



USER MANUAL

Content

CHAPTER 1 COMMANDS FOR QOS	4
1.1 accounting	4
1.2 class	4
1.3 class-map	5
1.4 clear mls qos statistics	5
1.5 clear mls qos queue statistics	5
1.6 drop	6
1.7 match	6
1.8 mls qos aggregate-policy	7
1.9 mls qos cos	9
1.10 mls qos internal-priority	9
1.11 mls qos map	9
1.12 mls qos queue algorithm	11
1.13 mls qos queue drop-algorithm	12
1.14 mls qos queue statistics enable	12
1.15 mls qos queue weight	12
1.16 mls qos queue wred	12
1.17 mls qos queue wdrp weight	13
1.18 mls qos queue bandwidth	13
1.19 mls qos trust	13
1.20 pass-through-cos	13
1.21 pass-through-dscp	14
1.22 policy	14
1.23 policy aggregate	16
1.24 policy-map	16
1.25 service-policy input	16
1.26 service-policy input vlan	17
1.27 set internal priority	17
1.28 show class-map	18
1.29 show policy-map	18

1.30 show mls qos interface	19
1.31 show mls qos in {interface <interface-name> policy vlan <vlan-id>	22
1.32 show mls qos interface wred	22
1.33 show mls qos maps	22
1.34 show mls qos queue statistics	25
1.35 show mls qos vlan	26
1.36 show mls qos aggregate-policy	26
1.37 transmit	27
CHAPTER 2 COMMANDS FOR FLOW-BASED REDIRECTION	28
2.1 access-group redirect to interface ethernet	28
2.2 match vlan <1-4096> redirect interface (ethernet) IFNAME	28
2.3 show flow-based-redirect	28
2.4 vlan-port-redirect vlan maximum <1-1000>	29
CHAPTER 3 COMMANDS FOR FLEXIBLE QINQ	30
3.1 add	30
3.2 delete	30
3.3 match	30
3.4 service-policy	31
3.5 set	31
CHAPTER 4 COMMANDS FOR EGRESS QOS	33
4.1 mls qos egress green remark	33
4.2 mls qos map	33
4.3 service-policy output	36
4.4 service-policy output vlan	36
4.5 set	36
4.6 show mls qos egress green remark	37
4.7 show mls qos maps	37

Chapter 1 COMMANDS FOR QOS

1.1 accounting

- **Command:** `accounting`
 - `no accounting`
- **Function:** Set statistic function for the classified traffic.
- **Parameter:** None.
- **Command mode:** Policy map configuration mode
- **Default:** Do not set statistic function.
- **Usage Guide:** After enable this function, add statistic function to the traffic of the policy class map. In single bucket mode, the messages can only red or green when passing policy and printing the information. In dual bucket mode, there are three colors(green, yellow, red) of messages. Note: In policy-map, accounting does not take effect if only set internal priority is configured, but there is no policy.
- **Example:** Count the packets which satisfy c1 rule.
- `Switch(config)#policy-map p1`
- `Switch(Config-PolicyMap-p1)#class c1`
- `Switch(Config-PolicyMap-p1-Class-c1)#accounting`
- `Switch(Config-PolicyMap-p1-Class-c1)#exit`
- `Switch(Config-PolicyMap-p1)#exit`

1.2 class

- **Command:** `class <class-map-name> [insert-before <class-map-name>]`
 - `no class <class-map-name>`
- **Function:** Associates a class to a policy map and enters the policy class map mode; the `no` command deletes the specified class.
- **Parameters:** `<class-map-name>` is the class map name used by the class.
 - `insert-before <class-map-name>` insert a new configured class to the front of a existent class to improve the priority of the new class.
- **Default:** No policy class is configured by default.
- **Command mode:** Policy map configuration mode
- **Usage Guide:** Before setting up a policy class, a policy map should be created and the policy map mode entered. In the policy map mode, classification and nexthop configuration can be performed on packet traffic classified by class map.
- **Example:** After add a policy class map c1 to the policy map, add a policy class map c2 and insert it to the front of c1.
- `Switch(config)#policy-map p1`
- `Switch(Config-PolicyMap-p1)#class c1`
- `Switch(Config-PolicyMap-p1-Class-c1)#exit`

- Switch(Config-PolicyMap-p1)#class c2 insert-before c1
- Switch(Config-PolicyMap-p1-Class-c2)#exit

1.3 class-map

- **Command:** class-map <class-map-name>
 - no class-map <class-map-name>
- **Function:** Creates a class map and enters class map mode; the no command deletes the specified class map.
- **Parameters:** <class-map-name> is the class map name.
- **Default:** No class map is configured by default.
- **Command mode:** Global Mode
- **Usage Guide:**
- **Example:** Creating and then deleting a class map named "c1".
- Switch(config)#class-map c1
- Switch(Config-ClassMap-c1)#exit
- Switch(config)#no class-map c1

1.4 clear mls qos statistics

- **Command:** clear mls qos statistics [interface <interface-name> | vlan <vlan-id>]
- **Function:** Clear accounting data of the specified ports or VLAN Policy Map. If there are no parameters, clear accounting data of all policy map.
- **Parameters:** <vlan-id>: VLAN ID
 - <interface-name>: The interface name
- **Default:** Do not set action.
- **Command mode:** Admin Mode
- **Usage Guide:** Clear accounting data of the specified ports or VLAN Policy Map. If there are no parameters, clear accounting data of all policy map.
- **Example:** Clear the Policy Map statistic of VLAN 100.
- Switch#Clear mls qos statistics vlan 100

1.5 clear mls qos queue statistics

- **Command:** clear mls qos queue statistics [interface<Ethernet-name>]
- **Function:** Clear the queue statistics information on the port.
- **Parameters:** <Ethernet-name> port name, supports to use '-' or ';' to make up the port name list.
- **Default:** None.
- **Command Mode:** Global mode.

- **Usage Guide:** If the port name was not appointed, clear the statistics information of all the ports. Otherwise, clear the statistics information of the appointed port or appointed port list.
- **Example:** Clear the queue statistics information of the port 1/0/1; 1/0/3; 1/0/4 and 1/0/5.
- (config) #: clear mls qos statistics interface Ethernet 1/0/1;3-5

1.6 drop

- **Command:** drop
 - no drop
- **Function:** Drop data package that match the class, the no command cancels the assigned action.
- **Parameters:** None.
- **Default:** Do not set the action.
- **Command mode:** Policy class map configuration mode
- **Usage Guide:** Drop the specified packet after configure this command.
- **Example:** Drop the packet which satisfy c1.
 - Switch(config)#policy-map p1
 - Switch(Config-PolicyMap-p1)#class c1
 - Switch(Config-PolicyMap-p1-Class-c1)#drop
 - Switch(Config-PolicyMap-p1-Class-c1)#exit
 - Switch(Config-PolicyMap-p1)#exit

1.7 match

- **Command:** match {access-group <acl-index-or-name> | ip dscp <dscp-list> | ip precedence <ip-precedence-list> | ipv6 access-group <acl-index-or-name> | ipv6 dscp <dscp-list> | ipv6 flowlabel <flowlabel-list> | vlan <vlan-list> | cos <cos-list> | vlan range <vlan-list>}
 - no match {access-group | ip dscp | ip precedence | ipv6 access-group | ipv6 dscp | ipv6 flowlabel | vlan | cos | vlan range}
- **Function:** Configure the match standard of the class map; the no form of this command deletes the specified match standard.
- **Parameter:** access-group <acl-index-or-name> match specified IP ACL, MAC ACL or IPv6 ACL, the parameters are the number or name of the ACL;
 - ip dscp <dscp-list> and ipv6 dscp <dscp-list> match specified DSCP value, the parameter is a list of DSCP consisting of maximum 8 DSCP values, the ranging is 0~63;
 - ip precedence <ip-precedence-list> match specified IP Precedence, the parameter is a IP Precedence list consisting of maximum 8 IP Precedence values with a valid range of 0~7;

- **ipv6 access-group <acl-index-or-name>** match specified IPv6 ACL, the parameter is the number or name of the IPv6 ACL;
 - **ipv6 flowlabel <flowlabel-list>** match specified IPv6 flow label, the parameter is IPv6 flow label value, the ranging is 0~1048575;
 - **vlan <vlan-list>** match specified VLAN ID, the parameter is a VLAN ID list consisting of maximum 8 VLAN IDs, the ranging is 1~4094;
 - **cos <cos-list>** match specified CoS value, the parameter is a CoS list consisting of maximum 8 CoS, the range is 0~7.
 - **vlan range <vlan-list>** : some appointed matching VLAN ID value. The parameter is a VLAN ID table and the number restriction of the ID matching vlan is 1 to 4094 (When issuing the hardware, it is limited by the size of L4 table). The scheme of vlan range is as 1;4-9;10.
- **Default:** No match standard by default
 - **Command Mode:** Class-map Mode
 - **Usage Guide:** Only one match standard can be configured in a class map. When configuring the match ACL, permit rule as the match option, apply Policy Map action. Deny rule as the excluding option, do not apply Policy Map action. If configure another match rule after one was configured, the operation fails, but configure the same match rule will cover the previous.
 - **Example:** Create a class-map named c1, and configure the class rule of this class-map to match packets with IP Precedence of 0.
 - Switch(config)#class-map c1
 - Switch(Config-ClassMap-c1)#match ip precedence 0
 - Switch(Config-ClassMap-c1)#exit

1.8 mls qos aggregate-policy

- **Command:**
 - **Single Bucket Mode:**
 - **mls qos aggregate-policy <policer_name> <bits_per_second> <normal_burst_bytes> [{exceed-action ACTION}]**
 - **Dual Bucket Mode:**
 - **mls qos aggregate-policy <policer_name> <bits_per_second> <normal_burst_bytes> (pir <peak_rate_bps> | <maximum_burst_bytes>) ({exceed-action ACTION | violate-action ACTION)**
 - **ACTION definition:**
 - **drop | transmit | set-internal-priority <intp_value> | policed-intp-transmit**
- **[no] mls qos aggregate-policy <policer_name>**
 - **Function:** Define an aggregate policy command, analyze the working mode of the token bucket, whether it is single rate single bucket, single rate dual bucket or dual rate dual

bucket, and set the corresponding action for different color packets. The no operation will delete the mode configuration.

- **Parameters: policer_name:** the name of aggregation policy;
- **bits_per_second:** the committed information rate - CIR , in Kbps, ranging from 1 to 10000000;
- **normal_burst_bytes:** the committed burst size – CBS, in kb, ranging from 1 to 1000000. When the configured CBS value exceeds the max limit of the chip, configure the hardware with max number supported by the chip without any CLI prompt;
- **maximum_burst_bytes:** the peak burst size - PBS, in kb, ranging from 1to 1000000. When the configured PBS value exceeds the max limit of the chip, configure the hardware with max number supported by the chip without any CLI prompt. Notice: this configuration only exists in dual bucket mode;
- **pir_peak_rate_bps:** the peak information rate - PIR, in kbps, ranging from 1to 10000000. Without configuring PIR, the Police works in the single rate dual bucket mode; otherwise in the dual rate dual bucket mode. Notice: this configuration only exist in the dual bucket mode.
- **exceed-action:** the actions to take when the CIR is exceeded but PIR isn't, which means the messages are yellow, the default is Drop;
- **violate-action:** the actions to take when the PIR is exceeded, which means the messages are red, the default is Drop.
- **ACTION:**
- **drop/transmit:** Drop/transmit the packets
- **set-internal-priority <intp_value>:** Modify the internal priority of the packets
- **policed-intp-transmit:** Drop the internal priority according to INT-PRIO_TO_INT-PRIO mapping
- **Default:** No aggregation Policy is defined by default; the default action of exceed-action and violate-action both is drop.
- **Command mode:** Global Mode
- **Usage Guide:** The CLI can support both single bucket and dual bucket configuration, and determine which one by checking whether PIR or PBS is configured. When configuring with CLI, after configuring CBS, if the action is directly configured, the mode is single rate single bucket; if only PBS is configured, the mode is single rate dual bucket three colors; if PIR and PBS are configured, the mode is dual rate dual bucket three colors. The actions of **set** and **policy** selected by policy map are same, the action of policy can cover the action of the set. Furthermore, If the actions of exceed-action and violate-action are set-internal-priority in policy, <intp_value> must be same.
- **Example:** Set the dual bucket mode, CIR is 1000, CBS is 1000, PIR is 20000, PBS is 10000. The action is policed-intp-transmit when CIR is exceeded but PIR isn't, which means the messages are yellow.
- Switch(config)#mls qos aggregate-policy color 10000 1000 20000 10000 exceed-action policed-intp-transmit

1.9 mls qos cos

- **Command:** `mls qos cos {<default-cos>}`
 - `no mls qos cos`
- **Function:** Configures the default CoS value of the port; the “`no mls qos cos`” command restores the default setting.
- **Parameters:** `<default-cos>` is the default CoS value for the port, the valid range is 0 to 7.
- **Default:** The default CoS value is 0.
- **Command mode:** Port Configuration Mode.
- **Usage Guide:** Configure the default CoS value for switch port. If the ingress packets without 802.1Q tag of the port, set the cos value of the packets with tag as the default value. If the ingress packets with 802.1Q tag of the port, do not modify the cos value according to the default cos value.
- **Example:** Setting the default CoS value of ethernet port 1/0/1 to 7.
- `Switch(config)#interface ethernet 1/0/1`
- `Switch(Config-If-Ethernet1/0/1)#mls qos cos 7`

1.10 mls qos internal-priority

- **Command:** `mls qos internal-priority {<default-intp> }`
 - `no mls qos internal-priority`
- **Function:** Configure the default internal priority of the port, the no command restores the default.
- **Parameter:** `<default-intp>` the default internal priority of the port, ranging from 0 to 119.
- **Default:** The default intp value is 0.
- **Command Mode:** Port mode
- **Usage Guide:** Configure the default internal priority of the port. If there is no dscp and cos fields of the trust packets, the ingress packet of the port will obtain a default internal priority. The packet's internal priority may be reset according to the configured QoS policy.
- **Example:** Configure the default intp value as 40 on ethernet 1/0/1.
- `Switch(config)#interface ethernet 1/0/1`
- `Switch(Config-If-Ethernet1/0/1)#mls qos internal-priority 40`

1.11 mls qos map

- **Command:** `mls qos map {cos-intp <intp1...intp8> | dscp-intp <in-dscp list> to <intp> | intp-cos <intp list> to <out-cos> | intp-dp <intp list> to <out-dp> | intp-dscp <intp list> to <out-dscp> | <color> intp-intp <intp list> to <intp> | intp-queue <intp list> to <out-queue> }`

- **no mls qos map {cos-intp | dscp-intp | intp-cos | intp-dp | intp-dscp | intp-intp <color> | intp-queue}**

- **Function:** Set the priority mapping of QoS, the no command restores the default mapping.
- **Parameters:** cos-intp <intp1...intp8> defines the mapping from CoS value to intp (internal priority), each intp value is delimited with space, <intp1..intp8> are 8 intp value corresponding to the 0 to 7 CoS value;
- dscp-intp defines the mapping from DSCP to intp, <in-dscp list> stand for incoming DSCP values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 63, <intp> is the internal priority value, ranging from 0 to 119;
- intp-cos defines the mapping from intp to CoS, <intp list> stand for incoming int-prio values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 119, <out-cos> is the cos output value, ranging from 0 to 7;
- intp-dp defines the mapping from intp to dp, <intp list> stand for incoming int-prio values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 119, <out-dp> is the dp output value, ranging from 0 to 1;
- intp-dscp defines the mapping from intp to DSCP, <intp list> stand for incoming int-prio values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 119, <out-dscp> is the dscp output value, ranging from 0 to 63;
- intp-intp defines the mapping from intp of the ingress to intp of the egress, <color> is the color(yellow or red) of the packet; <intp list> stand for int-prio values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 119, <intp> is the intp output value, ranging from 0 to 119;
- intp-queue defines the mapping from intp to the egress queue, <intp list> stand for incoming int-prio values, up to 8 values are supported, each value is delimited with space, ranging from 0 to 119, <out-queue> is the queue ID of the output queue, ranging from 0 to 7.
- **Default:**
 - Ingress COS-TO-Internal-Priority map:
 - COS: 0 1 2 3 4 5 6 7
 - INTP: 0 8 16 24 32 40 48 56
 - Ingress DSCP-TO-Internal-Priority map:
 - In-DSCP Value 0-7 8-15 16-23 24-31 32-39 40-47 48-55 56-63
 - INTP Value 0-7 8-15 16-23 24-31 32-39 40-47 48-55 56-63
 - Egress Internal-Priority-TO-COS map:
 - INTP Value 0-7 8-15 16-23 24-31 32-39 40-47 48-55 56-63 64-119
 - COS Value 0 1 2 3 4 5 6 7 7
 - Egress Internal-Priority-TO-Drop-Precedence map:

- INTP Value 0-119
- DP Value 0

- Egress Internal-Priority-TO-DSCP map:
 - INTP Value 0-63 64-119
 - DSCP Value 0-63 63

- Internal-Priority-TO-Internal-Priority-YELLOW map:
 - In-Intp Value 0-119
 - INTP Value 0-119

- Internal-Priority-TO-Internal-Priority-RED map:
 - In-Intp Value 0-119
 - INTP Value 0-119

- Egress Internal-Priority-TO-Queue map:
 - INTP Value 0-7 8-15 16-23 24-31 32-39 40-47 48-55 56-63
 - QUEUE Value 0 1 2 3 4 5 6 7
 - INTP Value 64-71 72-79 80-87 88-95 96-103 104-111 112-119
 - QUEUE Value 0 1 2 3 4 5 6
 - **Command mode:** Global Mode
 - **Usage Guide:** INTP means the chip internal priority setting. The ingress packets from the port obtain a internal priority through the mapping, reset the internal priority according to intp-intp or set action in after QoS policy, and process the egress packets according to the mapping from intp to cos, dscp, queue, dp.
 - **Example:** Setting the global cos-to-intp mapping.
 - Switch(config)#mls qos map cos-intp 1 2 3 4 5 6 7 0

1.12 mls qos queue algorithm

- **Command:** mls qos queue algorithm {sp | wdr}
 - no mls qos queue algorithm
- **Function:** After configure this command, the queue management algorithm is set.
- **Parameters:** sp: The strict priority, the queue number of bigger, then the priority is higher
 - wdr: Select wdr algorithm
- **Default:** The default queue algorithm is wdr.
- **Command mode:** Port Mode.
- **Usage Guide:** After configure this command, the queue management algorithm is set.
- **Example:** Setting the queue management algorithm as sp.

- Switch(interface-ethernet1/0/1)#mls qos queue algorithm sp

1.13 mls qos queue drop-algorithm

- This command is not supported by switch.

1.14 mls qos queue statistics enable

- **Command:** mls qos queue statistics enable
- **no mls qos queue statistics enable**
- **Function:** Enable or disable the queue statistics function.
- **Parameters:** None.
- **Default:** Disable.
- **Command Mode:** Global Mode.
- **Usage Guide:** Enable the statistics function through this command to make the counter statistic the packets of each queue of the egress ports respectively.
- **Example:** Enable the queue statistics function.
- (config) #: mls qos queue statistics enable

1.15 mls qos queue weight

- **Command:** mls qos queue weight <weight0..weight7>
 - **no mls qos queue weight**
- **Function:** After configure this command, the queue weight is set.
- **Parameters:** <weight0..weight7> defines the queue weight, for WDRR algorithm, this configuration is valid, for SP algorithm, this configuration is invalid, weight ranging from 0 to 255. The absolute value of weight is meaningless. WDRR allocates bandwidth by using 8 weight values.
- **Default:** The queue weight is 1 1 1 1 1 1 1 0, and the seventh queue weight is the users configured.
- **Command mode:** Global Mode.
- **Usage Guide:** If the queue weight is configured as 0, join the queue to SP algorithm. If the queue weight is not configured as 0, join the queue to WDRR, and turns into SP+WDRR. When managing the queue, select a queue according to WDRR algorithm in WDRR group, WDRR and SP queues execute the strict priority management mode.
- **Example:** Configure the queue weight as 1 2 3 4 5 6 7 8.
- Switch(interface-ethernet1/0/1)#mls qos queue weight 1 2 3 4 5 6 7 8

1.16 mls qos queue wred

- This command is not supported by switch.

1.17 mls qos queue wdr weight

- This command is not supported by the switch.

1.18 mls qos queue bandwidth

- This command is not supported by switch.

1.19 mls qos trust

- **Command:** `mls qos trust {cos | dscp}`
- **no mls qos trust {cos | dscp}**
- **Function:** Configures port trust; the no command disables the current trust status of the port.
- **Parameters:** cos configures the port to trust CoS value; **dscp** configures the port to trust DSCP value.
- **Default:** Do not trust CoS and DSCP values.
- **Command mode:** Port Configuration Mode.
- **Usage Guide:** **trust cos mode:** can set the intp value based cos-to-intp mapping.
- **trust dscp mode:** can set the intp field based dscp-to-intp mapping, it is valid for IPv4, IPv6 packets.
- **trust cos** and **trust dscp** can be set at the same time, **trust dscp** priority is higher than **trust cos** priority.
- **Example:** Configuring ethernet port 1/0/1 to trust cos value, i.e., classifying the packets according to cos value.
- Switch(config)#interface ethernet 1/0/1
- Switch(Config-If-Ethernet1/0/1)#mls qos trust cos

1.20 pass-through-cos

- **Command:** `pass-through-cos`
 - **no pass-through-cos**
- **Function:** Forbid the egress packets rewriting L2 cos value.
- **Parameter:** None.
- **Default:** The egress packets rewrite L2 CoS value.
- **Command Mode:** Port Mode
- **Usage Guide:** The egress packets can not rewrite L2 CoS value when configuring pass-through-cos on the ingress. This command may associate with other commands of QoS, such as mls qos trust command. After QoS actions are valid, the egress packets save the original CoS value.
- **Example:** Configuring ethernet port 1/0/1 to trust dscp value, i.e., classifying the packets according to dscp value.

- Switch(config)#interface ethernet 1/0/1
- Switch(config-if-ethernet1/0/1)#mls qos trust dscp
- Switch(config-if-ethernet1/0/1)#pass-through-cos

1.21 pass-through-dscp

- **Command:** pass-through-dscp
 - no pass-through-dscp
- **Function:** Forbid the egress packets rewriting DSCP value.
- **Parameter:** None.
- **Default:** The egress packets rewrite DSCP value.
- **Command Mode:** Port Mode
- **Usage Guide:** The egress packets can not rewrite DSCP value when configuring pass-through-dscp on the ingress. This command may associate with other commands of QoS, such as mls qos trust command. After QoS actions are valid, the egress packets save the original DSCP value.
- **Example:** Configuring ethernet port 1/0/1 to trust CoS value, i.e., classifying the packets according to CoS value.
- Switch(config)#interface ethernet 1/0/1
- Switch(config-if-ethernet1/0/1)#mls qos trust cos
- Switch(config-if-ethernet1/0/1)#pass-through-dscp

1.22 policy

- **Command:**
- **Single Bucket Mode:**
- policy <bits_per_second> <normal_burst_bytes> {{exceed-action ACTION} }
- **Dual Bucket Mode:**
- policy <bits_per_second> <normal_burst_bytes> [pir <peak_rate_bps>] | <maximum_burst_bytes> {{exceed-action ACTION | violate-action ACTION } }
- **ACTION definition:**
- drop | transmit / set-internal-priority <intp_value> | policed-intp-transmit
- **no policy**
- **Function:** The non-aggregation policy command supporting three colors. Determine whether the working mode of token bucket is single rate single bucket, single rate dual bucket or dual rate dual bucket, set the corresponding action to the different color packets. The no command will delete the mode configuration.
- **Parameters:** **bits_per_second:** The committed information rate – CIR (Committed Information Rate), in Kbps, ranging from 1 to 10000000;

- **normal_burst_bytes:** The committed burst size – CBS (Committed Burst Size), in byte, ranging from 1 to 1000000. When the configured CBS value exceeds the max limit of the chip, configure the hardware with max number supported by the chip without any CLI prompt;
 - **maximum_burst_bytes:** The peak burst size – PBS (Peak Burst Size), in byte, ranging from 1 to 10000000. When the configured PBS value exceeds the max limit of the chip, configure the hardware with max number supported by the chip without any CLI prompt. **Notice:** this configuration only exists in dual bucket mode;
 - **pir_peak_rate_bps:** The peak information rate – PIR (Peak Information Rate), in kbps, ranging from 1 to 10000000. Without configuring PIR, the Police works in the single rate dual bucket mode; otherwise in the dual rate dual bucket mode. **Notice:** this configuration only exists in dual bucket mode;
 - **violate-action:** The actions to take when the PIR is exceeded, which means the messages are red, the default as drop;
 - **exceed-action:** The actions to take when the CIR is exceeded but PIR isn't, which means the messages are yellow, the default as drop.
-
- ACTION include:
 - **drop/transmit:** Drop/transmit the packets
 - set-internal-priority <intp_value> sets the internal priority of the packets
 - policed-intp-transmit modifies the internal priority according to intp-to-intp mapping
 - **Default:** No policy action; the default action of exceed-action and violate-action both are drop.
 - **Command mode:** Policy class map configuration Mode
 - **Usage Guide:** **Notice:** After the global L3 hardware forwarding function is enabled, the command is valid.
 - The CLI can support both single bucket and dual bucket configuration, and determine which one to select by checking whether PIR or PBS is configured. When configuring with CLI, after configuring CBS, if the action is directly configured, the mode is single bucket dual color; if only PBS is configured, the mode is single rate dual bucket three color; if PIR and PBS are configured, the mode is dual rate dual bucket three color. "set" and "policy" (policy aggregate) are selected and have the same action in Policy Map, then the action selected by "policy" will cover the action of "set".
 - If the actions of exceed-action and violate-action are set-internal-priority in policy, <intp_value> must be same.
 - **Example:** In the policy class table configuration mode, set the CIR as 1000, CBS as 2000 and the action when CIR is exceeded as transmitting the messages after changing intp to 40.
 - Switch(config)#class-map cm
 - Switch(config-classmap-cm)#match cos 0
 - Switch(config-classmap-cm)#exit
 - Switch(config)#policy-map 1

- Switch(config-policymap-1)#class cm
- Switch(config-policymap-1-class-cm)#policy 1000 2000 exceed-action set-internal-priority 40

1.23 policy aggregate

- **Command:** `policy aggregate <aggregate-policy-name>`
 - `no policy aggregate`
- **Function:** Police Map reference aggregate policy, applies an aggregate policy to classified traffic; the no command deletes the specified aggregate policy.
- **Parameters:** `<aggregate-policy-name>` is the policy set name.
- **Default:** No policy is configured by default.
- **Command mode:** Policy class map configuration Mode
- **Usage Guide:** The same policy set can be referred to by different policy class maps.
- **Example:** Create class-map, the match rule is the cos value is 0; policy-map is 1, enter the policy map mode, set the Policy and choose the color policy for the current list.
- Switch(config)#class-map cm
- Switch(config-classmap-cm)#match cos 0
- Switch(config-classmap-cm)#exit
- Switch(config)#policy-map 1
- Switch(config-policymap-1)#class cm
- Switch(config-policymap-1-class-cm)#policy aggregate color

1.24 policy-map

- **Command:** `policy-map <policy-map-name>`
 - `no policy-map <policy-map-name>`
- **Function:** Creates a policy map and enters the policy map mode; the “no policy-map <policy-map-name>” command deletes the specified policy map.
- **Parameters:** `<policy-map-name>` is the policy map name.
- **Default:** No policy map is configured by default.
- **Command mode:** Global Mode
- **Usage Guide:** classification matching and remarking can be done in policy map configuration mode.
- **Example:** Creating and deleting a policy map named “p1”.
- Switch(config)#policy-map p1
- Switch(Config-PolicyMap-p1)#exit
- Switch(config)#no policy-map p1

1.25 service-policy input

- **Command:** `service-policy input <policy-map-name>`

- **no service-policy input <policy-map-name>**
- **Function:** Applies a policy map to the specified port; the no command deletes the specified policy map applied to the port.
- **Parameters:** **input <policy-map-name>** applies the specified policy map to the ingress direction of switch port.
- **Default:** No policy map is bound to port and VLAN interface by default.
- **Command mode:** Port Configuration Mode.
- **Usage Guide:** Only one policy map can be applied to each direction of each port. Egress policy map is not supported yet.
- **Example:**
 - Bind policy p1 to ingress Ethernet port1/0/1.
 - Switch(config)#interface ethernet 1/0/1
 - Switch(Config-If-Ethernet1/0/1)#service-policy input p1
 - Bind policy p1 to ingress redirection of v1 interface.
 - Switch(config)#interface vlan 1
 - Switch(Config-If-vlan1)#service-policy input p1

1.26 service-policy input vlan

- **Command:** **service-policy input <policy-map-name> vlan <vlan-list>**
 - **no service-policy input <policy-map-name> vlan <vlan-list>**
- **Function:** Applies a policy map to the specified VLAN interface; the no command deletes the specified policy map applied to the VLAN interface.
- **Parameters:** **input <policy-map-name>** applies the specified policy map to the ingress direction of switch VLAN interface.
- **Default:** No policy map is bound to VLAN interface by default.
- **Command mode:** Global Configuration Mode.
- **Usage Guide:** Only one policy map can be applied to each direction of each VLAN interface. Use the policy-map on the port at first when binding policy-map on VLAN and VLAN's port at the same time. Egress policy map is not supported yet.
- **Example:**
 - Bind policy p1 to ingress of VLAN interface v2, v3, v4, v6.
 - Switch(config)# service-policy input p1 vlan 2-4;6

1.27 set internal priority

- **Command:** **set internal priority <new-intp>**
 - **no set internal priority**
- **Function:** Assign a new internal priority for the classified traffic, the no command cancels the new value assigned.
- **Parameter:** **<new-intp>** Set a new internal priority for the traffic that accord the matching standard.

- **Default:** Do not assign the internal priority.
- **Command Mode:** Policy Class-map Mode
- **Usage Guide:** Assign a new value for the classified traffic that accord the matching standard only.
- **Example:** Set the internal priority of the packets matching the c1 class rule to 63.
 - Switch(config)#policy-map p1
 - Switch(config-policy-map-p1)#class c1
 - Switch(config-policy-map-p1-class-c1)#set internal priority 63
 - Switch(config-policy-map-p1-class-c1)#exit
 - Switch(config-policy-map-p1)#exit

1.28 show class-map

- **Command:** show class-map [*<class-map-name>*]
- **Function:** Displays class map of QoS.
- **Parameters:** *<class-map-name>* is the class map name.
- **Default:** N/A.
- **Command mode:** Admin Mode.
- **Usage Guide:** Displays all configured class-map or specified class-map information.
- **Example:**
 - Switch # show class-map
 - Class map name:c1, used by 1 times
 - match acl name:1

Displayed information	Explanation
Class map name:c1	Name of the Class map
used by 1 times	Used times
match acl name:1	Classifying rule for the class map.

1.29 show policy-map

- **Command:** show policy-map [*<policy-map-name>*]
- **Function:** Displays policy map of QoS.
- **Parameters:** *<policy-map-name>* is the policy map name.
- **Default:** N/A.
- **Command mode:** Admin Mode.
- **Usage Guide:** Displays all configured policy-map or specified policy-map information.
- **Example:**

- Switch#show policy -map
- Policy Map p1, used by 0 port
- Class Map name: c1
- policy CIR: 1000 CBS: 1000 PIR: 200 PBS: 3000
- conform-action:
- transmit
- exceed-action:
- drop
- violate-action:
- drop

Displayed information	Explanation
Policy Map p1	Name of policy map
Class map name:c1	Name of the class map referred to
policy CIR: 1000 CBS: 1000 PIR: 200 PBS: 3000 conform-action: transmit exceed-action: drop violate-action: drop	Policy implemented

1.30 show mls qos interface

- **Command:** show mls qos interface [<interface-id>] [policy | queuing]
- **Function:** Displays QoS configuration information on a port.
- **Parameters:** <interface-id> is the port ID; **policy** is the policy setting on the port; **queuing** is the queue setting for the port.
- **Default:** N/A.
- **Command mode:** Admin Mode and Common Mode.
- **Usage Guide:** In single rate single bucket mode, the messages can only red or green when passing police. In dual bucket mode, there are three colors of messages, they are GREEN, YELLOW, RED.

- **Example:**
- Switch #show mls qos interface ethernet 1/0/1
- Ethernet 1/0/1
- Default COS: 0
- Default int-Prio: 0
- Trust: COS DSCP
- Pass-through-cos: NONE
- Pass-through-dscp: NONE

- Attached Policy Map for Ingress: 1
- Classmap classified green yellow red (in packets)
- 1 4509799 6769 0 4503030

Display Information	Explanation
Ethernet1/0/1	Port name
default cos: 0	Default CoS value of the port
Default int-Prio: 0	Default internal priority value of the port
Trust: COS DSCP	The trust state of the port
Pass-through-cos: NONE	Whether forbid the modification of cos value
Pass-through-dscp: NONE	Whether forbid the modification of dscp value
Attached Policy Map for Ingress: p1	Policy name bound to port
ClassMap	ClassMap name
classified	Total data packets match this ClassMap. If there is no Accounting for Class Map, show NA

green	Total green data packets match this ClassMap. If there is no Accounting for Class Map, show NA
yellow	Total yellow data packets match this ClassMap. If there is no Accounting for Class Map, show NA
red	Total red data packets match this ClassMap. If there is no Accounting for Class Map, show NA
Queue Algorithm:	WDRR or PQ queue out method

- Switch(config)#show mls qos interface ethernet1/0/1 queuing
- Ethernet1/0/1:
- Queue Algorithm: WDRR

Display Information	Explanation
Queue Algorithm:	WDRR or PQ queue out method

- Switch# show mls qos interface ethernet 1/0/1 policy
- Ethernet1/0/1:
- Attached Policy Map for Ingress: p1
- Classmap classified green yellow red (in packets)
- c1 20 10 NA 10
- c2 30 10 10 10
- c3 NA NA NA NA

Display Information	Explanation
Ethernet1/0/1	Port name

Attached Policy Map for Ingress: p1	Policy name bound to port
ClassMap	ClassMap name
classified	Total data packets match this ClassMap.
Green	Total green data packets match this ClassMap.
Yellow	Total yellow data packets match this ClassMap.
Red	Total red data packets match this ClassMap.

1.31 show mls qos in {interface <interface-name> policy | vlan <vlan-id>

- **Command:** show mls qos in {interface <interface-name> policy | vlan <vlan-id>
- **Function:** Show the policy configuration information of the in direction of port or vlan.
- **Parameters:** <interface-name>: port name.
- **Command Mode:** Admin and configuration mode
- **Default:** None.
- **Usage Guide:** Show the policy configuration information of the in direction.
- **Example:** Show the policy configuration information of the in direction.
- Switch#show mls qos in interface ethernet1/0/1 policy
- Ethernet1/0/1:
- Attached Policy Map for Ingress: p

1.32 show mls qos interface wred

- This command is not supported by switch.

1.33 show mls qos maps

- **Command:** show mls qos maps [cos-intp | dscp-intp | intp-intp | intp-cos | intp-dscp | intp-dp | intp-queue]
- **Function:** Display the configuration of QoS mapping.
- **Parameters:** **cos-intp:** The mapping from ingress L2 CoS to internal priority
- **dscp-intp:** The mapping from ingress DSCP to internal priority

- **intp-intp:** The mapping from internal priority to internal priority
- **intp-cos:** The mapping from egress internal priority to L2 CoS
- **intp-dscp:** The mapping from egress internal priority to DSCP
- **intp-dp:** The mapping from egress internal priority to DP
- **intp-queue:** The mapping from internal priority to queue
- **Default:** None.
- **Command mode:** Admin and Configuration Mode.
- **Usage Guide:** Display the map configuration information of QoS.
- **Example:** Display configuration information of the mapping table.
- Switch#show mls qos maps
- Ingress COS-TO-Internal-Priority map:
- COS: 0 1 2 3 4 5 6 7
- -----
- INTP: 0 8 16 24 32 40 48 56

- Ingress DSCP-TO-Internal-Priority map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 1 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49
- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63

- Internal-Priority-TO-Internal-Priority-YELLOW map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 1 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49
- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63 64 65 66 67 68 69
- 7: 70 71 72 73 74 75 76 77 78 79
- 8: 80 81 82 83 84 85 86 87 88 89
- 9: 90 91 92 93 94 95 96 97 98 99
- 10: 100 101 102 103 104 105 106 107 108 109

- 11: 110 111 112 113 114 115 116 117 118 119

- Internal-Priority-TO-Internal-Priority-RED map:
 - d1 : d2 0 1 2 3 4 5 6 7 8 9
 - 0: 0 1 2 3 4 5 6 7 8 9
 - 1: 10 11 12 13 14 15 16 17 18 19
 - 2: 20 21 22 23 24 25 26 27 28 29
 - 3: 30 31 32 33 34 35 36 37 38 39
 - 4: 40 41 42 43 44 45 46 47 48 49
 - 5: 50 51 52 53 54 55 56 57 58 59
 - 6: 60 61 62 63 64 65 66 67 68 69
 - 7: 70 71 72 73 74 75 76 77 78 79
 - 8: 80 81 82 83 84 85 86 87 88 89
 - 9: 90 91 92 93 94 95 96 97 98 99
 - 10: 100 101 102 103 104 105 106 107 108 109
 - 11: 110 111 112 113 114 115 116 117 118 119

- Egress Internal-Priority-TO-Drop-Precedence map:
 - d1 : d2 0 1 2 3 4 5 6 7 8 9
 - 0: 0 0 0 0 0 0 0 0 0 0
 - 1: 0 0 0 0 0 0 0 0 0 0
 - 2: 0 0 0 0 0 0 0 0 0 0
 - 3: 0 0 0 0 0 0 0 0 0 0
 - 4: 0 0 0 0 0 0 0 0 0 0
 - 5: 0 0 0 0 0 0 0 0 0 0
 - 6: 0 0 0 0 0 0 0 0 0 0
 - 7: 0 0 0 0 0 0 0 0 0 0
 - 8: 0 0 0 0 0 0 0 0 0 0
 - 9: 0 0 0 0 0 0 0 0 0 0
 - 10: 0 0 0 0 0 0 0 0 0 0
 - 11: 0 0 0 0 0 0 0 0 0 0

- Egress Internal-Priority-TO-COS map:
 - d1 : d2 0 1 2 3 4 5 6 7 8 9
 - 0: 0 0 0 0 0 0 0 0 1 1
 - 1: 1 1 1 1 1 1 2 2 2 2
 - 2: 2 2 2 2 3 3 3 3 3 3
 - 3: 3 3 4 4 4 4 4 4 4 4
 - 4: 5 5 5 5 5 5 5 5 6 6

- 5: 6 6 6 6 6 6 7 7 7 7
- 6: 7 7 7 7 7 7 7 7 7 7
- 7: 7 7 7 7 7 7 7 7 7 7
- 8: 7 7 7 7 7 7 7 7 7 7
- 9: 7 7 7 7 7 7 7 7 7 7
- 10: 7 7 7 7 7 7 7 7 7 7
- 11: 7 7 7 7 7 7 7 7 7 7

- Egress Internal-Priority-TO-DSCP map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 1 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49
- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63 63 63 63 63 63 63
- 7: 63 63 63 63 63 63 63 63 63 63
- 8: 63 63 63 63 63 63 63 63 63 63
- 9: 63 63 63 63 63 63 63 63 63 63
- 10: 63 63 63 63 63 63 63 63 63 63
- 11: 63 63 63 63 63 63 63 63 63 63

- Egress Internal-Priority-TO-Queue map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 0 0 0 0 0 0 0 1 1
- 1: 1 1 1 1 1 1 2 2 2 2
- 2: 2 2 2 2 3 3 3 3 3 3
- 3: 3 3 4 4 4 4 4 4 4 4
- 4: 5 5 5 5 5 5 5 5 6 6
- 5: 6 6 6 6 6 6 7 7 7 7
- 6: 7 7 7 7 0 0 0 0 0 0
- 7: 0 0 1 1 1 1 1 1 1 1
- 8: 2 2 2 2 2 2 2 2 3 3
- 9: 3 3 3 3 3 3 4 4 4 4
- 10: 4 4 4 4 5 5 5 5 5 5
- 11: 5 5 6 6 6 6 6 6 6 6

1.34 show mls qos queue statistics

- **Command:** show mls qos queue statistics [interface<Ethernet-name>]

- **Function:** Read the queue statistics information on the port.
- **Parameters:** <Ethernet-name> port name, supports to use '-' or ';' to make up the port name list.
- **Default:** None.
- **Command Mode:** Admin mode/Configuration mode.
- **Usage Guide:** If the port name was not appointed, print the statistics information of all the ports. Otherwise, print the statistics information of the appointed port or appointed port list.
- **Example:** Read the queue statistics information of 1/0/1; 1/0/3; 1/0/4 and 1/0/5.
- (config) #: show mls qos statistics interface Ethernet 1/0/1;3-5

1.35 show mls qos vlan

- **Command:** show mls qos vlan <v-id>
- **Parameters:** v-id: the ranging from 1 to 4094.
- **Command Mode:** Admin mode.
- **Default:** None.
- **Example:**
- Switch#show mls qos vlan 1
- Vlan 1:
- Attached Policy Map for Ingress: 1
- Classmap classified in-profile out-profile (in packets)
- 1 NA NA NA

- Switch(config)#show mls qos vlan 7
- Vlan 7:
- Attached Policy Map for Ingress: 7
- Classmap classified in-profile out-profile (in packets)
- 7 0 0 0

1.36 show mls qos aggregate-policy

- **Command:** show mls qos aggregate-policy [<aggregate-policy-name>]
- **Function:** Show aggregate-policy information of QoS.
- **Parameter:** <aggregate-policy-name> the aggregate-policy name
- **Default:** None.
- **Command Mode:** Admin mode and configuration mode
- **Usage Guide:** Show all or the specified aggregate-policy configuration.
- **Example:**
- Switch(config)#show mls qos aggregate-policy a2
- aggregate policy a2 10 10 10 exceed-action drop

- Not used by any Policy Map

Display Information	Explanation
aggregate policy a2 10 10 10 exceed-action drop	aggregate-policy configuration
Not used by any Policy Map	The time for using aggregate-policy

1.37 transmit

- **Command:** transmit
 - no transmit
- **Function:** Transmit data package that match the class, the no command cancels the assigned action.
- **Parameters:** None.
- **Default:** Do not set the action.
- **Command mode:** Policy class map configuration mode
- **Usage Guide:** Send the packet directly after configure this command.
- **Example:** Send the packet which satisfy c1.
 - Switch(config)#policy-map p1
 - Switch(Config-PolicyMap-p1)#class c1
 - Switch(Config-PolicyMap-p1-Class-c1)#transmit
 - Switch(Config-PolicyMap-p1-Class-c1)#exit
 - Switch(Config-PolicyMap-p1)#exit

Chapter 2 COMMANDS FOR FLOW-BASED REDIRECTION

2.1 access-group redirect to interface ethernet

- **Command:** `access-group <aclname> redirect to interface [ethernet <IFNAME> | <IFNAME>]`
 - `no access-group <aclname> redirect`
- **Function:** Specify flow-based redirection; “no access-group <aclname> redirect” command is used to delete flow-based redirection.
- **Parameters:** **<aclname>** name of the flow , only supports digital standard IP ACL, digital extensive IP ACL, nomenclatural standard IP ACL, nomenclatural extensive IP ACL, digital standard IPv6 ACL, and nomenclatural standard IPv6 ACL. Parameters of **Timerange** and **Portrange** can not be set in ACL; the type of ACL should be Permit. **<IFNAME>** the destination port of redirection.
- **Command Mode:** Physical Port Configuration Mode.
- **Usage Guide:** “no access-group <aclname> redirect” command is used to delete flow-based redirection. Flow-based redirection function enables the switch to transmit the data frames meeting some special condition to another specified port.
- **Examples:** Redirecting the frames whose source IP is 192.168.1.111 received from port 1 to port 6,
 - Switch(config)#access-list 1 permit host 192.168.1.111
 - Switch(config)# interface ethernet 1/0/1
 - Switch(Config-If-Ethernet1/0/1)# access-group 1 redirect to interface ethernet 1/0/6

2.2 match vlan <1-4096> redirect interface (ethernet |) IFNAME

- **Command:** `match vlan <1-4096> redirect interface (ethernet |) IFNAME`
 - `no match vlan <1-4096> redirect`
- **Command Mode:** Port Mode.
- **Function:** Configure the vlan redirection function of the port.
- **Parameters:** `vlan <1-4096>: vlanID`
 - `IFNAME:` Port name
- **Usage Guide:** Redirect the flow which matches the packet of vid from the appointed port to another port.
- **Example:** Redirect the flow of vlan1 of 1/0/1 to the port of 1/0/2.
- `(config-if-ethernet1/0/1)#match vlan 1 redirect interface ethernet 1/0/2`

2.3 show flow-based-redirect

- **Command:** `show flow-based-redirect {interface [ethernet <IFNAME> | <IFNAME>]}`
- **Function:** Display the information of current flow-based redirection in the system/port.

- **Parameters:** 1. No specified port, display the information of all the flow-based redirection in the system.
 - 2. Specify ports in **<IFNAME>**, display the information of the flow-based redirection configured in the ports listed in the interface-list.
- **Command Mode:** Admin Mode and Configuration Mode.
- **Usage Guide:** This command is used to display the information of current flow-based redirection in the system/port.
- **Examples:**
 - Switch(config)# show flow-based-redirect
 - Flow-based-redirect config on interface ethernet 1/0/1:
 - RX flow (access-list 1) is redirected to interface Ethernet1/0/6

2.4 vlan-port-redirect vlan maximum <1-1000>

- **Command:** vlan-port-redirect vlan maximum <1-1000>
 - no vlan-port-redirect vlan maximum
- **Command Mode:** Global Mode.
- **Function:** Configure the maximum number of vlan of redirect on each port.
- **Default:** 500
- **Parameters:** maximum <1-1000>: maximum number of vlan
- **Usage Guide:** Configure the maximum number of vlan of redirect on each port.
- **Example:** Configure the maximum number of vlan of redirect on 1/0/1 as 600.
- (config)# vlan-port-redirect vlan maximum 600

Chapter 3 COMMANDS FOR FLEXIBLE QINQ

3.1 add

- **Command:** `add s-vid <new-vid>`
- **no add s-vid**
- **Function:** Add a specified external tag or inner tag for the packet which match the class map, no command cancels the operation.
- **Parameters:** `s-vid <new-vid>` specifies VID of an external VLAN Tag.
- **Default:** Do not add the tag.
- **Command Mode:** Policy class-map configuration mode
- **Usage Guide:** Add the external tag for the packet which match the class map after this command is configured.
- **Example:** Add an external VLAN Tag with VID of 2 for the packet which satisfy c1 class rule.
 - Switch(config)#policy-map p1
 - Switch(Config-PolicyMap-p1)#class c1
 - Switch(Config-PolicyMap-p1-Class-c1)#add s-vid 2

3.2 delete

- This command is not supported by switch.

3.3 match

- **Command:** `match {access-group <acl-index-or-name> | ip dscp <dscp-list>| ip precedence <ip-precedence-list>| ipv6 access-group <acl-index-or-name>| ipv6 dscp <dscp-list> | ipv6 flowlabel <flowlabel-list> | vlan <vlan-list> | cos <cos-list>}`
- **no match {access-group | ip dscp | ip precedence | ipv6 access-group | ipv6 dscp | ipv6 flowlabel | vlan | cos}**
- **Function:** Configure the match standard of the class map; the no command deletes the specified match standard.
- **Parameter:** `access-group <acl-index-or-name>` match the specified IP ACL or MAC ACL, the parameters are the number or name of ACL
- `ip dscp <dscp-list>` and `ipv6 dscp <dscp-list>` match the specified DSCP value, the parameter is a list of DSCP consisting of maximum 8 DSCP values, the ranging is 0 to 63
- `ip precedence <ip-precedence-list>` match the specified IP Precedence, the parameter is a IP Precedence list consisting of maximum 8 IP Precedence values with a valid range of 0 to 7
- `ipv6 access-group <acl-index-or-name>` match the specified IPv6 ACL, the parameter is the number or name of IPv6 ACL

- **ipv6 flowlabel <flowlabel-list>** match the specified IPv6 flow label, the parameter is IPv6 flow label value, the ranging is 0 to 1048575
- **vlan <vlan-list>** match the specified VLAN ID, the parameter is a VLAN ID list consisting of maximum 8 VLAN IDs, the ranging is 1 to 4094
- **<cost-list> match** the specified CoS value, the parameter is a CoS list consisting of maximum 8 CoS values, the ranging is 0 to 7
- **Default:** There is no match standard.
- **Command Mode:** Class-map Mode
- **Usage Guide:** Only one match standard can be configured in a class map. When configuring the ACL match, permit rule is the match option, it will apply Policy Map action. Deny rule is the excluding option, it does not apply Policy Map action. If it has been configured other match rule, the operation is failure, but configuring the same match rule will cover the previous.
- **Example:** Create a class-map named c1, and configure the class rule of the class-map to match packets with IP Precedence of 0.
- Switch(config)#class-map c1
- Switch(config-classmap-c1)#match ip precedence 0
- Switch(config-classmap-c1)#exit

3.4 service-policy

- **Command:** **service-policy <policy-map-name> in**
 - **no service-policy <policy-map-name> in**
- **Function:** Bind the specified policy of flexible QinQ to the ingress of the port, the no command cancels the binding.
- **Parameters:** **service-policy <policy-map-name>:** The specified policy-map name of flexible QinQ.
- **Default:** No policy map is bound to port.
- **Command mode:** Port Mode.
- **Usage Guide:** Only one policy map can be bound to each port, the function takes effect after the policy map is bound to a port.
- **Example:** Apply policy-map p1 to Ethernet port 1/0/1 for flexible QinQ.
- Switch(Config-If-Ethernet1/0/1)#service-policy p1 in

3.5 set

- **Command:** **set s-vid <new-vid>**
- **no set s-vid**
- **Function:** Assign the new cos and vid value to the packets which match the class map, no command cancels the operation.
- **Parameters:** **s-vid <new-vid>** specifies VID of an external VLAN Tag
- **Default:** Do not assign the value.

- **Command Mode:** Policy class-map configuration mode
- **Usage Guide:** Only assign the new value again for the classified flow that correspond the match standard.
- **Example:** Set an external VLAN Tag! VID as 3 for the packet which satisfy c2 class rule.
- Switch(config)#policy-map p1
- Switch(Config-PolicyMap-p1)#class c2
- Switch(Config-PolicyMap-p1-Class-c2)#set s-vid 3
- Switch(Config-PolicyMap-p1-Class-c2)#exit

Chapter 4 COMMANDS FOR EGRESS QoS

4.1 mls qos egress green remark

- **Command:** [no] mls qos egress green remark
- **Function:** Set Egress QoS remarking to take effect for green packets, no command does not take effect to green packets.
- **Parameter:** None.
- **Default:** Do not modify green packets.
- **Command Mode:** Global Mode
- **Usage Guide:** QoS attribute of green packets will be modified by remark table after enable the global configuration.
- **Example:** Egress remarking takes effect for green packets.
- Switch(config)#mls qos egress green remark

4.2 mls qos map

- **Command:** mls qos map cos-cos <color> <cos1...cos8>
 - mls qos map cos-dscp <color> <dscp1...dscp8>
 - mls qos map dscp-cos <color> <dscp list> to <cos>
- mls qos map dscp-dscp <color> <dscp list> to <dscp>
- no mls qos map (cos-cos | cos-dscp | dscp-cos | dscp-dscp) <color>
- **Function:** Set mapping between Egress QoS remark tables, no command restores the default configuration.
- **Parameters:** cos-cos: Set mapping from cos to cos for Egress remark cos table
 - cos-dscp: Set mapping from cos to dscp for Egress remark cos table
 - dscp-cos: Set mapping from dscp to cos for Egress remark dscp table
 - dscp-dscp: Set mapping from dscp to dscp for Egress remark dscp table
 - <color>: Packet's colors, including green、yellow、red
 - <cos>: cos value, its range from 0 to 7
 - <dscp>: dscp value, its range from 0 to 63
 - <dscp list>: 1 to 8 dscp values
- **Default:** default mapping:
- COS-TO-COS-GREEN map:
- COS: 0 1 2 3 4 5 6 7
- -----
- COS: 0 1 2 3 4 5 6 7
- COS-TO-COS-YELLOW map:
- COS: 0 1 2 3 4 5 6 7
- -----

- COS: 0 1 2 3 4 5 6 7

- COS-TO-COS-RED map:
- COS: 0 1 2 3 4 5 6 7
- -----
- COS: 0 1 2 3 4 5 6 7

- COS-TO-DSCP-GREEN map:
- COS: 0 1 2 3 4 5 6 7
- -----
- DSCP: 0 8 16 24 32 40 48 56

- COS-TO-DSCP-YELLOW map:
- COS: 0 1 2 3 4 5 6 7
- -----
- DSCP: 0 8 16 24 32 40 48 56

- COS-TO-DSCP-RED map:
- COS: 0 1 2 3 4 5 6 7
- -----
- DSCP: 0 8 16 24 32 40 48 56

- DSCP-TO-COS-GREEN map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 0 0 0 0 0 0 0 0 1 1
- 1: 1 1 1 1 1 1 2 2 2 2
- 2: 2 2 2 2 3 3 3 3 3 3
- 3: 3 3 4 4 4 4 4 4 4 4
- 4: 5 5 5 5 5 5 5 5 6 6
- 5: 6 6 6 6 6 6 7 7 7 7
- 6: 7 7 7 7

- DSCP-TO-COS-YELLOW map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 0 0 0 0 0 0 0 0 1 1
- 1: 1 1 1 1 1 1 2 2 2 2
- 2: 2 2 2 2 3 3 3 3 3 3
- 3: 3 3 4 4 4 4 4 4 4 4
- 4: 5 5 5 5 5 5 5 5 6 6

- 5: 6 6 6 6 6 6 7 7 7 7
- 6: 7 7 7 7

- DSCP-TO-COS-RED map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 0 0 0 0 0 0 0 1 1
- 1: 1 1 1 1 1 1 2 2 2 2
- 2: 2 2 2 2 3 3 3 3 3 3
- 3: 3 3 4 4 4 4 4 4 4 4
- 4: 5 5 5 5 5 5 5 5 6 6
- 5: 6 6 6 6 6 6 7 7 7 7
- 6: 7 7 7 7

- DSCP-TO-DSCP-GREEN map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 10 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49
- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63

- DSCP-TO-DSCP-YELLOW map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 9 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49
- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63

- DSCP-TO-DSCP-RED map:
- d1 : d2 0 1 2 3 4 5 6 7 8 9
- 0: 0 1 2 3 4 5 6 7 8 9
- 1: 10 11 12 13 14 15 16 17 18 19
- 2: 20 21 22 23 24 25 26 27 28 29
- 3: 30 31 32 33 34 35 36 37 38 39
- 4: 40 41 42 43 44 45 46 47 48 49

- 5: 50 51 52 53 54 55 56 57 58 59
- 6: 60 61 62 63
- **Command Mode:** Global Mode
- **Usage Guide:** Egress remark mapping table is a global table, it is used to distinguish QoS attributes for modifying packets with different colors.
- **Example:** Set yellow packet's dscp of 0 to 3.
- Switch(config)#mls qos map dscp-dscp yellow 0 to 3

4.3 service-policy output

- **Command:** [no] service-policy input <policy-map-name>
- **Function:** Applies a policy map to the egress of the port; no command deletes the specified policy map applied to the port.
- **Parameters:** output <policy-map-name> applies the specified policy map to the egress of the port.
- **Default:** No policy map is bound to port.
- **Command mode:** Port Mode.
- **Usage Guide:** Only a policy map can be applied to each direction of each port. Policy may not be bound to the port if it uses the rule or action which is not supported by EFP.
- **Example:** Bind policy-map p1 to egress Ethernet 1/0/1.
- Switch(config)#interface ethernet 1/0/1
- Switch(Config-If-Ethernet1/0/1)#service-policy output p1

4.4 service-policy output vlan

- **Command:** [no] service-policy output <policy-map-name> vlan <vlan-list>
- **Function:** Applies a policy map to the VLAN interface; no command deletes the specified policy map applied to the VLAN interface.
- **Parameters:** output <policy-map-name> applies the specified policy map to the egress of VLAN interface.
- **Default:** No policy map is bound to VLAN interface.
- **Command mode:** Global Mode.
- **Usage Guide:** Only a policy map can be applied to each direction of each VLAN. Policy may not be bound if it uses the rule or action which is not supported by EFP.
- **Example:** Bind policy p1 to egress vlan1.
- Switch(config)#service-policy output p1 vlan 1

4.5 set

- **Command:** set {ip dscp <new-dscp> | ip precedence <new-precedence> | cos <new-cos> | c-vid <new-c-vid> | s-vid <new-s-vid> | s-tpid <new-s-tpid>}
 - no set {ip dscp | ip precedence | cos | c-vid | s-vid | s-tpid}

- **Function:** Assign a new DSCP, IP Precedence for the classified traffic; no command deletes the new value.
- **Parameter:** `ip dscp <new-dscp>` new DSCP value of IPv4 and IPv6 packets.
 - `ip precedence <new-precedence>` new IPv4 Precedence, only one can be selected for IPv4 Precedence and IP DSCP.
 - `cos <new cos>` new CoS value.
 - `c-vid <new-c-vid>` new c-vid value.
 - `s-vid <new-s-vid>` new s-vid value.
 - `s-tpid <new-s-tpid>` new s-tpid value.
- **Default:** Do not assign a new value.
- **Command Mode:** Policy Class-map Mode
- **Usage Guide:** Only the classified traffic matching the standard will be assigned the new values.
- **Example:** Set IP Precedence of the packets which satisfy c1 class rule as 3.
- Switch(config)#policy-map p1
- Switch(Config-PolicyMap-p1)#class c1
- Switch(Config-PolicyMap-p1-Class-c1)#set ip precedence 3
- Switch(Config-PolicyMap-p1-Class-c1)#exit
- Switch(Config-PolicyMap-p1)#exit

4.6 show mls qos egress green remark

- **Command:** `show mls qos egress green remark`
- **Function:** Show whether Egress remarking mapping takes effect for green packets.
- **Parameter:** None.
- **Default:** None.
- **Command Mode:** Admin and configuration mode
- **Usage Guide:** When show mapping relation between Egress remarking table and green packets, it will show whether map green.
- **Example:** Show whether Egress remarking mapping takes effect for green packets.
- Switch(config)#show mls qos egress green remark
- Green remarking: Disable.

4.7 show mls qos maps

- **Command:** `show mls qos maps (cos-cos | cos-dscp | dscp-cos | dscp-dscp) <color>`
- **Function:** Show Egress remarking mapping.
- **Parameters:** cos-cos: Set mapping from cos to cos for Egress remark cos table
 - cos-dscp: Set mapping from cos to dscp for Egress remark cos table
 - dscp-cos: Set mapping from dscp to cos for Egress remark dscp table
 - dscp-dscp: Set mapping from dscp to dscp for Egress remark dscp table
 - <color>: Packet's colors, including green、yellow、red

- **Default:** None.
- **Command Mode:** Admin and configuration mode
- **Usage Guide:** Show mapping of Egress remarking table.
- **Example:** Show mapping between cos-cos table and green packets.
- Switch(config)#show mls qos maps cos-cos green
- COS-TO-COS-GREEN map:
- COS: 0 1 2 3 4 5 6 7
- -----
- COS: 0 1 2 3 4 5 6 7

- Green remarking: Disable.