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Chapter 1 IPv4 Multicast Protocol

1.1 Commands for DCSCM

1.1.1 access-list (Multicast Destination Control)

Command: `access-list <6000-7999> {deny|permit} ip {{<source>
 <source-wildcard>}}{host <source-host-ip>}|any-source} {{<destination>
 <destination-wildcard>}}{host-destination
 <destination-host-ip>}|any-destination}
 no access-list <6000-7999> {deny|permit} ip {{<source>
 <source-wildcard>}}{host <source-host-ip>}|any} {{<destination>
 <destination-wildcard>}}{host-destination
 <destination-host-ip>}|any-destination}`

Function: Configure destination control multicast access-list, the “no access-list <6000-7999> {deny|permit} ip {{<source> <source-wildcard>}}{host <source-host-ip>}|any-source} {{<destination> <destination-wildcard>}}{host-destination <destination-host-ip>}|any-destination}” command deletes the access-list.

Parameter: <6000-7999>: destination control access-list number.
 {deny|permit}: deny or permit.
 <source>: multicast source address.
 <source-wildcard>: multicast source address wildcard character..
 <source-host-ip>: multicast source host address.
 <destination>: multicast destination address.
 <destination-wildcard>: multicast destination address wildcard character.
 <destination-host-ip>: multicast destination host address

Default: None

Command Mode: Global Mode

Usage Guide: ACL of Multicast destination control list item is controlled by specific ACL number from 6000 to 7999, the command applies to configure this ACL. ACL of Multicast destination control only needs to configure source IP address and destination IP address controlled (group IP address), the configuration mode is basically the same to other ACLs, and use wildcard character to configure address range, and also specify a host address or all address. Remarkable, “all address” is 224.0.0.0/4 according to group IP address, not 0.0.0.0/0 in other access-list.

Example:

```
Switch(config)#access-list 6000 permit ip 10.1.1.0 0.0.0.255 232.0.0.0 0.0.0.255
Switch(config)#
```

1.1.2 access-list (Multicast Source Control)

Command: `access-list <5000-5099> {deny|permit} ip {{<source>
<source-wildcard>}}{host <source-host-ip>}|any-source} {{<destination>
<destination-wildcard>}}{host-destination
<destination-host-ip>}|any-destination}`
`no access-list <5000-5099> {deny|permit} ip {{<source>
<source-wildcard>}}{host <source-host-ip>}|any} {{<destination>
<destination-wildcard>}}{host-destination
<destination-host-ip>}|any-destination}`

Function: Configure source control multicast access-list; the “no access-list <5000-5099> {deny|permit} ip {{<source> <source-wildcard>}}{host <source-host-ip>}|any-source} {{<destination> <destination-wildcard>}}{host-destination <destination-host-ip>}|any-destination}” command deletes the access-list.

Parameter: <5000-5099>: source control access-list number.

{deny|permit}: deny or permit.

<source>: multicast source address..

<source-wildcard>: multicast source address wildcard character.

<source-host-ip>: multicast source host address.

<destination>: multicast destination address.

<destination-wildcard>: multicast destination address wildcard character.

<destination-host-ip>: multicast destination host address.

Default: None

Command Mode: Global Mode

Usage Guide: ACL of Multicast source control list item is controlled by special ACL number from 5000 to 5099, the command applies to configure this ACL. ACL of Multicast source control only needs to configure source IP address and destination IP address controlled (group IP address), the configuration mode is basically the same to other ACLs, and use wildcard character to configure address range, and also specify a host address or all address. Remarkable, “all address” is 224.0.0.0/4 according to group IP address, not 0.0.0.0/0 in other access-list.

Example: Switch(config)#access-list 5000 permit ip 10.1.1.0 0.0.0.255 232.0.0.0 0.0.0.255

1.1.3 ip multicast destination-control

This command is not supported by the switch.

1.1.4 ip multicast destination-control access-group

Command: ip multicast destination-control access-group <6000-7999>

no ip multicast destination-control access-group <6000-7999>

Function: Configure multicast destination-control access-list used on interface, the “**no ip multicast destination-control access-group <6000-7999>**” command deletes the configuration.

Parameter: <6000-7999>: destination-control access-list number.

Default: None

Command Mode: Interface Configuration Mode

Usage Guide: The command is only working under global multicast destination-control enabled, after configuring the command, if IGMP-SPOOPING is enabled, for adding the interface to multicast group, and match configured access-list, such as matching: permit, the interface can be added, otherwise do not be added.

Example:

```
Switch(config)#inter e 1/4
```

```
Switch(Config-If-Ethernet 1/4)#ip multicast destination-control access-group 6000
```

```
Switch (Config-If-Ethernet1/4)#
```

1.1.5 ip multicast destination-control access-group

(sip)

Command: ip multicast destination-control <IPADDRESS/M> access-group <6000-7999>

no ip multicast destination-control <IPADDRESS/M> access-group <6000-7999>

Function: Configure multicast destination-control access-list used on specified net segment, the “**no ip multicast destination-control <IPADDRESS/M> access-group <6000-7999>**” command deletes this configuration.

Parameter: <IPADDRESS/M>: IP address and mask length;

<6000-7999>: Destination control access-list number.

Default: None

Command Mode: Global Mode

Usage Guide: The command is only working under global multicast destination-control enabled, after configuring the command, if IGMP-SPOOPING or IGMP is enabled, for adding the members to multicast group. If configuring multicast destination-control on specified net segment of transmitted igmp-report, and match configured access-list, such as matching permit, the interface can be added, otherwise do not be added. If relevant group or source in show ip igmp groups detail has been established before executing the command, it needs to execute clear ip igmp groups command to clear relevant groups in Admin mode.

Example:

```
Switch(config)#ip multicast destination-control 10.1.1.0/24 access-group 6000
```

1.1.6 ip multicast destination-control access-group (vmac)

Command: ip multicast destination-control <1-4094> <macaddr >access-group <6000-7999>

no ip multicast destination-control <1-4094> <macaddr >access-group <6000-7999>

Function: Configure multicast destination-control access-list used on specified vlan-mac, the “no ip multicast destination-control <1-4094> <macaddr >access-group <6000-7999>”command deletes this configuration.

Parameter: <1-4094>: VLAN-ID;

<macaddr>: Transmitting source MAC address of IGMP-REPORT, the format is “xx-xx-xx-xx-xx-xx”;

<6000-7999>: Destination-control access-list number.

Default: None

Command Mode: Global Mode

Usage Guide: The command is only working under global multicast destination-control enabled, after configuring the command, if IGMP-SPOOPING is enabled, for adding the members to multicast group. If configuring multicast destination-control to source MAC address of transmitted igmp-report, and match configured access-list, such as matching: permit, the interface can be added, otherwise do not be added.

Example:

```
Switch(config)#ip multicast destination-control 1 00-01-03-05-07-09 access-group 6000
```

1.1.7 ip multicast policy

Command: ip multicast policy <IPADDRESS/M> <IPADDRESS/M> cos <priority>

no ip multicast policy <IPADDRESS/M> <IPADDRESS/M> cos

Function: Configure multicast policy, the “**no ip multicast policy <IPADDRESS/M> <IPADDRESS/M> cos**” command deletes it.

Parameter:

<IPADDRESS/M>: are multicast source address, mask length, destination address, and mask length separately.

<priority>: specified priority, range from 0 to 7

Default: None

Command Mode: Global Mode

Usage Guide: The command configuration modifies to a specified value through the switch matching priority of specified range multicast data packet, and the TOS is specified to the same value simultaneously. Carefully, the packet transmitted in UNTAG mode does not modify its priority.

Example: Switch(config)#ip multicast policy 10.1.1.0/24 225.1.1.0/24 cos 7

1.1.8 ip multicast source-control

Command: ip multicast source-control

no ip multicast source-control

Function: Configure to globally enable multicast source control, the “**no ip multicast source-control**” command restores global multicast source control disabled.

Parameter: None

Default: Disabled

Command Mode: Global Mode

Usage Guide: The source control access-list applies to interface with only enabling global multicast source control, and configure to disabled global multicast source control without configuring source control access-list on every interface. After configuring the command, multicast data received from every interface does not have matching multicast source control list item, and then they will be thrown away by switches, namely only multicast data matching to PERMIT can be received and forwarded.

Example: Switch(config)#ip multicast source-control

1.1.9 ip multicast source-control access-group

Command: ip multicast source-control access-group <5000-5099>

no ip multicast source-control access-group <5000-5099>

Function: Configure multicast source control access-list used on interface, the “no ip multicast source-control access-group <5000-5099>” command deletes the configuration.

Parameter: <5000-5099>: Source control access-list number.

Default: None

Command Mode: Interface Configuration Mode

Usage Guide: The command configures with only enabling global multicast source control. After that, it will match multicast data message imported from the interface according to configured access-list, such as matching: permit, the message will be received and forwarded; otherwise the message will be thrown away.

Example:

```
Switch (config)#interface ethernet1/4
```

```
Switch (Config-If-Ethernet1/4)#ip multicast source-control access-group 5000
```

```
Switch (Config-If-Ethernet1/4)#
```

```
Switch(router-msdp)#default-rpf-peer 10.0.0.1 rp-policy 10
```

1.1.10 multicast destination-control

Command: `multicast destination-control`

`no multicast destination-control`

Function: Configure to globally enable multicast destination control, the NO command is to recover and disable the multicast destination control globally.

Parameters: None.

Default: Disabled.

Command Mode: Global Configuration Mode.

Usage Guide: Only after globally enabling the multicast destination control, the other destination control configuration can take effect; the destination access list can be applied to ports, VLAN-MAC and SIP. After configuring this command, IGMP-SNOOPING and IGMP will match according to the rules mentioned above when they try to add ports after receiving IGMP-REPORT.

Example:

```
switch(config)# multicast destination-control
```

1.1.11 show ip multicast destination-control

Command: `show ip multicast destination-control [detail]`

`show ip multicast destination-control interface <Interfacename> [detail]`

`show ip multicast destination-control host-address <ipaddress> [detail]`

`show ip multicast destination-control <vlan-id> <mac-address> [detail]`

Function: Display multicast destination control

Parameter: detail: expresses if it display information in detail or not..

<Interfacename>: interface name or interface aggregation name, such as Ethernet1/1, port-channel 1 or ethernet1/1.

Default: None

Command Mode: Admin Mode and Global Mode

Usage Guide: The command displays multicast destination control rules of configuration, including detail option, and access-list information applied in detail.

Example:

```
Switch (config)#show ip multicast destination-control
ip multicast destination-control is enabled
ip multicast destination-control 11.0.0.0/8 access-group 6003
ip multicast destination-control 1 00-03-05-07-09-11 access-group 6001
multicast destination-control access-group 6000 used on interface Ethernet1/13
switch(config)#
```

1.1.12 show ip multicast destination-control

access-list

Command: show ip multicast destination-control access-list

show ip multicast destination-control access-list <6000-7999>

Function: Display destination control multicast access-list of configuration.

Parameter: <6000-7999>: access-list number.

Default: None

Command Mode: Admin Mode and Global Mode

Usage Guide: The command displays destination control multicast access-list of configuration.

Example:

```
Switch# sh ip multicast destination-control acc
access-list 6000 deny ip any any-destination
access-list 6000 deny ip any host-destination 224.1.1.1
access-list 6000 deny ip host 2.1.1.1 any-destination
access-list 6001 deny ip host 2.1.1.1 225.0.0.0 0.255.255.255
access-list 6002 permit ip host 2.1.1.1 225.0.0.0 0.255.255.255
access-list 6003 permit ip 2.1.1.0 0.0.0.255 225.0.0.0 0.255.255.255
```

1.1.13 show ip multicast policy

Command: show ip multicast policy

Function: Display multicast policy of configuration

Parameter: None

Default: None

Command Mode: Admin Mode and Global Mode

Usage Guide: The command displays multicast policy of configuration

Example:

```
Switch#show ip multicast policy
ip multicast-policy 10.1.1.0/24 225.0.0.0/8 cos 5
```

1.1.14 show ip multicast source-control

Command: `show ip multicast source-control [detail]`

`show ip multicast source-control interface <Interfacename> [detail]`

Function: Display multicast source control configuration

Parameter: detail: expresses if it displays information in detail.

<Interfacename>: interface name, such as Ethernet 1/1 or ethernet1/1.

Default: None

Command Mode: Admin Mode and Global Mode

Usage Guide: The command displays multicast source control rules of configuration, including detail option, and access-list information applied in detail.

Example:

```
Switch#show ip multicast source-control detail
ip multicast source-control is enabled
Interface Ethernet1/13 use multicast source control access-list 5000
access-list 5000 permit ip 10.1.1.0 0.0.0.255 232.0.0.0 0.0.0.255
access-list 5000 deny ip 10.1.1.0 0.0.0.255 233.0.0.0 0.255.255.255
```

1.1.15 show ip multicast source-control access-list

Command: `show ip multicast source-control access-list`

`show ip multicast source-control access-list <5000-5099>`

Function: Display source control multicast access-list of configuration

Parameter: <5000-5099>: access-list number

Default: None

Command Mode: Admin Mode and Global Mode

Usage Guide: The command displays source control multicast access-list of configuration

Example:

```
Switch#sh ip multicast source-control access-list
access-list 5000 permit ip 10.1.1.0 0.0.0.255 232.0.0.0 0.0.0.255
access-list 5000 deny ip 10.1.1.0 0.0.0.255 233.0.0.0 0.255.255.255
```

1.2 Commands for IGMP Snooping

1.2.1 clear ip igmp snooping vlan

Command: clear ip igmp snooping vlan <1-4094> groups [A.B.C.D]

Function: Delete the group record of the specific VLAN.

Parameters: <1-4094> the specific VLAN ID; A.B.C.D the specific group address.

Command Mode: Admin Configuration Mode

Usage Guide: Use show command to check the deleted group record.

Example: Delete all groups.

```
Switch#clear ip igmp snooping vlan 1 groups
```

Relative Command: show ip igmp snooping vlan <1-4094>

1.2.2 clear ip igmp snooping vlan <1-4094>

mrouter-port

Command: clear ip igmp snooping vlan <1-4094> mrouter-port [ethernet IFNAME | IFNAME]

Function: Delete the mrouter port of the specific VLAN.

Parameters: <1-4094> the specific VLAN ID; ethernet the Ethernet port name; IFNAME the port name.

Command Mode: Admin Configuration Mode

Usage Guide: Use show command to check the deleted mrouter port of the specific VLAN.

Example: Delete mrouter port in vlan 1.

```
Switch# clear ip igmp snooping vlan 1 mrouter-port
```

Relative Command: show ip igmp snooping mrouter-port

1.2.3 debug igmp snooping all/packet/event/timer/mfc

Command: debug igmp snooping all/packet/event/timer/mfc

no debug igmp snooping all/packet/event/timer/mfc

Function: Enable the IGMP Snooping switch of the switch; the “no debug igmp snooping all/packet/event/timer/mfc” disables the debugging switch.

Command Mode: Admin Mode

Default: IGMP Snooping debugging switch is disabled on the switch by default.

Usage Guide: The command is used for enable the IGMP Snooping debugging switch of the switch, switch IGMP data packet message can be shown with “packet” parameter, event message with “event”, timer message with “time”, downsending hardware entries message with “mfc”, and all debugging messages with “all”.

1.2.4 ip igmp snooping

Command: ip igmp snooping

no ip igmp snooping

Function: Enable the IGMP Snooping function; the “no ip igmp snooping” command disables this function.

Command mode: Global Mode

Default: IGMP Snooping is disabled by default.

Usage Guide: Use this command to enable IGMP Snooping, that is permission every VLAN config the function of IGMP snooping. The “no ip igmp snooping” command disables this function.

Example: Enable IGMP Snooping.

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

1.2.5 ip igmp snooping proxy

Command: ip igmp snooping proxy

no ip igmp snooping proxy

Function: Enable IGMP Snooping proxy function, the no command disables the function.

Parameter: None.

Command Mode: Global Mode

Default: Enable.

Example:

```
Switch(config)#no ip igmp snooping proxy
```

1.2.6 ip igmp snooping vlan

Command: ip igmp snooping vlan <vlan-id>

no ip igmp snooping vlan <vlan-id>

Function: Enable the IGMP Snooping function for the specified VLAN; the “no ip igmp snooping vlan <vlan-id>” command disables the IGMP Snooping function for the specified VLAN.

Parameter: <vlan-id> is the VLAN number.

Command mode: Global Mode

Default: IGMP Snooping is disabled by default.

Usage Guide: To configure IGMP Snooping on specified VLAN, the global IGMP Snooping should be first enabled. Disable IGMP Snooping on specified VLAN with the “**no ip igmp snooping vlan <vlan-id>**” command.

Example: Enable IGMP Snooping for VLAN 100 in Global Mode.

```
Switch(config)#ip igmp snooping vlan 100
```

1.2.7 ip igmp snooping vlan immediate-leave

Command: ip igmp snooping vlan <vlan-id> immediate-leave

no ip igmp snooping vlan <vlan-id> immediate-leave

Function: Enable the IGMP Snooping fast leave function for the specified VLAN; the “**no ip igmp snooping vlan <vlan-id> immediate-leave**” command disables the IGMP Snooping fast leave function.

Parameter: <vlan-id> is the VLAN number specified.

Command mode: Global Mode

Default: This function is disabled by default.

Usage Guide: Enable immediate-leave function of the IGMP Snooping in specified VLAN; the “no” form of this command disables the immediate-leave function of the IGMP Snooping.

Example: Enable the IGMP Snooping fast leave function for VLAN 100.

```
Switch(config)#ip igmp snooping vlan 100 immediate-leave
```

1.2.8 ip igmp snooping vlan I2-general-querier

Command: ip igmp snooping vlan < vlan-id > I2-general-querier

no ip igmp snooping vlan < vlan-id > I2-general-querier

Function: Set this VLAN to layer 2 general querier.

Parameter: *vlan-id*: is ID number of the VLAN, ranging is <1-4094>.

Command Mode: Global mode

Default: VLAN is not as the IGMP Snooping layer 2 general querier.

Usage Guide: It is recommended to configure a layer 2 general querier on a segment. IGMP Snooping function will be enabled by this command if not enabled on this VLAN before configuring this command, IGMP Snooping function will not be disabled when disabling the layer 2 general querier function. This command is mainly for sending general queries regularly to help switches within this segment learn mrouter ports.

Comment: There are three paths IGMP snooping learn mrouter

- 1 Port receives the IGMP query messages
- 2 Port receives multicast protocol packets, and supports DVMRP, PIM
- 3 Static configured port

1.2.9 ip igmp snooping vlan l2-general-querier-source

Command: ip igmp snooping vlan <vlanid> L2-general-query-source <A.B.C.D>
no ip igmp snooping vlan <vlanid> L2-general-query-source

Function: Configure source address of query of igmp snooping

Parameters: <vlanid>: the id of the VLAN, with limitation to <1-4094>. <A.B.C.D> is the source address of the query operation.

Command Mode: Global mode.

Default: 0.0.0.0

Usage Guide: It is not supported on Windows 2000/XP to query with the source address as 0.0.0.0. So the layer 2 query source address configuration does not function. The client will stop sending requesting datagrams after one is sent. And after a while, it can not receive multicast datagrams.

Example:

```
Switch(config)#ip igmp snooping vlan 2 L2-general-query-source 192.168.1.2
```

1.2.10 ip igmp snooping vlan

l2-general-querier-version

Command: ip igmp snooping vlan <vlanid> L2-general-query-version <version>

Function: Configure igmp snooping.

Parameters: <vlan-id> is the id of the VLAN, limited to <1-4094>. <version> is the version number, limited to <1-3>.

Command Mode: Global mode.

Default: version 3.

Usage Guide: When the switch is connected to V1 and V2 capable environment, and for VLAN which has source of layer 2 query configuration, the VLAN can be queried only if the version number has been specified. This command is used to query the layer 2 version number.

Example:

```
Switch(config)#ip igmp snooping vlan 2 L2-general-query-version 2
```

1.2.11 ip igmp snooping vlan limit

Command: ip igmp snooping vlan <vlan-id> limit {group <g_limit> | source <s_limit>}

no ip igmp snooping vlan <vlan-id> limit

Function: Configure the max group count of VLAN and the max source count of every group. The “no ip igmp snooping vlan <vlan-id> limit” command cancels this configuration.

Parameter: <vlan-id> is the VLAN number.

g_limit: <1-65535>, max number of groups joined.

s_limit: <1-65535>, max number of source entries in each group, consisting of include source and exclude source.

Command mode: Global Mode.

Default: Maximum 50 groups by default, with each group capable with 40 source entries.

Usage Guide: When number of joined group reaches the limit, new group requesting for joining in will be rejected for preventing hostile attacks. To use this command, IGMP snooping must be enabled on VLAN. The “no” form of this command restores the default other than set to “no limit”. For the safety considerations, this command will not be configured to “no limit”. It is recommended to use default value and if layer 3 IGMP is in operation, please make this configuration in accordance with the IGMP configuration as possible.

Example: Switch(config)#ip igmp snooping vlan 2 limit group 300

1.2.12 ip igmp snooping vlan mrouter-port interface

Command: ip igmp snooping vlan <vlan-id> mrouter-port interface[<ehernet> | <port-channel>] <ifname>

no ip igmp snooping vlan <vlan-id> mrouter-port interface[<ehernet> | <port-channel>] <ifname>

Function: Configure static mrouter port of VLAN. The no form of the command cancels this configuration.

Parameter: *vlan-id*: ranging between <1-4094>

ehernet: Name of Ethernet port

ifname: Name of interface

port-channel: Port aggregation

Command Mode: Global mode

Default: No static mrouter port on VLAN by default.

Usage Guide: When a port is a static mrouter port while also a dynamic mrouter port, it should be taken as a static mrouter port. Deleting static mrouter port can only be realized by the no command.

Example: Switch(config)#ip igmp snooping vlan 2 mrouter-port interface ethernet1/13

1.2.13 ip igmp snooping vlan mrouter-port learnpim

Command: ip igmp snooping vlan <vlan-id> mrouter-port learnpim

no ip igmp snooping vlan <vlan-id> mrouter-port learnpim

Function: Enable the function that the specified VLAN learns mrouter-port (according to pim packets), the no command will disable the function.

Parameter: <vlan-id>: The specified VLAN ID, ranging from 1 to 4094.

Command Mode: Global Mode

Default: Enable

Usage Guide: Enable the function that the specified VLAN learns mrouter-port (according to pim packets). After a port received pim packets, it will be set to mrouter port for implementing the automatic learning.

Example: Disable the function that vlan 100 learns mrouter-port (according to pim packets).

Switch(config)#no ip igmp snooping vlan 100 mrouter-port learnpim

1.2.14 ip igmp snooping vlan mrpt

Command: ip igmp snooping vlan <vlan-id> mrpt <value>

no ip igmp snooping vlan <vlan-id> mrpt

Function: Configure this survive time of mrouter port.

Parameter: *vlan-id*: VLAN ID, ranging between <1-4094>

value: mrouter port survive period, ranging between <1-65535>seconds

Command Mode: Global mode

Default: 255s

Usage Guide: This command validates on dynamic mrouter ports but not on mrouter port. To use this command, IGMP Snooping of this VLAN should be enabled previously.

Example: Switch(config)#ip igmp snooping vlan 2 mrpt 100

1.2.15 ip igmp snooping vlan query-interval

Command: ip igmp snooping vlan <vlan-id> query-interval <value>

no ip igmp snooping vlan <vlan-id> query-interval

Function: Configure this query interval.

Parameter: *vlan-id*: VLAN ID, ranging between <1-4094>

value: query interval, ranging between <1-65535>seconds

Command Mode: Global mode

Default: 125s

Usage Guide: It is recommended to use the default settings. Please keep this configure in accordance with IGMP configuration as possible if layer 3 IGMP is running.

Example: Switch(config)#ip igmp snooping vlan 2 query-interval 130

1.2.16 ip igmp snooping vlan query-mrsp

Command: ip igmp snooping vlan <vlan-id> query-mrsp <value>

no ip igmp snooping vlan <vlan-id> query-mrsp

Function: Configure the maximum query response period. The “no ip igmp snooping vlan <vlan-id> query-mrsp” command restores to the default value.

Parameter: *vlan-id*: VLAN ID, ranging between <1-4094>

value: ranging between <1-25> seconds

Command Mode: Global mode

Default: 10s

Usage Guide: It is recommended to use the default settings. Please keep this configure in accordance with IGMP configuration as possible if layer 3 IGMP is running.

Example:

Switch(config)#ip igmp snooping vlan 2 query-mrsp 18

1.2.17 ip igmp snooping vlan query-robustness

Command: ip igmp snooping vlan <vlan-id> query-robustness <value>

no ip igmp snooping vlan <vlan-id> query-robustness

Function: Configure the query robustness. The “no ip igmp snooping vlan <vlan-id> query-robustness” command restores to the default value.

Parameter: *vlan-id*: VLAN ID, ranging between <1-4094>

value: ranging between <2-10>

Command Mode: Global mode

Default: 2

Usage Guide: It is recommended to use the default settings. Please keep this configure in accordance with IGMP configuration as possible if layer 3 IGMP is running.

Example:

Switch(config)#ip igmp snooping vlan 2 query-robustness 3

1.2.18 ip igmp snooping vlan report source-address

Command: ip igmp snooping vlan <vlan-id> report source-address <A.B.C.D>
no ip igmp snooping vlan <vlan-id> report source-address

Function: Configure forward report source-address for IGMP, the “no ip igmp snooping vlan <vlan-id> report source-address” command restores the default setting.

Parameter: *vlan-id*: VLAN ID range<1-4094>;

A.B.C.D: IP address, can be 0.0.0.0.

Command Mode: Global Mode.

Default: Disabled.

Usage Guide: Default configuration is recommended here. If IGMP snooping needs to be configured, the source address for forwarded IGMP messages can be 0.0.0.0. If it is required by the upstream that IGMP messages should use the same network address, the source address of IGMP messages should be configured to be the same with upstream.

Example:

```
Switch (config)#ip igmp snooping vlan 2 report source-address 10.1.1.1
```

1.2.19 ip igmp snooping vlan specific-query-mrsp

Command: ip igmp snooping vlan <vlan-id> specific-query-mrsp <value>
no ip igmp snooping vlan <vlan-id> specific-query-mrspt

Function: Configure the maximum query response time of the specific group or source, the no command restores the default value.

Parameters: <vlan-id>: the specific VLAN ID, the range from 1 to 4094.

<value>: the maximum query response time, unit is second, the range from 1 to 25, default value is 1.

Command Mode: Global mode

Default: Enable the function.

Usage Guide: After enable vlan snooping in global mode, input this command to configure the maximum query response time of the specific group.

Example: Configure/cancel the specific-query-mrsp of vlan3 as 2s.

```
Swth(config)#ip igmp snooping vlan 3 specific-query-mrsp 2
```

```
Swth(config)#no ip igmp snooping vlan 3 specific-query-mrspt
```

1.2.20 ip igmp snooping vlan static-group

Command: ip igmp snooping vlan <vlan-id> static-group <A.B.C.D> [source <A.B.C.D>] interface [ethernet | port-channel] <IFNAME>

```
no ip igmp snooping vlan <vlan-id> static-group <A.B.C.D> [source  
<A.B.C.D>] interface [ethernet | port-channel] <IFNAME>
```

Function: Configure static-group on specified port of the VLAN. The no form of the command cancels this configuration.

Parameter: *vlan-id*: ranging between <1-4094>

A.B.C.D: the address of group or source

ethernet: Name of Ethernet port

port-channel: Port aggregation

ifname: Name of interface

Command Mode: Global mode

Default: No configuration by default.

Usage Guide: When a group is a static while also a dynamic group, it should be taken as a static group. Deleting static group can only be realized by the no form of the command.

Example:

```
Switch(config)#ip igmp snooping vlan 1 static-group 224.1.1.1 source 192.168.1.1  
interface ethernet 1/1
```

1.2.21 ip igmp snooping vlan suppression-query-time

Command: ip igmp snooping vlan <vlan-id> suppression-query-time <value>

```
no ip igmp snooping vlan <vlan-id> suppression-query-time
```

Function: Configure the suppression query time. The “no ip igmp snooping vlan <vlan-id> suppression-query-time” command restores to the default value.

Parameter: *vlan-id*: VLAN ID, ranging between <1-4094>

value: ranging between <1-65535> seconds

Command Mode: Global mode

Default: 255s

Usage Guide: This command can only be configured on L2 general querier. The Suppression-query-time refers to the period of suppression state in which the querier enters when receives query from the layer 3 IGMP in the segments.

Example: Switch(config)#ip igmp snooping vlan 2 suppression-query-time 270

1.2.22 show ip igmp snooping

Command: show ip igmp snooping [vlan <vlan-id>]

Parameter: <vlan-id> is the VLAN number specified for displaying IGMP Snooping messages.

Command Mode: Admin Mode

Usage Guide: If no VLAN number is specified, it will show whether global IGMP Snooping switch is on, which VLAN is configured with I2-general-querier function, and if a VLAN number is specified, detailed IGMP messages for this VLAN will be shown.

Example:

1. Show IGMP Snooping summary messages of the switch

```
Switch(config)#show ip igmp snooping
Global igmp snooping status: Enabled
L3 multicasting: running
Igmp snooping is turned on for vlan 1(querier)
Igmp snooping is turned on for vlan 2
-----
```

Displayed Information	Explanation
Global igmp snooping status	Whether the global igmp snooping switch on the switch is on
L3 multicasting	whether the layer 3 multicast protocol of the switch is running
Igmp snooping is turned on for vlan 1(querier)	which VLANs on the switch is enabled with igmp snooping function, whether they are I2-general-querier

2. Display the IGMP Snooping summary messages of vlan1.

```
Switch#show ip igmp snooping vlan 1
Igmp snooping information for vlan 1

Igmp snooping L2 general querier           :Yes(COULD_QUERY)
Igmp snooping query-interval               :125(s)
Igmp snooping max reponse time             :10(s)
Igmp snooping robustness                   :2
Igmp snooping mrouter port keep-alive time :255(s)
Igmp snooping query-suppression time      :255(s)
```

IGMP Snooping Connect Group Membership

Note:*-All Source, (S)- Include Source, [S]-Exclude Source

Groups	Sources	Ports	Exptime	System Level
238.1.1.1	(192.168.0.1)	Ethernet1/8	00:04:14	V2
	(192.168.0.2)	Ethernet1/8	00:04:14	V2

igmp snooping vlan 1 mrouter port

Note:"!"-static mrouter port

!Ethernet1/2

Displayed Information	Explanation
igmp snooping L2 general querier	Whether the VLAN enables I2-general-querier function and show whether the querier state is could-query or suppressed
igmp snooping query-interval	Query interval of the VLAN
igmp snooping max reponse time	Max response time of the VLAN
igmp snooping robustness	IGMP Snooping robustness configured on the VLAN
igmp snooping mrouter port keep-alive time	keep-alive time of dynamic mrouter of the VLAN
igmp snooping query-suppression time	Suppression timeout of VLAN when as I2-general-querier
IGMP Snooping Connect Group Membership	Group membership of this VLAN, namely the correspondence between ports and (S,G)
igmp snooping vlan 1 mrouter port	mrouter port of the VLAN, including both static and dynamic

Chapter 2 IPv6 Multicast Protocol

2.1 Commands for MLD Snooping Configuration

2.1.1 clear ipv6 mld snooping vlan

Command: clear ipv6 mld snooping vlan <1-4094> groups [X:X::X:X]

Function: Delete the group record of the specific VLAN.

Parameters: <1-4094> the specific VLAN ID; X:X::X:X the specific group address.

Command Mode: Admin Configuration Mode

Usage Guide: Use show command to check the deleted group record.

Example: Delete all groups.

```
Switch#clear ipv6 mld snooping vlan 1 groups
```

Relative Command: show ipv6 mld snooping vlan <1-4094>

2.1.2 clear ipv6 mld snooping vlan <1-4094>

mrouter-port

Command: clear ipv6 mld snooping vlan <1-4094> mrouter-port [ethernet IFNAME|IFNAME]

Function: Delete the mrouter port of the specific VLAN.

Parameters: <1-4094> the specific VLAN ID; ethernet the Ethernet port name; IFNAME the port name.

Command Mode: Admin Configuration Mode

Usage Guide: Use show command to check the deleted group record.

Example: Delete the mrouter port in vlan 1.

```
Switch# clear ipv6 mld snooping vlan 1 mrouter-port
```

Relative Command: show ipv6 mld snooping mrouter-port

2.1.3 debug mld snooping all/packet/event/timer/mfc

Command: debug mld snooping all/packet/event/timer/mfc

no debug mld snooping all/packet/event/timer/mfc

Function: Enable the debugging of the switch MLD Snooping; the “no” form of this command disables the debugging.

Command Mode: Admin Mode

Default: The MLD Snooping Debugging of the switch is disabled by default

Usage Guide: This command is used for enabling the switch MLD Snooping debugging, which displays the MLD data packet message processed by the switch—packet, event messages—event, timer messages—timer, messages of down streamed hardware entry—mfc, all debug messages—all.

2.1.4 ipv6 mld snooping

Command: `ipv6 mld snooping`

`no ipv6 mld snooping`

Function: Enable the MLD Snooping function on the switch; the “`no ipv6 mld snooping`” command disables MLD Snooping.

Command Mode: Global Mode

Default: MLD Snooping disabled on the switch by default

Usage Guide: Enable global MLD Snooping on the switch, namely allow every VLAN to be configured with MLD Snooping; the “no” form of this command will disable MLD Snooping on all the VLANs as well as the global MLD snooping

Example: Enable MLD Snooping under global mode.

Switch (config)#`ipv6 mld snooping`

2.1.5 ipv6 mld snooping vlan

Command: `ipv6 mld snooping vlan <vlan-id>`

`no ipv6 mld snooping vlan <vlan-id>`

Function: Enable MLD Snooping on specified VLAN; the “no” form of this command disables MLD Snooping on specified VLAN.

Parameter: `<vlan-id>` is the id number of the VLAN, with a valid range of `<1-4094>`.

Command Mode: Global Mode

Default: MLD Snooping disabled on VLAN by default

Usage Guide: To configure MLD snooping on certain VLAN, the global MLD snooping should be first enabled. Disable MLD snooping on specified VLAN with the `no ipv6 mld snooping vlan vid` command

Example: Enable MLD snooping on VLAN 100 under global mode.

Switch (config)#`ipv6 mld snooping vlan 100`

2.1.6 ipv6 mld snooping vlan immediate-leave

Command: `ipv6 mld snooping vlan <vlan-id> immediate-leave`

`no ipv6 mld snooping vlan <vlan-id> immediate-leave`

Function: Enable immediate-leave function of the MLD protocol in specified VLAN; the “no” form of this command disables the immediate-leave function of the MLD protocol

Parameter: *<vlan-id>* is the id number of specified VLAN, with valid range of <1-4094>.

Command Mode: Global Mode

Default: Disabled by default

Usage Guide: Enabling the immediate-leave function of the MLD protocol will hasten the process the port leaves one multicast group, in which the specified group query of the group will not be sent and the port will be directly deleted.

Example: Enable the MLD immediate-leave function on VLAN 100.

```
Switch (config)#ipv6 mld snooping vlan 100 immediate-leave
```

2.1.7 ipv6 mld snooping vlan l2-general-querier

Command: `ipv6 mld snooping vlan < vlan-id > l2-general-querier`

`no ipv6 mld snooping vlan < vlan-id > l2-general-querier`

Function: Set the VLAN to Level 2 general querier.

Parameter: *vlan-id*: is the id number of the VLAN, with a valid range of <1-4094>

Command Mode: Global Mode

Default: VLAN is not a MLD Snooping L2 general querier by default.

Usage Guide: It is recommended to configure an L2 general querier on a segment. If before configure with this command, MLD snooping is not enabled on this VLAN, this command will no be executed. When disabling the L2 general querier function, MLD snooping will not be disabled along with it. Main function of this command is sending general queries periodically to help the switches within this segment learn mrouter port.

Comment: There are three ways to learn mrouter port in MLD Snooping:

1. The port which receives MLD query messages
2. The port which receives multicast protocol packets and support PIM
3. The port statically configured.

Example: Set VLAN 100 to L2 general querier.

```
Switch (config)# ipv6 mld snooping vlan 100 l2-general-querier
```

2.1.8 ipv6 mld snooping vlan limit

Command: `ipv6 mld snooping vlan < vlan-id > limit {group <g_limit> | source <s_limit>}`

`no ipv6 mld snooping vlan < vlan-id > limit`

Function: Configure number of groups the MLD snooping can join and the maximum number of sources in each group.

Parameter: *vlan-id*: VLAN ID, the valid range is <1-4094>

g_limit: <1-65535>, max number of groups joined

s_limit: <1-65535>, max number of source entries in each group, consisting of include source and exclude source

Command Mode: Global Mode

Default: Maximum 50 groups by default, with each group capable with 40 source entries.

Usage Guide: When number of joined group reaches the limit, new group requesting for joining in will be rejected for preventing hostile attacks. To use this command, MLD snooping must be enabled on VLAN. The “no” form of this command restores the default other than set to “no limit”. For the safety considerations, this command will not be configured to “no limit”. It is recommended to use default value and if layer 3 MLD is in operation, please make this configuration in accordance with the MLD configuration as possible.

Example: Switch(config)#ipv6 mld snooping vlan 2 limit group 300

2.1.9 ipv6 mld snooping vlan mrouter-port interface

Command: `ipv6 mld snooping vlan <vlan-id> mrouter-port interface [<ethernet>|<port-channel>] <ifname>`

`no ipv6 mld snooping vlan <vlan-id> mrouter-port interface [<ethernet>|<port-channel>] <ifname>`

Function: Set the static mrouter port of the VLAN; the “no” form of this command cancels the configuration.

Parameter: *vlan-id*: VLAN id, the valid range is<1-4094>

Ehternet: name of Ethernet port

Ifname: Name of interface

port-channel: port aggregate

Command Mode: Global Mode

Default: When a port is made static and dynamic mrouter port at the same time, it's the static mrouter properties is preferred. Deleting the static mrouter port can only be done with the “no” form of this command.

Example: Switch(config)#ipv6 mld snooping vlan 2 mrouter-port interface ethernet1/13

2.1.10 ipv6 mld snooping vlan mrouter-port learnpim6

Command: `ipv6 mld snooping vlan <vlan-id> mrouter-port learnpim6`

`no ipv6 mld snooping vlan <vlan-id> mrouter-port learnpim6`

Function: Enable the function that the specified VLAN learns mrouter-port (according to pimv6 packets), the no command will disable the function.

Parameter: *<vlan-id>*: The specified VLAN ID, ranging from 1 to 4094.

Command Mode: Global Mode

Default: Enable

Usage Guide: Enable the function that the specified VLAN learns mrouter-port (according to pimv6 packets). After a port received pimv6 packets, it will be set to mrouter port for implementing the automatic learning.

Example: Disable the function that vlan 100 learns mrouter-port (according to pimv6 packets).

```
Switch(config)#no ipv6 mld snooping vlan 100 mrouter-port learnpim6
```

2.1.11 ipv6 mld snooping vlan mrpt

Command: `ipv6 mld snooping vlan <vlan-id> mrpt <value>`

`no ipv6 mld snooping vlan <vlan-id> mrpt`

Function: Configure the keep-alive time of the mrouter port.

Parameter: *vlan-id*: VLAN ID, the valid range is <1-4094>

value: mrouter port keep-alive time with a valid range of <1-65535> secs.

Command Mode: Global Mode

Default: 255s

Usage Guide: This configuration is applicable on dynamic mrouter port, but not on static mrouter port. To use this command, MLD snooping must be enabled on the VLAN.

Example: `Switch(config)#ipv6 mld snooping vlan 2 mrpt 100`

2.1.12 ipv6 mld snooping vlan query-interval

Command: `ipv6 mld snooping vlan <vlan-id> query-interval <value>`

`no ipv6 mld snooping vlan <vlan-id> query-interval`

Function: Configure the query interval.

Parameter: *vlan-id*: VLAN ID, the valid range is <1-4094>

value: query interval, valid range: <1-65535>secs.

Command Mode: Global Mode

Default: 125s

Usage Guide: It is recommended to use default value and if layer 3 MLD is in operation, please make this configuration in accordance with the MLD configuration as possible.

Example:

```
Switch(config)#ipv6 mld snooping vlan 2 query-interval 130
```

2.1.13 ipv6 mld snooping vlan query-mrsp

Command: `ipv6 mld snooping vlan <vlan-id> query-mrsp <value>`

no ipv6 mld snooping vlan <vlan-id> query-mrsp

Function: Configure the maximum query response period. The “no” form of this command restores the default value.

Parameter: *vlan-id*: VLAN ID, the valid range is <1-4094>

value: the valid range is <1-25> secs .

Command Mode: Global Mode

Default: 10s

Usage Guide: It is recommended to use default value and if layer 3 MLD is in operation, please make this configuration in accordance with the MLD configuration as possible.

Example:

```
Switch(config)#ipv6 mld snooping vlan 2 query-mrsp 18
```

2.1.14 ipv6 mld snooping vlan query-robustness

Command: **ipv6 mld snooping vlan <vlan-id> query-robustness <value>**

no ipv6 mld snooping vlan <vlan-id> query-robustness

Function: Configure the query robustness; the “no” form of this command restores to the default value.

Parameter: *vlan-id*: VLAN ID, the valid range is <1-4094>

value: the valid range is <2-10>.

Command Mode: Global Mode

Default: 2

Usage Guide: It is recommended to use default value and if layer 3 MLD is in operation, please make this configuration in accordance with the MLD configuration as possible.

Example:

```
Switch(config)#ipv6 mld snooping vlan 2 query-robustness 3
```

2.1.15 ipv6 mld snooping vlan static-group

Command: **ipv6 mld snooping vlan<vlan-id> static-group <X:X::X:X> [source<X:X::X:X>] interface [ethernet | port-channel] <IFNAME>**

no ipv6 mld snooping vlan <vlan-id> static-group <X:X::X:X> [source<X:X::X:X>] interface [ethernet | port-channel] <IFNAME>

Function: Configure static-group on specified port of the VLAN. The no form of the command cancels this configuration.

Parameter: *vlan-id*: ranging between <1-4094>

X:X::X:X: The address of group or source.

ethernet: Name of Ethernet port

port-channel: Port aggregation

ifname: Name of interface

Command Mode: Global mode

Default: No configuration by default.

Usage Guide: When a group is a static while also a dynamic group, it should be taken as a static group. Deleting static group can only be realized by the no form of the command.

Example:

```
Switch(config)#ip igmp snooping vlan 1 static-group ff1e::15 source 2000::1 interface ethernet 1/1
```

2.1.16 ipv6 mld snooping vlan suppression-query-time

Command: `ipv6 mld snooping vlan <vlan-id> suppression-query-time <value>`

`no ipv6 mld snooping vlan <vlan-id> suppression-query-time`

Function: Configure the suppression query time; the “no” form of this command restores the default value.

Parameter: *vlan-id*: VLAN ID, valid range: <1-4094>

value: valid range: <1-65535>secs.

Command Mode: Global Mode

Default: 255s

Usage Guide: This command can only be configured on L2 general querier. The Suppression-query-time represents the period the suppression state maintains when general querier receives queries from layer 3 MLD within the segment. To use this command, the query-intervals in different switches within the same segment must be in accordance. It is recommended to use the default value.

Example:

```
Switch(config)#ipv6 mld snooping vlan 2 suppression-query-time 270
```

2.1.17 show ipv6 mld snooping

Command: `show ipv6 mld snooping [vlan <vlan-id>]`

Parameter: *<vlan-id>* is the number of VLAN specified to display the MLD Snooping messages

Command Mode: Admin Mode

Usage Guide: If no VLAN number is specified, it will show whether the global MLD snooping is enabled and layer 3 multicast protocol is running, as well as on which VLAN the MLD Snooping is enabled and configured l2-general-querier. If a VLAN number is specified, the detailed MLD Snooping messages of this VLAN will be displayed.

Example:

1. Summary of the switch MLD snooping

```
Switch(config)#show ipv6 mld snooping
Global mld snooping status: Enabled
L3 multicasting: running
Mld snooping is turned on for vlan 1(querier)
Mld snooping is turned on for vlan 2
-----
```

Displayed Information	Explanation
Global mld snooping status	Whether or not the global MLD Snooping is enabled on the switch
L3 multicasting	Whether or not the layer 3 multicast protocol is running on the switch.
Mld snooping is turned on for vlan 1(querier)	On which VLAN of the switch is enabled MLD Snooping, if the VLAN are I2-general-querier.

2. Display the detailed MLD Snooping information of vlan1

```
Switch#show ipv6 mld snooping vlan 1
Mld snooping information for vlan 1
```

```
Mld snooping L2 general querier :Yes(COULD_QUERY)
Mld snooping query-interval :125(s)
Mld snooping max reponse time :10(s)
Mld snooping robustness :2
Mld snooping mrouter port keep-alive time :255(s)
Mld snooping query-suppression time :255(s)
```

MLD Snooping Connect Group Membership

Note:*-All Source, (S)- Include Source, [S]-Exclude Source

Groups	Sources	Ports	Exptime	System Level
Ff1e::15	(2000::1)	Ethernet1/8	00:04:14	V2
	(2000::2)	Ethernet1/8	00:04:14	V2

```
Mld snooping vlan 1 mrouter port
```

Note:"!"-static mrouter port

```
!Ethernet1/2
```

Displayed information	Explanation
Mld snooping L2 general querier	whether or not I2-general-querier is enabled on VLAN, the querier display status is set to could-query or

	suppressed
Mld snooping query-interval	Query interval time of the VLAN
Mld snooping max reponse time	Max response time of this VLAN
Mld snooping robustness	Robustness configured on the VLAN
Mld snooping mrouter port keep-alive time	Keep-alive time of the dynamic mrouter on this VLAN
Mld snooping query-suppression time	timeout of the VLAN as I2-general-querier at suppressed status.
MLD Snooping Connect Group Membership	Group membership of the VLAN, namely the correspondence between the port and (S,G) .
Mld snooping vlan 1 mrouter port	Mrouter port of the VLAN, including both static and dynamic.

Chapter 3 Commands for Multicast VLAN

3.1 multicast-vlan

Command: `multicast-vlan`

`no multicast-vlan`

Function: Enable multicast VLAN function on a VLAN; the “no” form of this command disables the multicast VLAN function.

Parameter: None.

Command Mode: VLAN Configuration Mode.

Default: Multicast VLAN function not enabled by default.

Usage Guide: The multicast VLAN function can not be enabled on Private VLAN. To disabling the multicast VLAN function of the VLAN, configuration of VLANs associated with the multicast VLAN should be deleted. Note that the default VLAN can not be configured with this command and only one multicast VLAN is allowed on a switch.

Examples:

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

```
Switch(Config-Vlan2)# multicast-vlan
```

3.2 multicast-vlan association

Command: `multicast-vlan association <vlan-list>`

`no multicast-vlan association <vlan-list>`

Function: Associate several VLANs with a multicast VLAN; the “no” form of this command cancels the association relations.

Parameter: `<vlan-list>` the VLAN ID list associated with multicast VLAN. Each VLAN can only be associated with one multicast VLAN and the association will only succeed when every VLAN listed in the VLAN ID table exists.

Command Mode: VLAN Mode.

Default: The multicast VLAN is not associated with any VLAN by default.

Usage Guide: After a VLAN is associated with the multicast VLAN, when there comes the multicast order in the port of this VLAN, then the multicast data will be sent from the multicast VLAN to this port, so to reduce the data traffic. The VLAN associated with the multicast VLAN should not be a Private VLAN. A VLAN can only be associated with

another VLAN after the multicast VLAN is enabled. Only one multicast VLAN can be enabled on a switch.

Examples:

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

```
Switch(Config-Vlan2)# multicast-vlan association 3, 4
```