Chapter 28: IGMP

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28.1 IGMP Overview

IGMP (Internet Group Management Protocol) is used to manage IP multicast group member as well as to establish and maintain the relationship between the IP host and multicast router.

Currently, there are three versions of IGMP: IGMPv1 (RFC 1112), IGMPv2 (RFC 2236) and IGMPv3 (RFC 3376). The IGMPv2 version is widely used.

IGMPv1 defines two types of message: General Query and Group Membership Report. It manages the multicast group members based on query mechanism and response mechanism.

IGMPv2 defines three types of message: Membership Query (including General Query and Group-Specific Query), Group Membership Report and Group Membership-Leave. Compared with IGMPV1, IGMPV12 added querier election mechanism and leave group mechanism.

IGMPv3 added source filter mechanism on the basis of v2, enhancing the function of query and report. Moreover, it presents the clear requirements to accept or reject the multicast message from some certain multicast source when the host adds certain multicast group.

All versions support ASM mode. Only IGMPv3 supports SSM mode. IGMPv1 and IGMPv2 canbe able to apply to SSM mode under the help of IGMP SSM Mapping technology.

28.2 Configure IGMP

28.2.1 IGMP Configuration List

Configuration Task	Description	Detailed Configuration
Enable Multicast Routing Protocol	Required	28.2.2
Enable IGMP Protocol	Required	28.2.3
Configure IGMP Version	Optional	28.2.4
Configure IGMP General Query Interval	Optional	28.2.5
Configure Last-Member-Query-Interval	Optional	28.2.6
Configure Robustness Variable of IGMP Querier	Optional	28.2.7
Configure the Maximum Number of the Multicast Group Added to the Interface	Optional	28.2.8
Configure IGMP Maximum Query Response Time	Optional	28.2.9
Configure Multicast Group Filter Function	Optional	28.2.10
Establish Static IP Multicast Table	Optional	28.2.11
Configure Static Multicast Group	Optional	28.2.12
Configure IGMP Proxy	Optional	28.2.13
Configure IGMP SSM Mapping	Optional	28.2.14
Configure SSM-Mapping static group address mapping rule	Optional	28.2.15
IGMP Display and Maintenance	Optional	28.2.16

28.2.2 Enable Multicast Routing Protocol

You should enable multicast routing before Configure IGMP protocol. Only if you enable themulticast protocol can relative configurations take effect.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enable enable multicast routing	**ip multicast-routing**	
Disable multicast routing	**undo ip multicast-routing**	

28.2.3 Enable IGMP Protocol

Enable the IGMP protocol on interface to make GPON forward multicast message. Please perform the configurations under interface configuration mode (including VLAN interface and SuperVlan interface).

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Enable IGMP protocol	**ip igmp**	
Disable IGMP protocol	**undo ip igmp**	

28.2.4 Configure IGMP Version

Due to different versions of the IGMP protocol have different message structures and messagetypes, so you need to configure the same IGMP version for all the routers in the same networksegment. Otherwise, IGMP cannot be able to run normally. Please perform the configurations

under interface configuration mode (including VLAN interface and SuperVlan interface).

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure the interface to run IGMP version	**ip igmp version** { **1** | **2** | **3** }	IGMPv2 by default
Configure defaultIGMPversion	**undo ip igmp version**	

28.2.5 Configure IGMP General Query Interval

The Ethernet GPON periodically sends the Membership Query Message to discover which multicast groups exist on the network connected to the Ethernet GPON. This time interval is set by the Query Interval timer. You can configure the Query Interval timer to modify the interval at which IGMP hosts send query messages.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure IGMP general query interval	**ip igmp query-interval** *seconds*	125 seconds by default.
Configure default IGMP general query interval	**undo ip igmp query-interval**	

28.2.6 Configure Last-Member-Query-Interval

After receiving leave-message, GPON will forward specified group query message to know whether there are other group members in multicast group. User can be able to modify the interval value of specified group query message.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure last-member-query-interval	**ip igmp last-member-query-interval** *seconds*	1 second by default.
Configure default last-member-query-interval	**undo ip igmp last-member-query-interval**	

28.2.7 Configure Robustness Variable of IGMP Querier

The robustness variable is a very important parameter that reflects the performance of the IGMP protocol running on the GPON. It is mainly used to control message forwarding frequency so as to enhance the robustness of network protocol operation. In addition, the robustness variable coefficient is also an important parameter for calculating other variables, such as the existence time of other inquires, group membership time, etc.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure robustness variable of IGMP querier	**ip igmp robustness-variable** *value*	2 by default.
Configure default robustness variable of IGMP querier	**undo ip igmp robustness-variable**	

28.2.8 Configure the Maximum Number of the Multicast Group Added to the Interface

Through this function, users can easily control the number of multicast groups that an interfacecan join. If the maximum number is exceeded, the GPON will not process the newly added IGMP messages

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure the maximum number of the multicast group added to the interface	**ip igmp limit-group** *limit-num*	By default, the maximum number of IGMP groups added to an interface is the maximum

		number of multicast groups
Configurethe default maximum number of the multicast group added to the interface	**undo ip igmp limit-group**	

28.2.9 Configure IGMP Maximum Query Response Time

When the host receives the query from the GPON, it will start the Delay Timers for each multicast group it joins. It uses a random number between 0 and Max Response Time as the initial value. The Max Response Time is the maximum response time specified by the query message (the maximum query response time for IGMP Version 1 is 10 seconds). The host should inform GPON the member of the multicast group before the timer expired. If the GPONdoes not receive any group member reports after the maximum query response time has expired, it considers that there is no local group member and it will not send the multicast packets it receives to the network to which it is connected.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**Interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure the maximum query response time of IGMP	**ip igmp query-max-response-time** *seconds*	10 seconds by default
Configure the default maximum query response time of IGMP	**undo ip igmp query-max-response-time**	

28.2.10 Configure Multicast Group Filter Function

The GPON determines which multicast group includes the local group members that are directly connected to the GPON by sending an IGMP query message. If you do not want to addcertain multicast groups to a host on the network segment where the interface is located, you can configure the ACL rule on the interface. The interface filters the received IGMP report according to the rule. The multicast group maintains the group membership.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Configure filter function of multicast group	**ip igmp access-group** *acl-number* [**all** | **ethernet** *interface-list*]	By default, hosts on this interface can join any valid multicast group.
Delete filter function of multicast group	**undo ip igmp access-group** *acl-number* [**all** | **ethernet** *interface-list*]	

28.2.11 Establish Static IP Multicast Table

Create a static IP multicast entry to realize the forwarding of multicast message. You can create (S, G) and (*, G) entries. If a static multicast member exists (which is created through

the command of ip igmp static-group), It will automatically add the static member's port to the egress port of the corresponding static entry.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**Interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Create static IP multicast table	**ip igmp create-group** *groups-address-list* **source** { * | *source-address* }	There is no static multicast table by default.
Delete static IP multicast table	**undo ip igmp create-group** *groups-address-list* **source** { * | *source-address* }	

28.2.12 Configure Static Multicast Group

Configure the GPON port to become a static multicast group so that the GPON can forward the multicast packets to this port and specify the source address list at the same time. Please perform the configurations under interface configuration mode (including VLAN interface and SuperVlan interface). When Configure this function under the SuperVlan interface mode, you should specify the sub-VLAN.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**Interface** { **vlan-interface** |	

	supervlan-interface } *vlan-id*	
Add a port into static multicast group	**ip igmp static-group** { *** |** *groups-address* } { **all** | **ethernet** *interface-list* } **sourcelist** { * | *sourcelist* }	
Delete a port from static multicast group	**undo ip igmp static-group** { **all** | *groups-address* { **all** | **ethernet** *interface-list* } **sourcelist** { * | *sourcelist* } }	

28.2.13 Configure IGMP Proxy

After enabling IGMP proxy, GPON acts as a host forwards the multicast group information via report message. When the multicast router receives the message, it transmits the multicast traffic to GPON and then GPON will transmit the multicast traffic to the downlink user. If a certain multicast has no host, GPON will forward leave message to multicast routing, and thenmulticast routing will stop forwarding multicast data to GPON. This function is mainly applied tonetwork peripheral GPONes, which effectively saves GPON resources since GPONes can complete the multicast forwarding without enabling the multicast routing protocols.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**Interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Enable IGMP-Proxy	**igmp-proxy**	
Disable IGMP-Proxy	**undo igmp-proxy**	

28.2.14 Configure IGMP SSM Mapping

In the SSM network, some recipient hosts only run IGMPv1 or IGMPv2 due to the variety of possible restrictions. You can configure the IGMP SSM Mapping function in router so as to offer SSM service to those recipient hosts of IGMPv1 or IGMPv2.

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter VLAN-interface mode	**Interface** { **vlan-interface** | **supervlan-interface** } *vlan-id*	
Enable ssm-mapping	**ip igmp ssm-mapping**	
Disable ssm-mapping	**undo ip igmp ssm-mapping**	

28.2.15 Configure SSM-Mapping static group address mapping rule

Operation	Command	Remarks
Enter global configuration	**system-view**	
Enter IGMP global configuration mode	**mroute igmp**	
Configure the SSM-Mapping static group address mapping rule	**ssm-mapping** *ipaddress mask multicast-source-ipaddress*	By default, no static group address mapping rule is configured

Delete the SSM-Mapping static group address mapping rule	**undo ssm-mapping** { *ipaddress mask* | **all** }	

28.2.16 IGMP Display and Maintenance

Operation	Command	Remarks
Display IGMP interface information	**display ip igmp interface** [{ **vlan-interface** *vlan-id* } | { **supervlan-interface** *vlan-id* }]	
Display static configurations and the IGMP multicast group information	**display ip igmp groups** [*multicast-ip*]	
Display IGMP proxy	**display igmp-proxy**	
Display SSM-Mapping mapping rule	**display ip igmp ssm-mapping** [*multicast-ip*]	