

EPON Multicast Settings

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Chapter 1 EPON Multicast Settings

1.1 OLT Multicast Introduction

The task of IGMP/MLD snooping is to maintain the correlation of VLAN and group address and to keep up with the change of the multicast group. The main functions of IGMP/MLD snooping include listening the IGMP/MLD packets, maintaining the map of group address and VLAN, and keeping the state of host's IGMP/MLD entity identical with that of the router's IGMP/MLD entity.

When the layer-2 device does not run IGMP/MLD snooping, the multicast data will be broadcasted at the second layer; when the layer-2 device does run IGMP/MLD snooping, the multicast data in the known multicast group will not be broadcast at the second layer, but be transmitted to a designated receiver in the second layer and the unknown multicast data will be discarded.

On the PON port, OLT will over the broadcast LLID channel transmit the multicast data to all ONUs in SCB mode.

OLTs and ONUs of support the multicast VLAN. If the multicast services need be isolated from other services on OLT, you have to plan private VLANs on OLT for multicast to make one multicast VLAN corresponds to one multicast channel or a multicast channel group (a set of multicast channels solely managed by one permission). A multicast channel is designed only for a specific multicast VLAN. The multicast flows being transmitted in the SCN channel all have carried the multicast VLAN tag. Other data flows of a user (including unicast flows and uplink IGMP/MLD packets) are destined to be transmitted to the unicast VLAN/CVLAN.

ONU establishes on the basis of the Add/Del Multicast VLAN OAM message the correlation of the UNI port and the multicast VLAN, and on the basis of IGMP/MLD snooping multicast forward-table the correlation of the UNI port and the specific multicast group.

If ONU receives the following two types of IGMP/MLD general/specific group query packets, it will drop them:

One is the IGMP/MLD general/specific group query packets without VLAN tag;

The other is the IGMP/MLD general/specific group query packets that have carried the VLAN tag but whose VLAN IDs does not belong to the configured multicast VLAN ID set of ONU.

When IEP3310/3314 receives the IGMP report packets after IGMP/MLD snooping is enabled, the VLAN in the multicast forward table is the PVID of the multicast router's port. After the router's port receives the multicast packet, IEP3310/3314 will first check the multicast forward table to confirm which member ports will be forwarded and then change the packet's VLAN tag to the multicast VLAN tag.

Additionally, ONU should under the control of OLT remove/reserve the multicast VLAN tag of the IGMP query packets. As to IGMP/MLD Group-Specific Query packets, OLT should add the multicast VLAN tag to these packets according to the multicast VLAN. As to IGMP/MLD General Query packets, they will be distributed to all multicast VLANs in the EPON system, that is, OLT will copy multiple copies of

each IGMP/MLD General Query packet, add different multicast VLAN tags and at last distribute these copies to all ONUs over the broadcast LLID.

The IGMP/MLD Proxying allows the VLAN where the multicast user is located to receive the multicast source from other VLANs. The IGMP/MLD Proxying runs on layer 2 independently without other multicast routing protocols. IGMP/MLD Proxying will be transmitted by the IGMP/MLD packets of the proxied VLAN to the proxying VLAN and maintain the hardware forward table of the multicast user of the agent VLAN according to these IGMP/MLD packets. IGMP/MLD Proxying divides different VLANs into two kinds: proxied VLANs and proxying VLANs. The downstream multicast VLANs can be set to the proxied VLANs, while the upstream multicast VLANs can be set to the proxying VLANs.

Note:

1. It is to be noted that IGMP/MLD snooping can functions normally only if there is multicast router existing for only by listening the query or report packets can IGMP/MLD snooping realize its functions. That is, a switch has to receive the IGMP/MLD query packets periodically and therefore the router age timer of IGMP/MLD snooping must be set to be bigger than the group query period of the multicast router which connects the switch. You can run **show ip mcst** command to browse the information about the multicast router in each VLAN.
2. The transmitted multicast packets must carry the VLAN tag and the VLAN tag must be same to PVID of the port which connects the multicast router.

Although IGMP/MLD Proxying is based on IGMP/MLD snooping, two are independent in application; IGMP/MLD Snooping will not be affected when IGMP/MLD Proxying is enabled or disabled, while IGMP/MLD Proxying can run only when IGMP/MLD Snooping is enabled.

1.2 OLT IGMP Multicast Configuration Tasks

- Enabling/Disabling DGMP Snooping
- Adding/Removing the Correlation of Multicast VLAN and Multicast IP Group
- Adding/Canceling the Static Multicast Address of VLAN
- Setting the Router Age Timer of IGMP Snooping
- Setting the Response Time Timer of IGMP Snooping
- Setting the Port of the Static Multicast Router
- Monitoring and Maintaining IGMP Snooping
- Enabling/Disabling IGMP-Proxy
- Setting the Querier Address of IGMP Proxy
- Setting the Query Counts and Period of the Special IGMP Proxy Group
- Monitoring and Maintaining DHCP-Proxy
- Setting the Multicast Mode
- Allocating the Multicast Permission for the UNI Port of ONU

1.2.1 Enabling/Disabling IGMP Multicast

Run the following commands in global configuration mode.

Command	Purpose
ip mcst enable	Enables the multicast.
{no ip mcst ip mcst disable}	Resumes the default settings.

Note:

After IGMP snooping is enabled, when DLF occurs on multicast packets (that is, the destination address is not registered in the swap chip through the igmp-snooping), all multicast packets whose destination addresses are not registered on any port will be dropped.

1.2.2 Adding/Removing the Correlation of Multicast VLAN and Multicast IP Group

This command has two functions: one is that only the Report and Leave packets whose destination IP addresses have been added to a multicast VLAN can be received by IGMP snooping; the other one is that the VLAN tag which transforms the next multicast flow is the multicast VLAN tag. One multicast VLAN can include multiple continuous or discontinuous multicast IP addresses, while one multicast IP address can only belong to one multicast VLAN.

Run the following commands in global configuration mode.

Command	Purpose
ip mcst mc-vlan <i>vlan_id</i> range <i>A.B.C.D</i><1-n>	Adds the correlation of multicast VLAN and multicast IP address.
no ip mcst mc-vlan <i>vlan_id</i> [<i>range A.B.C.D</i><1-n>]	Deletes the correlation of multicast VLAN and multicast IP address.

1.2.3 Adding/Canceling the Static Multicast Address of VLAN

The static multicast address can make some IGMP-incompatible hosts receive the corresponding multicast packets.

Run the following commands in global configuration mode.

Command	Purpose
ip mcst vlan <i>vlan_id</i> static <i>A.B.C.D</i> interface <i>intf</i>	Adds the static multicast address of VLAN.
no ip mcst vlan <i>vlan_id</i> static <i>A.B.C.D</i> interface <i>intf</i>	Removes the static multicast address of VLAN.

Note:

1. To make the adding of the static multicast address successful, you have to set A.B.C.D in the correlation of configured multicast VLAN and multicast IP address.
2. On IEP3310/3314 OLT, you have to set the VLAN parameter in this command to be the same as the VLAN tag of the downlink multicast data.

1.2.4 Setting the Router Age Timer of IGMP Snooping

The router age timer is used to monitor whether the IGMP querier exists or not; the IGMP querier maintenance is used to maintain and manage the multicast address by sending the query packets and IGMP snooping works by independence on the communication between IGMP querier and host.

Run the following commands in global configuration mode.

Command	Purpose
ip mcst timer router-age <i>timer_value</i>	Sets the value of the router age of IGMP Snooping.
no ip mcst timer router-age	Resumes the default value of the router age of IGMP Snooping.

Note:

The settings of the timer requires to refer to the query period settings of the IGMP querier for it cannot be smaller than the query period; you are recommended to set the router age timer to the triple of the query period.

By default the router age timer is set to be 260 seconds of IGMP snooping.

1.2.5 Setting the Response Timer of IGMP Snooping

The response time timer means the threshold time for the host to report the multicast after IGMP querier sends the query packets; if this report packet is not received after the timer ages, the switch will delete this multicast address.

Run the following commands in global configuration mode.

Command	Purpose
ip mcst timer response-time <i>timer_value</i>	Sets the value of the response time of IGMP Snooping.
no ip mcst timer response-time	Resumes the default value of the response time of IGMP Snooping.

Note:

The value of the timer cannot be set too small, or the multicast communication may be unstable.

By default the response time is set to be 15 seconds of IGMP snooping.

1.2.6 Setting the Port of the Static Multicast Router

After a port is set to be a static multicast port, all the IGMP report packets and leave packets, received by OLT, will be transmitted to this port.

Run the following commands in global configuration mode.

Command	Purpose
ip mcst mrouter interface <i>inft_name</i>	Sets the port of the static multicast router of IGMP snooping.
no ip mcst mrouter interface <i>inft_name</i>	Deletes the port of the static multicast router of IGMP snooping.

1.2.7 Enabling/Disabling IGMP-Proxy

Run the following commands in global configuration mode.

Command	Purpose
ip igmp-proxy enable	Enables IGMP proxy.
{no ip igmp-proxy ip igmp-proxy disable}	Resumes the default settings.

1.2.8 Setting Querier Port of OLT

Run the following commands in global configuration mode.

Command	Purpose
ip mcst querier { <i>enable</i> <i>disable</i> }	Sets the querier port of OLT to regularly transmit the query packets outward automatically.
{no ip mcst querier ip mcst querier disable}	Resumes the default settings of the querier port of OLT.

1.2.9 Setting the Querier Address of IGMP Proxy

Run the following commands in global configuration mode.

Command
[no] ip mcst querier address [<i>ip_addr</i>]

The default source IP address of the query packet is 10.0.0.200.

1.2.10 Setting the Query Counts and Period of the Special IGMP Proxy Group

Run the following commands in global configuration mode.

Command	Purpose
[no] ip igmp-proxy last-member-query {count <i>value1</i> interval <i>value2</i>}	Sets the query counts and period of the special IGMP proxy group.

The default query times of the query group is 2 and its default period is also 2.

1.2.11 Setting the Multicast-Incompatible Mode of OLT

Run the following commands in global configuration mode.

Command	Purpose
ip mcst compatible enable	Enables the multicast-compatible function.
{no ip mcst compatible ip mcst compatible disable}	Resumes the default settings.

Note:

After the multicast compatible function of OLT is enabled, OLT can take the LLID port as the minimum unit and at the same time support IGMP snooping and dynamic controllable multicast.

1.2.12 Switching over the IGMP Multicast Mode

Run the following commands in global configuration mode.

Command	Purpose
ip mcst mode {igmp-snooping dynamic-controllable}	Switches over the multicast mode.
{no ip mcst mode ip mcst igmp-snooping}	Resumes the default settings.

Note:

After the OLT multicast mode is switched over, the multicast modes of all ONUs will be automatically switched over to the same mode. The users therefore are free of the trouble of setting ONUs one by one.

1.2.13 Setting the Multicast Preview Time

Run the following commands in global configuration mode.

Command	Purpose
---------	---------

Ip preview time {1-60}	Sets the preview time of the multicast preview channel (the default time is 5 seconds).
------------------------	---

1.2.14 Monitoring and Maintaining the IGMP Multicast

Run the following commands in EXEC mode:

Command	Purpose
show ip mcst	Displays the information about IGMP-snooping configuration.
show ip mcst timer	Displays the information about the IGMP-snooping clock.
show ip mcst groups	Displays the information about the multicast group of IGMP-snooping.
show ip mcst statistics	Displays the information about IGMP-snooping statistics.
[no] debug ip mcst [packet timer event error]	Enables/disables the print switch of IGMP snooping packet/timer debug/event/error. If the specific debug switch is not designated, all the debug switches will be enabled or disabled.
show ip igmp-proxy	Displays the information about IGMP proxy.
[no] debug ip igmp-proxy	Enables or disables the IGMP-proxy debug switch.

The following shows the information about IGMP-snooping running:

```

OLT #show ip mcst

Global multicast configuration:
-----
Globally enable      : Enabled
Multicast mode      : IGMP Snooping
Dif-frames filtering : Enabled
Querier              : Disabled
Querier address     : 10.0.0.200
Router age          : 260 s
Response time       : 15 s

Router Port List:
-----
G0/2(querier);

OLT #

```

This command is used to display the information about the multicast group of IGMP-snooping.

OLT #show ip mcst groups

Vlan Group	Type	Port(s)
2 225.1.1.1	LEARNING	E0/3:1

OLT #

The following example shows the timers of IGMP snooping:

OLT#show ip mcst timers**Querier on port G0/2: 258**

vlan 2 multicast address 0100.5e01.0101 response time : 13

OLT#

Querier on port G0/2: 251 means the timeout time of the ageing timer of the router.

vlan 2 multicast address 0100.5e01.0101 response time : This shows the time period from receiving a multicast query packet to the present; if there is no host to respond when the timer times out, the port will be canceled.

The IGMP snooping statistics information is displayed below:

OLT#show ip mcst statistics

v1_packets:0	Number of the IGMPv1 packets
v2_packets:6	Number of the IGMPv2 packets
v3_packets:0	Number of the IGMPv3 packets
general_query_packets:5	Number of the general query packets
special_query_packets:0	Number of the special query packets
join_packets:6	Number of the Report packets
leave_packets:0	Number of the Leave packets
err_packets:0	Number of the error packets

The information about IGMP snooping debug is shown below:

OLT#debug ip mcst packet

May 13 05:28:18 MCST: Receive IGMPv2 query from G0/2, diID=331, source ip addr=10.0.0.200, group=0.0.0.0. Type, port, source IP and destination IP of the received packet

May 13 05:28:18 MCST: Flood packet from G0/2 to vlan 2 downstream.

The information about IGMP snooping debug timer is shown below:

OLT#debug ip mcst timer

OLT#May 13 05:35:22 [MCST] TIMER: Vlan 2 multicast group 225.1.1.1 response time restart, initvalue = 15.

May 13 05:35:36 [MCST] timer: Vlan 2 multicast group 225.1.1.1 response time expiry.

May 13 05:35:36 [MCST] at port:

May 13 05:35:36 [MCST] E0/3:1

1.3 OLT MLD Multicast Configuration Tasks

- Enabling/Disabling MLD-Snooping
- Enabling/Disabling the Solicitation of Hardware Forward of Multicast Group

- Adding/Removing the Correlation of Multicast VLAN and Multicast IP Group
- Adding/Canceling the Static Multicast Address of VLAN
- Setting the Router Age Timer of MLD Snooping
- Setting the Response Time MLD Snooping
- Setting the Port of the Static Multicast Router
- Monitoring and maintaining MLD Snooping
- Enabling/Disabling IGMP-Proxy
- Setting the Querier Address of MLD Proxying
- Setting the Query Counts and Period of the Special MLD Proxy Group
- Monitoring and maintaining MLD Proxying

1.3.1 Enabling/Disabling MLD Multicast

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping enable	Enables MLD snooping multicast.
{no ip mld-snooping ip mld-snooping disable}	Resumes the default settings.

Note:

After MLD snooping is enabled, when DLF occurs on multicast packets (that is, the destination address is not registered in the swap chip through the MLD-snooping), all multicast packets whose destination addresses are not registered on any port will be dropped.

1.3.2 Enabling/Disabling the Solicitation of Hardware Forward of Multicast Group

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping solicitation	Enables the solicitation of hardware forward of multicast group.
no ip mld-snooping solicitation	Disables the solicitation of hardware forward of multicast group.

1.3.3 Adding/Removing the Correlation of Multicast VLAN and Multicast IP Group

This command has two functions: one is that only the Report and Leave packets whose destination IP addresses have been added to a multicast VLAN can be received by MLD snooping; the other one is that the VLAN tag which transforms the next multicast flow is the multicast VLAN tag. One multicast VLAN can include multiple continuous or discontinuous multicast IP addresses, while one multicast IP address can only belong to one multicast VLAN.

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping mc-vlan <i>vlan_id</i> range X:X:X:X::X &<1-n>	Adds the correlation of multicast VLAN and multicast IP address.
no ip mld-snooping mc-vlan <i>vlan_id</i> [range X:X:X:X::X &<1-n>]	Deletes the correlation of multicast VLAN and multicast IP address.

1.3.4 Adding/Canceling the Static Multicast Address of VLAN

The static multicast address can make some MLD-incompatible hosts receive the corresponding multicast packets.

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping vlan <i>vlan_id</i> static X:X:X:X::X interface <i>intf</i>	Adds the static multicast address of VLAN.
no ip mld-snooping vlan <i>vlan_id</i> static X:X:X:X::X interface <i>intf</i>	Removes the static multicast address of VLAN.

Note:

1. To make the adding of the static multicast address successful, you have to set X:X:X:X::X in the correlation of configured multicast VLAN and multicast IP address.
2. On IEP3310/3314 OLT, you have to set the VLAN parameter in this command to be the same as the VLAN tag of the downlink multicast data.

1.3.5 Setting the Router Age Timer of MLD Snooping

The router age timer is used to monitor whether the MLD querier exists or not; the MLD querier maintenance is used to maintain and manage the multicast address by sending the query packets and MLD snooping works by independence on the communication between MLD querier and host.

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping timer router-age <i>timer_value</i>	Sets the value of the router age of MLD Snooping.
no ip mld-snooping timer router-age	Resumes the default value of the router age of MLD Snooping.

Note:

The settings of the timer requires to refer to the query period settings of the MLD querier for it cannot be smaller than the query period; you are recommended to set the router age timer to the triple of the query period.

By default the router age timer is set to be 260 seconds of MLD snooping.

1.3.6 Setting the Response Timer of MLD Snooping

The response time timer means the threshold time for the host to report the multicast after MLD querier sends the query packets; if this report packet is not received after the timer ages, the switch will delete this multicast address.

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping timer response-time <i>timer_value</i>	Sets the value of the response time of MLD Snooping.
no ip mld-snooping timer response-time	Resumes the default value of the response time of MLD Snooping.

Note:

The value of the timer cannot be set too small, or the multicast communication may be unstable.

By default the response time is set to be 15 seconds of MLD snooping.

1.3.7 Setting the Port of the Static Multicast Router

After a port is set to be a static multicast port, all the MLD report packets and leave packets, received by OLT, will be transmitted to this port.

Run the following commands in global configuration mode.

Command	Purpose
ip mld-snooping mrouter interface <i>inft_name</i>	Sets the port of the static multicast router of MLD snooping.
no ip mld-snooping mrouter interface <i>inft_name</i>	Deletes the port of the static multicast router of MLD snooping.

1.3.8 Enabling/Disabling MLD-Proxy

Run the following commands in global configuration mode.

Command	Purpose
ip mld-proxying enable	Enables MLD proxying.
no ip mld-proxying enable	Resumes the default settings.

1.3.9 Setting the Querier Address of MLD Proxying

Run the following commands in global configuration mode.

Command	Purpose
[no] ip mld-proxying querier address <i>[ip_addr]</i>	Sets the querier address of MLD proxying to be the source IP address of the query packet.

The default source IP address of the query packet is 10.0.0.200.

1.3.10 Setting the Query Counts and Period of the Special MLD Proxy Group

Run the following commands in global configuration mode.

Command	Purpose
[no] ip mld-proxying last-member-query {count value1} interval value2}	Sets the query counts and period of the special MLD proxy group.

The default query times of the query group is 2 and its default period is also 2.

1.3.11 Monitoring and Maintaining the MLD Multicast

Run the following commands in EXEC mode:

Command	Purpose
show ip mld-snooping	Displays the information about MLD-snooping configuration.
show ip mld-snooping timer	Displays the information about the MLD-snooping clock.
show ip mld-snooping groups	Displays the information about the multicast group of MLD-snooping.
show ip mld-snooping statistics	Displays the MLD snooping statistics information.
show ip mld-proxying	Displays the information about MLD proxy.

The following shows the information about MLD-snooping running:

```

OLT#show ip mld-snooping

Global multicast configuration:
-----
Globally enable      : Disabled
Multicast mode      : MLD Snooping
Df-frames filtering : Disabled
Router age          : 260 s
Response time       : 10 s
Handle Solicitation : Disabled

Router Port PVID VLANMAP=

Router Port List:
-----

None

OLT#
    
```

The information about the multicast group of MLD-snooping is shown below:

```

OLT#show ip mld-snooping groups

Total Group Counts: 0

Vlan Group      Type      Port(s)
-----
2 ff12::5      LEARNING E0/3:1
    
```

The following example shows the timer of MLD snooping:

```

OLT#show ip mcst timers

Querier on port G0/2: 258

vlan 2 multicast address 3333.0000.0005 response time : 13

OLT#

Querier on port G0/2: 251 means the timeout time of the ageing timer of the router.
vlan 2 multicast address 3333.0000.0005 response time : This shows the time period from
receiving a multicast query packet to the present; if there is no host to respond when the timer
times out, the port will be canceled.
    
```

The MLD snooping statistics information is displayed below:

```

OLT#show ip mld-snooping statistics

v1_packets:0      Number of the MLDv1 packets
v2_packets:6      Number of the MLDv2 packets
v3_packets:0      Number of the MLDv3 packets
general_query_packets:5  Number of the general query packets
    
```



```
special_query_packets:0    Number of the special query packets
listener_packets:6        Number of the Report packets
leave_packets:0           Number of the Leave packets
err_packets:0             Number of the error packets
```

The information about MLD proxying is shown below:

```
OLT #show ip mld-proxying
Global MLD Proxying configuration
-----
Status                : Disable
Last member query interval: 1
Last member query count  : 2
Querier address        : FE80::3FF:FEFE:FD00:1

OLT#
```

1.4 Remote Configuration Commands for ONU Multicast

OLT can set the multicast of ONU remotely. The detailed configuration content is shown below:

- Enabling/Disabling IGMP-Snooping
- Setting the Fast-Leave of IGMP Snooping
- Setting the Query Counts and Period of the Special IGMP Proxy Group
- Monitoring and Maintaining IGMP-Snooping
- Setting the Example of IGMP Proxy

China Telecom stipulates that the OLT can set the multicast of ONU through the CTC OAM channel.

1.4.1 Enabling/Disabling IGMP Snooping

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu mcst enable	Enables IGMP snooping.
{no epon onu mcst epon onu mcst disable}	Resumes the default settings.

Note:

1. After IGMP snooping is enabled, when DLF occurs on multicast packets (that is, the destination address is not registered in the swap chip through the igmp-snooping), all multicast packets whose destination addresses are not registered on any port will be dropped. ONU only supports IGMP snooping V1 and IGMP snooping V2.

2. Because this command is not defined by China Telecom, it only takes effect on ONU.

1.4.2 Setting the Multicast Mode of ONU

ONU has two kinds of multicast modes: IGMP snooping and controllable multicast defined by China Telecom. The multicast mode of ONU must kept same with that of OLT.

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu ctc mcst switch { dynamic-controllable igmp-snooping}	Switches over the multicast mode of ONU.
no epon onu ctc mcst switch	Switches the multicast mode of ONU over to the default mode.

The ONU multicast mode is IGMP snooping by default.

1.4.3 Setting Fast-Leave

The configuration of the **fast-leave** attribute makes the ONU delete the corresponding port in the port list of the corresponding multicast group shortly after ONU receives the **leave** packet, while the timer is not enabled any more for waiting to see whether other hosts will be added to the multicast group; if other hosts of a same port also belong to this multicast group and are reluctant to leave, the multicast communication of these hosts may be affected and in this case the **fast-leave** function should not be enabled.

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu ctc mcst fast-leave enable	Enables fast-leave.
{no epon onu ctc mcst fast-leave epon onu ctc mcst fast-leave disable}	Disables Fast-leave.

The fast-leave function of ONU is enabled by default.

1.4.4 Setting Tag-Stripe

The tag-stripe attribute is used to remove the VLAN tag of the next multicast packet that ONU receives.

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu port <i>port_id</i> ctc mcst tag-stripe enable	Enables the tag-stripe function of the UNI port.

{no epon onu port <i>port_id</i> ctc mcsttag-stripe epon onu port <i>port_id</i> ctc mcst tag-stripe disable}	Disables the tag-stripe function of the UNI port.
--	---

The tag-stripe function of the ONU UNI port is disabled by default.

1.4.5 Setting the Permission of Multicast

If OLT is in dynamic controllable multicast mode or in multicast-compatible mode and the LLID port supports the dynamic controllable multicast, you have to set the permission of the multicast channel for related UNI ports.

Run the following commands in LLID interface configuration mode.

Command	Purpose
ip mcst permission uni <i>uni-index</i> range <i>A.B.C.D</i><<i>1-n</i>> {permit preview forbidden}	Sets the permission of the multicast channel for the related UNI port.
no ip mcst permission uni <i>uni-index</i> range <i>A.B.C.D</i><<i>1-n</i>>	Disables the preview permission of the UNI port.

1.4.6 Setting Max-Group-Number

The **max-group-number** attribute can enable the UNI port of ONU to limit the number of the to-be-forwarded multicast groups.

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu port <i>port_id</i> ctc mcst max-group-number <i>value</i>	Sets the value of max-group-number of a UNI port.
no epon onu port <i>port_id</i> ctc mcst max-group-number	Resumes the default value of max-group-number of a UNI port.

The default value of max-group-number of the ONU UNI port is 128.

1.4.7 Setting the Correlation of UNI port and Multicast VLAN

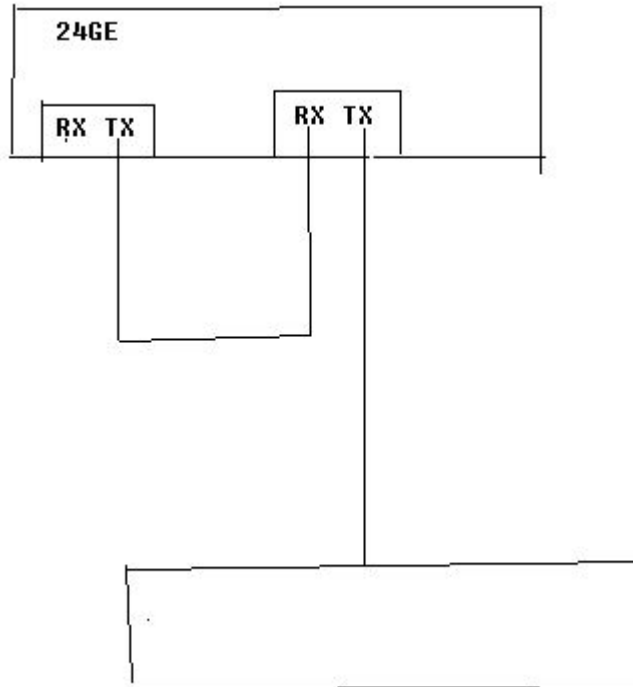
To configure the correlation of the UNI port and the multicast VLAN so that ONU can remove the VLAN tag of the downlink multicast packets, run the command above.

Run the following commands in LLID interface configuration mode.

Command	Purpose
epon onu port <i>port_id</i> ctc mcst mc-vlan {add <i>vlanmap</i> delete <i>vlanmap</i> clear}	Sets the correlation of UNI port and multicast VLAN.

1.5 Forced Multicast Forwarding

To set a forced-forward port to be in forced mode, you need not conduct other settings if you connect the optical fiber as shown in the following figure.



1.6 EPON Multicast Configuration Examples

1.6.1 IGMP-Snooping Configuration Example

ONU is connected to the EPON0/3 port of IEP3310/3314. And then the G0/2 port of IEP3310/3314 is connected with the multicast router.

The network topology is shown in figure 1.

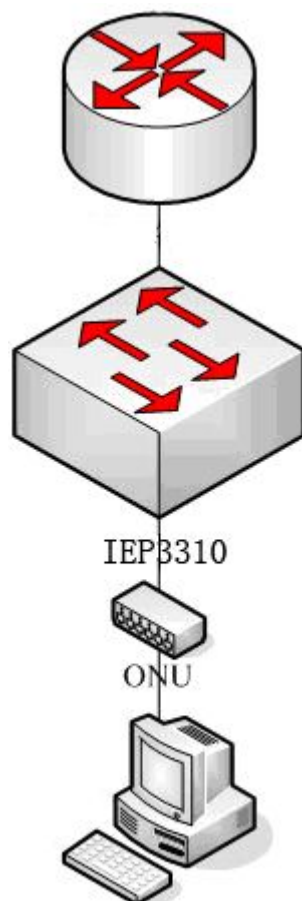


Figure 1 IGMP-Snooping configuration

(1) Enable the multicast function of IEP3310/3314:

```
OLT_config#ip mcst enable
```

(2) Set the correlation of multicast VLAN 2 and multicast group 225.1.1.1:

```
OLT_config#ip mcst mc-vlan 2 range 225.1.1.1
```

(3) Set the G0/2 port, which connects IEP3310/3314 and the multicast router, to belong to the multicast VLAN 2:

```
OLT_config_g0/2#switchport mode trunk
```

```
OLT_config_g0/2#switchport trunk vlan-allowed 1-2
```

(4) Set the UNI port of ONU to forward the multicast packets of multicast VLAN 2:

```
OLT_config_e0/3:1#epon onu port 1 ctc mcst mc-vlan add 2
```

1.6.2 IGMP-Proxy Configuration Example

ONU is connected to the EPON0/3 port of IEP3310/3314. And then the G0/2 port of IEP3310/3314 is connected with the multicast router.

The network topology is shown in figure 2.

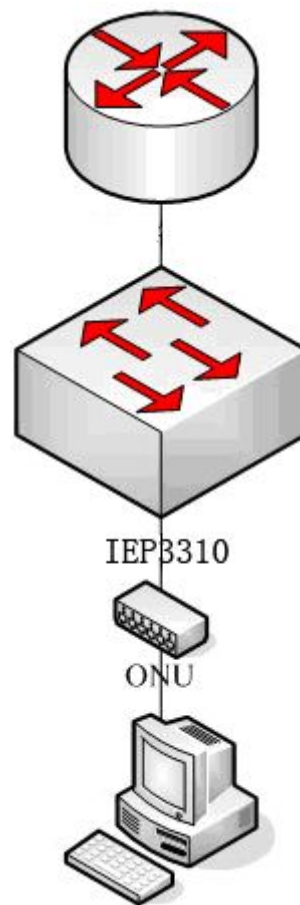


Figure 2 IGMP-Proxy configuration

- (1) Enable the multicast function of IEP3310/3314:

```
OLT_config#ip mcst enable
```

- (2) Enable the IGMP proxy of IEP3310/3314:

```
OLT_config#ip proxy enable
```

- (3) Set the correlation of multicast VLAN 2 and multicast group 225.1.1.1:

```
OLT_config#ip mcst mc-vlan 2 range 225.1.1.1
```

- (4) Set the G0/2 port, which connects IEP3310/3314 and the multicast router, to belong to the multicast VLAN 2:

```
OLT_config_g0/2#switchport mode trunk
```

```
OLT_config_g0/2#switchport trunk vlan-allowed 1-2
```

- (5) Set the UNI port of ONU to forward the multicast packets of multicast VLAN 2:

```
OLT_config_e0/3:1#epon onu port 1 ctc mcst mc-vlan add 2
```

1.6.3 Controllable IGMP Multicast Configuration Example

ONU is connected to the EPON0/3 port of IEP3310/3314. And then the G0/2 port of IEP3310/3314 is connected with the multicast router.

The network topology is shown in figure 3.

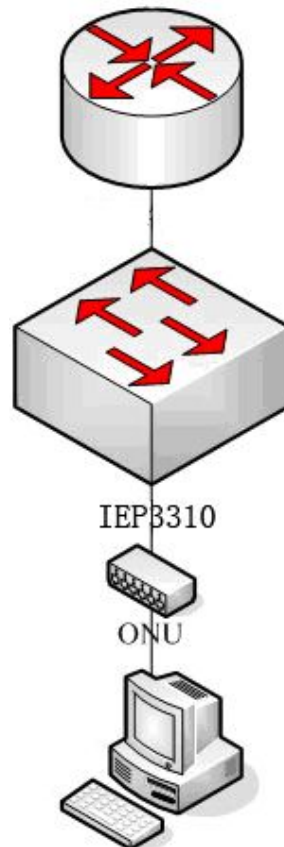


Figure 3 IGMP-Proxy configuration

- (1) Enable the multicast function of IEP3310/3314:

```
OLT_config#ip mcst enable
```

- (2) Set the multicast mode of IEP3310/3314 to be controllable multicast:

```
OLT_config#ip mcst mode dynamic-controllable
```

- (3) Set the correlation of multicast VLAN 2 and multicast group 225.1.1.1:

```
OLT_config#ip mcst mc-vlan 2 range 225.1.1.1
```

- (4) Set the G0/2 port, which connects IEP3310/3314 and the multicast router, to belong to the multicast VLAN 2:

```
OLT_config_g0/2#switchport mode trunk
```

```
OLT_config_g0/2#switchport trunk vlan-allowed 1-2
```

- (5) Set UNI port 1 of ONU to forward the multicast packets of multicast 225.1.1.1:

```
OLT_config#ip mcast permission interface E0/1:2 uni 1 range 225.1.1.1 permit
```

1.6.4 Example of MLD-Snooping Configuration Example

ONU is connected to the EPON0/3 port of IEP3310/3314. And then the G0/2 port of IEP3310/3314 is connected with the multicast router.

The network topology is shown in figure 4.

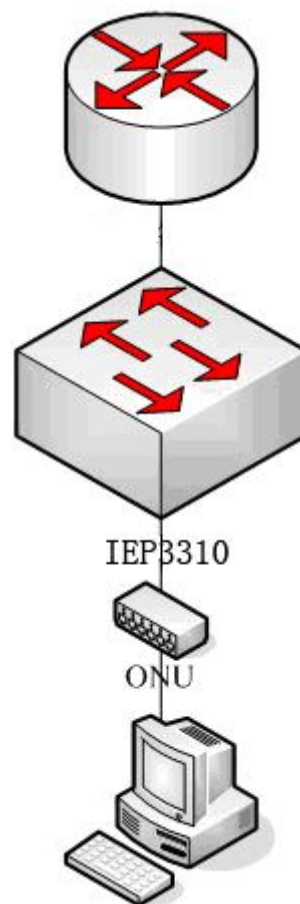


Figure 4 IGMP-Snooping configuration

- (6) Enable the multicast function of IEP3310/3314:

```
OLT_config#ip mld-snooping enable
```

- (7) Set the correlation of multicast VLAN 2 and multicast group ff12::5:

```
OLT_config#ip mld-snooping mc-vlan 2 range ff12::5
```

- (8) Set the G0/2 port, which connects IEP3310/3314 and the multicast router, to belong to the multicast VLAN 2:


```
OLT_config_g0/2#switchport mode trunk
OLT_config_g0/2#switchport trunk vlan-allowed 1-2
(9) Set the UNI port of ONU to forward the multicast packets of multicast VLAN
2:
OLT_config_e0/3:1#epon onu port 1 ctc mcst mc-vlan add 2
```

1.6.5 MLD-Proxy Configuration Example

ONU is connected to the EPON0/3 port of IEP3310/3314. And then the G0/2 port of IEP3310/3314 is connected with the multicast router.

The network topology is shown in figure 5.

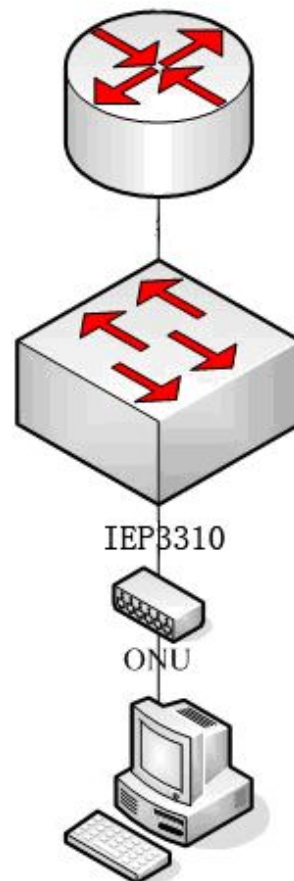


Figure 5 IGMP-Proxy configuration

```
(10) Enable the multicast function of IEP3310/3314:
OLT_config#ip mld-snooping enable
(11) Enable the MLD proxy of IEP3310/3314:
OLT_config#ip mld-proxying enable
```

(12) Set the correlation of multicast VLAN 2 and multicast group ff12::5:

```
OLT_config#ip mld-snooping mc-vlan 2 range ff12::5
```

(13) Set the G0/2 port, which connects IEP3310/3314 and the multicast router, to belong to the multicast VLAN 2:

```
OLT_config_g0/2#switchport mode trunk
```

```
OLT_config_g0/2#switchport trunk vlan-allowed 1-2
```

(14) Set the UNI port of ONU to forward the multicast packets of multicast VLAN 2:

```
OLT_config_e0/3:1#epon onu port 1 ctc mcst mc-vlan add 2
```