and VLAN 4, respectively.

Figure 4 IGMP proxy example



4. Routing Switch 2 then proxies the IGMP join into VLAN 3, which is connected to Border Router 1.
5. Border Router 1 uses PIM-SM to find and connect to the multicast traffic for the requested traffic. The traffic is flooded into the PIM-DM network where it is routed to the original joining host.
6. Additionally, the join was proxied from Routing Switch 3 to Border Router 2. At first, both border routers will flood the traffic into the PIM-DM domain. However, PIM-DM only forwards multicasts based on the shortest reverse path back to the source of the traffic as determined by the unicast routing tables (routing FIB.) Only one multicast stream is sent to the joining host. This configuration provides a redundant in case the first fails.

Configuring IGMP proxy (CLI)

For more information on IGMP proxy, see [“IGMP general operation and features” \(page 5\)](#).

Adding or leaving a multicast domain

Syntax:

```
[no] igmp-proxy-domain <domain-name> [
  <border-router-ip-address> | <mcast-range | all> ]
```

The no form of the command is used to remove a multicast domain.

All VLANs associated with the domain must first be removed for this command to work. See the `no` form of `igmp-proxy` in the VLAN context command.

<code><domain-name></code>	User-defined name to associate with the PIM border router and multicast range that is being sent toward the border router.
<code><border-router-ip-addr></code>	The IP address of the border router toward which IGMP proxy packets are sent. Not required for the <code>no</code> form of the command. NOTE: The current routing FIB determines the best path toward the border router and therefore the VLAN that a proxy is sent out on
<code>[<low-bound-ip-address all>]</code>	The low boundary (inclusive) of the multicast address range to associate with this domain (for example, 234.0.0.1) If <code>all</code> is selected, the multicast addresses in the range of 224.0.1.0 to 239.255.255.255 are included in this domain. NOTE: Addresses 224.0.0.0 to 224.0.0.255 are never used, because these addresses are reserved for protocols.
<code><high-bound-ip-address></code>	The high boundary (inclusive) of the multicast address range to associate with this domain (for example, 236.1.1.1)

Example 12 shows the IGMP proxy border IP addresses (111.11.111.111) being configured.

Example 12 IGMP proxy border IP address command

```
HP Switch(config)# igmp-proxy-domain Bob 111.11.111.111
```

Example 13 shows the lower and upper boundaries of the multicast address range associated with the domain named Bob.

Example 13 Setting the lower and upper bounds for multicasting

```
HP Switch(config)# igmp-proxy-domain Bob 111.11.111.111 234.0.0.1
HP Switch(config)# igmp-proxy-domain Bob 111.11.111.111 236.1.1.1
```

VLAN context command

This command is performed when in VLAN context mode. When a query occurs on the upstream interface, an IGMP join is sent for all multicast addresses that are currently joined on the downstream interface.

Syntax:

```
[no] igmp-proxy <domain-name>
```

Tells the VLAN which IGMP proxy domains to use with joins on the VLAN.

The `no` version of the command with no domain name specified removes all domains associated with this VLAN.

Note that multiple different domains may be configured in the same VLAN context where the VLAN is considered the downstream interface. The domain name must exist prior to using this command to add the domain.

NOTE: If the unicast routing path to the specified IP address was through the specified VLAN, no proxy IGMP would occur, that is, a proxy is not sent back out on the VLAN that the IGMP join came in on.

If no unicast route exists to the border router, no proxy IGMP packets are sent.

IGMP proxy show command

Syntax:

```
show igmp-proxy <entries | domains | vlans>
```

Shows the currently active IGMP proxy entries, domains, or VLANs.

Example 14 Showing active IGMP proxy entries

```
HP Switch(config)# show igmp-proxy entries
```

Total number of multicast routes: 2

Multicast Address	Border Address	VID	Multicast Domain
234.43.209.12	192.168.1.1	1	George
235.22.22.12	15.43.209.1	1	SAM
226.44.3.3	192.168.1.1	2	George

Example 15 Showing IGMP proxy domains

```
HP Switch(config)# show igmp-proxy domains
```

Total number of multicast domains: 5

Multicast Domain	Multicast Range	Border Address	Active entries
George	225.1.1.1/234.43.209.12	192.168.1.1	2
SAM	235.0.0.0/239.1.1.1	15.43.209.1	1
Jane	236.234.1.1/236.235.1.1	192.160.1.2	0
Bill	ALL	15.43.209.1	0

Example 16 Showing active IGMP proxy VLANs

```
HP Switch(config)# show igmp-proxy vlans
```

IGMP PROXY VLANs

VID	Multicast Domain	Active entries
1	George	1
1	Sam	1
1	Jane	0
2	George	1
4	George	0
4	Bill	0

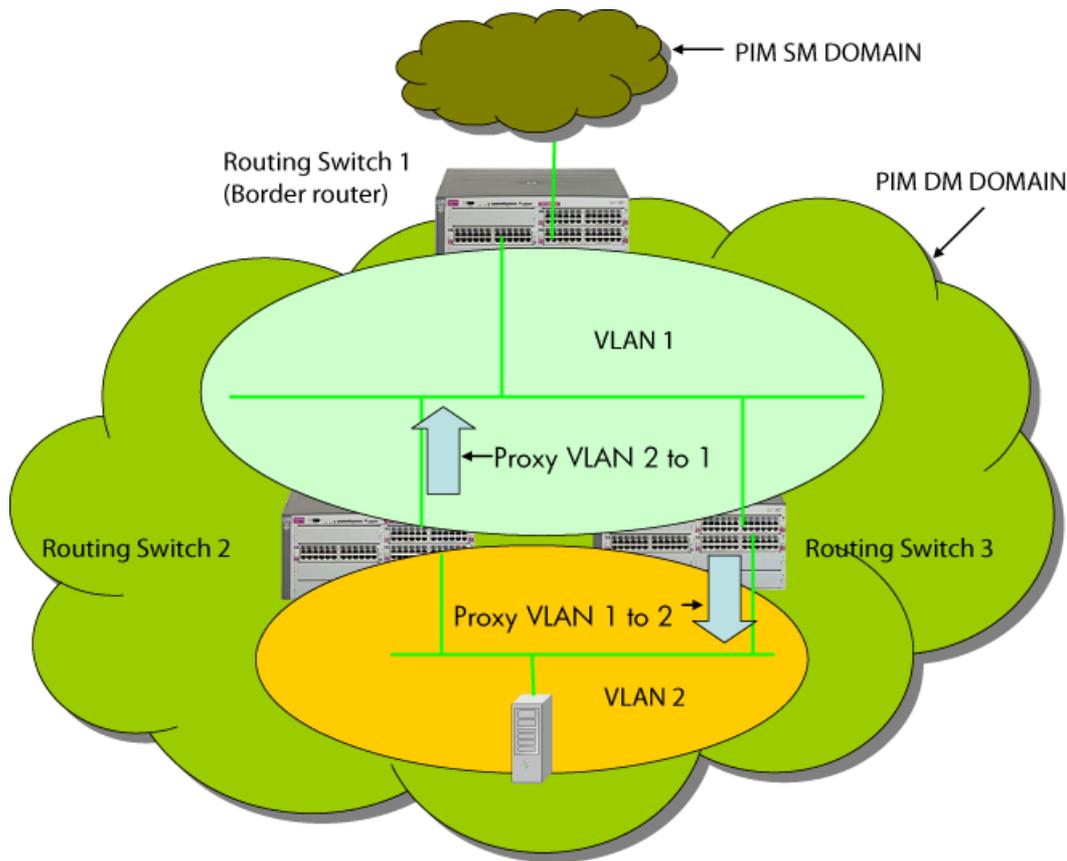
Operating notes for IGMP proxy forwarding

- You can configure up to 12 multicast domains, which indicate a range of multicast addresses and the IP address of the PIM-SM/PIM-DM border router.
- You must give each domain a unique name, up to 20 characters.
- The domains may have overlapping multicast ranges.

- The IP address of the border router may be the same or different in each configured domain.
- Duplicate IGMP joins are automatically prevented, or leaves that would remove a flow currently joined by multiple hosts.
- Range overlap allows for redundant connectivity and the ability for multicasts to arrive from different border routers based on the shortest path back to the source of the traffic.
- The configured domain names must be associated with one or more VLANs for which the proxy joins are to be done.
- All routers in the path between the edge router receiving the initial IGMP packets and the border router have to be configured to forward IGMP using IGMP proxy.
- All upstream and downstream interfaces using IGMP proxy forwarding require IGMP and PIM to be enabled.
- You must remove all VLAN associations with the domain name before that domain name can be removed.
- The appropriate border routers must be used for each VLAN, or PIM-DM will not forward the traffic. This could occur when multiple border routers exist. It may be necessary to configure multiple overlapping domains if the multicast source address can generate the same multicast address and have different best paths to the PIM-DM domain.

△ CAUTION: Be careful to avoid configuring a IGMP forward loop, because this would leave the VLANs in a joined state forever once an initial join is sent from a host. For example, a join is issued from the host in VLAN 2 and Routing Switch 2 will proxy the join onto VLAN 1. Routing Switch 3 will then proxy the join back onto VLAN 2 and increment its internal count of the number of joins on VLAN 2. Even after the host on VLAN 2 issues a leave, the proxy join will continue to remain and refresh itself each time a query occurs on VLAN 2. This type of loop could be created with multiple routers if an IGMP proxy is allowed to get back to the VLAN of the router that initially received the IGMP join from a host; see [Figure 5](#).

Figure 5 Proxy loop scenario



Using the switch as querier

The function of the IGMP Querier is to poll other IGMP-enabled devices in an IGMP-enabled VLAN to elicit group membership information. The switch performs this function if there is no other device in the VLAN, such as a multicastrouter, to act as Querier. Although the switch automatically ceases Querier operation in an IGMP-enabled VLAN if it detects another Querier on the VLAN, you can also use the switch's CLI to disable the Querier capability for that VLAN.

NOTE: A Querier is required for proper IGMP operation. For this reason, if you disable the Querier function on a switch, ensure that there is an IGMP Querier (and, preferably, a backup Querier) available on the same VLAN.

If the switch becomes the Querier for a particular VLAN (for example, the DEFAULT_VLAN), then subsequently detects queries transmitted from another device on the same VLAN, the switch ceases to operate as the Querier for that VLAN. If this occurs, the switch Event Log lists a pair of messages similar to these:

```
I 01/15/12 09:01:13 igmp:
DEFAULT_VLAN: Other Querier detected
I 01/15/12 09:01:13 igmp:
DEFAULT_VLAN: This switch is no longer Querier
```

In the above scenario, if the other device ceases to operate as a Querier on the default VLAN, the switch detects this change and can become the Querier as long as it is not pre-empted by some other IGMP Querier on the VLAN. In this case, the switch Event Log lists messages similar to the following to indicate that the switch has become the Querier on the VLAN:

```
I 01/15/12 09:21:55 igmp: DEFAULT_VLAN:
Querier Election in process
I 01/15/12 09:22:00 igmp: DEFAULT_VLAN:
This switch has been elected as Querier
```

Well-known or reserved multicast addresses excluded from IP multicast filtering

Each multicast host group is identified by a single IP address in the range of 224.0.0.0 through 239.255.255.255. Specific groups of consecutive addresses in this range are termed "well-known" addresses and are reserved for predefined host groups. IGMP does not filter these addresses, so any packets the switch receives for such addresses are flooded out all ports assigned to the VLAN on which they were received (except the port on which the packets entered the VLAN.)

Table 4 lists the 32 well-known address groups (8192 total addresses) that IGMP does not filter on.

Table 4 IP multicast address groups excluded from IGMP filtering

Groups of consecutive addresses in the range of 224.0.0.x to 239.0.0.x ¹		Groups of consecutive addresses in the range of 224.128.0.x to 239.128.0.x ¹	
224.0.0.x	232.0.0.x	224.128.0.x	232.128.0.x
225.0.0.x	233.0.0.x	225.128.0.x	233.128.0.x
226.0.0.x	234.0.0.x	226.128.0.x	234.128.0.x
227.0.0.x	235.0.0.x	227.128.0.x	235.128.0.x
228.0.0.x	236.0.0.x	228.128.0.x	236.128.0.x
229.0.0.x	237.0.0.x	229.128.0.x	237.128.0.x
230.0.0.x	238.0.0.x	230.128.0.x	238.128.0.x
231.0.0.x	239.0.0.x	231.128.0.x	239.128.0.x

¹ x is any value from 0 to 255.

IP multicast filters

NOTE: This operation applies to the HP Series 5400zl switches, the Series 3500yl switches, the switch 6200yl, the switch 8212zl, the Series 5300xl switches, as well as the 1600M, 2400M, 2424M, 4000M, and 8000M, but not to the Series 2500, 2650, Series 4100gl, Series 4200vl, or 6108 switches (which do not have static traffic/security filters.)

IP multicast addresses occur in the range from 224.0.0.0 through 239.255.255.255 (which corresponds to the ethernet multicast address range of 01005e-000000 through 01005e-7fffff.) Where a switch has a static traffic/security filter configured with a "multicast" filter type and a "multicast address" in this range, the switch will use the static filter unless IGMP learns of a multicast group destination in this range. In this case, IGMP dynamically takes over the filtering function for the multicast destination addresses for as long as the IGMP group is active. If the IGMP group subsequently deactivates, the switch returns filtering control to the static filter.

Reserved addresses excluded from IP multicast filtering

Traffic to IP multicast groups in the IP address range of 224.0.0.0 to 224.0.0.255 will always be flooded because addresses in this range are "well known" or "reserved" addresses. Thus, if IP multicast is enabled, and there is an IP multicast group within the reserved address range, traffic to that group will be flooded instead of filtered by the switch.

2 Multimedia Traffic Control with IP Multicast (IGMP) v2 NG

IGMP V2 NG Overview

IGMP, after being re-architected, is referred to as IGMP v2 NG, the next generation of IGMP version 2. IGMP v2 NG is based on the existing working Multicast Listener Discovery (MLD) code base and an event-driven architecture which enable easy enhancement and maintenance of the code. IGMP v2 NG uses Multicast Traffic Manager (MTM) to program hardware filters and MAC address.

The syslog hostname configuration is system-wide, not per syslog server.

Features overview

IGMP V2 NG supports both existing features in legacy IGMP and new features in IGMP v2 NG:

- Existing features in legacy IGMP:
 - IGMP version 1 support
 - IGMP version 2 support
 - IGMP proxy
 - IGMP flooding
 - IGMP Delayed Flush
 - Snooping functionality
 - PIM Interactions
- New features in IGMP v2 NG:
 - Static multicast group support (user configurable flood groups)
 - IGMP v2 standard MIB
 - Decoupling of IGMP proxy
 - IGMP topology change handling
 - Improved show commands
 - Fast data structures
 - MTM for Hardware interaction
 - Packet throttling

IGMP Context Commands

These CLI commands allow the user to configure IGMP.

Enabling delayed flush on IGMP

Enables and configures delayed flush timeout value (in secs) for the igmp for all VLANs. To disable delayed flush on all VLANs, set this value to 0. (Default: 0).

Syntax:

```
igmp delayed-flush <0-255>
```

Configuring Fast-Learn IGMP

Enables the fast learn feature globally. The `no` form of the command disables the fast learn feature. This command is independent of interface context `fast-learn` command and only one command will be exposed to the user. By default, this feature is disabled on all ports. `hpicfgmpMcastPortFastLearn` is the Mib variable defined for this command.

Syntax:

```
[no] igmp fastlearn <port-list>
```

VLAN Context Commands

Any of the VLAN context commands implicitly adds a row to `IgmpInterfaceTable` for this VLAN if this row is missing in the table (with `createAndGo` for `ip igmp`, and `createAndWait` for all other commands).

Enabling or Disabling IGMP on a VLAN

Enables IGMP on a VLAN. This command must be executed in a VLAN context.

Syntax:

```
[no] vlan <vid> ip igmp
```

Configuring the Querier Function

Disables or re-enables the ability for the switch to become a querier if necessary. When changing to querier, a time delay of up to 32 seconds may occur. When no IP is assigned, the IP source address of 0.0.0.0 is used for both static (self-joined) groups and proxy queries. The `no` form of the command disables the querier function on the switch. The `show ip igmp config` command displays the current querier command. (Default Querier Capability: Enabled.)

Syntax:

```
[no] vlan <vid> ip igmp
```

Configuring the IGMP Query Interval

Configures the query interval. Time range is 5 to 300 seconds, the default value is 125 seconds.

Syntax:

```
vlan <vid> ip igmp query interval <Query-interval time>
```

Configuring Per-Port IGMP Traffic Filters

Used in the VLAN context, this command specifies how each port should handle IGMP traffic. (Default: auto.)

NOTE: All incoming and outgoing multicast data traffic is blocked on these blocked ports including the incoming query and reports, however, the outgoing General queries are not blocked on these ports.

Syntax:

```
vlan <vid> ip igmp [auto <port-list> | blocked <port-list> | forward <port-list>]
```

Configuring Fast-Leave IGMP

Enables igmp fast-leaves on the specified ports in the selected VLAN. The `no` form of the command disables igmp fast-leave on the specified ports in the selected VLAN. (Default: Enabled.)

Syntax:

```
[no] vlan <vid> ip igmp fastleave <port-list>
```

Configuring Forced Fast-Leave IGMP

Enables IGMP Forced Fast-Leave on the specified ports in the selected VLAN, even if they are cascaded. (Default: Disabled.) The `no` form of the command disables Forced Fast-Leave on the specified ports in the selected VLAN.

Syntax:

```
[no] vlan <vid> ip igmp forcedfastleave <port-list>
```

Configuring Static Multicast Groups

Creates the IGMP static group <group-address> on the selected VLAN. The `no` form of the command deletes the static group from the selected VLAN.

Syntax:

```
[no] vlan <vid> ip igmp static-group <group-address>
```

Show Commands

These CLI commands allow the user to configure IGMP.

Viewing the current IGMP configuration and status

Syntax:

```
show ip igmp [vlan <vid>]
```

Displays IGMP status for all VLANs with IGMP enabled on the switch unless a specified VLAN has been given.

Example: show ip igmp

```
IGMP Service Protocol Info
Total VLAN's with IGMP enabled:  33
Current count of Multicast groups joined:  21
VLAN ID:  1
VLAN Name:  DEFAULT_VLAN
IGMP Version:  2
Querier Address [this switch]:  10.0.102.221
Querier Up Time:  1hr 53min 2sec
Querier Expiry Time:  2min 1sec
Ports with multicast routers:  A1, A3-A5
Active Group Addresses |Type| Expires | Ports | Reports | queries |
-----+-----+-----+-----+-----+-----+
xxx.xxx.xxx.xxx       |filt| 1min 2sec | A1     | 20      | 20      |
xxx.xxx.xxx.xxx       |std  | 3min 2sec | all    | 20      | 20      |
xxx.xxx.xxx.xxx       |filt| 23min 3sec | A1-B3, C4 | 20      | 20      |
xxx.xxx.xxx.xxx       |filt| 23min 10sec | A1,B2,C5 | 20      | 20      |
xxx.xxx.xxx.xxx       |filt| 2min 5sec  | F22    | 20      | 20      |
xxx.xxx.xxx.xxx       |stat | 0min 0sec  | all    | 20      | 20      |
Active Group Addresses |Type| Expires | Ports
-----+-----+-----+-----
xxx.xxx.xxx.xxx       |filt| 1min 2sec | A1
```

```

xxx.xxx.xxx.xxx      |std  | 3min 2sec | all
xxx.xxx.xxx.xxx      |filt | 23min 3sec | A1-B3, C4
xxx.xxx.xxx.xxx      |filt | 23min 10sec | A1,B2,C5
xxx.xxx.xxx.xxx      |filt | 2min 5sec  | F22

```

```

VLAN ID: 200
VLAN Name: client vlan
IGMP Version: 2
Querier Address: 10.0.102.204
Querier Port: 4 <only displayed when not querier>
Querier Up Time: 1hr 53min 2sec
Querier Expiry Time: 2min 1sec
Ports with multicast routers: A1, A3-A5

```

```

Active Group Addresses |Type| Expires | Ports
-----+-----+-----+-----
xxx.xxx.xxx.xxx      |filt | 1min 2sec | A1
xxx.xxx.xxx.xxx      |std  | 3min 2sec | all
xxx.xxx.xxx.xxx      |filt | 23min 3sec | A1-B3, C4
xxx.xxx.xxx.xxx      |stat | 0min 0sec | A1,B2,C5
xxx.xxx.xxx.xxx      |filt | 2min 5sec | F22

```

show ip igmp vlan 200

```

IGMP Service Protocol Info
Total VLAN's with IGMP enabled: 33
Current count of Multicast groups joined: 21
VLAN ID: 200
VLAN Name: client vlan
IGMP Version: 2
Querier Address: 10.0.102.204
Querier Port: 4 <only displayed when not querier>
Querier Up Time: 1hr 53min 2sec
Querier Expiry Time: 2min 1sec
Ports with multicast routers: A1, A3-A5

```

```

Active Group Addresses |Type| Expires | Ports
-----+-----+-----+-----
xxx.xxx.xxx.xxx      |filt | 1min 2sec | A1
xxx.xxx.xxx.xxx      |std  | 3min 2sec | all
xxx.xxx.xxx.xxx      |filt | 23min 3sec | A1-B3, C4
xxx.xxx.xxx.xxx      |stat | 0min 0sec | A1,B2,C5
xxx.xxx.xxx.xxx      |filt | 2min 5sec | F22

```

Syntax:

```
show ip igmp config
```

Global command listing IGMP status for all VLANs configured in the switch.

```

IGMP Service Config
Control unknown multicast [Yes]: Yes
Forced fast leave timeout [0]: 0
Delayed flush timeout [0]: 0
VLAN ID|VLAN NAME      |IGMP Enabled|Querier Allowed | Querier Interval |
-----+-----+-----+-----+-----
1      |DEFAULT_VLAN    |No          |Yes             | 125               |
200    |client vlan     |Yes         |No              | 125               |
300    |Data Centre     |Yes         |Yes             | 125               |

```

Syntax:

```
show ip igmp vlan <vlan> config
```

Displays IGMP configuration for a specific VLAN on the switch, including per-port data.

```
IGMP Service Vlan Config
VLAN ID: 300
VLAN NAME: VLAN300
IGMP Enabled [No]: Yes
Querier Allowed [Yes]: Yes
Port|      Type      | Port Mode | Forced Fast Leave | Fast Leave-----+-----+
-----+-----+
5  |100/1000T      | Auto     | No                 | Yes
6  |100/1000T      | Forward  | No                 | Yes
8  |100/1000T      | Blocked  | Yes                | No
(all ports on vlan shown)
```

Syntax:

```
show ip igmp vlan <vid> group [<ip-addr>]
```

Lists the ports currently joined for a specified group, with port type, port mode, Age Timer data and Leave Timer data. If the group is not specified, all groups are shown.

Example: Filtered group

```
IGMP Service Protocol Group Info
VLAN ID: 300
VLAN NAME: VLAN300
Filtered Group Address: xxx.xxx.xxx.xxx
Last Reporter: xxx.xxx.xxx.xxx
Up Time: 4 hr 4 min 2 sec
Port| Port Type      | Port Mode | Expires           | Access
-----+-----+
5  |100/1000T      | Auto     | 1min 3 sec       | Host
6  |100/1000T      | Forward  | 2min 44 sec      | Router
8  |100/1000T      | Blocked  | 24 sec           | Host-Router
Filtered Group Address: xxx.xxx.xxx.xxx
Last Reporter: xxx.xxx.xxx.xxx
Up Time: 4 hr 4 min 2 sec
Port| Port Type      | Port Mode | Expires           | Access
-----+-----+
5  |100/1000T      | Auto     | 1min 3 sec       | Host
6  |100/1000T      | Forward  | 2min 44 sec      | Router
8  |100/1000T      | Blocked  | 24 sec           | Host-Router
```

Example: Standard group

```
IGMP Service Protocol Group Info
Standard Group Address: xxx.xxx.xxx.xxx
Last Reporter: xxx.xxx.xxx.xxx
Expiry Time: 2min 10 sec
Up Time: 4 hr 4 min 2 sec
```

Example: Static group

```
IGMP Service Protocol Group Info
Static Group Address: xxx.xxx.xxx.xxx
Last Reporter: xxx.xxx.xxx.xxx /*<if joined groups are there else null>*/
Expiry Time: 0min 0sec
Up Time: 4 hr 0 min 0 sec
```

Syntax:

```
show ip igmp groups
```

Displays IGMP group address information.

```
VLAN ID Group Address Expires           UpTime           Last Reporter    | Type
```

-----+-----					
2	226.0.6.7	0h 2m 58s	1h 13m 4s	192.168.0.2	Filter
2	226.0.6.8	0h 2m 58s	1h 13m 4s	192.168.0.2	Standard
2	226.0.6.9	0h 2m 58s	1h 13m 4s	192.168.0.2	Static

Statistics and State commands

Syntax:

```
show ip igmp statistics
```

Displays IGMP high level statistics for all VLANs on the switch.

```
Total VLAN's with IGMP enabled: 33
Current count of multicast groups joined: 21
IGMP Service Statistics
```

VLAN ID	VLAN NAME	JOINED GROUPS			
		total	filtered	standard	static
1	DEFAULT_VLAN	52	50	0	2
300	Office Client	80	75	5	0
300	Data Center	1100	1000	99	1

Syntax:

```
show ip igmp vlan <vid> statistics
```

Displays IGMP high level statistics for < vid > VLAN on the switch.

```
VLAN ID : 2
VLAN NAME : VLAN2
Number of Filtered Groups      : 20
Number of Standard Groups     : 0
Number of Static Groups       : .....2
Total Multicast Groups Joined : 22
```

Syntax:

```
show ip igmp vlan <vid> counters
```

Displays IGMP historical counters for <vid> VLAN on the switch.

```
IGMP Service Vlan Counters
```

```
VLAN ID: 300
VLAN NAME : VLAN300
```

```
General Query Recd           : 0
General Query Tx             : 0
Group Specific Query Recd    : 0
Group Specific Query Tx      : 0
V1 Member Report Recd       : 0
V2 Member Report Recd       : 0
V3 Member Report Recd       : 0
Leave Recd                    : 0
Unknown IGMP Type Recd      : 0
Unknown Pkt Recd            : 0
Forward to Routers TX Counter : 0
Forward to Vlan TX Counter  : 0
Port Fast Leave Counter      : 0
Port Forced Fast Leave Counter : 0
Port Membership Timeout Counter : 0
```

Help function commands

Syntax:

```
show igmp delayed-flush
```

Shows switch-wide IGMP delayed flush value.

Output:

```
IGMP Delayed Group Flush Timer: Disabled
```

Syntax:

```
show igmp filter-unknown-mcast
```

Shows switch-wide IGMP filter unknown multicast value.

Output:

```
IGMP Filter Unknown Multicast: Disabled
IGMP Filter Unknown Multicast Status: Disabled
```

Syntax:

```
show ip igmp
```

Usage:

```
show ip igmp [config|group IP-ADDR|groups vlan
<VLAN-ID>|statistics|VLAN-
```

Invoked without any parameters, shows per-VLAN IGMP status, or, if VLANs are disabled displays the global IGMP status.

When followed by the `config` keyword, shows IGMP global configuration information.

When followed by `statistics` keyword shows igmp statistical information.

`VLAN-ID` can be used to get operational, statistical, and configuration information for a particular VLAN (if VLAN support is enabled).

The `group` keyword can be used to show a list of ports where a particular multicast group is registered.

The `group` keyword can be used to show VLAN-ID, group address, uptime, expiration time, last reporter and hardware filter type information for each group.

When followed by `VLAN` keyword and `VLAN-ID`, it displays the VLAN group address, uptime, expiration time, last reporter and multicast filter type for groups that belong to that VLAN-ID.

Output:

```
IGMP Service Protocol Info
```

```
Total VLANs with IGMP enabled          : 0
Current count of multicast groups joined : 0
```

```
IGMP Filter Unknown Multicast: Disabled
IGMP Filter Unknown Multicast Status: Disabled
```

```
VLAN ID      : 1
VLAN Name    : DEFAULT_VLAN
IGMP version : 2
IGMP is not enabled
```

Syntax:

```
show ip igmp groups
```

Shows VLAN-ID, uptime, expiration time, multicast filter type.

Output:

IGMP Group Address Information

VLAN ID	Group Address	Expires	UpTime	Last Reporter	Type
-----	-----	-----	-----	-----	-----

Syntax:

```
show ip igmp config
```

Shows IGMP configuration information.

Output:

IGMP Service Config

```
Control unknown multicast [Yes] : Yes
Forced fast leave timeout [0] : 4
Delayed flush timeout [0] : 0
```

VLAN ID	VLAN Name	IGMP Enabled	Querier Allowed	Querier Interval
-----	-----	-----	-----	-----
1	DEFAULT_VLAN	No	Yes	125

Syntax:

```
show ip igmp statistics
```

Shows IGMP statistical information.

Output:

```
Total VLANs with IGMP enabled : 0
Current count of multicast groups joined : 0
```

IGMP Joined Groups Statistics

VLAN ID	VLAN Name	Total	Filtered	Standard	Static
-----	-----	-----	-----	-----	-----
1	DEFAULT_VLAN	0	0	0	0

Syntax:

```
show ip igmp vlan <ID>
```

Usage:

```
show ip igmp [config|group IP-ADDR|groups vlan
<VLAN-ID>|statistics|VLAN-
```

Invoked without any parameters, shows per-VLAN IGMP status, or, if VLANs are disabled displays the global IGMP status.

When followed by the `config` keyword, shows IGMP global configuration information.

When followed by `statistics` keyword shows igmp statistical information.

`VLAN-ID` can be used to get operational, statistical, and configuration information for a particular VLAN (if VLAN support is enabled).

The `group` keyword can be used to show a list of ports where a particular multicast group is registered.

The `group` keyword can be used to show VLAN-ID, group address, uptime, expiration time, last reporter and hardware filter type information for each group.

When followed by `VLAN` keyword and `VLAN-ID`, it displays the VLAN group address, uptime, expiration time, last reporter and multicast filter type for groups that belong to that VLAN-ID.

Output:

IGMP Service Protocol Info

```
Total VLANs with IGMP enabled      : 0
Current count of multicast groups joined : 0

IGMP Filter Unknown Multicast: Disabled
IGMP Filter Unknown Multicast Status: Disabled

VLAN ID      : 1
VLAN Name    : DEFAULT_VLAN
IGMP version : 2
IGMP is not enabled
```

Syntax:

```
show ip igmp vlan <ID> group <group-address>
Shows IGMP group information for the specified VLAN.
```

Output:

IGMP ports and group information for group 239.0.2.1

```
VLAN ID: 2
Uptime: 0h 0m 47s
Last Reporter: 10.20.30.255
Type: Filter

Port      Port Type Port Mode Expires Access
-----  -
A2       1000T   Auto    214    host
```

Syntax:

```
show ip igmp vlan <ID> config
Shows IGMP configuration information for the specified VLAN.
```

Output:

IGMP Service VLAN Config

```
VLAN ID : 1
VLAN Name : DEFAULT_VLAN
IGMP Enabled [No] : No

Querier Allowed [Yes] : Yes
Querier Interval [125] : 125
```

Syntax:

```
show ip igmp vlan <ID> counters
Shows information about IGMP counters for the specified VLAN.
```

Output:

IGMP service Vlan counters

```
VLAN ID : 5
VLAN Name : VLAN5

General Query Rx      : 0
General Query Tx      : 115
Group Specific Query Rx : 0
Group Specific Query Tx : 0
V1 Member Report Rx   : 0
V2 Member Report Rx   : 108
V3 Member Report Rx   : 0
Leave Rx               : 2
Unknown IGMP Type Rx  : 0
Unknown Pkt Rx        : 0
Forward to Routers Tx Counter : 110
Forward to Vlan Tx Counter : 115
Port Fast Leave Counter : 2
Port Forced Fast Leave Counter : 0
Port Membership Timeout Counter : 0
Leave Forward to Router Tx : 0
Join For Reserved Group Rx : 0
Forward to ISC Port Tx Counter : 0
Leave Without Join Rx : 0
FFL Query Sent Tx Counter : 0
Group Filter To Static Counter : 0
Group Static To Filter Counter : 0
Group Filter To Standard Counter : 0
Group Standard To Filter Counter : 0
Group Standard To Static Counter : 0
Honored Leave V1 Group Counter : 0
Group Notified to PIM Counter : 0
Relinquished Querier Role : 0
Join onRouter Port Counter : 0
Igmp V1 Rx Dropped : 0
Igmp V2 Rx Dropped : 0
```

Syntax:

```
show ip igmp vlan <ID> statistics
Shows IGMP statistics information for the specified VLAN.
```

Output:

```
IGMP Statistics

VLAN ID : 1
VLAN Name : DEFAULT_VLAN

Number of Filtered Groups : 0
Number of Standard Groups : 0
Number of Static Groups : 0
Total Multicast Groups Joined : 0
```

Index

A

auto port setting, 5

B

blocked port
from IGMP operation, 5

C

Command syntax

igmp

delayed-flush, 16
filter-unknown-mcast, 17

igmp fastlearn, 27

igmp-proxy, 21

igmp-proxy-domain, 20

ip

igmp, 10
igmp fastleave, 15
igmp static-group, 12

ip igmp querier interval, 12

show

igmp delayed-flush, 17
igmp-proxy, 22
ip igmp, 6, 7
ip igmp groups, 9
ip igmp statistics, 8
ip igmp vlan, 7, 9, 10

show igmp delayed-flush, 32

show igmp filter-unknown-mcast, 32

show ip igmp, 32

show ip igmp config, 29, 33

show ip igmp groups, 30, 33

show ip igmp statistics, 31, 33

show ip igmp vlan, 28, 33

show ip igmp vlan config, 29, 34

show ip igmp vlan counters, 31, 34

show ip igmp vlan group, 30

show ip igmp vlan statistics, 31, 35

vlan

ip igmp, 11
ip igmp forcedfastleave, 16

vlan ip igmp, 27

vlan ip igmp fastleave, 28

vlan ip igmp forcedfastleave, 28

vlan ip igmp querier, 11

vlan ip igmp query interval, 27

vlan ip igmp static-group, 28

F

filters

effect of IGMP, 25

maximum allowed, 6

forwarding port, IGMP, 5

I

IGMP

benefits, 5

effect on filters, 25

Exclude Source, 13

Fast Leave, 14

Include Source, 13

IP multicast address range, 25

leave group, 12

maximum address count, 6

multicast group, 12

multimedia, 5

operation, 13

port states, 5

proxy

forwarding, 19

proxy: forward loop, 23

proxy: forwarding commands, 20

proxy: show command, 22

proxy: vlan context command, 21

query, 12

report, 12

status, 13

Version 3, 13

IGMP control, 5

P

port

auto, IGMP, 5

blocked, IGMP, 5

forwarding, IGMP, 5

state, 5

proxy forwarding, IGMP, 19

R

router, multicast, with IGMP, 12

S

subnet, 13

V

VLAN

IGMP configuration;IGMP:configure per VLAN, 5