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# **QoS Function Command**

200812



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We hope to hear from you!

# CONTENTS

<b>Release Notes</b>	<b>5</b>
<b>Chapter 1 QoS Configuration</b>	<b>1</b>
<b>1.1 QoS Introduction</b>	<b>1</b>
1.1.1 Introduction	1
1.1.2 Classification	3
1.1.3 Policy and Marking	5
1.1.4 Bit-Rate Limitation and Reshaping	6
1.1.5 Mapping Table	6
1.1.6 Queueing and Scheduling	7
1.1.7 QoS Default Configuration	7
<b>1.2 QoS Enable and Disable</b>	<b>9</b>
1.2.1 QoS Start and Stop Default Configuration	9
1.2.2 QoS Start and Close Default Configuration	9
1.2.3 Monitoring and Maintenance	9
1.2.4 Configuration Examples	9
<b>1.3 Classification Function Configuration</b>	<b>10</b>
1.3.1 Classification Default Configuration	10
1.3.2 Flow Classification Configuration Based on Port TRUST Status	10
1.3.3 Configuring Flow Classification on ACL/class-map	15
1.3.4 Monitoring and Maintenance	18
1.3.5 Typical Configuration Examples	20
<b>1.4 Policy and Marking Function Configuration</b>	<b>21</b>
1.4.1 Policy and Marking Default Configuration	21
1.4.2 Policy and Marking Configuration	21
1.4.3 Monitoring and Maintenance	28
1.4.4 Specific Configuration Examples	30
<b>1.5 Bit-Rate Limitation and Reshaping Function Configuration</b>	<b>31</b>
1.5.1 Bit-Rate Limitation and Reshaping Default Configuration	31
1.5.2 Configuration Based on Bit-Rate and Reshaping of Data Flow	31
1.5.3 Monitoring and Maintenance	32
1.5.4 Specific Configuration Examples	33
<b>1.6 Map Function Configuration</b>	<b>34</b>
1.6.1 Map Default Configuration	34
1.6.2 CoS-DSCP map List Configuration	35
1.6.3 IP-Precedence-DSCP Map List Configuration	36
1.6.4 DSCP-CoS Map List Configuration	38
1.6.5 DSCP-MUTATION Map List Configuration	39
1.6.6 CoS-queue Map List Configuration	43
1.6.7 Set Ports Based on smac、dmac、vlan's Frame Priority and Priority Override Function	45
1.6.8 Monitoring and Maintenance	46
1.6.9 Specific Configuration Examples	49
<b>1.7 Queue and Adjust Function Mode</b>	<b>49</b>
1.7.1 Queue and Adjust Default Configuration	49
1.7.2 SP Configuration	49
1.7.3 WRR Configuration	49
1.7.4 SP+WRR Configuration	49
1.7.5 Monitoring and Maintenance	50
1.7.6 Specific Configuration Examples	51
<b>1.8 QoS Trouble Shoot</b>	<b>51</b>
<b>1.9 QoS Command Reference</b>	<b>52</b>

# Release Notes

Date of Release	Manual Version	Software Version	Revisions

# Preface

## About This Manual

This manual introduces primary functions of the configuration management software for RC series products.

## Who Should Read This Manual

This manual is a valuable reference for sales and marketing staff, after service staff and telecommunication network designers. For those who want to have an overview of the features, applications, structure and specifications of ... device, this is also a recommended document.

## Relevant Manuals

《Raisecom NView System User Manual》

《Raisecom Nview System Installation and Deployment Manual》

《... User Manual》

《... Commands Notebook》

## Organization

This manual is an introduction of the main functions of ... EMS. To have a quick grasp of the using of the EMS of ... , please read this manual carefully. The manual is composed of the following chapters

### Chapter 1 Overview

This chapter briefly introduces the basic function of ...

### Chapter 2 Configuration Management

This chapter mainly introduces the central site configuration management function of the ....

### Chapter 3 Performance Management

This chapter focuses on performance management function of ....

### Chapter 4 Device Maintenance Management

This chapter introduces the device maintenance management function of ....

### Appendix A Alarm Type

The alarm types supported by ....

## Compliance

The RC series products developed by Raisecom are strictly complied with the following standards as well as ITU-T, IEEE, IETF and related standards from other international telecommunication standard organizations:

YD/T900-1997 SDH Equipment Technical Requirements - Clock

YD/T973-1998 SDH 155Mb/s and 622Mb/s Technical conditions of optical transmitter module and receiver module

YD/T1017-1999 Network node interface for the Synchronous Digital Hierarchy (SDH)

YD/T1022-1999 Requirement of synchronous digital hierarchy (SDH) equipment function

YD/T1078-2000 SDH Transmission Network Technique Requirements-Interworking of Network Protection Architectures

YD/T1111.1-2001 Technical Requirements of SDH Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Receiver Modules

YD/T1111.2- 2001 Technical Requirements of SHD Optical Transmitter/Optical Receiver Modules——2.488320 Gb/s Optical Transmitter Modules

YD/T1179- 2002 Technical Specification of Ethernet over SDH

G.703 Physical/electrical characteristics of hierarchical digital interfaces

G.704 Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels

G.707 Network node interface for the synchronous digital hierarchy (SDH)

G.774 Synchronous digital hierarchy (SDH) - Management information model for the network element view

G.781 Synchronization layer functions

G.783 Characteristics of synchronous digital hierarchy (SDH) equipment functional blocks

G.784 Synchronous digital hierarchy (SDH) management

G.803 Architecture of transport networks based on the synchronous digital hierarchy (SDH)

G.813 Timing characteristics of SDH equipment slave clocks (SEC)

G.823 The control of jitter and wander within digital networks which are based on the 2048 kbit/s hierarchy

G.825 The control of jitter and wander within digital networks which are based on the synchronous digital hierarchy (SDH)

G.826 End-to-end error performance parameters and objectives for international, constant bit-rate digital paths and connections

G.828 Error performance parameters and objectives for international, constant bit-rate synchronous digital paths

G.829 Error performance events for SDH multiplex and regenerator sections

G.831 Management capabilities of transport networks based on the synchronous digital hierarchy (SDH)

G.841 Types and characteristics of SDH network protection architectures

G.842 Interworking of SDH network protection architectures

G.957 Optical interfaces for equipments and systems relating to the synchronous digital hierarchy

G.691 Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers

G.664 Optical safety procedures and requirements for optical transport systems

I.731 ATM Types and general characteristics of ATM equipment

I.732 ATM Functional characteristics of ATM equipment

IEEE 802.1Q Virtual Local Area Networks (LANs)

IEEE 802.1p Traffic Class Expediting and Dynamic Multicast Filtering

IEEE 802.3 CSMA/CD Access Method and Physical Layer Instruction



## Chapter 1 QoS Configuration

### 1.1 QoS Introduction

#### 1.1.1 Introduction

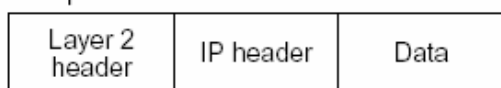
Generally speaking, Internet (Ipv4 standard) provides users only “best effort” service, cannot guarantee a real-time and complete packets transmission, and the quality of services either. Since user always has different requirements for the transmission quality of separate multi-media applications, network resources should be redistributed and scheduled according to user’s demands. By using network quality of service, user is able to process specific data traffic with higher priority, or applies particular management schedule strategy to make the network more predictable and the bandwidth management more effective.

##### 1. QoS Basis

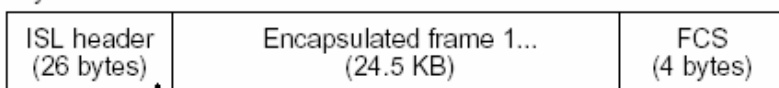
ISCOM2800 mechanism realizes layer-2 packets classification based on 802.1P and 802.1Q standards. 802.1Q defines VLAN, though QoS is not defined in this standard, the given mechanism which mention than the frame precedence can be modified configures a strong groundwork to realize QoS. 802.1P standard defines priority mechanism. If packets with high priority have not been transmitted, packets with low priority will not be transmitted.

In Layer-2 802.1Q frame header, there are 2 bytes of TAG control information string, the first 3 bits carry CoS (Class of Service) value, the values is from 0 to 7, shown in the figure below:

Encapsulated Packet

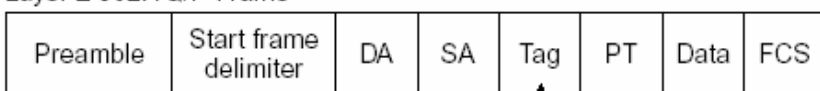


Layer 2 ISL Frame



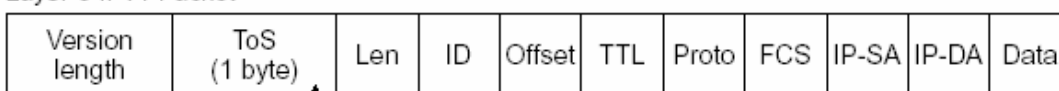
↑ 3 bits used for CoS

Layer 2 802.1Q/P Frame



↑ 3 bits used for CoS (user priority)

Layer 3 IPv4 Packet



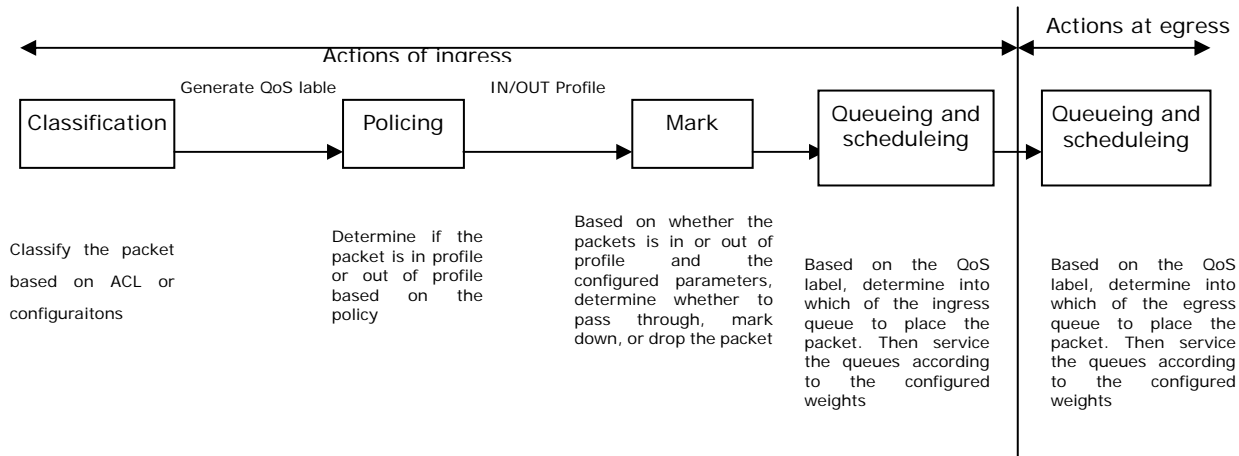
↑ IP precedence or DSCP

The 8 priority defined by CoS can be considered as the following 8 kinds of packets:

Priority	Message type	Application
000	Routine	Level 0 corresponds to the default of the best efforts of the information delivery
001	Priority	Level 1 ~ 4 are corresponds for the definition of multi-media data or important enterprise data.
010	Intermediate	
011	Flash	
100	Flash Override	
101	Critical	Level 5 or 6 is used in the sensitive-delay inter-act video/audio data
110	Internet Control	
111	Network Control	Level 7 is applied for the important high-level network data stream, such as routing information

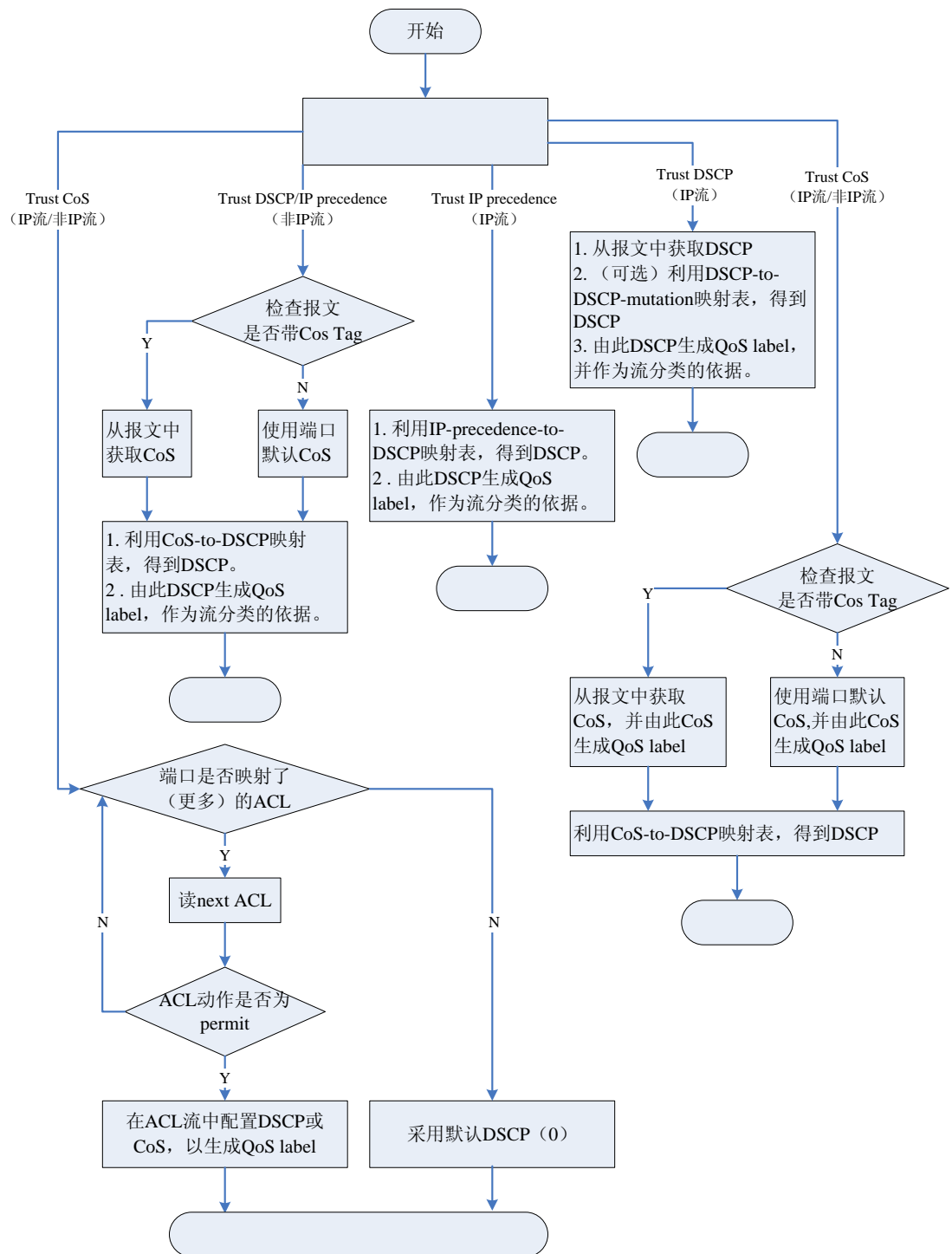
## 2. QoS basic mode

- ✓ Actions at ingress ports include traffic classification, policing and marking:
  - Classifying: to classify the traffic. This process generates a inner DSCP to identify the data's QoS characteristics.
  - Policing: Comparing inner DSCP and configured policies to determine whether the packet goes into the policy profile or out. Policy limits the occupied bandwidth. The results will be sent to marker.
  - Marking: Evaluates the policy and configuration information for the action to be taken when a packet is out of profile and determines what to do with the packet (pass through a packet without modification, mark down the QoS label in the packet, or drop the packet).
- ✓ Actions at the egress port include queueing and scheduling:
  - Queueing: evaluates the QoS packet label and the corresponding DSCP before selecting which queues to use. The DSCP value is mapped to an inner CoS value for the seletion of an output queue.
  - Scheduling: based on configured WRR (Weighted round robin) and threshold to provide service for output queue.
- ✓ The figure below shows the QoS basic model:



### 1.1.2 Classification

Classification is the process of distinguishing one kind of traffic from another by examining the fields in the packet. Classification works only when the global QoS function is enabled. QoS is disabled by default. You specify which fields in the frame or packet that you want to use to classify incoming traffic.



Description:

- ✓ For none-IP traffic, the classification procedure is as follows:
- Use port default value: if the data frame does not have CoS value, assign the incoming frame with the port default Cos value, and then use CoS-to-DSCP map to generate inner DSCP value.
- TRUST the CoS value of input frame (configure the port as TRUST COS): use configurable CoS-to-DSCP mapping table to generate inner DSCP value. For none-IP traffic, whether to configure it as DSCP TRUST and IP precedence TRUST is meaningless, system will use port default CoS value.
- Based on configured Layer-2 MAC ACL classification, check the source MAC, destination MAC and Ethernet field. If there is no configured ACL, assign the default DSCP value as 0. Otherwise, assign DSCP value to the incoming frame based on policy mapping table.

- ✓ For IP traffic:
  - TRUST IP DSCP value of incoming packets (configure the port as TRUST DSCP): use DSCP of IP packets as the inner DSCP value. You can use DSCP-to-DSCP mapping table to modify the DSCP value if the port is edge port of two QoS domains.
  - TRUST IP precedence of incoming packet (configure the port as TRUST IP precedence): use IP-precedence-to-DSCP mapping table to generate DSCP value.
  - TRUST CoS value of incoming packets: use CoS-to-DSCP mapping table to generate DSCP value.
  - Based on configured IP ACL for classification, check every field in IP packet header. If no ACL is configured, assign the default DSCP value as 0 to the packet. Otherwise, to assign DSCP value to the packet according to policy map.

As described in the diagram, not only we can classify the traffic by different traffic configuration port “TRUST”, and the message CoS, DSCP, IP-precedence; but also we can classify the traffic more flexible by the ACL function, class-map.

---

⚠ **Attention:**

- The use of two classification ways are mutually exclusive and later configuration will take effects.
- 

Class-map mechanism describe data flow classification on ACL:

1. Classification based on QoS ACL:

- 1) If a matched permit ACL (the first one) is found, related QoS actions will be activated.
- 2) If a matched deny ACL is found, ignore this one, and go on to the next one.
- 3) If all ACLs are checked but no matched permit ACL, packet will not be processed.
- 4) When matching multiple ACLs, implement QoS processing as the first permit ACL is found.
- 5) After defining an ACL classification, user can bond it to a policy. Policies include class classification (such as aggregation) or rate limiting, bond the policy to a port before taking effects.

2. Classification based on class-map:

A class map is a mechanism that you use to isolate and name a specific traffic flow (or class) from all other traffic. The class map defines the criteria used to match against a specific traffic flow to further classify it:

- ✓ by ACL match
- ✓ by DCSP, IP priority match.

### 1.1.3 Policy and Marking

1. Policy map

Each policy may have a lot of class-maps, to identify those flow movements.

## 2. Policy action

In each policy, different actions identify different flow movements. So far, there are 6 actions:

- ✓ TRUST: the TRUST status of flow as TRUST CoS, DSCP and ToS;
- ✓ set: modify the data packets of flow into new value include CoS, DSCP, ToS;
- ✓ policy: limit the speed of streams and modify them, also notice what actions are going to use if the flow is over speed limit.
- ✓ Set VLAN: VLAN coverage.
- ✓ Re-direct to port: redirect message.
- ✓ Copy-to-mirror: flow image.

## 3. Policy Application

A policy mapping is needed to binding on the IN/OUT port to be effective.

### 1.1.4 Bit-Rate Limitation and Reshaping

QoS uses policy for speed limiting and reshaping, also modify the DSCP data packet or byte losing.

#### 1. Three types of policy:

single-policy: each rule of class-map is using this policy individually.

class-policy: all rules of each class-map are sharing this policy.

aggregate-policy: all class-map of one policy-map are sharing this policy.

If the flow bit rate is out profile, each policy will have two actions: either drop or marked down DSCP value.

#### 2. Policy uses token bucket algorithm

When the switch receives a frame, a token will be added on the bucket. According to the indicated average bit rate, each token is added on the bucket after the switch checked the available space on the bucket. If not, the packet will be marked as nonconforming, then follow the policy actions(drop or modify). Moreover, burst will cause the actions as well.

### 1.1.5 Mapping Table

During QoS processing, switch describes the inner DSCP precedence for all traffics:

1. During the classification procedure, QoS use configured map table (CoS-to-DSCP、IP-precedence-to-DSCP), based on the CoS or IP precedence value in the incoming packet to

obtain an inner DSCP value; To configure DSCP TRUST status on port, if the DSCP values are different in the two QoS domains, use can use DSCP-to-DSCP-mutation map to modify DSCP value.

2. During the policing procedure, QoS can assign new DSCP values to IP or non-ip packets (if the packet is out of profile and the policy has indicated mark down action), this map is called policed-DSCP mapping.
3. Before traffics go into the scheduling, QoS use DSCP-to-CoS map to obtain CoS value according to inner DSCP value, and then use CoS-to-egress-queue map to select the egress queueing.

#### Attention:

- If the map table of DSCP-to-DSCP-mutation and policed-DSCP is empty, the default will be the DSCP value of incoming packet;
- DSCP-to-DSCP-mutation mapping table is applied for the port, other mapping tables are applied for the switch.

### 1.1.6 Queueing and Scheduling

Queueing and scheduling will be carried out for packets processing after policing and marking. ISCOM switch realizes two kinds of processing according to different classified packets:

1. Regenerate packet COS value according to the defined rules while maintaining the packet's native COS value
2. The policy is effective only when the rules are configured as relying on TOS value, that is to say: modify the packet's native COS value according to TOS value.

ISCOM series switches support 4 kinds of priority output queues, the priority values are 0-3. The highest priority is level 3; the switch also supports 3 kinds of queue scheduling policies: strict priority scheduling, control forward weight scheduling and control forward delay scheduling.

ISCOM series switches also support the processing of untagged Layer-2 frame. Every port has default priority which is COS value. When the port receives an untagged packet, the switch will consider the port default priority as the packet's COS value for queue dispatching and scheduling. After the packet goes out of the switch, it will Renew to the original format.

### 1.1.7 QoS Default Configuration

	Attribute	Default configuration
1	QoS enable	Disable

2	Global QoS Trust Status	UNTRUST
3	Port QoS Trust Status	UNTRUST
4	Port Default CoS	0
5	Port Default DSCP	0
6	Port Default CoS override	Disable
7	Port Default DSCP override	Disable
8	class-map match type	match-all
9	Policy Trust Status	DSCP
1	Queue scheduling policy	Strict priority secheduling SP
0		

CoS-DSCP default map:

CoS	0	1	2	3	4	5	6	7
DSCP	0	8	16	24	32	40	48	56

IP-Precedence-DSCP default map:

ToS	0	1	2	3	4	5	6	7
DSCP	0	8	1 6	2 4	3 2	4 0	4 8	5 6

DSCP-CoS default map:

DSCP	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
CoS	0	1	2	3	4	5	6	7

DSCP-to-DSCP-Mutation default map (default-dscp) :

DSCP	0	1	2	3	4	5	6	7
0	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23
2	24	25	26	27	28	29	30	31
3	32	33	34	35	36	37	38	39



5	40	41	42	43	44	45	46	47
6	48	49	50	51	52	53	54	55
7	56	57	58	59	60	61	62	63

Inner CoS to queue map:

Inner CoS value	0	1	2	3	4	5	6	7
Queue ID	1	1	2	2	3	3	4	4

## 1.2 QoS Enable and Disable

### 1.2.1 QoS Start and Stop Default Configuration

	Attributes	Default configuration
1	QoS start	Disable

### 1.2.2 QoS Start and Close Default Configuration

Under the default situation, QoS is disabled. Use the command below to enable QoS function under global configuration mode.

Step	Command	Description
1	<b>config</b>	Enter global configuration mode
2	<b>mls qos</b>	Enable QoS
3	<b>Exit</b>	Back to privileged EXEC mode
4	<b>show mls qos</b>	Show QoS configuration status

In order to diable QoS, implement command **no mls qos**.

Before enabling QoS, some functions are still effective, such as port default CoS, port default DSCP, queue scheduling mode, CoS to queue map and so on. Users are suggersted to disable the flow control function before enabling QoS.

### 1.2.3 Monitoring and Maintenance

	Command	Description
1	show mls qos	Show QoS switch status

### 1.2.4 Configuration Examples

Open QoS function:

```
Raisecom#config
```

```
Raisecom(config)#mls qos
```

```
Raisecom#show mls qos
```

Show as below:

QoS is enabled.

## 1.3 Classification Function Configuration

### 1.3.1 Classification Default Configuration

Function	Default Value
Global QoS TRUST status	UNTRUST
Port QoS TRUST status	UNTRUST
Port default CoS	0
Port default DSCP	0
Port default CoS override	Disable
Port default DSCP override	Disable
Class-mapbmatch type	match-all

### 1.3.2 Flow Classification Configuration Based on Port TRUST Status

#### Attention:

- Port TRUST status and ACL/Class-map flow classification are mutually exclusive, and later configuration will take effects.
- Global and port QoS TRUST status configurations are used for different devices. So far, it is not capable for those two configurations in one equipment.
- QoS TRUST status configuration and TRUST policy status configuration are mutually exclusive, and later configuration will take effects.

#### 1.3.2.1 Configuring Global QoS TRUST status

Configure QoS TRUST status for all ports. Reverse command: **no mls qos TRUST**.

Steps	Command	Description
-------	---------	-------------

<b>Step 1</b>	<b>Config</b>	Entry to global configuration mode
<b>Step 2</b>	<b>mls qos TRUST [cos   dscp   ip-precedence]</b>	<p>All QoS TRUST status ports configuration</p> <p>Cos: configuration the switch as TRUST CoS status</p> <p>Dscp: configuration the switch as TRUST DSCP status</p> <p>ip-precedence: configuration the switch as TRUST IP priority status.</p>
<b>Step 3</b>	<b>Exit</b>	Return to privileges mode
<b>Step 4</b>	<b>show mls qos port</b>	Show QoS port configuration

Configuration example:

```
Raisecom#config
```

```
Raisecom(config)#mls qos TRUST cos //configure port TRUST status
```

```
Raisecom(config)#exit
```

```
Raisecom# show mls qos port
```

Show results as:

```
TRUST state: TRUST CoS
```

```
Port Id          Default CoS
```

```
-----
```

```
1                0
```

```
2                0
```

```
.....
```

### 1.3.2.1 Configuring QoS port TRUST status

configure QoS port TRUST status. In default situation, the switch TRUST status is UNTRUST.  
Reverse Command is: **no mls qos TRUST**.

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry to global configuration mode

<b>Step 2</b>	<b>interface port <i>portid</i></b>	Entry to port configuration mode
<b>Step 3</b>	<b>mls qos TRUST [cos   dscp]</b>	Set QoS TRUST mode  Cos: set port as TRUST CoS status  Dscp:set port as TRUST DSCP status
<b>Step 4</b>	<b>Exit</b>	Return to global configuration mode
<b>Step 5</b>	<b>Exit</b>	Return privileges mode
<b>Step 6</b>	<b>Show mls qos port <i>portid</i></b>	Show QoS port configuration

### 1.3.2.3 Configuring CoS port default

Only if the port TRUST status is CoS, configuring default CoS takes effects. When the message is untag, CoS default port as CoS value. In default situation, that value will be 0. Reverse command: **no mls qos default-cos**. It can be set under port mode.

Steps	Command	Description
<b>Step 1</b>	<b>Config</b>	Entry to global configuration mode
<b>Step 2</b>	<b>interface port <i>portid</i></b>	Entry to port configuration mode
<b>Step 3</b>	<b>mls qos default-cos <i>cos-value</i></b>	Set default CoS value  CoS-value: set default port CoS value 0-7
<b>Step 4</b>	<b>Exit</b>	Return to global configuration mode
<b>Step 5</b>	<b>Exit</b>	Return to privileges mode
<b>Step 6</b>	<b>Show mls qos port <i>portid</i></b>	Show QoS port configuration

Configuration example: in Port 1, configure TRUST status as CoS, and when the incoming message is as untag, the CoS value will be 2.

```
Raisecom#config
Raisecom(config)#inter port 1
Raisecom(config-port)#mls qos TRUST cos //configure port TRUST status
Raisecom(config-port)# mls qos default-cos 2           //configure CoS port default
Raisecom(config-port)#exit
Raisecom(config)#exit
Raisecom# show mls qos port 1
```

Show results as:

```
Raisecom#sh mls qos port 1
```

Port 1:

TRUST state: TRUST CoS

Default CoS: 2

Default DSCP: 0

DSCP override: Disable

DSCP mutation map: default-dscp

#### 1.3.2.4 Configuring default port DSCP

Only if the port TRUST status is DSCP, the default configuration DSCP takes effect. When the incoming message of DSCP is 0, default port DSCP is used as DSCP value. In default situation, that value is 0. reverse command is: `no mls qos default-dscp`. It can be set up in port mode:

Steps	Command	description
<b>Step 1</b>	<b>Config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>Interface port</b> <i>portid</i>	Entry into port configuration mode
<b>Step 3</b>	<b>mls qos default-dscp</b> <i>dscp-value</i>	Set default DSCP value  dscp-value: est default port DSCP value as 0-63
<b>Step 4</b>	<b>Exit</b>	Return to global configuration mode
<b>Step 5</b>	<b>Exit</b>	Return to privilege mode
<b>Step 6</b>	<b>show mls qos port</b> <i>portid</i>	Show QoS port configuration mode

The configuration is similar to CoS port default configuration.

#### 1.3.2.5 Configuring port CoS override (Support equipment is not available)

Only if the port TRUST status is CoS, port CoS override configuration takes effect. Whether incoming message is untag or tag, CoS override value is used as CoS value. In Default situation, there will be no override. Reverse command: **no mls qos default-cos override**. It can be set up in port mode:

Steps	Command	Description
-------	---------	-------------

Step 1	<b>Config</b>	Entry into global configuration mode
Step 2	<b>Interface port</b> <i>portid</i>	Entry into port configuration mode
Step 3	<b>mls qos default-cos override</b>	Set CoS override value
Step 4	<b>Exit</b>	Return to global configuration mode
Step 5	<b>Exit</b>	Return to privilege mode
Step 6	<b>show mls qos port</b> <i>portid</i>	Show QoS port configuration

#### 1.3.2.6 Configuring port DSCP override

Only if port TRUST status is DSCP, that configuration takes effect. Whatever the incoming message DSCP is, DSCP override value is used as DSCP value. In default situation, there will be no override. Reverse command: **no mls qos default-dscp override**. It can be set in port mode:

Steps	Command	Description
Step 1	<b>Config</b>	Entry into global configuration mode
Step 2	<b>interface port</b> <i>portid</i>	Entry into port configuration mode
Step 3	<b>mls qos default-dscp override</b>	Set default DSCP value
Step 4	<b>Exit</b>	Entry into global configuration mode
Step 5	<b>exit</b>	Return to privilege mode
Step 6	<b>show mls qos port</b> <i>portid</i>	Show QoS port configuration

Configuration example: set TRUST status as DSCP in port 1 and port DSCP override value as 2.

```
Raisecom#config
```

```
Raisecom(config)#inter port 1
```

```
Raisecom(config-port)#mls qos TRUST dscp //set port TRUST status
```

```
Raisecom(config-port)# mls qos default-dscp 2
```

```
Raisecom(config-port)# mls qos default-dscp override //set port DSCP override value as 2
```

```
Raisecom(config-port)#exit
```

```
Raisecom(config)#exit
```

```
Raisecom# show mls qos port 1
```

Show results:

```
Raisecom#sh mls qos port 1
```

Port 1:

**TRUST state: TRUST DSCP**

Default CoS: 0

**Default DSCP: 2**

**DSCP override: Enable**

DSCP mutation map: default-dscp

### 1.3.3 Configuring Flow Classification on ACL/class-map

#### 1.3.3.1 Create delete class-map

Class-map is used to isolate the specific data stream, matching conditions include ACL, IP priority and DSCP, VLAN and class.

Creating **class-map** follows the steps below:

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>Class-map</b> <i>class-map-name</i> [match-all   match-any ]	Create name as aaa, class-map and entry into config-cmap mode.  <i>class-map-name</i> : class-map name, Max 16 characters  match-all: satisfy all rules in class match-any: satisfy only one rule in class
<b>Step 3</b>	<b>description</b> <i>WORD</i>	Description of information  <i>WORD</i> : description of information in class map, max 255 characters.
<b>Step 4</b>	<b>exit</b>	Return to global configuration mode
<b>Step 5</b>	<b>exit</b>	Return to privilege mode
<b>Step 6</b>	<b>show class-map</b> [ <i>WORD</i> ]	Show CLASS MAP  <i>WORD</i> : class-map name, max 16 characters

class-map has two matching types: match-all runs AND operation, as multi match statements and operation. If there is conflict, then the match states fail; match-any is run or operation and default is match-all.

Configuration examples:

```

Raisecom#config
Raisecom(config)# class-map aaa match-all
Raisecom(config-cmap)# description this-is-test-class
Raisecom(config-cmap)#exit
Raisecom(config)#exit
Raisecom#show class-map

```

Show results as:

```

Class Map match-all aaa (id 0)
    Description:this-is-test-class
    Match none

```

If **class-map** is needed to delete, run **no**, as **no class-map class-map-name**.

#### Attention:

- If class-map is quoted by policy in the port, then it is not able to be deleted.
- When matching configuration of class-map is match-all, the configuration may fail because the matching message may have conflicts.
- When a ACL is matched, ACL must be identified and its type must be permit.
- When a class-map is matched, sub class-map must be match-all type.

### 1.3.3.2 Configuring match statements

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>class-map class-map-name</b>	Entry into config-cmap mode  <i>class-map-name</i> : class-map name, max 16 characters
<b>Step 3</b>	<b>match { ip-access-list   mac-access-list   access-list-map } acl-index</b>	Match ACL  ip-access-list: match IP access list  mac-access-list: match MAC access list  access-list-map: match access control list map table  acl-index: access control list index
<b>Step 4</b>	<b>match ip dscp {0-63}</b>	Match DSCP value



Step 5	<b>match ip precedence {0-7}</b>	Match ToS value
Step 6	<b>match vlan {1-4094}</b>	Match VLAN
Step 7	<b>match class-map WORD</b>	Match class map WORD: match class-map name, max16 characters
Step 8	<b>exit</b>	Return to global configuration mode
Step 9	<b>exit</b>	Return to privilege mode
Step 10	<b>show class-map [WORD]</b>	Show CLASS MAP WORD: class-map name, max 16 characters

#### Attention:

- When access control list is matched, ACL must be created first.
- When class map is matched, class-map must be created first.
- If the match type of class-map is match-all, the configuration may fail because there be conflicts in matched messages.
- If the same class-map has been applied for some port, then it is not allowed to modify the match statement.

To delete some match statement:

Steps	Command	Description
Step 1	<b>config</b>	Entry into global configuration mode
Step 2	<b>class-map class-map-name</b>	Entry into config-cmap mode <i>class-map-name</i> : class-map name, max 16 characters
Step 3	<b>no match { ip-access-list   mac-access-list   access-list-map } acl-index</b>	Match ACL ip-access-list: match IP access list mac-access-list: match MAC access list access-list-map: match access control list map ta ble acl-index: access control list index
Step 4	<b>no match ip dscp {0-63}</b>	Match DSCP value
Step 5	<b>no match ip precedence {0-7}</b>	Match ToS value

Step 6	<b>no match vlan {1-4094}</b>	Match VLAN
Step 7	<b>no match class-map WORD</b>	Match class map WORD: Match class-map name, max 16 characters
Step 8	<b>exit</b>	Return to global configuration mode
Step 9	<b>exit</b>	Return to privilege mode
Step 10	<b>show class-map [WORD]</b>	Show CLASS MAP message WORD: class-map name, max 16 characters

#### **attention:**

- If the class-map has already been applied for some other port, it is not allowed to delete the match statement.

### 1.3.4 Monitoring and Maintenance

Command	Description
<b>show mls qos port [portlist]</b>	Show QoS port information Portlist: port number list
<b>show class-map [WORD]</b>	Show CLASS MAP information WORD: class-map name, max 16 characters

#### 1. Show QoS port information

#### **attention:**

- Show different information according to the supports of different equipments. There are the examples for supports of all configurations as show below.

Raisecom#show mls qos port 1

port 1:

Attached policy-map: aaa

TRUST state: not TRUSTed

default COS: 2

default DSCP: 3

DSCP override: disable

DSCP Mutation Map: aaa

If all port information is needed to check:

Raisecom#show mls qos port

port 1:

Attached policy-map: aaa

TRUST state: not TRUSTed

default COS: 2

default DSCP: 3

DSCP override: disable

DSCP Mutation Map: aaa

port 2:

Attached policy-map: aaa

TRUST state: not TRUSTed

default COS: 2

default DSCP: 3

DSCP override: disable

DSCP Mutation Map: aaa

.....

port 26:

TRUST state: not TRUSTed

default COS: 0

default DSCP: 0

DSCP override: disable

DSCP Mutation Map: default-dscp

## 2. Show QoS class-map information

Raisecom#show class-map

Class Map match-all aaa (id 0)

Match ip-access-list 1

```
Match ip dscp 2
Match class-map bbb
Match vlan 1
```

```
Class Map match-all bbb (id 1)
Match ip-access-list 2
```

If it is needed to show the specific name of class-map, use commands as below:

```
Raisecom#show class-map aaa
Class Map match-all aaa (id 0)
Match ip-access-list 1
Match ip dscp 2
Match class-map bbb
Match vlan 1
```

### 1.3.5 Typical Configuration Examples

Configuration examples: classify the flow and satisfy the flow in aaa condition: in VLAN1, DSCP is 2 and the messages are from 10.0.0.2 and 10.0.0.3.

```
Raisecom#config
Raisecom(config)# ip-access-list 1 permit ip 10.0.0.2 255.255.255.0 any
Raisecom(config)# ip-access-list 2 permit ip any 10.0.0.3 255.255.255.0
```

```
Raisecom(config)# class-map bbb match-all
Raisecom(config-cmap)#match ip-access-list 2
```

```
Raisecom(config)# class-map aaa match-all
Raisecom(config-cmap)#match ip-access-list 1
Raisecom(config-cmap)#match ip dscp 2
Raisecom(config-cmap)#match vlan 1
Raisecom(config-cmap)#match class-map bbb
Raisecom(config-cmap)# exit
Raisecom(config)#exit
Raisecom#show class aaa
```

Show results as:

```
Raisecom#show class aaa
```

```
Class Map match-all aaa (id 0)
```

```
Match ip-access-list 1
```

```
Match ip dscp 2
```

```
Match class-map bbb
```

```
Match vlan 1
```

## 1.4 Policy and Marking Function Configuration

### 1.4.1 Policy and Marking Default Configuration

Function	Default value
Policy TRUST status	DSCP

### 1.4.2 Policy and Marking Configuration

#### 1.4.2.1 Create delete policy-map

Use **policy-map** command to encapsulate and classify the data flow of class-map. Create **policy-map** as the steps below:

Steps	Command	Description
<b>Step 1</b>	<b>Config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>policy-map</b> <i>policy-map-name</i>	Create name as bbb, policy-map and entry into config-pmap mode.  policy-map-name: policy map name, max 16 characters
<b>Step 3</b>	<b>description</b> <i>WORD</i>	Description information  <b>WORD</b> : policy map description information, max 255 characters
<b>Step 4</b>	<b>Exit</b>	Return to global configuration mode
<b>Step 5</b>	<b>Exit</b>	Return to privilege mode
<b>Step 6</b>	<b>show policy-map</b> [ <i>WORD</i> ]	Show POLICY MAP information  <b>WORD</b> : policy map name, max 16

characters

Configuration examples:

```
Raisecom#config
```

```
Raisecom(config)# policy-map bbb
```

```
Raisecom(config)# exit
```

To check whether the configuration is right, use show command:

```
Raisecom#show policy-map
```

```
Policy Map bbb
```

```
Description: this-is-test-policy
```

If it is needed to delete a **policy-map**, use **command no, no policy-map *policy-map-name***.

#### Attention:

- If a policy-map is applied for other ports, then it is not able to be delete.

#### 1.4.2.2 Define policy map

To define one or more defined class-map as a policy, following steps below are used:

Steps	Command	Descriptions
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>policy-map</b> <i>policy-map-name</i>	Entry into config-pmap mode  <i>policy-map-name</i> : policy map name, max 16 characters
<b>Step 3</b>	<b>class-map</b> <i>class-map-name</i>	Encapsulate cuclass-map aaa into policy aaa, and entry into config-pmap-c mode  <i>class-map-name</i> : class-map name, max 16 characters
<b>Step 4</b>	<b>exit</b>	Return to config-pmap mode
<b>Step 5</b>	<b>exit</b>	Return to global configuration mode
<b>Step 6</b>	<b>exit</b>	Return to privilege mode
<b>Step 7</b>	<b>show policy-map</b> [WORD]	Display POLICY MAP information

		WORD : policy map name, max 16 characters
Step 8	<b>show policy-map class {WORD}</b>	Display POLICY MAP some classification information  <b>WORD:</b> class-map name, max 16 characters

One class can be applied for many policy.

Configuration examples:

Raisecom#config

Raisecom(config)# **policy-map aaa**

Raisecom(config-pmap)# **class-map aaa**

Raisecom(config-pmap-c)#exit

Raisecom(config-pmap)#exit

Raisecom(config)# **exit**

To check whether the configuration is right, use show command:

Raisecom#show policy-map

Policy Map aaa

Class aaa

To delete class-map from a policy:

Steps	Command	Description
Step 1	<b>config</b>	Entry into global configuration mode
Step 2	<b>policy-map</b> <i>policy-map-name</i>	Entry into config-pmap mode  <i>policy-map-name:</i> policy map name, max 16 characters
Step 3	<b>no class-map</b> <i>class-map-name</i>	Delete class-map from policy  <i>class-map-name:</i> class-map name, max 16 characters
Step 4	<b>exit</b>	Return privilege mode
Step 5	<b>show policy-map [WORD]</b>	Display POLICY MAP information

WORD : policy map name, max 16 characters

### Attention:

- It is not allowed to delete class-map if the policy-map has been applied for some other port.

#### 1.4.2.3 Define policy action

Different actions are used for different data flow in policy, show as below:

Steps	Command	Description
Step 1	<b>config</b>	Entry into global configuration mode
Step 2	<b>policy-map</b> <i>policy-name</i>	Entry into config-pmap mode  <i>policy-name</i> : policy map name, max 16 characters
Step 3	<b>Class-map</b> <i>class-name</i>	Encapsulate class-map into policy, and entry into config-pmap-c mode  <i>class-name</i> : class-map name, max 16 characters
Step 4	<b>police</b> <i>policer-name</i>	Use policer for the policy data flow for bit-rate limiting and reshaping, check the link for more information:  <a href="#">限速and 整形功能configuration</a>  <i>policer-name</i> : policer name, max 16 characters
Step 5	<b>TRUST</b> [ <b>cos</b>   <b>dscp</b>   <b>ip-precedence</b> ]	Policy TRUST status, default use DSCP  Cos: set switch TRUST CoS status  Dscp: set switch TRUST DSCP status  ip-precedence: set switch TRUST IP priority
Step 6	<b>set</b> { <b>ip dscp</b> <i>new-dscp</i>   <b>ip precedence</b> <i>new-precedence</i>   <b>cos</b> <i>new-cos</i> }	Set new value for data flow  <i>new-dscp</i> : DSCP value, 0-63;  <i>new-precedence</i> : IP priority value, 0-7



		new-cos: set CoS value, 0-7
Step 7	<b>set vlan &lt;1-4094&gt;</b>	Set VLAN override
Step 8	<b>redirect-to port <i>to-port</i></b>	Redirect the ports to-port: redirect the ports numbers
Step 9	<b>copy-to-mirror</b>	Data flow mirror image
Step 10	<b>exit</b>	Return to config-pmap mode
Step 11	<b>exit</b>	Return to global configuration mode
Step 12	<b>exit</b>	Return to privilege mode
Step 13	<b>show policy-map [WORD]</b>	Display POLICY MAP information WORD : policy map name, max 16 characters

#### Attention:

- So far, policy TRUST (TRUST command) functions are not supported
- Set command and policy TRUST command are mutually exclusive.
- In one class-map, set command can only be configured in one. Later configuration will take effect.

Configuration examples:

```
Raisecom#config
Raisecom(config)#policy-map aaa
Raisecom(config-pmap)#class-map aaa
Raisecom(config-pmap-c)#police aaa
Raisecom(config-pmap-c)#set cos 6
Raisecom(config-pmap-c)#set ip dscp 5
Raisecom(config-pmap-c)#set ip precedence 4
Raisecom(config-pmap-c)#set vlan 10
Raisecom(config-pmap-c)#redirect-to port 3
Raisecom(config-pmap-c)#exit
Raisecom(config-pmap)#exit
Raisecom(config)#exit
Raisecom# show policy-map aaa
```

Show as:

Policy Map aaa

Class aaa

police aaa

set ip precedence 4

set vlan 10

redirect-to port 3

To delete or modify data flow actions:

Steps	Command	Description
<b>Step 1</b>	<b>Config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>policy-map</b> <i>policy-name</i>	Entry into config-pmap mode  policy-name: policy map name, max 16 characters
<b>Step 3</b>	<b>class-map</b> <i>class-name</i>	Encapsulate class-map aaa into policy aaa, and entry into config-pmap-c mode  <i>class-name</i> : class-map name, max 16 characters
<b>Step 4</b>	<b>no police</b> <i>policer-name</i>	Apply policer in this policy data flow  policer-name: policer name, max 16 characters
<b>Step 5</b>	<b>no TRUST</b> [cos   dscp   ip-precedence]	Data flow TRUST status, default use DSCP  Cos: set switch as TRUST CoS status  Dscp: set switch as TRUST DSCP status  ip-precedence: set switch as TRUST IP priority status
<b>Step 6</b>	<b>no set</b> {ip dscp   ip precedence   cos }	Set new value for data flow  new-dscp : DSCP value, 0-63;  new-precedence: IP priority value, 0-7  new-cos: set CoS value, 0-7
<b>Step 7</b>	<b>no set vlan</b>	Set VLAN override

Step 8	<b>no redirect-to port</b>	Redirect to port
Step 9	<b>no copy-to-mirror</b>	Data flow mirror image
第 10 步	<b>exit</b>	Return to config-pmap mode
Step 11	<b>exit</b>	Return to global configuration mode
Step 12	<b>exit</b>	Return to privilege mode
Step 13	<b>show policy-map [WORD]</b>	Display POLICY MAP  WORD : policy map name, max 16 characters

#### Attention:

- It is not allowed to modify the action if its policy-map has been applied for other ports.

#### 1.4.2.4 Apply policy service-policy in ports

It actually does not take effect after all data flow and policy defined. They need to be applied for the ports. The steps for the apply policy are as below:

Steps	Command	Description
Step 1	<b>config</b>	Entry into global configuration mode
Step 2	<b>service-policy <i>policy-name</i> ingress <i>portid</i></b> <b>[egress <i>portlist</i> ]</b>	Apply policy on in/out port.  policy-name: policy map name, max 16 characters  portid: in port number  portlist: out port list
Step 3	<b>exit</b>	Return to privilege mode
Step 4	<b>show policy-map port [<i>portlist</i> ]</b>	Display port policy application information  Portlist: port number

#### Attention:

- QoS must start before applying policy; \
- When the configuring data flow becomes big, it may fail because it may get the biggest rule of capacity based on those 256 rules for 8 ports.
- The TRUST status are mutually exclusive if the TRUST status of the applied

---

front port is not UNTRUST status. After applied, the status will become UNTRUST status.

---

Application examples:

Raisecom#config

Raisecom(config)#service-policy aaa ingress 2 egress 1-5

Raisecom(config)#service-policy bbb egress 1

Raisecom(config)#exit

Raisecom#show policy-map port

Display as:

port 2 on ingress:

Policy Map aaa:

Egress:1-5

Class Map :aaa (match-all)

port 1 on egress:

Policy Map bbb:

### 1.4.3 Monitoring and Maintenance

Command	Description
<b>show policy-map [WORD]</b>	Display POLICY MAP information
	WORD : policy map name, max 16 characters
<b>show policy-map class {WORD}</b>	Display some classified information of POLICY MAP
	<b>WORD:</b> class-map name, max 16 characters
<b>show policy-map port [portlist ]</b>	Display port policy application information
	Portlist: port numbers

1. Display QoS policy-map information

Raisecom#show policy-map

Policy Map aaa

```
Class aaa
    police aaa
    set ip precedence 4
Class bbb
    police aaa
```

To display the specific name of policy-map information:

Raisecom#show policy-map aaa

```
Policy Map aaa
Class aaa
    police aaa
    set ip precedence 4
Class bbb
    police aaa
```

## 2. Display some classified information of POLICY MAP

If wanted to show specific policy-map name、indicated class-map name information:

Raisecom#show policy-map aaa class-map aaa

```
Policy Map aaa
Class aaa
    police aaa
    set ip precedence 4
```

## 3. Display QoS policy-map application information

If wanted to check which policy-map information applied on which ports:

Raisecom#show policy-map port 1

port 1:

```
Policy Map aaa:
Egerss:1-5
Class Map :aaa (match-all)
Class Map :bbb (match-all)
```

If wanted which policy-map information applied on all ports:

Raisecom#show policy-map port

port 1:

Policy Map aaa:

Egerss:1-5

Class Map :aaa (match-all)

Class Map :bbb (match-all)

#### 1.4.4 Specific Configuration Examples:

Raisecom#config

//Define ACL

Raisecom(config)# ip-access-list 1 permit ip 10.0.0.2 255.255.255.0 10.0.0.3 255.255.255.0

Raisecom(config)# ip-access-list 2 permit ip 10.0.0.3 255.255.255.0 10.0.0.2 255.255.255.0

//classify data flow

Raisecom(config)# class-map aaa match-all

Raisecom(config-cmap)#match ip-access-list 1

Raisecom(config-cmap)# exit

Raisecom(config)# class-map bbb match-all

Raisecom(config-cmap)#match ip-access-list 2

Raisecom(config-cmap)# exit

//bit-rate limitation and reshaping definition, details see: [限速and 整形功能configuration](#)

Raisecom(config)#mls qos class-policer p-aaa 4000 100 exceed-action drop

Raisecom(config)# mls qos class-policer p-bbb 8000 200 exceed-action drop

//define policy

Raisecom(config)#policy-map wnj

Raisecom(config-pmap)#class-map aaa //define data flow classification aaa in policy

Raisecom(config-pmap-c)# set ip dscp 5 //define policy action---set IP DSCP

Raisecom(config-pmap-c)#police p-aaa //define policy action——bit-rate limited reshaping

Raisecom(config-pmap-c)#exit

Raisecom(config-pmap)#class-map bbb //define data flow bbb in policy

Raisecom(config-pmap-c)# set ip dscp 6 //define policy action——set IP DSCP

```

Raisecom(config-pmap-c)#police p-bbb    //define policy action——bit-rate limited reshaping
Raisecom(config-pmap-c)#exit

Raisecom(config-pmap)#exit
Raisecom(config)#mls qos
Raisecom(config)#service-policy wmj ingress 1 egress 2    //apply policy in ports

```

## 1.5 Bit-Rate Limitation and Reshaping Function Configuration

### 1.5.1 Bit-Rate Limitation and Reshaping Default Configuration

None

### 1.5.2 Configuration Based on Bit-Rate and Reshaping of Data Flow

Create policer as following steps:

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>mls qos single-policer</b> <i>policer-name</i> <i>rate</i> <i>burst</i> <b>exceed-action</b> { <b>drop</b>   <b>policed-dscp-transmit</b> <i>marked-dscp</i> }	Create policer in type of single  policer-name: set policer name  rate: bit-rate value (Kbps), 8—2000000  burst: Burst value (KBps), 8—512000  drop: dropped packets once it is over bit-rate value  policed-dscp-transmi: modified DSCP value once it is over bit-rate value  marked-dscp: modified DSCP value once it is over bit-rate value
<b>Step 3</b>	<b>mls qos class-policer</b> <i>policer-name</i> <i>rate</i> <i>burst</i> <b>exceed-action</b> { <b>drop</b>   <b>policed-dscp-transmit</b> <i>marked-dscp</i> }	Create policer as type of class  policer-name: set policer name  rate: bit-rate value(Kbps), 8—2000000kbps  burst: burst value (KBps) , 8—512000  drop: dropped packets once it is over bit-rate value

		<p>policed-dscp-transmi: modify DSCP once it is over bit-rate value</p> <p>marked-dscp: modified DSCP value once over bit-rate value</p>
<b>Step 4</b>	<b>mls qos aggregate-policer</b> <i>policer-name rate burst exceed-action {drop   policed-dscp-transmit marked-dscp }</i>	<p>Create policer as type of aggregate</p> <p>policer-name: set policer name</p> <p>rate: bit-rate value(Kbps), 8—2000000kbps</p> <p>burst: burst value (KBps) , 8—512000</p> <p>drop: dropped packets once it is over bit-rate value</p> <p>policed-dscp-transmi: modify DSCP once it is over bit-rate value</p> <p>marked-dscp: modified DSCP value once over bit-rate value</p>
<b>Step 5</b>	<b>exit</b>	Return to global configuration mode
<b>Step 6</b>	<b>show mls qos policer</b> [ <b>single-policer   class-policer   aggregate-policer</b> ]	<p>Display policer information</p> <p>single-policer: display single policer</p> <p>class-policer: display class policer</p> <p>aggregate-policer: display aggregate policer</p>

To delete a policer, use command no, no {single-policer | class-policer | aggregate-policer } *placer-name*。

#### Attention:

- When delete a policer, it is not allowed to delete it if its policy is applied for other ports

### 1.5.3 Monitering and Maintenance

Command	Description
<b>show mls qos policer</b>	Display policer information
<b>[single-policer   class-policer  </b>	single-policer: Display single policer



**aggregate-policer ]**

class-policer: Display class policer

aggregate-policer: display aggregate policer

Raisecom#show mls qos policer

single-policer aaa 44 44 exceed-action policed-dscp-transmit 4

Used by policy map aaa

To show which port is using policer, use the commands below:

Raisecom#show mls qos port policers

Port id 1

policy map name: aaa

policer type: Single, name: aaa

rate: 44 kbps, burst: 44 kbyte, exceed action: policed-dscp-transmit, dscp:4

**1.5.4 Specific Configuration Examples**

Configuration examples:

Raisecom#config

Raisecom(config)# mls qos single-policer aaa 44 44 exceed-action policed-dscp-transmit 4

Raisecom(config)# exit

Raisecom#show mls qos policer

Display results as:

single-policer aaa 44 44 exceed-action policed-dscp-transmit 4

Not used by any policy map

If aaa is applied for a port:

Raisecom#show mls qos port policers

Port id 1

policy map name: aaa

policer type: Single, name: aaa

rate: 44 kbps, burst: 44 kbyte, exceed action: policed-dscp-transmit, dscp: 4

## 1.6 Map Function Configuration

### 1.6.1 Map Default Configuration

COS-DSCP default configuration relationship as:

CoS value	0	1	2	3	4	5	6	7
DSCP value	0	8	1 6	2 4	3 2	4 0	4 8	5 6

IP-Precedence-DSCP default map relation as:

ToS value	0	1	2	3	4	5	6	7
DSCP value	0	8	1 6	2 4	3 2	4 0	4 8	5 6

DSCP-COS default map relation as:

DSCP value	0 - 7	8 - 1 5	1 6 - 2 3	2 4 - 3 1	32 -3 9	4 0 - 4 7	4 8 - 5 5	5 6 - 6 3
CoS value	0	1	2	3	4	5	6	7

DSCP-to-DSCP-Mutation default map relation (default-dscp) as:

DSCP value	0	1	2	3	4	5	6	7
0	8	9	1 0	1 1	1 2	1 3	1 4	1 5
1	1 6	1 7	1 8	1 9	2 0	2 1	2 2	2 3
2	2 4	2 5	2 6	2 7	2 8	2 9	3 0	3 1
3	3 2	3 3	3 4	3 5	3 6	3 7	3 8	3 9

5	4 0	4 1	4 2	4 3	4 4	4 5	4 6	4 7
6	4 8	4 9	5 0	5 1	5 2	5 3	5 4	5 5
7	5 6	5 7	5 8	5 9	6 0	6 1	6 2	6 3

Internal COS – queuing default map relation as:

Internal CoS value	0	1	2	3	4	5	6	7
Queuing ID	1	1	2	2	3	3	4	4

### 1.6.2 CoS-DSCP map List Configuration

CoS-DSCP map list maps incoming packet COS value as a DSCP value. QoS is used to describe data flow priority. Its default map relation as:

CoS value	0	1	2	3	4	5	6	7
DSCP value	0	8	1 6	2 4	3 2	4 0	4 8	5 6

To modify the map relations, the following steps are set:

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>mls qos map cos-dscp dscp1 dscp2 dscp3 dscp4 dscp5 dscp6 dscp7 dscp8</b>	Set new map relation Dscp1-8: DSCP value
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps cos-dscp</b>	Show QoS COS-DSCP map list

Configuration examples:

Configuration **cos-dscp map as 2 3 4 5 6 7 8 9:**

Raisecom#config

```
Raisecom(config)# mls qos map cos-dscp 2 3 4 5 6 7 8 9
```

```
Raisecom(config)#exit
```

```
Raisecom# show mls qos maps cos-dscp
```

Show results as:

Cos-dscp map:

```
cos:    0    1    2    3    4    5    6    7
```

```
-----
```

```
dscp:   2    3    4    5    6    7    8    9
```

To backup COS-DSCP map list to default map relation, use command **no**.

Steps	Command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>no mls qos map cos-dscp</b>	Backup to default map relation
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps cos-dscp</b>	Display QoS COS-DSCP map list

```
Raisecom#show mls qos maps cos-dscp
```

Cos-dscp map:

```
cos:    0    1    2    3    4    5    6    7
```

```
-----
```

```
dscp:   0    8   16   24   32   40   48   56
```

### 1.6.3 IP-Precedence-DSCP Map List Configuration

IP-Precedence-DSCP map-list configuration maps incoming packet ToS into a DSCP value. QoS is used to describe the data flow priority. Its default map relation as show below:

ToS value	0	1	2	3	4	5	6	7
DSCP value	0	8	1 6	2 4	3 2	4 0	4 8	5 6

To modify that map relation, set as the following steps:

Steps	Command	Description
-------	---------	-------------

<b>Step 1</b>	<b>config</b>	Entry global configuration mode
<b>Step 2</b>	<b>mls qos map ip-prec-dscp</b> <i>dscp1 dscp2 dscp3</i> <i>dscp4 dscp5 dscp6 dscp7 dscp8</i>	Set new map relationship  Dscp1-8: DSCP value
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps ip-prec-dscp</b>	Display QoS IP-Precedence-DSCP map list

Configuration example:

Configure **ip-prec-dscp** map as **2 4 6 8 10 12 14 16**:

Raisecom#config

Raisecom(config)# **mls qos map ip-prec-dscp 2 4 6 8 10 12 14 16**

Raisecom(config)#exit

Raisecom# show mls qos maps ip-prec-dscp

show results as:

Ip Precedence-dscp map:

```

ipprec:   0   1   2   3   4   5   6   7
-----
dscp:     2   4   6   8  10  12  14  16

```

Backing up IP-Precedence-DSCP map list to default map relation, use command **no**.

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>no mls qos map ip-prec-dscp</b>	Backup to default map relation
<b>Step 3</b>	<b>Exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps ip-prec-dscp</b>	Show QoS IP-Precedence-DSCPmap list

Raisecom#show mls qos maps ip-prec-dscp

Ip Precedence-dscp map:

```

ipprec:   0   1   2   3   4   5   6   7
-----
dscp:     0   8  16  24  32  40  48  56

```

### 1.6.4 DSCP-CoS Map List Configuration

DSCP-CoSmap list maps the incoming packet DSCP value into a cos value. QoS use its description data flow priority. The default map relation is:

DSCP value	0-7	8-15	16-23	24-31	32-39	40-47	48-55	56-63
CoS value	0	1	2	3	4	5	6	7

To modify that map relation, follows the steps below:

Steps	Command	Description
<b>Step 1</b>	<b>Config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>mls qos map dscp-cos dscplist to cos</b>	set new map relation  Dscplist: DSCP list  Cos: cos value
<b>Step 3</b>	<b>Exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps dscp-cos</b>	Show QoS DSCP- CoSmap list

configuration examples:

configure **dscp-cos** map, mapping 1—10 into 7:

```
Raisecom#config
```

```
Raisecom(config)# mls qos map dscp-cos 1-10 to 7
```

```
Raisecom(config)#exit
```

```
Raisecom# show mls qos maps dscp-cos
```

show results as:

Dscp-cos map:

```
d1 : d2  0  1  2  3  4  5  6  7  8  9
-----
0:      0  7  7  7  7  7  7  7  7  7
1:      7  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
```

Renewing DSCP-CoSmap list to default mapping relation, use command **no**:

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>no mls qos map dscp-cos</b>	Back to the default mapping relation
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps dscp-cos</b>	showQoS DSCP-CoSmap list

Raisecom#show mls qos maps dscp-cos

Dscp-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

```

### 1.6.5 DSCP-MUTATION Map List Configuration

To get the IP data flow with QoS characters in two indepent QoS domain, the ports in the edge of those domains should be set as DSCP TRUST status. Then the receiving port receive the trust DSCP value to avoid QoS classification. If the DSCP values of those two domains are different, they can be converted through DSCP-to-DSCP converting map list.

DSCP-MUTATIONmap list maps the DSCPvalue into a new DSCP value. QoS uses its description data flow priority. There is a default map listdefault-DSCP in the system and this list could not be modified and deleted.

To modify that mapping relation, set the following steps:

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>mls qos map dscp-mutation <i>dscpname</i></b> <i>dscplist to dscp</i>	Create new DSCP mapping relation  Dscpname: DSCP mutation name

		Dscplist: output port DSCP
		Dscp: DSCP value
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps dscp-mutation</b>	showQoS DSCP-MUTATIONmap list

configuration examples:

Set **dscp-mutation** mapping, map 1—10, 20—30 into 30:

```
Raisecom#config
```

```
Raisecom(config)# mls qos map dscp-mutation aaa 1-10 to 30
```

```
Raisecom(config)# mls qos map dscp-mutation aaa 20-30 to 30
```

```
Raisecom(config)#exit
```

```
Raisecom# show mls qos maps dscp-mutation
```

show results as:

Dscp-dscp mutation map:

default-dscp:

```
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
```

Dscp-dscp mutation map:

aaa:

```
d1 : d2  0   1   2   3   4   5   6   7   8   9
-----
0 :      0   30  30  30  30  30  30  30  30  30
1 :      30  11  12  13  14  15  16  17  18  19
2 :      30  30  30  30  30  30  30  30  30  30
```



```

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

```

To delete DSCP-MUTATION map list, use command **no**.

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>no mls qos map dscp-mutation</b> <i>dscpname</i>	Delete DSCP mapping relation Dscpname: DSCP mutation name
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos maps dscp-mutation</b>	showQoS DSCP-CoSmap list

To apply the map list for DSCP-mutation, it could be used in port mode. Port default uses default-dscp mapping relation.

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>interface port</b> <i>portid</i>	Entry into port mode
<b>Step 3</b>	<b>mls qos dscp-mutation</b> <i>dscpname</i>	Apply DSCP mapping relation Dscpname: DSCP mutation name, max 16 characters
<b>Step 4</b>	<b>exit</b>	Return to configuraton mode
<b>Step 5</b>	<b>exit</b>	Return to privilege mode
<b>Step 6</b>	<b>show mls qos port</b> <i>portid</i>	Show QoS port configuration information

configuration examples:

```
Raisecom#config
```

```
Raisecom(config)#interface port 1
```

```
Raisecom(config-port)# mls qos dscp-mutation aaa
```

```
Raisecom(config-port)# exit
```

```
Raisecom(config)#exit
```

Raisecom#show mls qos port 1

To check whether the configuration is right, use command show:

Raisecom#show mls qos port 1

port 1:

TRUST state: not TRUSTed

default COS: 0

default DSCP: 0

DSCP override: disable

DSCP Mutation Map: aaa

### Attention:

In ISCOM2800 series, DSCP-MUTATION map list uses filter list to get hardware. In hardware, port 1-8 use same filter list (same as 9—16、17—24、port 25、port 26 are using one filter list individually, 5 filter list in total). thus, as any port in port 1-8 is using DSCP-MUTATION map list, the rest ports of port 1—8 are using DSCP-MUTATION map list as well.

To decline DSCP-MUTATION map list application in the port, use command **no**.

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>interface port <i>portid</i></b>	Entry into port mode
<b>Step 3</b>	<b>no mls qos dscp-mutation <i>dscpname</i></b>	Decline using DSCP map relation Dscpname: DSCP mutation name, max 16 characters
<b>Step 4</b>	<b>exit</b>	Return to configuration mode
<b>Step 5</b>	<b>exit</b>	Return to privilege mode
<b>Step 6</b>	<b>show mls qos port <i>portid</i></b>	showQoS port configuration information

To check whether the configuration is right, use command show:

Raisecom#show mls qos port 1

port 1:

TRUST state: not TRUSTed

default COS: 0

default DSCP: 0

DSCP override: disable

## DSCP Mutation Map: default-dscp

**⚠ Attention:**

- As
- When dscp-mutationmap list is used in some other port, its map list could not be deleted; only the map list is not used, it could be deleted.

**1.6.6 CoS-queue Map List Configuration**

CoS-queuemap list is sent to the output queue which is decided by the incoming packet CoS value.

QoS uses its description data flow priority, and its default map relation is:

Internal CoS value	0	1	2	3	4	5	6	7
Queue ID	1	1	2	2	3	3	4	4

To modify the map relation, set up with the following relation:

steps	command	description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>queue cos-map <i>queueid coslist</i></b>	set new map relation, packets CoS value in 1-4 are sent to Queue 1  Queueid: Queue number  Coslist: CoS value
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos queueing</b>	Show QoS queue map list

configuration examples:

```
Raisecom#config
```

```
Raisecom(config)# queue cos-map 1 1-4
```

```
Raisecom(config)#exit
```

```
Raisecom#show mls qos queueing
```

show results as:

the queue schedule mode: strict priority(SP)

Cos-queue map:

cos-queueid

0 - 1

1 - 1

2 - 1

3 - 1

4 - 1

5 - 3

6 - 4

7 - 4

To Renew CoS-queue map list to default map relation, use command **no**.

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	Entry into global configuration mode
<b>Step 2</b>	<b>no queue cos-map</b>	Renew default map relation
<b>Step 3</b>	<b>exit</b>	Return to privilege mode
<b>Step 4</b>	<b>show mls qos queueing</b>	Show QoS queueing map list

To check whether the configuration is correct, use command show:

Raisecom#show mls qos queueing

the queue schedule mode: strict priority(SP)

Cos-queue map:

cos-queueid

0 - 1

1 - 1

2 - 2

3 - 2

4 - 3

5 - 3

6 - 4

7 - 4

### 1.6.7 Set Ports Based on smac、dmac、vlan's Frame Priority and Priority Override Function

Ports can be based on smac、dmac、vlan entering switch's message frame priority and queue priority override。

Configuration steps as below:

steps	command	Description
<b>Step 1</b>	<b>config</b>	entry into global configuration mode
<b>Step 2</b>	<b>interface { port-list }</b> <i>&lt; 1-MAX_PORT_NUM &gt;</i>	Entry into Ethernet physic interface mode <i>1-MAX_PORT_NUM</i> equipement port numbers
<b>Step 3</b>	<b>mls qos {smac / dmac}</b> <i>{priority-set/cos-override}</i>	set up ports based onsmac、dmac's frame priority or queue priority override function  smac: source MAC  dmac: destination MAC  <i>cos-override</i> : frame priority  <i>priority-set</i> : queuepriority
<b>Step 4</b>	<b>mls qos {smac/dmac}</b> <i>priority-set cos-override</i>	set up ports based onsmac、dmac's frame priority and queue priority override function  smac: source MAC  dmac: destination MAC  <i>cos-override</i> : frame priority  <i>priority-set</i> : queue priority
<b>Step 5</b>	<b>mls qos vlan</b> <i>{priority-set/cos-override}</i>	set up ports based onvlan's frame priority or queue priority override function  <i>cos-override</i> : frame priority

		<i>priority-set</i> : queue priority
<b>Step</b>	<b>mls qos vlan <i>priority-set</i></b>	set up ports based on vlan's frame
<b>6</b>	<i>cos-override</i>	priority and queue priority override function
		<i>cos-override</i> : frame priority
		<i>priority-set</i> : queue priority
<b>Step</b>	<b>exit</b>	Exit
<b>7</b>		
<b>Step</b>	<b>show mls qos port-list</b>	Display QoS configuration
<b>8</b>	<i>{1- MAX_PORT_NUM }</i>	information
		<i>1-MAX_PORT_NUM</i> equipment port numbers

To use command no Renew all priority override based on smac、dmac、vlanto default configuration (even both of them are not override)。

### 1.6.8 Monitering and Maintenance

Command	Description
<b>show mls qos maps [cos-dscp   ip-prec-dscp   dscp-cos   dscp-mutation]</b>	Display all map list's configuration content.  cos-dscp : COS to DSCP map  ip-prec-dscp: Ip priority to DSCP map  dscp-cos: DSCP to CoS map  dscp-mutation: DSCP mutation map
<b>show mls qos queuing</b>	Display QoS queue map list
<b>show mls qos port-list {1- MAX_PORT_NUM }</b>	Display QoS configuration information  <i>1-MAX_PORT_NUM</i> equipment port numbers

#### 1. Map list information maps

Raisecom#show mls qos maps

Dscp-cos 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

```

## Cos-dscp map:

```

cos:    0    1    2    3    4    5    6    7
-----
dscp:   0    8   16   24   32   40   48   56

```

## Ip Precedence-dscp map:

```

ipprec:  0    1    2    3    4    5    6    7
-----
dscp:    0    8   16   24   32   40   48   56

```

## Dscp-dscp mutation map:

## default-dscp:

```

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

```

## Dscp-dscp mutation map:

## aaa:

```

d1 : d2  0    1    2    3    4    5    6    7    8    9
-----

```

```

0 :    0   1   2   3   4   5   6   7   8   9
1 :    30  30  30  30  30  30  30  30  30  30
2 :    30  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

```

## 2. Queue map list information queueing

Raisecom#show mls qos queueing

the queue schedule mode: bounded delay

wrr queue weights:

queueid-weights-delay

```

1   -   1   -   100
2   -   3   -   100
3   -   5   -   100
4   -   7   -   100

```

Cos-queue map:

cos-queueid

```

0   -   1
1   -   1
2   -   2
3   -   2
4   -   3
5   -   3
6   -   4
7   -   4

```

## 3. display QoS configuration information

Raisecom#show mls qos port-list 2

<i>port</i>	<i>smac-policy</i>	<i>dmac-policy</i>	<i>vlan-policy</i>
2	priority-set	--	--



### 1.6.9 Specific Configuration Examples

See the sections for details.

## 1.7 Queue and Adjust Function Mode

So far, the equipments support four queue adjust modes: strict priority (SP)、weighted priority (WRR)、BOUND-DELAY mode and SP+WRR's mixed mode。Default set is priority mode.

### 1.7.1 Queue and Adjust Default Configuration

Function	Default value
Queue adjust policy	Strict priority adjust SP

### 1.7.2 SP Configuration

Configuration steps as:

Steps	Command	Description
Step 1	<b>config</b>	entry into global configuration mode
Step 2	<b>queue strict-priority</b>	Configuration is strict priority
Step 3	<b>exit</b>	Return to privilege mode
Step 4	<b>show mls qos queuing</b>	display QoS queuing information

### 1.7.3 WRR Configuration

Configuration steps as:

Steps	Command	Description
Step 1	<b>config</b>	entry into global configuration mode
Step 2	<b>queue wrr-weight</b> <i>weight0 weight1 weight2 weight3</i>	Set ports' adjust mode as WRRmode Weight 0-3: set queue 0-3 weight value
Step 3	<b>exit</b>	Return to privilege mode
Step 4	<b>show mls qos queuing</b>	display QoS queuing information

### 1.7.4 SP+WRR Configuration

Configuration steps as:

Steps	Command	Description
<b>Step 1</b>	<b>config</b>	entry into global configuration mode
<b>Step 2</b>	<b>queue preempt-wrr</b> <i>weight1 weight2 weight3</i>	Set port adjust mode as PREEMP-WRR mode, like queue1 is strict priority, rest queues follow the weights  Weight 1-3: set queue1-3 weight value
<b>Step 3</b>	<b>queue preempt-wrr</b> <i>weight0 weight1</i>	Set ports adjust mode as PREEMP-WRR mode, like queue 0, 1 are strict priority, rest queue follow the weights
<b>Step 4</b>	<b>exit</b>	Return to privilege mode
<b>Step 5</b>	<b>show mls qos queuing</b>	display QoS queuing information

### 1.7.5 Monitoring and Maintenance

Command	Description
<b>show mls qos queuing</b>	Display QoS's queuemap list

#### 1. Queue map list information queueing

Raisecom#show mls qos queueing

the queue schedule mode: bounded delay

wrr queue weights:

queueid-weights-delay

1 - 1 - 100

2 - 3 - 100

3 - 5 - 100

4 - 7 - 100

Cos-queue map:

cos-queueid

0 - 1

1 - 1

2 - 2

3 - 2

```

4 - 3
5 - 3
6 - 4
7 - 4

```

### 1.7.6 Specific Configuration Examples

Configuration examples: set queue as WRR mode, weight as 1:2:4:8:

```
Raisecom#config
```

```
Raisecom(config)# queue wrr-weight 1 2 4 8
```

```
Raisecom(config)#exit
```

```
Raisecom#show mls qos queuing
```

Display results:

```
Raisecom#show mls qos queuing
```

the queue schedule mode: weighted round robin(WRR)

wrr queue weights:

Queue ID - Weights - Delay

```

1 - 1 - 0
2 - 2 - 0
3 - 4 - 0
4 - 8 - 0

```

## 1.8 QoS Trouble Shoot

1. Port TRUST status and policy configuration are mutually exclusive.
2. Data flow TRUST status and SET actions are mutually exclusive.
3. To delete class-map、policy-map、policer, it will be failed if they have been applied for the ports.
4. If class-map、policy-map have been applied for the ports, then modification for match statements and data flow actions (as set action) will fail.
5. Before apply data flow policy, QoS must be started first; data flow policy will be failed if QoS is stopped.
6. If class-map match type is matcha-all, the configuration may fail because there might be conflicts between matching information.
7. To match a ACL, ACL must be defined first and its type must be permit.
8. To match a class-map, sub class-map must be type of match-all.
9. As configuration data flow become more, it may be failed in applying because it is getting the

capacity biggest rule. (8 ports have 256 rules)

10. To start QoS policy, it is suggested to turn off data flow control function;

## 1.9 QoS Command Reference

Command	Description
<b>[no] mls qos</b>	Run and Stop QoS
<b>[no] mls qos trust [cos   dscp   ip-precedence]</b>	Set ports TRUST status
<b>mls qos default-cos</b> <i>default-cos</i>	Set QoS ports Default CoS value
<b>no mls qos default-cos</b>	Renew QoS ports Default CoS value
<b>mls qos map dscp-mutation</b> <i>dscp-name dcp-list to dscp</i>	Create DSCP-mutaion map list
<b>no mls qos map dscp-mutation</b> <i>dscp-name</i>	Delete DSCP-mutaion map list
<b>[no] mls qos dscp-mutation</b> <i>dscp-name</i>	Apply or decline DSCP-mutaion map application
<b>class-map</b> <i>class-map-name</i> <b>[match-any   match-all]</b>	Create class-map
<b>no class-map</b> <i>class-map-name</i>	Delete class-map
<b>[no] policy-map</b> <i>policy-map-name</i> <b>description</b> <i>WORD</i>	Create delete policy map Set policy map and class-map description information
<b>[no] class</b> <i>class-map-name</i>	apply class map on policy
<b>match { ip-access-list</b> <i>acl-index</i>   <b>mac-access-list</b> <i>acl-index</i>   <b>access-list-map</b> <i>acl-index</i>   <b>ip dscp</b> <i>dscp-list</i>   <b>ip precedence</b> <i>ip-precedence-list</i>   <b>class</b> <i>calss-name</i>   <b>vlan</b> <i>vlanlist</i> }	Set match statements
<b>no match { ip-access-list</b> <i>acl-index</i>   <b>mac-access-list</b> <i>acl-index</i>   <b>access-list-map</b> <i>acl-index</i>   <b>ip dscp</b>   <b>ip precedence</b>   <b>class</b> <i>calss-name</i>	Delete match statements

<b>vlan <i>vlanlist</i> }</b>	
<b>[no] trust [cos   dscp]</b>	Set data flow TRUST status
<b>set {ip dscp <i>new-dscp</i>   ip precedence <i>new-precedence</i>   cos <i>new-cos</i> }</b>	Set actions
<b>no set {ip dscp   ip precedence   cos }</b>	Delete set value
<b>mls qos {aggregate-policer  class-policer   single-policer } <i>policer-name rate burst</i> [ exceed-action { drop   policed-dscp-transmit <i>dscp</i> } ]</b>	Create policer
<b>no mls qos {aggregate-policer  class-policer   single-policer } <i>policer-name</i></b>	Delete policer
<b>[no] police <i>policer-name</i></b>	Apply policer
<b>service-policy <i>policy-map-name</i> ingress <i>portid</i> [ egress <i>portlist</i>]</b>	Apply policy
<b>no service-policy <i>policy-map-name</i> ingress <i>portid</i></b>	Decline apply policy
<b>mls qos map cos-dscp <i>dscp1 dscp2 dscp3 dscp4 dscp5 dscp6 dscp7 dscp8</i></b>	configuration CoS to DSCP map
<b>no mls qos map cos-dscp</b>	Renew CoS to DSCP map
<b>mls qos map ip-prec-dscp <i>dscp1 dscp2 dscp3 dscp4 dscp5 dscp6 dscp7 dscp8</i></b>	Configuration ToS to DSCP map
<b>no mls qos map ip-prec-dscp</b>	Renew ToS to DSCP map
<b>mls qos map dscp-cos <i>dscp-list to cos</i></b>	Configuration DSCP to switch internal priority map
<b>no mls qos map dscp-cos</b>	Renew DSCP to switch internal priority map
<b>queue cos-map <i>queue-id cos-list</i></b>	Configuration switch internal priority to queue map

<b>no queue cos-map</b>	Renew switch internal priority to queue map
<b>queue wrr-weight</b> <i>weight0 weight1 weight2 weight3</i>	Configuration switch queue adjust mode as WRR
<b>queue bounded-delay</b> <i>weight0 weight1 weight2 weight3 delaytime</i>	Set port adjust mode as BOUNDDELAY mode
<b>queue preempt-wrr</b> <i>weight1 weight2 weight3</i>	Set port adjust mode as PREEMP-WRR mode
<b>queue strict-priority</b>	Set port adjust mode as strict priority mode
<b>show mls qos</b>	Display QoS on/off status
<b>show mls qos policer</b> [ <i>policename</i>   <b>aggregate-policer</b>   <b>class-policer</b>   <b>single-policer</b> ]	Display policer information
<b>show mls qos maps</b> [ <b>cos-dscp</b>   <b>dscp-cos</b>   <b>dscp-mutation</b>   <b>ip-prec-dscp</b> ]	Display every map list configuration content
<b>show mls qos queueing</b>	Display in/out queue configuration information
<b>show mls qos port</b> <i>portid</i> [ <b>policers</b> ]	Display port strategy configuration, policer,etc information
<b>show class-map</b> [ <i>class-map-name</i> ]	Display class-map information
<b>show policy-map</b> [ <i>policy-map-name</i>   [ <b>port</b> <i>portId</i> ] [ <b>class</b> <i>class-name</i> ]	Display policy information

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