

# Cisco Group Management Protocol

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This chapter describes the capabilities of the Catalyst 2820 and Catalyst 1900 switches to support Cisco Group Management Protocol (CGMP). CGMP manages multicast traffic by allowing directed switching of IP multicast traffic within a network. CGMP offers the following benefits:

- Allows IP multicast packets to be switched only to those ports that have IP multicast clients.
- Saves network bandwidth on user segments by not propagating unnecessary IP multicast traffic.
- Does not require changes to the end host systems.
- Does not incur the overhead of creating a separate VLAN for each multicast group in the switched network.

CGMP filtering requires a network connection from the Catalyst 2820 or Catalyst 1900 switch to a router running CGMP. When CGMP is enabled, it automatically identifies the ports to which the CGMP-capable router is attached. CGMP is enabled by default and supports a maximum of 64 IP multicast group registrations.

For information on IP multicast, including Internet Group Management Protocol (IGMP), refer to RFC 1112.

# Accessing the CGMP Configuration Menu

To access the CGMP Configuration Menu, you must first access the Network Management Menu by entering **N** at the Main Menu selection prompt. Enter **G** in the Network Management Menu to access the CGMP menu.

CGMP is enabled by default. Use the CGMP Configuration Menu to enter the number of seconds the switch waits for keepalive messages before deleting CGMP-learned multicast groups, to enable or disable CGMP, or to list IP multicast addresses.

After entering **G** in the Network Management Menu, you see this display:

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Catalyst 1900 - Cisco Group Management Protocol (CGMP) Configuration

-----Settings-----

[H] Router Hold Time (secs)                300
[C] CGMP                                    Enabled

-----Actions-----

[L] List IP multicast addresses
[R] Remove IP multicast addresses
[X] Exit to previous menu

Enter Selection:
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## CGMP Configuration Steps

You can perform these functions using the CGMP menu:

- Enable or disable CGMP.
- Modify router hold time.
- List IP multicast addresses.
- Remove IP multicast addresses.

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## Enabling or Disabling CGMP

To enable or disable CGMP, do the following:

Step	Action
1 Access the Network Management Configuration Menu.	Enter <b>N</b> at the selection prompt in the Main Menu.
2 Access the CGMP Menu.	Enter <b>G</b> at the selection prompt in the Network Management Menu.
3 Access the CGMP configuration screen.	Enter <b>C</b> at the selection prompt in the configuration screen.
4 Enable or disable CGMP.	Enter <b>E</b> to enable CGMP, and press <b>Return</b> . Enter <b>D</b> to disable CGMP, and press <b>Return</b> .

### Verifying CGMP Status

To verify that you have enabled CGMP, access the CGMP configuration screen, and view the CGMP state.

## Modifying Router Hold Time

Multicast routers that support CGMP periodically send CGMP join messages to advertise themselves to switches within a network. A receiving switch saves the information and sets a timer equal to the router hold time. The timer is updated every time the switch receives a CGMP join message advertising itself. When the last router hold time expires, the switch removes all IP multicast groups learned from CGMP.

## CGMP Configuration Steps

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To modify router hold time, do the following:

Step	Action
1 Access the Network Management Configuration Menu.	Enter <b>N</b> at the selection prompt in the Main Menu.
2 Access the CGMP Menu.	Enter <b>G</b> at the selection prompt in the Network Management Menu.
3 Access the CGMP configuration screen.	Enter <b>H</b> at the selection prompt in the configuration screen.
4 Modify the router hold time.	Enter the new time value (5 through 900 seconds) at the selection prompt. Press <b>Return</b> .

### Verifying Router Hold Time

To verify that you have set the router hold time, access the CGMP configuration screen, and view the router hold time value.

### Listing IP Multicast Addresses

To list IP multicast addresses, do the following:

Step	Action
1 Access the Network Management Configuration Menu.	Enter <b>N</b> at the selection prompt in the Main Menu.
2 Access the CGMP Menu.	Enter <b>G</b> at the selection prompt in the Network Management Menu.
3 Access the multicast IP address list.	Enter <b>L</b> at the selection prompt in the configuration screen. Press <b>Return</b> . When you press Return, the multicast addresses appear.

### VLAN Multicast Address Table

When you complete Step 3 of “Listing IP Multicast Addresses,” the following information appears:

VLAN	Address	Destination
1	01-00-5E-01-01-01	1, A
1	01-00-5E-00-01-28	A

Press any key to continue.

## Removing IP Multicast Addresses

To remove an IP multicast address, do the following:

Step	Action
<b>1</b> Access the Network Management Configuration Menu.	Enter <b>N</b> at the selection prompt in the Main Menu.
<b>2</b> Access the CGMP Menu.	Enter <b>G</b> at the selection prompt in the Network Management Menu.
<b>3</b> Remove the multicast IP address.	Enter <b>R</b> at the selection prompt in the configuration screen. Press <b>Return</b> .  When you press Return, the multicast addresses appear.

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**Note** The **R** option is intended for use in recovering from unexpected situations. Use this option with caution.

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### Concepts about IP Multicast Addresses

CGMP works in conjunction with IGMP messages to dynamically configure Catalyst 2820 and Catalyst 1900 switch ports so that IP multicast traffic is forwarded only to those ports associated with IP multicast hosts.

CGMP software components run on both the router and the Catalyst 2820 and Catalyst 1900 switches. A CGMP-capable IP multicast router sees all IGMP packets and therefore can inform the Catalyst 2820 and Catalyst 1900 switches when specific hosts join or leave IP multicast groups. When the CGMP-capable router receives an IGMP control packet, it creates a CGMP packet that contains the request type (either join or leave), the multicast group address, and the actual MAC address of the host. The router then sends the CGMP packet to a well-known address to which all Catalyst 2820 and Catalyst 1900 switches listen. When a switch receives the CGMP packet, the switch interprets the packet and modifies the forwarding behavior of the multicast group. From then on, this multicast traffic is sent only to ports associated with the appropriate IP multicast clients. This process is done automatically, without user intervention.

User-specified multicast group settings are static, whereas multicast groups learned through CGMP are dynamic. While CGMP is active, you cannot manually configure a multicast MAC address that corresponds with an IP multicast group.

### Joining a Multicast Group

When a particular host attempts to join an IP multicast group, it sends an IGMP join message specifying its MAC address and which IP multicast group it is attempting to join. The CGMP-capable router then builds a CGMP join message and multicasts the join message to the well-known address which the Catalyst 2820 and Catalyst 1900 switches monitor. Upon receipt of the join message, each switch searches its forwarding table to determine if it contains the MAC address of the sending host. If a switch finds the host MAC address in its forwarding table associating the MAC address with a non-trunking port, the switch creates a multicast forwarding entry in the forwarding table. The host associated with that port then receives multicast traffic for that multicast group. In this way, the forwarding engine automatically learns the MAC addresses and port numbers of the IP multicast hosts.

### Leaving a Multicast Group

The multicast router sends periodic multicast-group queries. If a host should remain in a multicast group, it responds to the query from the router. In this case, the router does nothing. If a host should not remain in the multicast group, it does not respond to the router query. If, after a number of queries, the router receives no reports from any host in a multicast group, the router sends a CGMP command to the Catalyst 2820 or Catalyst 1900 switch, telling it to remove the multicast group from its forwarding tables.

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**Note** If there are other hosts in the same multicast group and they *do* respond to the multicast-group query, the router does not tell the switch to remove the group from its forwarding tables. The router does not remove a multicast group from the switch forwarding tables until all the hosts in the group have left the group.

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