



Configuring QoS

CHAPTERS

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This guide applies to:

T1600G-52TS v3, T1600G-52PS v3, T2600G-28TS v3 or above, T2600G-52TS v3 or above, T2600G-28MPS v3 or above, T2600G-28SQ v1 or above.

To configure QoS for T1500G-10PS v2 or above, T1500G-8T v2 or above, T1500G-10MPS v2 or above, T1500-28PCT v3 or above, T1600G-18TS v2 or above, T1600G-28TS v3 or above, T1600G-28PS v3 or above, T1600G-52TS v4 or above, T1600G-52PS v4 or above, refer to [Configuring QoS_T1500&T1500G&T1600G](#).

1 QoS

1.1 Overview

With network scale expanding and applications developing, internet traffic is dramatically increased, thus resulting in network congestion, packet drops and long transmission delay. Typically, networks treat all traffic equally on FIFO (First In First Out) delivery basis, but nowadays many special applications like VoD, video conferences, VoIP, etc, require more bandwidth or shorter transmission delay to guarantee the performance.

With QoS (Quality of Service) technology, you can classify and prioritize network traffic to provide differentiated services to certain types of traffic.

1.2 Supported Features

You can configure the class of service, bandwidth control, Voice VLAN and Auto VoIP features on the switch to maximize the network performance and bandwidth utilization.

Class of Service

The switch classifies the ingress packets, maps the packets to different priority queues and then forwards the packets according to specified scheduler settings to implement QoS function.

- Priority Mode: Three modes are supported, Port Priority, 802.1p Priority and DSCP Priority.
- Scheduler Mode: Two scheduler type are supported, Strict and Weighted.

Bandwidth Control

Bandwidth Control functions to control the traffic rate and traffic threshold on each port to ensure network performance.

- Rate limit functions to limit the ingress/egress traffic rate on each port. In this way, the network bandwidth can be reasonably distributed and utilized.
- Storm Control function allows the switch to monitor broadcast packets, multicast packets and UL-frames (Unknown unicast frames) in the network. If the transmission

rate of the packets exceeds the set rate, the packets will be automatically discarded to avoid network broadcast storm.

Voice VLAN and Auto VoIP

The voice VLAN and Auto VoIP features are used to prioritize the transmission of voice traffic. Voice traffic is typically more time-sensitive than data traffic, and the voice quality can deteriorate a lot because of packet loss and delay. To ensure the high voice quality, you can configure Voice VLAN or Auto VoIP.

These two features can be enabled on the ports that transmit voice traffic only or transmit both voice traffic and data traffic. Voice VLAN can change the voice packets' 802.1p priority and transmit the packets in desired VLAN. Auto VoIP can inform the voice devices of send the packets with specific configuration by working with the LLDP-MED feature.

2 Class of Service Configuration

With class of service configurations, you can:

- Configure port priority
- Configure 802.1p priority
- Configure DSCP priority
- Specify the scheduler settings

Configuration Guidelines

- Select the priority mode that the ports trust according to your network requirements.
A port can use only one priority to classify the ingress packets. Three priority modes are supported on the switch: Port Priority, 802.1P Priority and DSCP Priority.
 - » Port Priority
In this mode, the switch prioritizes packets according to their ingress ports, regardless of the packet field or type.
 - » 802.1P Priority
802.1P defines the first three bits in 802.1Q Tag as PRI field. The PRI values are from 0 to 7. 802.1P priority determines the priority of packets based on the PRI value.
In this mode, the switch requires packets with VLAN tag, regardless of the IP header of the packets.
 - » DSCP Priority
DSCP priority determines the priority of packets based on the ToS (Type of Service) field in their IP header. RFC2474 re-defines the ToS field in the IP packet header as DS field. The first six bits (bit 0-bit 5) of the DS field is used to represent DSCP priority. The DSCP values are from 0 to 63.
In this mode, the switch requires IP packets.
- Specify the 802.1p to queue mapping according to your needs.
For 802.1p Priority, the packets will be forwarded according to the 802.1p to queue mapping directly.
For Port Priority and DSCP Priority, the port priority and DSCP priority will first be mapped to the 8021p priority, and then mapped to the queue according to the 802.1p to queue mapping.

2.1 Using the GUI

2.1.1 Configuring Port Priority

- Configuring the Trust Mode and Port to 802.1p Mapping

Choose the menu **QoS > Class of Service > Port Priority** to load the following page.

Figure 2-1 Configuring the Trust Mode and Port to 802.1p Mapping

Port Priority Config

UNIT1 LAGS

<input type="checkbox"/>	Port	802.1p Priority	Trust Mode	LAG
<input checked="" type="checkbox"/>	1/0/1	0	Untrusted	--
<input type="checkbox"/>	1/0/2	0	Untrusted	--
<input type="checkbox"/>	1/0/3	0	Untrusted	--
<input type="checkbox"/>	1/0/4	0	Untrusted	--
<input type="checkbox"/>	1/0/5	0	Untrusted	--
<input type="checkbox"/>	1/0/6	0	Untrusted	--
<input type="checkbox"/>	1/0/7	0	Untrusted	--
<input type="checkbox"/>	1/0/8	0	Untrusted	--
<input type="checkbox"/>	1/0/9	0	Untrusted	--
<input type="checkbox"/>	1/0/10	0	Untrusted	--

Total: 28 1 entry selected. Cancel Apply

Follow these steps to configure the parameters of the port priority:

- Select the desired ports, specify the 802.1p priority and set the trust mode as Untrusted.

802.1p Priority

Specify the port to 802.1p mapping for the desired port. The ingress packets from one port are first mapped to 802.1p priority based on the port to 802.1p mapping, then to TC queues based on the 802.1p to queue mapping. The untagged packets from one port will be added an 802.1p priority value according to the port to 802.1p priority mapping.

Trust Mode

Select the Trust mode as Untrusted. In this mode, the packets will be processed according to the port priority configuration.

- Click **Apply**.

- **Configuring the 802.1p to Queue Mapping**

Choose the menu **QoS > Class of Service > 802.1p Priority** to load the following page.

Figure 2-2 Configuring the 802.1p to Queue Mapping

802.1p to Queue Mapping

802.1p Priority	Queue
0:	<input type="text" value="TC-1"/>
1:	<input type="text" value="TC-0"/>
2:	<input type="text" value="TC-2"/>
3:	<input type="text" value="TC-3"/>
4:	<input type="text" value="TC-4"/>
5:	<input type="text" value="TC-5"/>
6:	<input type="text" value="TC-6"/>
7:	<input type="text" value="TC-7"/>

802.1p Remap

UNIT1

LAGS

	Port	0	1	2	3	4	5	6	7	LAG
<input type="checkbox"/>	1/0/1	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/2	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/3	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/4	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/5	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/6	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/7	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/8	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/9	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/10	0	1	2	3	4	5	6	7	--
Total: 28										

In the **802.1p to Queue Mapping** section, configure the mappings and click **Apply**.

802.1p Priority	Displays the number of 802.1p priority. In QoS, 802.1p priority is used to represent class of service.
Queue	Select the TC queue for the desired 802.1p priority. The packets with the desired 802.1p priority will be put in the corresponding queue.

2.1.2 Configuring 802.1p Priority

- Configuring the Trust Mode

Choose the menu **QoS > Class of Service > Port Priority** to load the following page.

Figure 2-3 Configuring the Trust Mode

Port Priority Config

UNIT1
LAGS

	Port	802.1p Priority	Trust Mode	LAG
<input checked="" type="checkbox"/>	1/0/1	0	Untrusted	--
<input type="checkbox"/>	1/0/2	0	Untrusted	--
<input type="checkbox"/>	1/0/3	0	Untrusted	--
<input type="checkbox"/>	1/0/4	0	Untrusted	--
<input type="checkbox"/>	1/0/5	0	Untrusted	--
<input type="checkbox"/>	1/0/6	0	Untrusted	--
<input type="checkbox"/>	1/0/7	0	Untrusted	--
<input type="checkbox"/>	1/0/8	0	Untrusted	--
<input type="checkbox"/>	1/0/9	0	Untrusted	--
<input type="checkbox"/>	1/0/10	0	Untrusted	--

Total: 28
1 entry selected.

Cancel
Apply

Follow these steps to configure the trust mode:

- 1) Select the desired ports and set the trust mode as Trust 802.1p.

Trust Mode

Select the Trust mode as Trust 802.1p. In this mode, the tagged packets will be processed according to the 802.1p priority configuration and the untagged packets will be processed according to the port priority configuration.

- 2) Click **Apply**.

- **Configuring the 802.1p to Queue Mapping and 802.1p Remap**

Choose the menu **QoS > Class of Service > 802.1p Priority** to load the following page.

Figure 2-4 Configuring the 802.1p to Queue Mapping and 802.1p Remap

802.1p to Queue Mapping

802.1p Priority	Queue
0:	<input type="text" value="TC-0"/>
1:	<input type="text" value="TC-1"/>
2:	<input type="text" value="TC-2"/>
3:	<input type="text" value="TC-3"/>
4:	<input type="text" value="TC-4"/>
5:	<input type="text" value="TC-5"/>
6:	<input type="text" value="TC-6"/>
7:	<input type="text" value="TC-7"/>

802.1p Remap

UNIT1

LAGS

<input type="checkbox"/>	Port	0	1	2	3	4	5	6	7	LAG
<input checked="" type="checkbox"/>	1/0/1	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/2	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/3	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/4	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/5	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/6	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/7	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/8	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/9	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/10	0	1	2	3	4	5	6	7	--

Total: 28
1 entry selected.

Follow these steps to configure the parameters of the 802.1p priority:

- 1) In the **802.1p to Queue Mapping** section, configure the mappings and click **Apply**.

802.1p Priority

Displays the number of 802.1p priority. In QoS, 802.1p priority is used to represent class of service. IEEE 802.1p standard defines three bits in 802.1Q tag as PRI field. The PRI values are called 802.1p priority and used to represent the priority of the layer 2 packets. This function requires packets with VLAN tags.

Queue

Select the TC queue for the desired 802.1p priority. The packets with the desired 802.1p priority will be put in the corresponding queue.

- 2) (Optional) In the **802.1p Remap** section, configure the 802.1p to 802.1p mappings and click **Apply**.

0 ~ 7

Select the number of 802.1p priority to which the desired 802.1p priority will be remapped. 802.1p Remap is used to modify the 802.1p priority of the ingress packets. When the switch detects the packets with desired 802.1p priority, it will modify the value of 802.1p priority according to the map.

2.1.3 Configuring DSCP Priority

■ Configuring the Trust Mode

Choose the menu **QoS > Class of Service > Port Priority** to load the following page.

Figure 2-5 Configuring the Trust Mode

Port Priority Config

UNIT1		LAGS		
<input type="checkbox"/>	Port	802.1p Priority	Trust Mode	LAG
<input checked="" type="checkbox"/>	1/0/1	0	Untrusted	--
<input type="checkbox"/>	1/0/2	0	Untrusted	--
<input type="checkbox"/>	1/0/3	0	Untrusted	--
<input type="checkbox"/>	1/0/4	0	Untrusted	--
<input type="checkbox"/>	1/0/5	0	Untrusted	--
<input type="checkbox"/>	1/0/6	0	Untrusted	--
<input type="checkbox"/>	1/0/7	0	Untrusted	--
<input type="checkbox"/>	1/0/8	0	Untrusted	--
<input type="checkbox"/>	1/0/9	0	Untrusted	--
<input type="checkbox"/>	1/0/10	0	Untrusted	--

Total: 28 1 entry selected.

Follow these steps to configure the trust mode:

- 1) Select the desired ports and set the trust mode as Trust DSCP.

Trust Mode

Select the Trust mode as Trust DSCP. In this mode, the IP packets will be processed according to the DSCP priority configuration and the non-IP packets will be processed according to the port priority configuration.

- 2) Click **Apply**.

■ **Configuring the 802.1p to Queue Mapping**

Choose the menu **QoS > Class of Service > 802.1p Priority** to load the following page.

Figure 2-6 Configuring the 802.1p to Queue Mapping

802.1p to Queue Mapping

802.1p Priority	Queue
0:	<input type="text" value="TC-1"/>
1:	<input type="text" value="TC-0"/>
2:	<input type="text" value="TC-2"/>
3:	<input type="text" value="TC-3"/>
4:	<input type="text" value="TC-4"/>
5:	<input type="text" value="TC-5"/>
6:	<input type="text" value="TC-6"/>
7:	<input type="text" value="TC-7"/>

802.1p Remap

UNIT1

LAGS

	Port	0	1	2	3	4	5	6	7	LAG
<input type="checkbox"/>	1/0/1	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/2	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/3	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/4	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/5	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/6	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/7	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/8	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/9	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/10	0	1	2	3	4	5	6	7	--
Total: 28										

In the **802.1p to Queue Mapping** section, configure the mappings and click **Apply**.

802.1p Priority	Displays the number of 802.1p priority. In QoS, 802.1p priority is used to represent class of service.
Queue	Select the TC queue for the desired 802.1p priority. The packets with the desired 802.1p priority will be put in the corresponding queue.

■ **Configuring the DSCP to 802.1p Mapping and the DSCP Remap**

Choose the menu **QoS > Class of Service > DSCP Priority** to load the following page.

Figure 2-7 Configuring the DSCP to 802.1p Mapping and the DSCP Remap

Port 1/0/1

<input type="checkbox"/>	DSCP Priority	802.1p Priority	DSCP Remap
<input checked="" type="checkbox"/>	0	0	0 be (000000)
<input type="checkbox"/>	1	0	1
<input type="checkbox"/>	2	0	2
<input type="checkbox"/>	3	0	3
<input type="checkbox"/>	4	0	4
<input type="checkbox"/>	5	0	5
<input type="checkbox"/>	6	0	6
<input type="checkbox"/>	7	0	7
<input type="checkbox"/>	8	1	8 cs1 (001000)
<input type="checkbox"/>	9	1	9

Total: 64 1 entry selected.

Follow these steps to configure the DSCP Priority:

- 1) Select the desired port, configure the DSCP to 802.1p mapping and the DSCP remap.

DSCP Priority	Displays the number of DSCP priority. DSCP Priority is used to classify the packets based on the value of DSCP, and map them to different queues. ToS (Type of Service) is a part of IP header, and DSCP uses the first six bits of ToS to represent the priority of IP packets. The DSCP values range from 0 to 63.
802.1p Priority	Specify the DSCP to 802.1p mapping for the desired port. The ingress packets are first mapped to 802.1p priority, then to TC queues according to the 802.1p to queue mappings. The untagged packets with the desired DSCP value will be added an 802.1p priority value according to the DSCP to 802.1p mapping.
DSCP Remap	(Optional) Select the DSCP priority to which the desired DSCP priority will be remapped for the port. When the switch detects the packets with desired DSCP value, it will modify the packets' DSCP value according to the map.

- 2) Click **Apply**.

 **Note:**

All the ports in the same LAG should be assigned with the same port priority.

2.1.4 Specifying the Scheduler Settings

Specify the scheduler settings to control the forwarding sequence of different TC queues when congestion occurs.

Choose the menu **QoS > Class of Service > Scheduler Settings** to load the following page.

Figure 2-8 Specifying the Scheduler Settings

Scheduler Config

UNIT1 LAGS

2

4

6

8

10

12

14

16

18

20

22

24

26

28

1

3

5

7

9

11

13

15

17

19

21

23

25

27

Selected

Selected

Unselected

Unselected

Not Available

Not Available

Port 1/0/1

<input type="checkbox"/>	Queue TC-id	Scheduler Type	Queue Weight	Minimum Bandwidth	Management Type
<input checked="" type="checkbox"/>	0	Weighted	1	0%	Taildrop
<input type="checkbox"/>	1	Weighted	1	0%	Taildrop
<input type="checkbox"/>	2	Weighted	1	0%	Taildrop
<input type="checkbox"/>	3	Weighted	1	0%	Taildrop
<input type="checkbox"/>	4	Weighted	1	0%	Taildrop
<input type="checkbox"/>	5	Weighted	1	0%	Taildrop
<input type="checkbox"/>	6	Weighted	1	0%	Taildrop
<input type="checkbox"/>	7	Weighted	1	0%	Taildrop
Total: 8			1 entry selected.		<input type="button" value="Cancel"/> <input style="background-color: #00a0e3; color: white;" type="button" value="Apply"/>

Follow these steps to configure the schedule mode:

- 1) In the **Scheduler Config** section, select the desired port.
- 2) Select the desired queue and configure the parameters.

Queue TC-id Displays the ID number of priority Queue.

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Scheduler Type	<p>Select the type of scheduling used for corresponding queue. When the network congestion occurs, the egress queue will determine the forwarding sequence of the packets according to the type.</p> <p>Strict: In this mode, the egress queue will use SP (Strict Priority) to process the traffic in different queues. When congestion occurs, the traffic will be transmitted according to its queue priority strictly. The queue with higher priority occupies the whole bandwidth. Packets in the queue with lower priority are sent only when the queue with higher priority is empty.</p> <p>Weighted: In this mode, the egress queue will use WRR (Weighted Round Robin) to process the traffic in different queues. When congestion occurs, all the traffic will be transmitted, but the bandwidth that each traffic queue occupies will be allocated based on the queue weight.</p>
Queue Weight	Specify the queue weight for the desired queue. This value can be set only in the Weighted mode. The valid values are from 1 to 127.
Minimum Bandwidth	Specify the minimum guaranteed bandwidth for the desired queue. The valid values are from 0 to 100 and 0 means Minimum Bandwidth is disabled. If the queue bandwidth calculated according to the weight is smaller than the minimum bandwidth, the switch will be forced to allocate the minimum bandwidth to the queue, and the other queue will share the rest bandwidth based on the weight.
Management Type	Displays the Management Type for the queues. The switch supports Taildrop mode. When the traffic exceeds the limit, the additional traffic will be dropped.

3) Click **Apply**.

Note:

With ACL Redirect feature, the switch maps all the packets that meet the configured ACL rules to the new TC queue, regardless of the mapping relations configured in this section.

2.2 Using CLI

2.2.1 Configuring Port Priority

- Configuring the Trust Mode and the port to 802.1p Mapping

Follow these steps to configure the trust mode and the port to 802.1p mapping:

Step 1	<p>configure</p> <p>Enter global configuration mode</p>
Step 2	<p>interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>}</p> <p>Enter interface configuration mode.</p>

Step 3	<p>qos trust mode {untrust dot1p dscp}</p> <p>Select the trust mode for the port. By default, it is untrust. Here we set the trust mode as untrust.</p> <p><i>untrust:</i> Specify the ports' trust mode as untrust. In this mode, the packets will be processed according to the port priority configuration.</p>
Step 4	<p>qos port-priority dot1p-priority</p> <p>Specify the port to 802.1p priority mapping for the desired port. The ingress packets from one port are first mapped to 802.1p priority based on the port to 802.1p mapping, then to TC queues based on the 802.1p to queue mapping. The untagged packets from one port will be added an 802.1p priority value according to the port to 802.1p mapping.</p> <p><i>dot1p-priority:</i> Specify the 802.1p priority ranging from 0 to 7. The default value is 0.</p>
Step 5	<p>show qos trust interface [fastEthernet port gigabitEthernet port ten-gigabitEthernet port port-channel port-channel-id]</p> <p>Verify the trust mode of the ports.</p>
Step 6	<p>show qos port-priority interface [fastEthernet port gigabitEthernet port ten-gigabitEthernet port port-channel port-channel-id]</p> <p>Verify the port to 802.1p mappings.</p>
Step 7	<p>end</p> <p>Return to privileged EXEC mode.</p>
Step 8	<p>copy running-config startup-config</p> <p>Save the settings in the configuration file.</p>

■ Configuring the 802.1p to Queue Mapping

Follow these steps to configure the 802.1p to queue mapping:

Step 1	<p>configure</p> <p>Enter global configuration mode</p>
Step 2	<p>qos cos-map {dot1p-priority} {tc-queue}</p> <p>Specify the 802.1p to queue mapping. The packets with the desired 802.1p priority will be put in the corresponding queues. By default, the 802.1p priority 0 to 7 is respectively mapped to TC-1, TC-0, TC-2, TC-3, TC-4, TC-5, TC-6, TC-7.</p> <p><i>dot1p-priority:</i> Specify the 802.1p priority. The valid values are from 0 to 7.</p> <p><i>tc-queue:</i> Specify the ID number of the TC queue. The valid values are from 0 to 7.</p>
Step 3	<p>show qos cos-map</p> <p>Verify the 802.1p to queue mappings.</p>
Step 4	<p>end</p> <p>Return to privileged EXEC mode.</p>

Step 5 **copy running-config startup-config**

Save the settings in the configuration file.

The following example shows how to configure the trust mode of port 1/0/1 as untrust, map the port 1/0/1 to 802.1p priority 1 and map 802.1p priority 1 to TC3:

Switch#configure**Switch(config)#interface gigabitEthernet 1/0/1****Switch(config-if)#qos trust mode untrust****Switch(config-if)#qos port-priority 1****Switch(config-if)#exit****Switch(config)#qos cos-map 1 3****Switch(config)#show qos trust interface gigabitEthernet 1/0/1**

Port	Trust Mode	LAG
-----	-----	-----
Gi1/0/1	untrust	N/A

Switch(config)#show qos port-priority interface gigabitEthernet 1/0/1

Port	CoS Value	LAG
-----	-----	-----
Gi1/0/1	CoS 1	N/A

Switch(config)#show qos cos-map

Tag	0	1	2	3	4	5	6	7
-----	-----	-----	-----	-----	-----	-----	-----	-----
TC	TC0	TC3	TC2	TC3	TC4	TC5	TC6	TC7

Switch(config)#end**Switch#copy running-config startup-config**

2.2.2 Configuring 802.1p Priority

- **Configuring the Trust Mode**

Follow these steps to configure the trust mode:

Step 1	configure Enter global configuration mode
Step 2	interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>} Enter interface configuration mode.
Step 3	qos trust mode {untrust dot1p dscp} Select the trust mode for the port. By default, it is untrust. Here we set the trust mode as dot1p. <i>dot1p</i> : Specify the ports' trust mode as dot1p. In this mode, the tagged packets will be processed according to the 802.1p priority configuration and the untagged packets will be processed according to the port priority configuration.
Step 4	show qos trust interface [fastEthernet <i>port</i> gigabitEthernet <i>port</i> ten-gigabitEthernet <i>port</i> port-channel <i>port-channel-id</i>] Verify the trust mode of the ports.
Step 5	end Return to privileged EXEC mode.
Step 6	copy running-config startup-config Save the settings in the configuration file.

- **Configuring the 802.1p to Queue Mapping and 802.1p Remap**

Follow these steps to configure the 802.1p to queue mapping and 802.1p remap:

Step 1	configure Enter global configuration mode
Step 2	qos cos-map {dot1p-priority} {tc-queue} Specify the 802.1p to queue mapping. The packets with the desired 802.1p priority will be put in the corresponding queues. By default, the 802.1p priority 0 to 7 is respectively mapped to TC-1, TC-0, TC-2, TC-3, TC-4, TC-5, TC-6, TC-7. <i>dot1p-priority</i> : Specify the 802.1p priority. The valid values are from 0 to 7. <i>tc-queue</i> : Specify the ID number of the TC queue. The valid values are from 0 to 7.
Step 3	interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>} Enter interface configuration mode.

-
- Step 4 **qos dot1p-remap {dot1p-priority} {new-dot1p-priority}**
- (Optional) Specify the 802.1p to 802.1p mappings. 802.1p Remap is used to modify the 802.1p priority of the ingress packets. When the switch detects the packets with desired 802.1p priority, it will modify the value of 802.1p priority according to the map. By default, the original 802.1p priority 0 is mapped to the 802.1p priority 0, the original 802.1p priority 1 is mapped to the 802.1p priority 1 and so on.
- dot1p-priority*: Specify the original 802.1p priority. The valid values are from 0 to 7.
- new-dot1p-priority*: Specify the new 802.1p priority. The valid values are from 0 to 7.
-
- Step 5 **show qos cos-map**
- Verify the 802.1p to queue mappings.
-
- Step 6 **show qos dot1p-remap interface [fastEthernet port | gigabitEthernet port | ten-gigabitEthernet port | port-channel port-channel-id]**
- Verify the 802.1p to 802.1p mappings of the ports.
-
- Step 7 **end**
- Return to privileged EXEC mode.
-
- Step 8 **copy running-config startup-config**
- Save the settings in the configuration file.
-

The following example shows how to configure the trust mode of port 1/0/1 as dot1p, map 802.1p priority 3 to TC4, and configure to map the original 802.1p 1 to 802.1p priority 3:

Switch#configure

Switch(config-if)#interface gigabitEthernet 1/0/1

Switch(config-if)#qos trust mode dot1p

Switch(config-if)#exit

Switch(config)#qos cos-map 3 4

Switch(config)#interface gigabitEthernet 1/0/1

Switch(config-if)#qos dot1p-remap 1 3

Switch(config-if)#show qos trust interface gigabitEthernet 1/0/1

Port	Trust Mode	LAG
-----	-----	-----
Gi1/0/1	trust 802.1P	N/A

Switch(config-if)#show qos cos-map

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

```

-----+-----+-----+-----+-----+-----+-----+-----+-----
TC  |TC0 |TC1 |TC2 |TC4 |TC4 |TC5 |TC6 |TC7
-----+-----+-----+-----+-----+-----+-----+-----+-----

```

```
Switch(config-if)#show qos dot1p-remap interface gigabitEthernet 1/0/1
```

```
Port      0  1  2  3  4  5  6  7  LAG
-----
```

```
Gi1/0/1  0  3  2  3  4  5  6  7  N/A
```

```
Switch(config-if)#end
```

```
Switch#copy running-config startup-config
```

2.2.3 Configuring DSCP Priority

- Configuring the Trust Mode

Follow these steps to configure the trust mode:

Step 1	configure Enter global configuration mode
Step 2	interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>} Enter interface configuration mode.
Step 3	qos trust mode {untrust dot1p dscp} Select the trust mode for the port. By default, it is untrust. Here we set the trust mode as dscp. <i>dscp</i> : Specify the ports' trust mode as dscp. In this mode, the IP packets will be processed according to the DSCP priority configuration and the non-IP packets will be processed according to the port priority configuration.
Step 4	show qos trust interface [fastEthernet <i>port</i> gigabitEthernet <i>port</i> ten-gigabitEthernet <i>port</i> port-channel <i>port-channel-id</i>] Verify the trust mode of the ports.
Step 5	end Return to privileged EXEC mode.
Step 6	copy running-config startup-config Save the settings in the configuration file.

- Configuring the 802.1p to Queue Mapping

Follow these steps to configure the 802.1p to queue mapping:

Step 1	<p>configure</p> <p>Enter global configuration mode</p>
Step 2	<p>qos cos-map {dot1p-priority} {tc-queue}</p> <p>Specify the 802.1p to queue mapping. The packets with the desired 802.1p priority will be put in the corresponding queues. By default, the 802.1p priority 0 to 7 is respectively mapped to TC-1, TC-0, TC-2, TC-3, TC-4, TC-5, TC-6, TC-7.</p> <p><i>dot1p-priority</i>: Specify the 802.1p priority. The valid values are from 0 to 7.</p> <p><i>tc-queue</i>: Specify the ID number of the TC queue. The valid values are from 0 to 7.</p>
Step 3	<p>show qos cos-map</p> <p>Verify the 802.1p to queue mappings.</p>
Step 4	<p>end</p> <p>Return to privileged EXEC mode.</p>
Step 5	<p>copy running-config startup-config</p> <p>Save the settings in the configuration file.</p>

■ Configuring the DSCP to 802.1p Mapping and DSCP Remap

Follow these steps to configure the DSCP to 802.1p mapping and DSCP remap:

Step 1	<p>configure</p> <p>Enter global configuration mode</p>
Step 2	<p>interface {fastEthernet port range fastEthernet port-list gigabitEthernet port range gigabitEthernet port-list ten-gigabitEthernet port range ten-gigabitEthernet port-list port-channel port-channel-id range port-channel port-channel-list}</p> <p>Enter interface configuration mode.</p>
Step 3	<p>qos dscp-map {dscp-value-list} {dot1p-priority}</p> <p>Specify the DSCP to 802.1p mapping. The ingress packets with the desired DSCP priority are first mapped to 802.1p priority based on the DSCP to 802.1p mapping, then to TC queues based on the 802.1p to queue mapping. The untagged packets with the desired DSCP priority will be added an 802.1p priority value according to the DSCP to 802.1p mapping. by default, the DSCP priorities 0-7 are mapped to the 802.1p priority 0, the DSCP priorities 8-15 are mapped to the 802.1p priority 1 and so on.</p> <p><i>dscp-value-list</i>: Specify the DSCP value list in the format of "1-3,5,7". The valid values are from 0 to 63.</p> <p><i>dot1p-priority</i>: Specify the 802.1p priority. The valid values are from 0 to 7.</p>

-
- Step 4 **qos dscp-remap {*dscp-value-list*} {*dscp-remap-value*}**
- (Optional) Specify the DSCP to DSCP mappings for the ports. DSCP Remap is used to modify the DSCP priority of the ingress packets. When the switch detects the packets with the desired DSCP priority, it will modify the value of DSCP priority according to the map. By default, the original DSCP priority 0 is mapped to the DSCP priority 0, the original DSCP priority 1 is mapped to the DSCP priority 1 and so on.
- dscp-value-list*: Specify the original DSCP priority list in the format of "1-3,5,7". The valid values are from 0 to 63.
- dscp-remap-value*: Specify the new DSCP priority. The valid values are from 0 to 63.
-
- Step 5 **show qos dscp-map interface [fastEthernet *port* | gigabitEthernet *port* | ten-gigabitEthernet *port* | port-channel *port-channel-id*]**
- Verify the DSCP to queue mappings.
-
- Step 6 **show qos dscp-remap interface [fastEthernet *port* | gigabitEthernet *port* | ten-gigabitEthernet *port* | port-channel *port-channel-id*]**
- Verify the DSCP to DSCP mappings of the ports.
-
- Step 7 **end**
- Return to privileged EXEC mode.
-
- Step 8 **copy running-config startup-config**
- Save the settings in the configuration file.
-

The following example shows how to configure the trust mode of port 1/0/1 as dscp, map 802.1p priority 3 to TC4, map DSCP priority 1-3,5,7 to 802.1p priority 3, and configure to map the original DSCP priority 9 to DSCP priority 5:

Switch#configure

Switch(config)#interface gigabitEthernet 1/0/1

Switch(config-if)#qos trust mode dscp

Switch(config-if)#exit

Switch(config)#qos cos-map 3 4

Switch(config)#interface gigabitEthernet 1/0/1

Switch(config-if)#qos dscp-map 1-3,5,7 3

Switch(config-if)#qos dscp-remap 9 5

Switch(config-if)#show qos trust interface gigabitEthernet 1/0/1

Port	Trust Mode	LAG
------	------------	-----

-----	-----	-----
-------	-------	-------

Gi1/0/1	trust DSCP	N/A
---------	------------	-----

Switch(config-if)#show qos cos-map

```

-----+-----+-----+-----+-----+-----+-----+-----+-----+
Tag |0   |1   |2   |3 |4   |5   |6   |7
-----+-----+-----+-----+-----+-----+-----+-----+
TC  |TC0 |TC1 |TC2 |TC4|TC4 |TC5 |TC6 |TC7
-----+-----+-----+-----+-----+-----+-----+-----+

```

Switch(config-if)#show qos dscp-map interface gigabitEthernet 1/0/1

Gi1/0/1----LAG: N/A

```

DSCP:           0  1  2  3  4  5  6  7
DSCP to 802.1P 0  3  3  3  0  3  0  3
                -----
DSCP:           8  9 10 11 12 13 14 15
DSCP to 802.1P 1  1  1  1  1  1  1  1
                -----
DSCP:           16 17 18 19 20 21 22 23
DSCP to 802.1P 2  2  2  2  2  2  2  2
                -----
DSCP:           24 25 26 27 28 29 30 31
DSCP to 802.1P 3  3  3  3  3  3  3  3
                -----
DSCP:           32 33 34 35 36 37 38 39
DSCP to 802.1P 4  4  4  4  4  4  4  4
                -----
DSCP:           40 41 42 43 44 45 46 47
DSCP to 802.1P 5  5  5  5  5  5  5  5
                -----
DSCP:           48 49 50 51 52 53 54 55
DSCP to 802.1P 6  6  6  6  6  6  6  6
                -----
DSCP:           56 57 58 59 60 61 62 63

```

```
DSCP to 802.1P 7 7 7 7 7 7 7 7
```

```
-----
```

```
Switch(config-if)#show qos dscp-remap interface gigabitEthernet 1/0/1
```

```
Gi1/0/1----LAG: N/A
```

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

```
DSCP remap value 0 1 2 3 4 5 6 7
```

```
-----
```

```
DSCP:          8 9 10 11 12 13 14 15
```

```
DSCP remap value 8 5 10 11 12 13 14 15
```

```
-----
```

```
DSCP:          16 17 18 19 20 21 22 23
```

```
DSCP remap value 16 17 18 19 20 21 22 23
```

```
-----
```

```
DSCP:          24 25 26 27 28 29 30 31
```

```
DSCP remap value 24 25 26 27 28 29 30 31
```

```
-----
```

```
DSCP:          32 33 34 35 36 37 38 39
```

```
DSCP remap value 32 33 34 35 36 37 38 39
```

```
-----
```

```
DSCP:          40 41 42 43 44 45 46 47
```

```
DSCP remap value 40 41 42 43 44 45 46 47
```

```
-----
```

```
DSCP:          48 49 50 51 52 53 54 55
```

```
DSCP remap value 48 49 50 51 52 53 54 55
```

```
-----
```

```
DSCP:          56 57 58 59 60 61 62 63
```

```
DSCP remap value 56 57 58 59 60 61 62 63
```

```
-----
```

```
Switch(config-if)#end
```

```
Switch#copy running-config startup-config
```

2.2.4 Specifying the Scheduler Settings

Follow these steps to specify the scheduler settings to control the forwarding sequence of different TC queues when congestion occurs.

Step 1	<p>configure</p> <p>Enter global configuration mode.</p>
Step 2	<p>interface <i>{fastEthernet port range fastEthernet port-list gigabitEthernet port range gigabitEthernet port-list ten-gigabitEthernet port range ten-gigabitEthernet port-list port-channel port-channel-id range port-channel port-channel-list}</i></p> <p>Enter interface configuration mode.</p>
Step 3	<p>qos queue <i>tc-queue mode</i> <i>{sp wrr}</i> <i>[weight weight]</i></p> <p>Specify the type of scheduling used for corresponding queue. When the network congestion occurs, the egress queue will determine the forwarding sequence of the packets according to the type. By default, it is wrr mode and the all the queue weights are 1.</p> <p><i>tc-queue</i>: Specify the ID number of TC queue. The valid values are from 0 to 7.</p> <p><i>sp</i>: In sp mode, the egress queue will use SP (Strict Priority) to process the traffic in different queues. When congestion occurs, the traffic will be transmitted according to its queue priority strictly. The queue with higher priority occupies the whole bandwidth. Packets in the queue with lower priority are sent only when the queue with higher priority is empty.</p> <p><i>wrr</i>: In wrr mode, the egress queue will use WRR (Weighted Round Robin) to process the traffic in different queues. When congestion occurs, all the traffic will be transmitted, but the bandwidth that each traffic queue occupies will be allocated based on the queue weight.</p> <p><i>weight</i>: Specify the queue weight for the desired queue. This value can be set only in the wrr mode. The valid values are from 1 to 127.</p>
Step 4	<p>qos queue <i>tc-queue bandwidth rate</i></p> <p>Specify the minimum guaranteed bandwidth for the desired queue. If the queue bandwidth calculated according to the weight is smaller than the minimum bandwidth, the switch will be forced to allocated the minimum bandwidth to the queue, and the other queue will share the rest bandwidth based on the weight.</p> <p><i>tc-queue</i>: Specify the ID number of the TC queue. The valid values are from 0 to 7.</p> <p><i>rate</i>: Specify the rate for the desired TC queue. The valid values are from 1 to 100. The default value is 0.</p>
Step 5	<p>show qos queue interface <i>[fastEthernet port gigabitEthernet port ten-gigabitEthernet port port-channel port-channel-id]</i></p> <p>Verify the scheduler settings..</p>
Step 6	<p>end</p> <p>Return to privileged EXEC mode.</p>
Step 7	<p>copy running-config startup-config</p> <p>Save the settings in the configuration file.</p>

 **Note:**

With ACL Redirect feature, the switch maps all the packets that meet the configured ACL rules to the new TC queue, regardless of the mapping relations configured in this section.

The following example shows how to specify the scheduler settings for port 1/0/1. Set the scheduler mode of TC1 as sp mode, set the scheduler mode of TC4 as wrr mode and set the queue weight as 5. Set the minimum bandwidth of TC4 as 10.

Switch#configure**Switch(config)#interface gigabitEthernet 1/0/1****Switch(config-if)#qos queue 1 mode sp****Switch(config-if)#qos queue 4 mode wrr weight 5****Switch(config-if)#qos queue 4 bandwidth 10****Switch(config-if)#show qos queue interface gigabitEthernet 1/0/1**

Gi1/0/1----LAG: N/A

Queue	Schedule Mode	Weight	Min Bandwidth(%)
TC0	WRR	1	0%
TC1	Strict	N/A	0%
TC2	WRR	1	0%
TC3	WRR	1	0%
TC4	WRR	5	10%
TC5	WRR	1	0%
TC6	WRR	1	0%
TC7	WRR	1	0%

-----	-----	-----	-----
TC0	WRR	1	0%
TC1	Strict	N/A	0%
TC2	WRR	1	0%
TC3	WRR	1	0%
TC4	WRR	5	10%
TC5	WRR	1	0%
TC6	WRR	1	0%
TC7	WRR	1	0%

Switch(config-if)#end**Switch#copy running-config startup-config**

3 Bandwidth Control Configuration

With bandwidth control configurations, you can:

- Configure rate limit
- Configure storm control

3.1 Using the GUI

3.1.1 Configuring Rate Limit

Choose the menu **QoS > Bandwidth Control > Rate Limit** to load the following page.

Figure 3-1 Configuring Rate Limit

The screenshot shows the 'Rate Limit Config' window. It has two tabs: 'UNIT1' (selected) and 'LAGS'. Below the tabs is a table with the following columns: 'Port', 'Ingress Rate (0-1,000,000Kbps)', 'Egress Rate (0-1,000,000Kbps)', and 'LAG'. The table contains 10 rows of ports from 1/0/1 to 1/0/10. The first row (1/0/1) is highlighted in light blue and has a checked checkbox in the first column. The other rows have unchecked checkboxes. At the bottom of the table, there is a summary bar showing 'Total: 28' and '1 entry selected.'. To the right of the summary bar are two buttons: 'Cancel' and 'Apply'.

<input type="checkbox"/>	Port	Ingress Rate (0-1,000,000Kbps)	Egress Rate (0-1,000,000Kbps)	LAG
<input checked="" type="checkbox"/>	1/0/1	0	0	--
<input type="checkbox"/>	1/0/2	0	0	--
<input type="checkbox"/>	1/0/3	0	0	--
<input type="checkbox"/>	1/0/4	0	0	--
<input type="checkbox"/>	1/0/5	0	0	--
<input type="checkbox"/>	1/0/6	0	0	--
<input type="checkbox"/>	1/0/7	0	0	--
<input type="checkbox"/>	1/0/8	0	0	--
<input type="checkbox"/>	1/0/9	0	0	--
<input type="checkbox"/>	1/0/10	0	0	--

Total: 28 1 entry selected.

Follow these steps to configure the Rate Limit function:

- 1) Select the desired port and configure the upper rate limit to receive and send packets.

Ingress Rate (0-1,000,000Kbps)

Configure the upper rate limit for receiving packets on the port. The valid values are from 0 to 1000000 Kbps and 0 means the ingress rate limit is disabled.

Egress Rate (0-1,000,000Kbps)

Configure the bandwidth for sending packets on the port. The valid values are from 0 to 1000000 Kbps and 0 means the egress rate limit is disabled.

- 2) Click **Apply**.

3.1.2 Configuring Storm Control

Choose the menu **QoS > Bandwidth Control > Storm Control** to load the following page.

Figure 3-2 Configuring Storm Control

UNIT1		LAGS		Recover						
<input type="checkbox"/>	Port	Rate Mode	Broadcast Threshold (0-1,000,000)	Multicast Threshold (0-1,000,000)	UL-Frame Threshold (0-1,000,000)	Action	Recover Time	LAG		
<input checked="" type="checkbox"/>	1/0/1	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/2	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/3	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/4	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/5	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/6	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/7	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/8	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/9	kbps	0	0	0	Drop	0	---		
<input type="checkbox"/>	1/0/10	kbps	0	0	0	Drop	0	---		

Total: 28 1 entry selected. Cancel Apply

Follow these steps to configure the Storm Control function:

- 1) Select the desired port and configure the upper rate limit for forwarding broadcast packets, multicast packets and UL-frames (Unknown unicast frames).

Rate Mode

Specify the Rate Mode for the broadcast threshold, multicast threshold and UL-Frame threshold on the desired port.

kbps: The switch will limit the maximum speed of the specific kinds of traffic in kilo-bits per second.

ratio: The switch will limit the percentage of bandwidth utilization for specific kinds of traffic.

pps: The switch will limit the maximum number of packets per second for specific kinds of traffic.

Broadcast Threshold (0-1,000,000)

Specify the upper rate limit for receiving broadcast packets. The valid values differ among different rate modes. The value 0 means the broadcast threshold is disabled. The broadcast traffic exceeding the limit will be processed according to the Action configurations.

Multicast Threshold (0-1,000,000)

Specify the upper rate limit for receiving multicast packets. The valid values differ among different rate modes. The value 0 means the multicast threshold is disabled. The multicast traffic exceeding the limit will be processed according to the Action configurations.

UL-Frame Threshold (0-1,000,000)	Specify the upper rate limit for receiving unknown unicast frames. The valid values differ among different rate modes. The value 0 means the unknown unicast threshold is disabled. The traffic exceeding the limit will be processed according to the Action configurations.
Action	Select the action that the switch will take when the traffic exceeds its corresponding limit. Drop: Set the Action as Drop. The port will drop the subsequent packets when the traffic exceeds the limit. Shutdown: Set the Action as Shutdown. The port will be shutdown when the traffic exceeds the limit.
Recover Time	Specify the recover time for the port. It takes effect only when the action is set as shutdown. The valid values are from 0 to 3600 seconds. When the port is shutdown, it can recover to its normal state after the recover time passed. If the recover time is specified as 0, which means the port will not recover to its normal state automatically and you can recover the port manually.

2) Click **Apply**.

 **Note:**

For ports in the same LAG, rate limit / storm control should be set to the same value to ensure a successful port aggregation.

3.2 Using the CLI

3.2.1 Configuring Rate Limit

Follow these steps to configure the upper rate limit for the port to receive and send packets:

Step 1	configure Enter global configuration mode.
Step 2	interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>} Enter interface configuration mode.
Step 3	bandwidth {ingress <i>ingress-rate</i> egress <i>egress-rate</i>} Configure the upper rate limit for the port to receive and send packets. <i>ingress-rate</i> : Configure the upper rate limit for receiving packets on the port. The valid values are from 0 to 1000000 Kbps. <i>egress-rate</i> : Configure the upper rate limit for sending packets on the port. The valid values are from 0 to 1000000 Kbps.

-
- Step 4 **show bandwidth interface [fastEthernet *port* | gigabitEthernet *port* | ten-gigabitEthernet *port* | port-channel *port-channel-id*]**
Verify the ingress/egress rate limit for forwarding packets on the port or LAG. If no port or LAG is specified, it displays the upper ingress/egress rate limit for all ports or LAGs.
-
- Step 5 **end**
Return to privileged EXEC mode.
-
- Step 6 **copy running-config startup-config**
Save the settings in the configuration file.
-

The following example shows how to configure the ingress-rate as 5120 Kbps and egress-rate as 1024 Kbps for port 1/0/5:

Switch#configure

Switch(config)#interface gigabitEthernet 1/0/5

Switch(config-if)#bandwidth ingress 5120 egress 1024

Switch(config-if)#show bandwidth interface gigabitEthernet 1/0/5

Port	IngressRate(Kbps)	EgressRate(Kbps)	LAG
-----	-----	-----	-----
Gi1/0/5	5120	1024	N/A

Switch(config-if)#end

Switch#copy running-config startup-config

3.2.2 Configuring Storm Control

Follow these steps to configure the upper rate limit on the port for forwarding broadcast packets, multicast packets and unknown unicast frames:

-
- Step 1 **configure**
Enter global configuration mode
-
- Step 2 **interface {fastEthernet *port* | range fastEthernet *port-list* | gigabitEthernet *port* | range gigabitEthernet *port-list* | ten-gigabitEthernet *port* | range ten-gigabitEthernet *port-list* | port-channel *port-channel-id* | range port-channel *port-channel-list*}**
Enter interface configuration mode.
-

Step 3 **storm-control rate-mode {kbps | ratio | pps}**

Specify the Rate Mode for the broadcast threshold, multicast threshold and UL-Frame threshold on the desired port.

kbps: The switch will limit the maximum speed of the specific kinds of traffic in kilo-bits per second.

ratio: The switch will limit the percentage of bandwidth utilization for specific kinds of traffic.

pps: The switch will limit the maximum number of packets per second for specific kinds of traffic.

Step 4 **storm-control broadcast rate**

Specify the upper rate limit for receiving broadcast packets. The broadcast traffic exceeding the limit will be processed according to the Action configurations.

rate: Enter the upper rate. In kbps mode, the valid values are from 1 to 1000000 Kbps. In ratio mode, the valid values are from 1 to 100 percent. In pps mode, the valid values are from 1 to 1488000 packets per second.

Step 5 **storm-control multicast rate**

Specify the upper rate limit for receiving multicast packets. The multicast traffic exceeding the limit will be processed according to the Action configurations.

rate: Enter the upper rate. In kbps mode, the valid values are from 1 to 1000000 Kbps. In ratio mode, the valid values are from 1 to 100 percent. In pps mode, the valid values are from 1 to 1488000 packets per second.

Step 6 **storm-control unicast rate**

Specify the upper rate limit for receiving unknown unicast frames. The traffic exceeding the limit will be processed according to the Action configurations.

rate: Enter the upper rate. In kbps mode, the valid values are from 1 to 1000000 Kbps. In ratio mode, the valid values are from 1 to 100 percent. In pps mode, the valid values are from 1 to 1488000 packets per second.

Step 7 **storm-control exceed {drop | shutdown} [recover-time time]**

Specify the action and the recover time. The switch will perform the action when the traffic exceeds its corresponding limit. By default, it is drop.

drop: Set the Action as Drop. The port will drop the subsequent packets when the traffic exceeds the limit.

shutdown: Set the Action as Shutdown. The port will be shutdown when the traffic exceeds the limit.

time: Specify the recover time for the port. It takes effect only when the action is set as shutdown. The valid values are from 0 to 3600 and the default value is 0. When the port is shutdown, it can recover to its normal state after the recover time passed. If the recover time is specified as 0, which means the port will not recover to its normal state automatically and you can recover the port manually.

Step 8 storm-control recover

(Optional) Recover the port manually. When the recover time is specified as 0, the port will not recover to its normal state automatically. In this condition, you need to use this command to recover the port manually.

Step 9 show storm-control interface [fastEthernet port | gigabitEthernet port | ten-gigabitEthernet port | port-channel port-channel-id]

Verify the storm control configurations of the port or LAG. If no port or LAG is specified, it displays the storm control configuration for all ports or LAGs.

Step 10 end

Return to privileged EXEC mode.

Step 11 copy running-config startup-config

Save the settings in the configuration file.

The following example shows how to configure the upper rate limit of broadcast packets as 148800 pps, Specify the action as shutdown and set the recover time as 10 for port 1/0/5:

Switch#configure

```
Switch(config)#interface gigabitEthernet 1/0/5
```

```
T2600G-28TS(config-if)#storm-control rate-mode pps
```

```
T2600G-28TS(config-if)#storm-control broadcast 148800
```

```
T2600G-28TS(config-if)#storm-control exceed shutdown recover-time 10
```

```
T2600G-28TS(config-if)#show storm-control interface gigabitEthernet 1/0/5
```

Port	Rate Mode	BcRate	McRate	UIRate	Exceed	Recover Time	LAG
-----	-----	-----	-----	-----	-----	-----	-----
Gi1/0/5	pps	148800	0	0	shutdown	10	N/A

```
Switch(config-if)#end
```

```
Switch#copy running-config startup-config
```

4 Voice VLAN Configuration

To complete the voice VLAN configurations, follow these steps:

- 1) Create a 802.1Q VLAN
- 2) Configure OUI addresses
- 3) Configure Voice VLAN globally
- 4) Add ports to Voice VLAN

Configuration Guidelines

- Before configuring voice VLAN, you need to create a 802.1Q VLAN for voice traffic. For details about 802.1Q VLAN Configuration, please refer to [Configuring 802.1Q VLAN](#).
- VLAN 1 is a default VLAN and cannot be configured as the voice VLAN.
- Only one VLAN can be set as the voice VLAN on the switch.

4.1 Using the GUI

4.1.1 Configuring OUI Addresses

The OUI address is assigned as a unique identifier by IEEE (Institute of Electrical and Electronics Engineers) to a device vendor. It is used by the switch to determine whether a packet is a voice packet.

If the OUI address of your voice device is not in the OUI table, you need to add the OUI address to the table.

Choose the menu **QoS > Voice VLAN > OUI Config** to load the following page.

Figure 4-1 Configuring OUI Addresses

OUI Config			
UNIT1 + Add - Delete			
<input type="checkbox"/>	OUI	Status	Description
<input type="checkbox"/>	00:01:E3	Default	SIEMENS
<input type="checkbox"/>	00:03:6B	Default	CISCO1
<input type="checkbox"/>	00:12:43	Default	CISCO2
<input type="checkbox"/>	00:0F:E2	Default	H3C
<input type="checkbox"/>	00:60:B9	Default	NITSUKO
<input type="checkbox"/>	00:D0:1E	Default	PINTEL
<input type="checkbox"/>	00:E0:75	Default	VERILINK
<input type="checkbox"/>	00:E0:BB	Default	3COM
<input type="checkbox"/>	00:04:0D	Default	AVAYA1
<input type="checkbox"/>	00:1B:4F	Default	AVAYA2
Total: 11			

Follow these steps to configure the OUI addresses:

- 1) Click **+ Add** to load the following page.

Figure 4-2 Creating an OUI Entry

OUI

OUI: (Format: 00:00:00)

Description: (1-16 characters)

- 2) Specify the OUI and the Description.

OUI	Enter the OUI address of your voice devices. The OUI address is used by the switch to determine whether a packet is a voice packet. An OUI address is the first 24 bits of a MAC address, and is assigned as a unique identifier by IEEE (Institute of Electrical and Electronics Engineers) to a device vendor. If the source MAC address of a packet matches the OUI addresses in the OUI list, the switch identifies the packet as a voice packet and prioritizes it in transmission.
Description	Give an OUI address description for identification.

- 3) Click **Create**.

4.1.1 Configuring Voice VLAN Globally

Choose the menu **QoS > Voice VLAN > Global Config** to load the following page.

Figure 4-3 Configuring Voice VLAN Globally

Global Config

Voice VLAN: Enable

VLAN ID: (2-4094)

Priority:

[Apply](#)

Follow these steps to configure voice VLAN globally:

- 1) Enable the voice VLAN feature and specify the parameters.

VLAN ID	Specify the 802.1Q VLAN ID to set the 802.1Q VLAN as the voice VLAN.
Priority	Select the priority that will be assigned to voice packets. A bigger value means a higher priority. This is an IEEE 802.1p priority, and you can further configure its scheduler mode in Class of Service if needed.

- 2) Click **Apply**.

4.1.1 Adding Ports to Voice VLAN

Choose the menu **QoS > Voice VLAN > Port Config** to load the following page.

Figure 4-4 Adding Ports to Voice VLAN

Port Config

UNIT1

LAGS

	Port	Voice VLAN	Operational Status
<input checked="" type="checkbox"/>	1/0/1	Disabled	Inactive
<input type="checkbox"/>	1/0/2	Disabled	Inactive
<input type="checkbox"/>	1/0/3	Disabled	Inactive
<input type="checkbox"/>	1/0/4	Disabled	Inactive
<input type="checkbox"/>	1/0/5	Disabled	Inactive
<input type="checkbox"/>	1/0/6	Disabled	Inactive
<input type="checkbox"/>	1/0/7	Disabled	Inactive
<input type="checkbox"/>	1/0/8	Disabled	Inactive
<input type="checkbox"/>	1/0/9	Disabled	Inactive
<input type="checkbox"/>	1/0/10	Disabled	Inactive

Total: 28
1 entry selected.

Cancel
Apply

Follow these steps to configure voice VLAN globally:

- 1) Select the desired ports and choose Enable in Voice VLAN filed.

Voice VLAN	Select Enable to enable the voice VLAN feature on ports and add the desired ports to Voice VLAN.
-------------------	--

Optional Status	Displays the state of the Voice VLAN on the corresponding port.
	Active: Indicates that Voive VLAN function is enabled on the port.
	Inactive: Indicates that Voive VLAN function is disabled on the port.

2) Click **Apply**.

4.2 Using the CLI

Follow these steps to configure voice VLAN:

Step 1	configure Enter global configuration mode.
Step 2	show voice vlan oui-table Check whether the OUI address of your voice device is in the OUI table. The OUI address is used by the switch to determine whether a packet is a voice packet. An OUI address is the first 24 bits of a MAC address, and is assigned as a unique identifier by IEEE (Institute of Electrical and Electronics Engineers) to a device vendor. If the source MAC address of a packet matches the OUI addresses in the OUI list, the switch identifies the packet as a voice packet and prioritizes it in transmission.
Step 3	voice vlan oui <i>oui-prefix</i> <i>oui-desc</i> <i>string</i> If the OUI address of your voice device is not in the OUI table, add the OUI address to the table. <i>oui-prefix:</i> Enter the OUI address for your voice device in the format of XX:XX:XX. <i>string:</i> Give an OUI address description for identification. It contains 16 characters at most.
Step 4	voice vlan <i>vid</i> Enable the voice VLAN feature and specify an existing 802.1Q VLAN as the voice VLAN. <i>vid:</i> Enter the 802.1Q VLAN ID to set the 802.1Q VLAN as the voice VLAN.
Step 5	voice vlan priority <i>pri</i> Specify the priority that will be assigned to voice packets. <i>pri:</i> Enter the priority that will be assigned to voice packets. A bigger value means a higher priority. The valid values are from 0 to 7 and the default value is 7. This is an IEEE 802.1p priority, and you can further configure its scheduler mode in Class of Service if needed.
Step 6	interface {fastEthernet <i>port</i> range fastEthernet <i>port-list</i> gigabitEthernet <i>port</i> range gigabitEthernet <i>port-list</i> ten-gigabitEthernet <i>port</i> range ten-gigabitEthernet <i>port-list</i> port-channel <i>port-channel-id</i> range port-channel <i>port-channel-list</i>} Enter interface configuration mode.
Step 7	voice vlan Enable the voice VLAN feature on ports and add the desired ports to voice VLAN.
Step 8	show voice vlan interface Verify the voice VLAN configuration information.

Step 8 **end**
Return to privileged EXEC mode.

Step 9 **copy running-config startup-config**
Save the settings in the configuration file.

The following example shows how to show the OUI table, set VLAN 8 as voice VLAN, set the priority as 6 and enable voice VLAN feature on port 1/0/3:

Switch#configure

Switch(config)#show voice vlan oui-table

```
00:01:E3   Default   SIEMENS
00:03:6B   Default   CISCO1
00:12:43   Default   CISCO2
00:0F:E2   Default   H3C
00:60:B9   Default   NITSUKO
00:D0:1E   Default   PINTEL
00:E0:75   Default   VERILINK
00:E0:BB   Default   3COM
00:04:0D   Default   AVAYA1
00:1B:4F   Default   AVAYA2
00:04:13   Default   SNOM
```

Switch(config)#voice vlan 8

Switch(config)#voice vlan priority 6

Switch(config)#interface gigabitEthernet 1/0/3

Switch(config-if)#voice vlan

Switch(config-if)#show voice vlan interface

```
Voice VLAN ID      8
Priority            6

Interface  Voice VLAN Mode  Operational Status  LAG
-----  -
Gi1/0/1   disabled          Down                N/A
Gi1/0/2   disabled          Down                N/A
```

Gi1/0/3	enabled	Up	N/A
Gi1/0/4	disabled	Down	N/A
Gi1/0/5	disabled	Down	N/A

.....

Switch(config-if)#end

Switch#copy running-config startup-config

5 Auto VoIP Configuration

Configuration Guidelines

- Before configuring Auto VoIP, you need to enable LLDP-MED on ports and configure the relevant parameters. For details about LLDP-MED configuration, please refer to [Configuring LLDP](#).
- Auto VoIP provide flexible solutions for optimizing the voice traffic. It can work with other features such as VLAN and Class of Service to process the voice packets with specific fields. You can choose and configure Auto VoIP and other features according to your needs.

5.1 Using the GUI

Choose the menu **QoS > Auto VoIP** to load the following page.

Figure 5-1 Configuring Auto VoIP

Global Config

Auto VoIP: Enable Apply

Port Config

UNIT1

	Port	Interface Mode	Value	CoS Override Mode	Operational Status	DSCP Value
<input checked="" type="checkbox"/>	1/0/1	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/2	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/3	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/4	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/5	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/6	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/7	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/8	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/9	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/10	Disable	0	Disabled	Disabled	0

Total: 28 1 entry selected. Cancel Apply

Follow these steps to configure the OUI addresses:

- In the **Global Config** section, enable the Auto VoIP function globally.
- In the **Port Config** section, select the desired and configure the parameters.

Interface Mode	<p>Select the interface mode for the port.</p> <p>Disable: Disable the Auto VoIP function on the corresponding port.</p> <p>None: Allow the voice devices to use its own configuration to send voice traffic.</p> <p>VLAN ID: The voice devices will send voice packets with desired VLAN tag. If this mode is selected, it is necessary to specify the VLAN ID in the Value field.</p> <p>In addition, you need to configure the 802.1Q VLAN to ensure the corresponding ports can forward the packets normally.</p> <p>Dot1p: The voice devices will send voice packets with desired 802.1p priority. If this mode is selected, it is necessary to specify 802.1p priority in the Value field.</p> <p>In addition, you can configure the Class of Service to make the switch process the packets according to the 802.1p priority.</p> <p>Untagged: The voice devices will send untagged voice packets.</p>
Value	<p>Enter the value of VLAN ID or 802.1p priority for the port according to the Interface Mode configurations.</p>
CoS Override Mode	<p>Enable or disable the Class of Service override mode.</p> <p>Enabled: Enable CoS override. The switch will ignore the 802.1p priority in the voice packets and put the packets in TC-5 directly.</p> <p>Disabled: Disable CoS override. The switch will then put the voice packets in the corresponding TC queue according to the 802.1p priority of the packets.</p>
Operational Status	<p>Displays the operating status of the Voice VLAN feature on the interface. To make it enabled, you must enable the Voice VLAN both globally and on the interface.</p>
DSCP Value	<p>Enter the value of DSCP priority. The voice device will send the packets with the corresponding DSCP value.</p> <p>In addition, you can configure the Class of Service to make the switch process the packets according to the DSCP priority.</p>

3) Click **Apply**.

5.2 Using the CLI

Follow these steps to configure Auto VoIP:

Step 1	<p>configure</p> <p>Enter global configuration mode.</p>
Step 2	<p>auto-voip</p> <p>Enable Auto VoIP globally.</p>

Step 3 **interface {fastEthernet *port* | range fastEthernet *port-list* | gigabitEthernet *port* | range gigabitEthernet *port-list* | ten-gigabitEthernet *port* | range ten-gigabitEthernet *port-list* | port-channel *port-channel-id* | range port-channel *port-channel-list*}**

Enter interface configuration mode.

Step 4 Select the interface mode for the port.

no auto-voip

Specify the interface mode as disabled, which means the Auto VoIP function is disabled on the corresponding port.

auto-voip none

Specify the interface mode as none. In this mode, the switch allows the voice devices to use its own configuration to send voice traffic.

auto-voip *vlan-id*

Specify the interface mode as VLAN ID. In this mode, the voice devices will send voice packets with desired VLAN tag. If this mode is selected, it is necessary to specify the 802.1Q VLAN ID. The valid values are from 1 to 4093.

In addition, you need to configure the 802.1Q VLAN to ensure the corresponding ports can forward the packets normally.

auto-voip dot1p *dot1p*

Specify the interface mode as dot1p. In this mode, the voice devices will send voice packets with desired 802.1p priority. If this mode is selected, it is necessary to specify 802.1p priority. The valid values are from 0 to 7.

In addition, you can configure the Class of Service to make the switch process the packets according to the 802.1p priority.

auto-voip untagged

Specify the interface mode as untagged. In this mode, the voice devices will send untagged voice packets.

Step 5 **auto-voip data priority {trust | untrust}**

Enable or disable the Class of Service override mode. By default, it is trust, which means the Class of Service override mode is disabled.

trust: In this mode, the switch will then put the voice packets in the corresponding TC queue according to the 802.1p priority of the packets.

untrust: In this mode, the switch will ignore the 802.1p priority in the voice packets and put the packets in TC-5 directly.

Step 6 **auto-voip dscp *value***

Specify the value of DSCP priority. The voice device will send the packets with the corresponding DSCP value.

In addition, you can configure the Class of Service to make the switch process the packets according to the DSCP priority.

value: Enter the value of DSCP priority. The valid values are from 0 to 63 and the default value is 0.

-
- Step 7 **show auto-voip**
Verify the global state of Auto VoIP.
-
- Step 8 **show auto-voip interface**
Verify the Auto VoIP configuration information of ports.
-
- Step 8 **end**
Return to privileged EXEC mode.
-
- Step 9 **copy running-config startup-config**
Save the settings in the configuration file.
-

The following example shows how to set the interface mode as dot1p, specify the 802.1p priority as 4, specify the DSCP priority as 10 and enable the CoS override mode for port 1/0/3:

Switch#configure

Switch(config)#auto-voip

Switch(config)#interface gigabitEthernet 1/0/3

Switch(config-if)#auto-voip dot1p 4

Switch(config-if)#auto-voip dscp 10

Switch(config-if)#auto-voip data priority untrust

Switch(config-if)#show auto-voip

Administrative Mode: Enabled

Switch(config-if)#show auto-voip interface

Interface.Gi1/0/1

Auto-VoIP Interface Mode. Disabled

Auto-VoIP COS Override. False

Auto-VoIP DSCP Value. 0

Auto-VoIP Port Status. Disabled

Interface.Gi1/0/2

Auto-VoIP Interface Mode. Disabled

Auto-VoIP COS Override. False

Auto-VoIP DSCP Value. 0

Auto-VoIP Port Status. Disabled


```
Interface.Gi1/0/3
Auto-VoIP Interface Mode.      Enabled
Auto-VoIP Priority.            4
Auto-VoIP COS Override.       True
Auto-VoIP DSCP Value.         10
Auto-VoIP Port Status.        Enabled
.....
```

```
Switch(config-if)#end
```

```
Switch#copy running-config startup-config
```

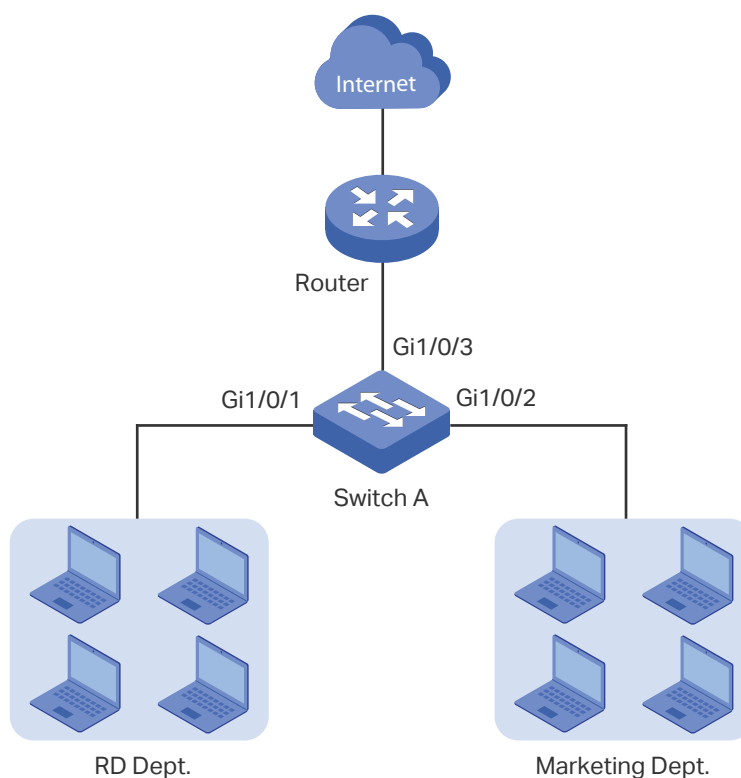
6 Configuration Examples

6.1 Example for Class of Service

6.1.1 Network Requirements

As shown below, both RD department and Marketing department can access the internet. When congestion occurs, the traffic from two departments can both be forwarded and the traffic from the Marketing department should take precedence.

Figure 6-1 QoS Application Topology



6.1.2 Configuration Scheme

To implement this requirement, you can configure Port Priority to put the packets from the Marketing department into the queue with the higher priority than the packets from the RD department.

- 1) Configure the trust mode of port 1/0/1 and port 1/0/2 as untrusted and map the ports to different queues.
- 2) Set the scheduler type of the queues as weighted for port 1/0/3 and specify the queue weight to make the traffic from the Marketing department take precedence.

Demonstrated with T2600G-28TS, the following sections provide configuration procedure in two ways: using the GUI and using the CLI.

6.1.3 Using the GUI

- 1) Choose the menu **QoS > Class of Service > Port Priority** to load the following page. Set the trust mode of port 1/0/1 and 1/0/2 as untrusted. Specify the 802.1p priority of port 1/0/1 as 1 and specify the 802.1p priority of port 1/0/2 as 0. Click **Apply**.

Figure 6-2 Configuring Port Priority

Port Priority Config

UNIT1
LAGS

	Port	802.1p Priority	Trust Mode	LAG
<input type="checkbox"/>		1	Untrusted	
<input checked="" type="checkbox"/>	1/0/1	1	Untrusted	--
<input type="checkbox"/>	1/0/2	0	Untrusted	--
<input type="checkbox"/>	1/0/3	0	Untrusted	--
<input type="checkbox"/>	1/0/4	0	Untrusted	--
<input type="checkbox"/>	1/0/5	0	Untrusted	--
<input type="checkbox"/>	1/0/6	0	Untrusted	--
<input type="checkbox"/>	1/0/7	0	Untrusted	--
<input type="checkbox"/>	1/0/8	0	Untrusted	--
<input type="checkbox"/>	1/0/9	0	Untrusted	--
<input type="checkbox"/>	1/0/10	0	Untrusted	--

Total: 28
1 entry selected.
Cancel
Apply

- 2) Choose the menu **QoS > Class of Service > 802.1p Priority** to load the following page. Map the 802.1p priority 0 to TC-1 and map the 802.1p priority 1 to TC-0. Click **Apply**.

Figure 6-3 Configuring the 802.1p to Queue Mappings

802.1p to Queue Mapping

802.1p Priority	Queue
0:	TC-1 ▼
1:	TC-0 ▼
2:	TC-2 ▼
3:	TC-3 ▼
4:	TC-4 ▼
5:	TC-5 ▼
6:	TC-6 ▼
7:	TC-7 ▼

Apply

802.1p Remap

UNIT1		LAGS								
	Port	0	1	2	3	4	5	6	7	LAG
<input type="checkbox"/>	1/0/1	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/2	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/3	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/4	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/5	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/6	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/7	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/8	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/9	0	1	2	3	4	5	6	7	--
<input type="checkbox"/>	1/0/10	0	1	2	3	4	5	6	7	--
Total: 28										

- 3) Choose the menu **QoS > Class of Service > Scheduler Settings** to load the following page. Select the port 1/0/3 and set the scheduler type of TC-0 and TC-1 as Weighted. Specify the queue weight of TC-0 as 1 and specify the queue weight of TC-1 as 5. Click **Apply**.




Figure 6-4 Configuring the Egress Queue

Scheduler Config

UNIT1 LAGS


2 4 6 8 10 12 14 16 18 20 22 24 26 28

1 3 5 7 9 11 13 15 17 19 21 23 25 27

 Selected  Unselected  Not Available

Port 1/0/3

<input type="checkbox"/>	Queue TC-id	Scheduler Type	Queue Weight	Minimum Bandwidth	Management Type
		Weighted	5		
<input type="checkbox"/>	0	Weighted	1	0%	Taildrop
<input checked="" type="checkbox"/>	1	Weighted	5	0%	Taildrop
<input type="checkbox"/>	2	Weighted	1	0%	Taildrop
<input type="checkbox"/>	3	Weighted	1	0%	Taildrop
<input type="checkbox"/>	4	Weighted	1	0%	Taildrop
<input type="checkbox"/>	5	Weighted	1	0%	Taildrop
<input type="checkbox"/>	6	Weighted	1	0%	Taildrop
<input type="checkbox"/>	7	Weighted	1	0%	Taildrop
Total: 8		1 entry selected.			Cancel <input type="button" value="Apply"/>

- 4) Click  Save to save the settings.

6.1.4 Using the CLI

- 1) Set the trust mode of port 1/0/1 as untrusted and specify the 802.1p priority as 1.

```
Switch_A#configure
```

```
Switch_A(config)#interface gigabitEthernet 1/0/1
```

```
Switch_A(config-if)#qos trust mode untrust
```

```
Switch_A(config-if)#qos port-priority 1
```

```
Switch_A(config-if)#exit
```

- 2) Set the trust mode of port 1/0/2 as untrusted and specify the 802.1p priority as 0.

```
Switch_A(config)#interface gigabitEthernet 1/0/2
```

```
Switch_A(config-if)#qos trust mode untrust
```

```
Switch_A(config-if)#qos port-priority 0
```

```
Switch_A(config-if)#exit
```

- 3) Map the 802.1p priority 0 to TC-1 and map the 802.1p priority 1 to TC-0.

```
Switch_A(config)#qos cos-map 0 1
```

```
Switch_A(config)#qos cos-map 1 0
```

- 4) Set the scheduler type of TC-0 and TC-1 as Weighted for egress port 1/0/3. Specify the queue weight of TC-0 as 1 and specify the queue weight of TC-1 as 5.

```
Switch_A(config)#interface gigabitEthernet 1/0/3
```

```
Switch_A(config-if)#qos queue 0 mode wrr weight 1
```

```
Switch_A(config-if)#qos queue 1 mode wrr weight 5
```

```
Switch_A(config-if)#end
```

```
Switch_A#copy running-config startup-config
```

Verify the configurations

Verify the trust mode of the port:

```
Switch_A#show qos trust interface
```

Port	Trust Mode	LAG
-----	-----	-----
Gi1/0/1	untrust	N/A
Gi1/0/2	untrust	N/A
Gi1/0/3	untrust	N/A
Gi1/0/4	untrust	N/A
...		

Verify the port to 802.1p mappings:

```
Switch_A#show qos port-priority interface
```

Port	CoS Value	LAG
-----	-----	-----
Gi1/0/1	CoS 1	N/A
Gi1/0/2	CoS 0	N/A
Gi1/0/3	CoS 0	N/A
Gi1/0/4	CoS 0	N/A
...		

Verify the 802.1p to queue mappings:

```
Switch_A#show qos cos-map
```

```
-----+-----+-----+-----+-----+-----+-----+-----+-----
Tag |0   |1   |2   |3   |4   |5   |6   |7
-----+-----+-----+-----+-----+-----+-----+-----+-----
TC  |TC1 |TC0 |TC2 |TC4 |TC4 |TC5 |TC6 |TC7
-----+-----+-----+-----+-----+-----+-----+-----+-----
```

Verify the scheduler mode of the egress port:

```
Switch_A#show qos queue interface gigabitEthernet 1/0/3
```

```
Gi1/0/3----LAG: N/A
```

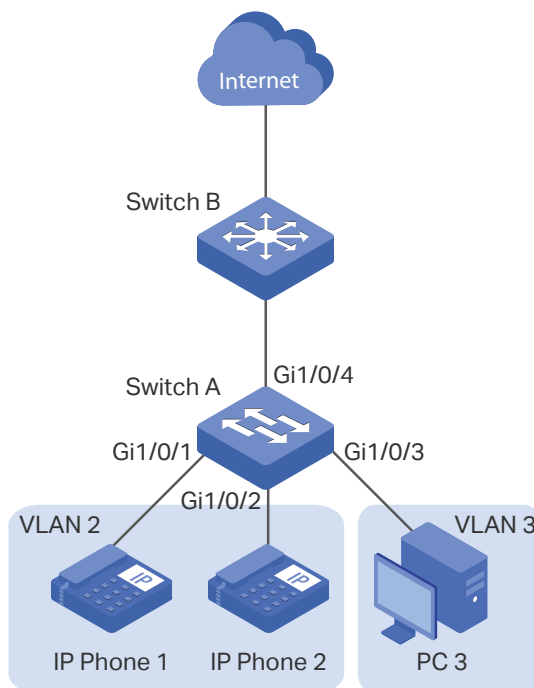
Queue	Schedule Mode	Weight	Min Bandwidth(%)
TC0	WRR	1	0%
TC1	WRR	5	0%
TC2	WRR	1	0%
TC3	WRR	1	0%
TC4	WRR	1	0%
TC5	WRR	1	0%
TC6	WRR	1	0%
TC7	WRR	1	0%

6.2 Example for Voice VLAN

6.2.1 Network Requirements

As shown below, the company plans to install IP phones in the office area. To ensure the good voice quality, IP phones and the computers will be connected to the different ports of the switch, and the voice traffic requires a higher priority than the data traffic.

Figure 6-5 Voice VLAN Application Topology



6.2.2 Configuration Scheme

To implement this requirement, you can configure Voice VLAN to ensure that the voice traffic can be transmitted in the same VLAN and the data traffic is transmitted in another VLAN. In addition, specify the priority to make the voice traffic can take precedence when the congestion occurs.

- 1) Configure 802.1Q VLAN for port 1/0/1, port 1/0/2, port 1/0/3 and port 1/0/4.
- 2) Configure Voice VLAN feature on port 1/0/1 and port 1/0/2.

Demonstrated with T2600G-28TS, the following sections provide configuration procedure in two ways: using the GUI and using the CLI.

6.2.3 Using the GUI

- 1) Choose the menu **L2 FEATURES > VLAN > 802.1Q VLAN > VLAN Config** and click **+ Add** to load the following page. Create VLAN 2 and add untagged port 1/0/1, port 1/0/2 and port 1/0/4 to VLAN 2. Click **Create**.

Figure 6-6 Configuring VLAN 2

VLAN Config

VLAN ID: (2-4094, format: 2,4-5,8)

VLAN Name: (1-16 characters)

Untagged Ports

Port: (Format: 1/0/1, input or choose below)

UNIT1
LAGS

Select All

2

4

6

8

10

12

14

16

18

20

22

24

26

28

1

3

5

7

9

11

13

15

17

19

21

23

25

27

Selected

Unselected

Not Available

Tagged Ports

Port: (Format: 1/0/1, input or choose below)

UNIT1
LAGS

Select All

2

4

6

8

10

12

14

16

18

20

22

24

26

28

1

3

5

7

9

11

13

15

17

19

21

23

25

27

Selected

Unselected

Not Available

Cancel

Create

- 2) Click **Add** to load the following page. Create VLAN 3 and add untagged port 1/0/3 and port 1/0/4 to VLAN 3. Click **Create**.

Figure 6-7 Configuring VLAN 3

VLAN Config

VLAN ID: (2-4094, format: 2,4-5,8)

VLAN Name: (1-16 characters)

Untagged Ports

Port: (Format: 1/0/1, input or choose below)

UNIT1
LAGS

Select All

2

4

6

8

10

12

14

16

18

20

22

24

26

28

1

3

5

7

9

11

13

15

17

19

21

23

25

27

+ Selected

+ Unselected

+ Not Available

Tagged Ports

Port: (Format: 1/0/1, input or choose below)

UNIT1
LAGS

Select All

2

4

6

8

10

12

14

16

18

20

22

24

26

28

1

3

5

7

9

11

13

15

17

19

21

23

25

27

+ Selected

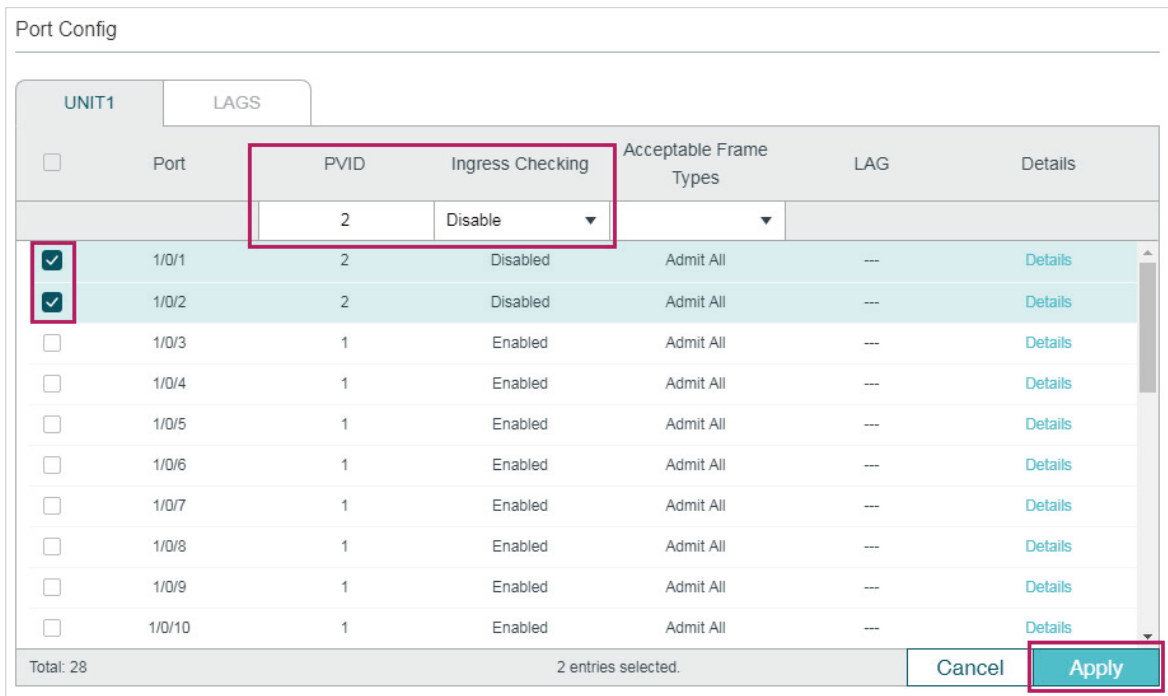
+ Unselected

+ Not Available

Cancel
Create

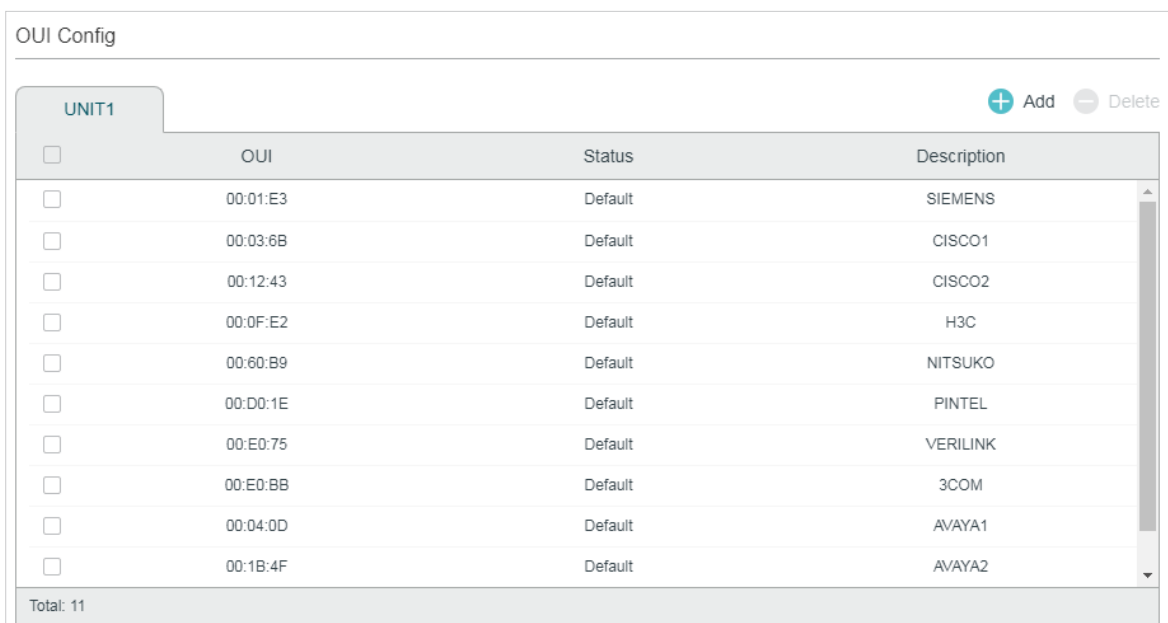
- 3) Choose the menu **L2 FEATURES > VLAN > 802.1Q VLAN > Port Config** to load the following page. Disable the Ingress Checking feature on port 1/0/1 and port 1/0/2 and specify the PVID as 2. Click **Apply**.

Figure 6-8 Specifying the Parameters of the Ports



- 4) Choose the menu **QoS > Voice VLAN > OUI Config** to load the following page. Check the OUI table.

Figure 6-9 Checking the OUI Table



- 5) Choose the menu **QoS > Voice VLAN > Global Config** to load the following page. Enable Voice VLAN globally. Specify the VLAN ID as 2 and set the priority as 7. Click **Apply**.

Figure 6-10 Configuring Voice VLAN Globally

Global Config

Voice VLAN: Enable

VLAN ID: (2-4094)

Priority:

- 6) Choose the menu **QoS > Voice VLAN > Port Config** to load the following page. Enable Voice VLAN on port 1/0/1 and port 1/0/2. Click **Apply**.

Figure 6-11 Enabling Voice VLAN on Ports

Port Config

UNIT1 LAGS

<input type="checkbox"/>	Port	Voice VLAN	Operational Status
<input checked="" type="checkbox"/>	1/0/1	Enabled	Inactive
<input checked="" type="checkbox"/>	1/0/2	Enabled	Inactive
<input type="checkbox"/>	1/0/3	Disabled	Inactive
<input type="checkbox"/>	1/0/4	Disabled	Inactive
<input type="checkbox"/>	1/0/5	Disabled	Inactive
<input type="checkbox"/>	1/0/6	Disabled	Inactive
<input type="checkbox"/>	1/0/7	Disabled	Inactive
<input type="checkbox"/>	1/0/8	Disabled	Inactive
<input type="checkbox"/>	1/0/9	Disabled	Inactive
<input type="checkbox"/>	1/0/10	Disabled	Inactive

Total: 28 2 entries selected.

- 7) Click  Save to save the settings.

6.2.4 Using the CLI

- 1) Create VLAN 2 and add untagged port 1/0/1, port 1/0/2 and port 1/0/4 to VLAN 2.

```
Switch_A#configure
```

```
Switch_A(config)#vlan 2
```

```
Switch_A(config-vlan)#name VoiceVLAN
```

```
Switch_A(config-vlan)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/1
```

```
Switch_A(config-if)#switchport general allowed vlan 2 untagged
```

```
Switch_A(config-if)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/2
```

```
Switch_A(config-if)#switchport general allowed vlan 2 untagged
Switch_A(config-if)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/4
```

```
Switch_A(config-if)#switchport general allowed vlan 2 untagged
Switch_A(config-if)#exit
```

- 2) Create VLAN 3 and add untagged port 1/0/3 and port 1/0/4 to VLAN 3.

```
Switch_A(config)#vlan 3
```

```
Switch_A(config-vlan)#name VLAN3
```

```
Switch_A(config-vlan)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/3
```

```
Switch_A(config-if)#switchport general allowed vlan 3 untagged
```

```
Switch_A(config-if)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/4
```

```
Switch_A(config-if)#switchport general allowed vlan 3 untagged
```

```
Switch_A(config-if)#exit
```

- 3) Disable the Ingress Checking feature on port 1/0/1 and port 1/0/2 and specify the PVID as 2.

```
Switch_A(config)#interface gigabitEthernet 1/0/1
```

```
Switch_A(config-if)#no switchport check ingress
```

```
Switch_A(config-if)#switchport pvid 2
```

```
Switch_A(config-if)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/2
```

```
Switch_A(config-if)#no switchport check ingress
```

```
Switch_A(config-if)#switchport pvid 2
```

```
Switch_A(config-if)#exit
```

- 4) Check the OUI table.

```
Switch(config)#show voice vlan oui
```

```
00:01:E3   Default   SIEMENS
```

```
00:03:6B   Default   CISCO1
```

```
00:12:43   Default   CISCO2
```

```
00:0F:E2   Default   H3C
```

```

00:60:B9   Default   NITSUKO
00:D0:1E   Default   PINTEL
00:E0:75   Default   VERILINK
00:E0:BB   Default   3COM
00:04:0D   Default   AVAYA1
00:1B:4F   Default   AVAYA2
00:04:13   Default   SNOM

```

- 5) Enable Voice VLAN globally. Specify the VLAN ID as 2 and set the priority as 7.

```
Switch_A(config)#voice vlan 2
```

```
Switch_A(config)#voice vlan priority 7
```

- 6) Enable Voice VLAN on port 1/0/1 and port 1/0/2.

```
Switch_A(config)#interface gigabitEthernet 1/0/1
```

```
Switch_A(config-if)#voice vlan
```

```
Switch_A(config-if)#exit
```

```
Switch_A(config)#interface gigabitEthernet 1/0/2
```

```
Switch_A(config-if)#voice vlan
```

```
Switch_A(config-if)#end
```

```
Switch_A#copy running-config startup-config
```

Verify the configurations

Verify the basic VLAN configuration:

```
Switch_A(config)#show vlan brief
```

VLAN	Name	Status	Ports
1	System-VLAN	active	Gi1/0/1, Gi1/0/2, Gi1/0/3, Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, Gi1/0/10, Gi1/0/11, Gi1/0/12, Gi1/0/13, Gi1/0/14, Gi1/0/15, Gi1/0/16, Gi1/0/17, Gi1/0/18, Gi1/0/19, Gi1/0/20, Gi1/0/21, Gi1/0/22, Gi1/0/23, Gi1/0/24, Gi1/0/25, Gi1/0/26, Gi1/0/27, Gi1/0/28

2	VoiceVLAN	active	Gi1/0/1, Gi1/0/2, Gi1/0/4
3	VLAN3	active	Gi1/0/3, Gi1/0/4

Verify the Voice VLAN configuration:

```
Switch_A(config)#show voice vlan interface
```

```
Voice VLAN ID      2
```

```
Priority           7
```

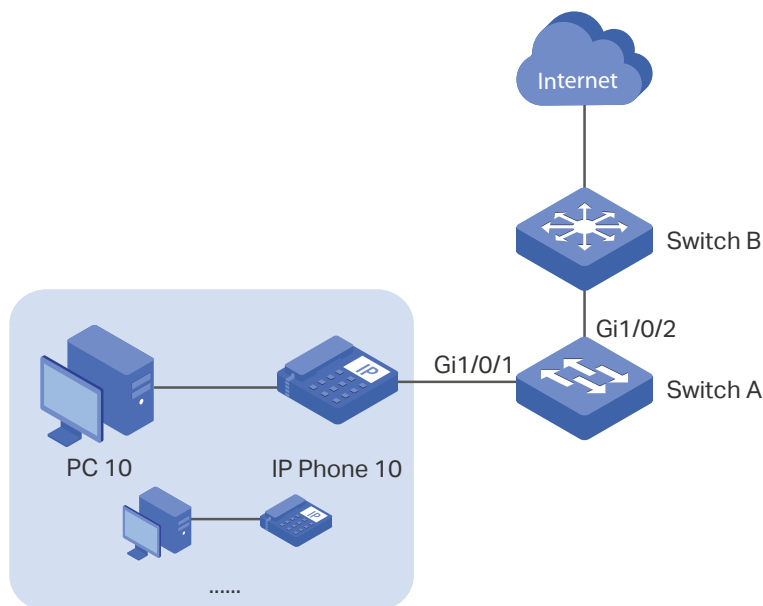
Interface	Voice VLAN Mode	Operational Status	LAG
-----	-----	-----	---
Gi1/0/1	enabled	Up	N/A
Gi1/0/2	enabled	Up	N/A
Gi1/0/3	disabled	Down	N/A
Gi1/0/4	disabled	Down	N/A
Gi1/0/5	disabled	Down	N/A
...			
Gi1/0/28	disabled	Down	N/A

6.3 Example for Auto VoIP

6.3.1 Network Requirements

As shown below, the company plans to install IP phones in the office area. IP phones share switch ports used by computers, because no more ports are available for IP phones. To ensure the good voice quality, the voice traffic requires a higher priority than the data traffic.

Figure 6-12 Auto VoIP Application Topology



6.3.2 Configuration Scheme

To optimize voice traffic, configure Auto VoIP and LLDP-MED to instruct IP Phones to send traffic with desired DSCP priority. Voice traffic is put in the desired queue and data traffic is put in other queues according to the Class of Service configurations. Make sure that the voice traffic can take precedence when congestion occurs.

- 1) Enable the Auto VoIP feature and configure the DSCP value of ports.
- 2) Configure Class of Service.
- 3) Enable LLDP-MED and configure the corresponding parameters.

Demonstrated with T2600G-28TS, the following sections provide configuration procedure in two ways: using the GUI and using the CLI.

6.3.3 Using the GUI

Auto VoIP configurations for port1/0/1 and other ports connected to the IP phone are the same, the following configuration procedures take port 1/0/1 as example.

- 1) Choose the menu **QoS > Auto VoIP** to load the following page. Enable Auto VoIP globally and specify the DSCP value of port 1/0/1 as 63. Click **Apply**.

Figure 6-13 Configuring Auto VoIP

Global Config

Auto VoIP: Enable

Port Config

UNIT1

<input type="checkbox"/>	Port	Interface Mode	Value	CoS Override Mode	Operational Status	DSCP Value
<input checked="" type="checkbox"/>	1/0/1	Disable	0	Disabled	Disabled	63
<input type="checkbox"/>	1/0/2	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/3	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/4	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/5	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/6	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/7	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/8	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/9	Disable	0	Disabled	Disabled	0
<input type="checkbox"/>	1/0/10	Disable	0	Disabled	Disabled	0

Total: 28 1 entry selected.

- Choose the menu **QoS > Class of Service > Port Priority** to load the following page. Set the trust mode of port 1/0/1 as trust DSCP. Click **Apply**.

Figure 6-14 Configuring Port Priority

Port Priority Config

UNIT1 LAGS

<input type="checkbox"/>	Port	802.1p Priority	Trust Mode	LAG
<input checked="" type="checkbox"/>	1/0/1	0	Trust DSCP	--
<input type="checkbox"/>	1/0/2	0	Untrusted	--
<input type="checkbox"/>	1/0/3	0	Untrusted	--
<input type="checkbox"/>	1/0/4	0	Untrusted	--
<input type="checkbox"/>	1/0/5	0	Untrusted	--
<input type="checkbox"/>	1/0/6	0	Untrusted	--
<input type="checkbox"/>	1/0/7	0	Untrusted	--
<input type="checkbox"/>	1/0/8	0	Untrusted	--
<input type="checkbox"/>	1/0/9	0	Untrusted	--
<input type="checkbox"/>	1/0/10	0	Untrusted	--

Total: 28 1 entry selected.

- Choose the menu **QoS > Class of Service > DSCP Priority** to load the following page. Select port 1/0/1 and specify the 802.1p priority as 7 for DSCP priority 63. Click **Apply**.

Figure 6-15 Specifying the 802.1p priority for DSCP priority 63

DSCP Priority Config

UNIT1 LAGS

Port 1/0/1

<input type="checkbox"/>	DSCP Priority	802.1p Priority	DSCP Remap
<input type="checkbox"/>		7	
<input type="checkbox"/>	54	6	54
<input type="checkbox"/>	55	6	55
<input type="checkbox"/>	56	7	56 cs7 (111000)
<input type="checkbox"/>	57	7	57
<input type="checkbox"/>	58	7	58
<input type="checkbox"/>	59	7	59
<input type="checkbox"/>	60	7	60
<input type="checkbox"/>	61	7	61
<input type="checkbox"/>	62	7	62
<input checked="" type="checkbox"/>	63	7	63

Total: 64 1 entry selected. Cancel Apply

- 4) Select port 1/0/1 and specify the 802.1p priority as 5 for other DSCP priorities. Click **Apply**.

Figure 6-16 Specifying the 802.1p priority for Other DSCP priorities

DSCP Priority Config

UNIT1 LAGS

2 4 6 8 10 12 14 16 18 20 22 24 26 28

1 3 5 7 9 11 13 15 17 19 21 23 25 27

Selected Unselected Not Available

Port 1/0/1

<input type="checkbox"/>	DSCP Priority	802.1p Priority	DSCP Remap
<input type="checkbox"/>		5	
<input checked="" type="checkbox"/>	54	5	54
<input checked="" type="checkbox"/>	55	5	55
<input checked="" type="checkbox"/>	56	5	56 cs7 (111000)
<input checked="" type="checkbox"/>	57	5	57
<input checked="" type="checkbox"/>	58	5	58
<input checked="" type="checkbox"/>	59	5	59
<input checked="" type="checkbox"/>	60	5	60
<input checked="" type="checkbox"/>	61	5	61
<input checked="" type="checkbox"/>	62	5	62
<input type="checkbox"/>	63	7	63

Total: 64 63 entries selected. Cancel Apply

- 5) Choose the menu **QoS > Class of Service > Scheduler Settings** to load the following page. Select port 1/0/2. Set the scheduler mode as weighted and specify the queue weight as 1 for TC-5. Click **Apply**.

Figure 6-17 Configuring the TC-5 for the Port

Scheduler Config

UNIT1 LAGS

Selected Unselected Not Available

Port 1/0/2

<input type="checkbox"/>	Queue TC-id	Scheduler Type	Queue Weight	Minimum Bandwidth	Management Type
<input type="checkbox"/>		Weighted	1		
<input type="checkbox"/>	0	Weighted	1	0%	Taildrop
<input type="checkbox"/>	1	Weighted	1	0%	Taildrop
<input type="checkbox"/>	2	Weighted	1	0%	Taildrop
<input type="checkbox"/>	3	Weighted	1	0%	Taildrop
<input type="checkbox"/>	4	Weighted	1	0%	Taildrop
<input checked="" type="checkbox"/>	5	Weighted	1	0%	Taildrop
<input type="checkbox"/>	6	Weighted	1	0%	Taildrop
<input type="checkbox"/>	7	Weighted	1	0%	Taildrop
Total: 8		1 entry selected.		Cancel	Apply

- 6) Select port 1/0/2. Set the scheduler mode as weighted and specify the queue weight as 10 for TC-7. Click **Apply**.

Figure 6-18 Configuring the TC-7 for the Port

Scheduler Config

UNIT1 LAGS

Selected Unselected Not Available

Port 1/0/2

<input type="checkbox"/>	Queue TC-id	Scheduler Type	Queue Weight	Minimum Bandwidth	Management Type
<input type="checkbox"/>		Weighted	10		
<input type="checkbox"/>	0	Weighted	1	0%	Taildrop
<input type="checkbox"/>	1	Weighted	1	0%	Taildrop
<input type="checkbox"/>	2	Weighted	1	0%	Taildrop
<input type="checkbox"/>	3	Weighted	1	0%	Taildrop
<input type="checkbox"/>	4	Weighted	1	0%	Taildrop
<input type="checkbox"/>	5	Weighted	1	0%	Taildrop
<input type="checkbox"/>	6	Weighted	1	0%	Taildrop
<input checked="" type="checkbox"/>	7	Weighted	10	0%	Taildrop

Total: 8 1 entry selected. Cancel Apply

- 7) Choose the menu **L2 FEATURES > LLDP > LLDP-MED Config > Port Config** click Detail to of port1/0/1 to load the following page. Check the boxes of all the TLVs. Click **Save**.

Figure 6-19 Configuring the TLVs

- 8) Choose the menu **L2 FEATURES > LLDP > LLDP-MED Config > Port Config** to load the following page. Enable LLDP-MED on port 1/0/1. Click **Apply**.

Figure 6-20 Enabling LLDP-MED on the Port

UNIT1	Port	LLDP-MED Status	Included TLVs
<input checked="" type="checkbox"/>	1/0/1	Enabled	Detail
<input type="checkbox"/>	1/0/2	Disabled	Detail
<input type="checkbox"/>	1/0/3	Disabled	Detail
<input type="checkbox"/>	1/0/4	Disabled	Detail
<input type="checkbox"/>	1/0/5	Disabled	Detail
<input type="checkbox"/>	1/0/6	Disabled	Detail
<input type="checkbox"/>	1/0/7	Disabled	Detail
<input type="checkbox"/>	1/0/8	Disabled	Detail
<input type="checkbox"/>	1/0/9	Disabled	Detail
<input type="checkbox"/>	1/0/10	Disabled	Detail

Total: 28 1 entry selected. [Cancel](#) [Apply](#)

- 9) Click  to save the settings.

6.3.4 Using the CLI

- 1) Enable Auto VoIP globally and specify the DSCP value of port 1/0/1 as 63.

```
Switch_A#configure
Switch_A(config)#auto-voip
Switch_A(config)#interface gigabitEthernet 1/0/1
Switch_A(config-if)#auto-voip dscp 63
Switch_A(config-if)#exit
```

- 2) Set the trust mode of port 1/0/1 as trust DSCP. Specify the 802.1p priority as 7 for DSCP priority 63 and specify 802.1p priority as 5 for other DSCP priorities.

```
Switch_A(config)#interface gigabitEthernet 1/0/1
Switch_A(config-if)#qos trust mode dscp
Switch_A(config-if)#qos dscp-map 63 7
Switch_A(config-if)#qos dscp-map 0-62 5
Switch_A(config-if)#exit
```

- 3) On port 1/0/1, set the scheduler mode as weighted and specify the queue weight as 1 for TC-5. Set the scheduler mode as weighted and specify the queue weight as 10 for TC-7.

```
Switch_A(config)#interface gigabitEthernet 1/0/1
Switch_A(config-if)#qos queue 5 mode wrr weight 1
Switch_A(config-if)#qos queue 7 mode wrr weight 10
Switch_A(config-if)#exit
```

- 4) Enable LLDP-MED on port 1/0/1 and select all the TLVs to be included in outgoing LLDPDU.

```
Switch_A(config)#interface gigabitEthernet 1/0/1
Switch_A(config-if)#lldp med-status
Switch_A(config-if)#lldp med-tlv-select all
Switch_A(config-if)#end
Switch_A#copy running-config startup-config
```

Verify the configurations

Verify the configuration of Auto VoIP:

```
Switch_A(config)#show auto-voip
```

```
Administrative Mode: Enabled
```

Verify the Auto VoIP configuration of ports:

```
Switch_A(config)#show auto-voip interface
```

```
Interface.Gi1/0/1
```

```
Auto-VoIP Interface Mode.      Disabled
```

```
Auto-VoIP COS Override.       False
```

```
Auto-VoIP DSCP Value.         63
```

```
Auto-VoIP Port Status.        Disabled
```

```
Interface.Gi1/0/2
```

```
Auto-VoIP Interface Mode.      Disabled
```

```
Auto-VoIP COS Override.       False
```

```
Auto-VoIP DSCP Value.         0
```

```
Auto-VoIP Port Status.        Disabled
```

```
Interface.Gi1/0/3
```

```
Auto-VoIP Interface Mode.      Disabled
```

```
Auto-VoIP COS Override.       False
```

```
Auto-VoIP DSCP Value.         0
```

```
Auto-VoIP Port Status.        Disabled
```

...

Verify the configuration of Class of Service:

```
Switch_A(config-if)#show qos trust interface gigabitEthernet 1/0/1
```

```
Port      Trust Mode  LAG
```

```
-----
```

```
Gi1/0/1  trust DSCP  N/A
```



```
Switch_A(config)#show qos cos-map
```

```
-----+-----+-----+-----+-----+-----+-----+-----+-----+
Tag |0   |1   |2   |3   |4   |5   |6   |7
-----+-----+-----+-----+-----+-----+-----+-----+
TC  |TC1 |TC0 |TC2 |TC3 |TC4 |TC5 |TC6 |TC7
-----+-----+-----+-----+-----+-----+-----+-----+

```

```
Switch_A(config)#show qos dscp-map interface gigabitEthernet 1/0/1
```

```
Gi1/0/1----LAG: N/A
```

```
DSCP:           0  1  2  3  4  5  6  7
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:           8  9 10 11 12 13 14 15
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:          16 17 18 19 20 21 22 23
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:          24 25 26 27 28 29 30 31
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:          32 33 34 35 36 37 38 39
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:          40 41 42 43 44 45 46 47
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----
DSCP:          48 49 50 51 52 53 54 55
DSCP to 802.1P  5  5  5  5  5  5  5  5
                -----

```

```
DSCP:          56  57  58  59  60  61  62  63
DSCP to 802.1P  5   5   5   5   5   5   5   7
                ---- ---- ---- ---- ---- ---- ----
```

Verify the configuration of LLDP-MED:

```
Switch_A(config)#show lldp interface
```

LLDP interface config:

```
gigabitEthernet 1/0/1:
```

```
  Admin Status:      TxRx
  SNMP Trap:         Disabled
  TLV                Status
  ---              -----
  Port-Description   Yes
  System-Capability  Yes
  System-Description Yes
  System-Name        Yes
  Management-Address Yes
  Port-VLAN-ID        Yes
  Protocol-VLAN-ID   Yes
  VLAN-Name          Yes
  Link-Aggregation   Yes
  MAC-Physic         Yes
  Max-Frame-Size     Yes
  Power              Yes
  LLDP-MED Status:   Enabled
  TLV                Status
  ---              -----
  Network Policy     Yes
```

Location Identification	Yes
Extended Power Via MDI	Yes
Inventory Management	Yes
...	

7 Appendix: Default Parameters

Default settings of Class of Service are listed in the following tables.

Table 7-1 Default Settings of Port Priority Configuration

Parameter	Default Setting
802.1P Priority	0
Trust Mode	Untrusted

Table 7-2 Default Settings of 802.1p to Queue Mapping

802.1p Priority	Queues (8)
0	TC1
1	TC0
2	TC2
3	TC3
4	TC4
5	TC5
6	TC6
7	TC7

Table 7-3 Default Settings of 802.1p Remap Configuration

Original 802.1p Priority	New 802.1p Priority
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7

Table 7-4 Default Settings of DSCP to 802.1p Mapping

DSCP	802.1p Priority
0 to 7	0
8 to 15	1

DSCP	802.1p Priority
16 to 23	2
24 to 31	3
32 to 39	4
40 to 47	5
48 to 55	6
56 to 63	7

Table 7-5 Default Settings of DSCP Remap Configuration

Original DSCP	New DSCP	Original DSCP	New DSCP	Original DSCP	New DSCP
0	0 be (000000)	22	22 af23 (010110)	44	44
1	1	23	23	45	45
2	2	24	24 cs3 (011000)	46	46 ef (101110)
3	3	25	25	47	47
4	4	26	26 af31 (011010)	48	48 cs6 (110000)
5	5	27	27	49	49
6	6	28	28 af32 (011100)	50	50
7	7	29	29	51	51
8	8 cs1 (001000)	30	30 af33 (011110)	52	52
9	9	31	31	53	53
10	10 af11 (001010)	32	32 cs4 (100000)	54	54
11	11	33	33	55	55
12	12 af12 (001100)	34	34 af41 (100010)	56	56 cs7 (111000)
13	13	35	35	57	57
14	14 af13 (001110)	36	36 af42 (100100)	58	58
15	15	37	37	59	59
16	16 cs2 (010000)	38	38 af43 (100110)	60	60
17	17	39	39	61	61
18	18 af21 (010010)	40	40 cs5 (101000)	62	62
19	19	41	41	63	63
20	20 af22 (010100)	42	42		
21	21	43	43		

Table 7-6 Default Settings of Scheduler Settings Configuration

Parameter	Default Setting
Scheduler Type	Weighted
Queue Weight	1
Minimum Bandwidth	0%
Management Type	Taildrop

Default settings of Class of Service are listed in the following tables.

Table 7-7 Default Settings of Bandwidth Control

Parameter	Default Setting
Ingress Rate (0-1,000,000Kbps)	0
Egress Rate (0-1,000,000Kbps)	0

Table 7-8 Default Settings of Storm Control

Parameter	Default Setting
Rate Mode	kbps
Broadcast Threshold (0-1,000,000)	0
Multicast Threshold (0-1,000,000)	0
UL-Frame Threshold (0-1,000,000)	0
Action	Drop
Recover Time	0

Default settings of Voice VLAN are listed in the following tables.

Table 7-9 Default Settings of Global Configuration

Parameter	Default Setting
Voice VLAN	Disabled
VLAN ID	None
Priority	7

Table 7-10 Default Settings of Port Configuration

Parameter	Default Setting
Voice VLAN	Disabled

Table 7-11 Default Settings of OUI Table

OUI	Status	Description
00:01:E3	Default	SIEMENS
00:03:6B	Default	CISCO1
00:12:43	Default	CISCO2
00:0F:E2	Default	H3C
00:60:B9	Default	NITSUKO
00:D0:1E	Default	PINTEL
00:E0:75	Default	VERILINK
00:E0:BB	Default	3COM
00:04:0D	Default	AVAYA1
00:1B:4F	Default	AVAYA2
00:04:13	Default	SNOM

Default settings of Auto VoIP are listed in the following tables.

Table 7-12 Default Settings of Auto VoIP

Parameter	Default Setting
Interface Mode	Disabled
Value	None
Cos Override Mode	Disabled
DSCP Value	0