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Configuration Guide

Managing 802.1Q VLAN

T1600G/T1700G/T1700X Series Switches

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1 802.1Q VLAN

VLAN (Virtual Local Area Network) is a network technique that solves broadcasting issues in local area networks. It is usually applied in the following occasions:

- To restrict broadcast domain: VLAN technique divides a big local area network into several VLANs, and all VLAN traffic remains within its VLAN. It reduces the influence of broadcast traffic in Layer 2 network to the whole network.
- To enhance network security: Devices from different VLANs cannot achieve Layer 2 communication, and thus users can group and isolate devices to enhance network security.
- For easier management: VLANs group devices logically instead of physically, so devices in the same VLAN need not be located in the same place. It eases the management of devices in the same work group but located in different places.

2 802.1Q VLAN Configuration

To complete 802.1Q VLAN configuration, follow these steps:

1) Configure PVID (Port VLAN ID) of the port;

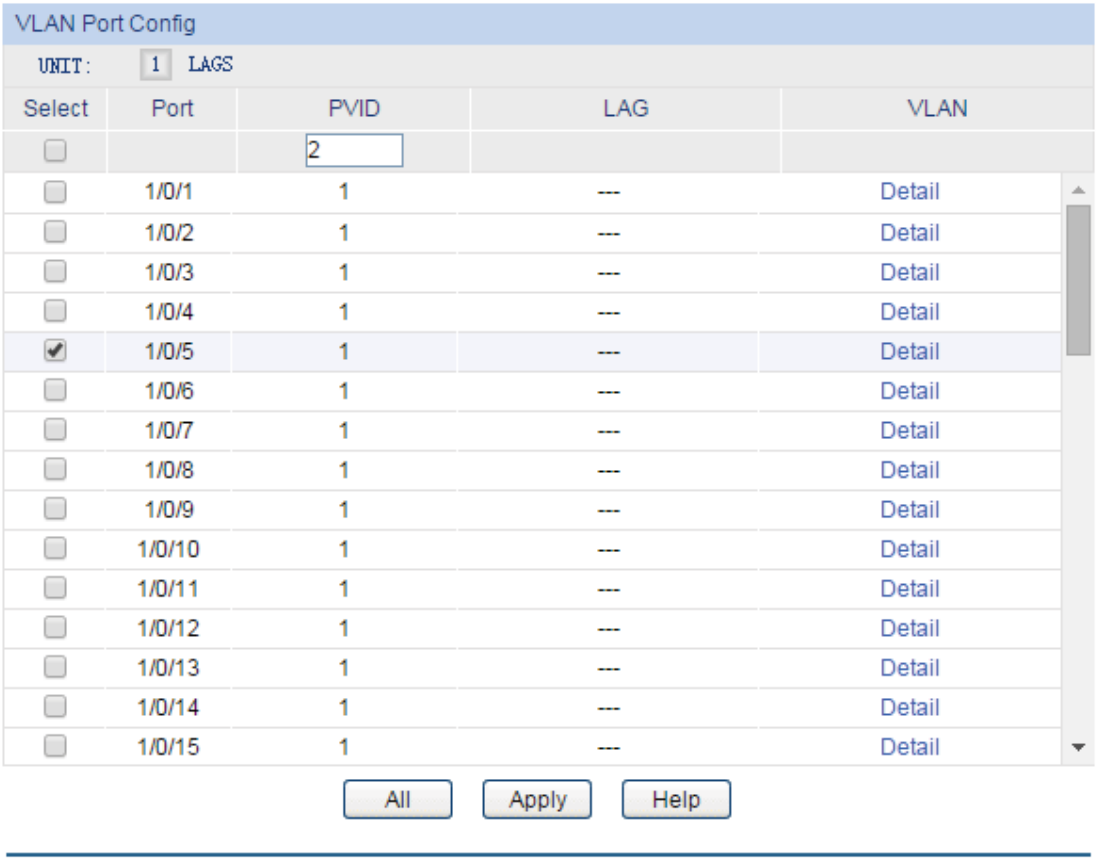
2) Configure the VLAN, including creating a VLAN and adding the configured port to the VLAN.

2.1 Using the GUI

2.1.1 Configuring the PVID of the Port

Choose the menu **VLAN > 802.1Q VLAN > Port Config** to load the following page.

Figure 2-1 Configuring the Port



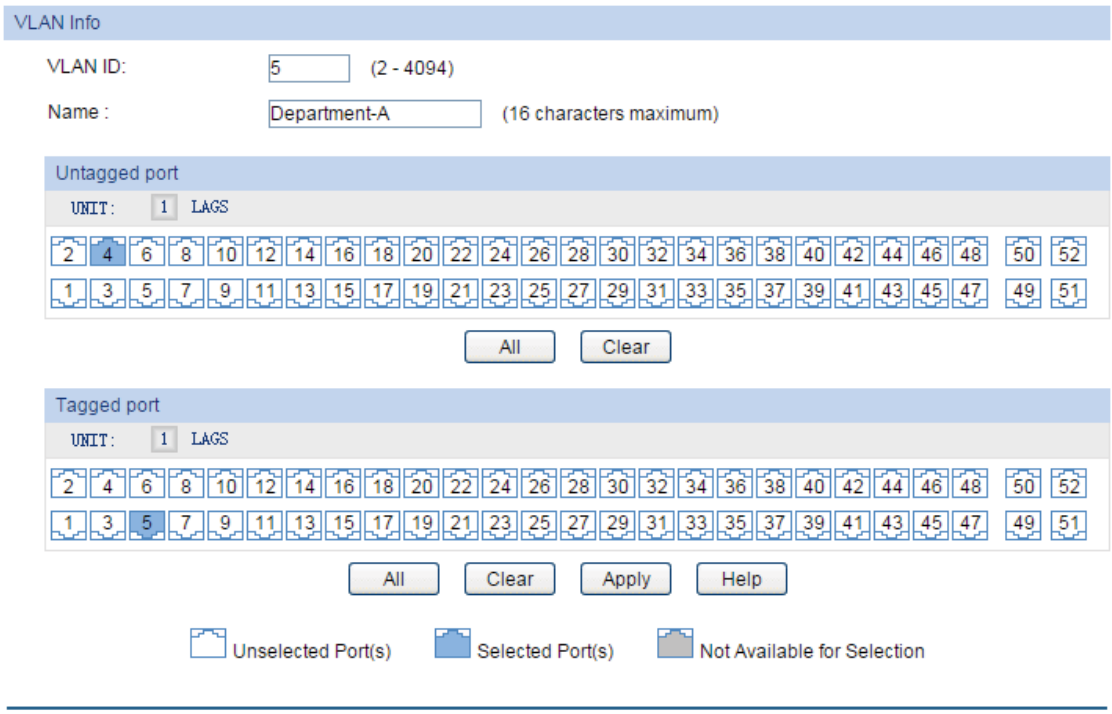
Select a port and configure its PVID. Click **Apply** to finish the configuration.

PVID	The default VLAN ID of the port with the values between 1 and 4094. It is used mainly in the following two ways: • When the port receives a tagged packet, the switch inserts a VLAN tag to the packet based on the PVID. • When the port receives a UL packet or a broadcast packet, the switch broadcasts the packet within the default VLAN.
LAG	Displays the LAG (Link Aggregation Group) which the port belongs to.
VLAN	Check details of the VLAN which the port is in.

2.1.2 Configuring the VLAN

Choose the menu **VLAN > 802.1Q VLAN > VLAN Config** and click **Create** to load the following page.

Figure 2-2 Configuring VLAN



Follow these steps to configure VLAN:

1) Enter a VLAN ID and a description for identification to create a VLAN.

VLAN ID	Enter a VLAN ID for identification with the values between 2 and 4094.
Name	Give a VLAN description for identification with up to 16 characters.

2) Select the untagged port(s) and the tagged port(s) respectively to add to the created VLAN based on the network topology.

Untagged port	The selected ports will forward untagged packets in the target VLAN.

Tagged port	The selected ports will forward tagged packets in the target VLAN.

3) Click **Apply** to make the settings effective.

2.2 Using the CLI

2.2.1 Creating a VLAN

Follow these steps to create a VLAN:

Step 1	**configure** Enter global configuration mode.
Step 2	**vlan** *vlan-list* When you enter a new VLAN ID, the switch creates a new VLAN and enters VLAN configuration mode; when you enter an existing VLAN ID, the switch directly enters VLAN configuration mode. *vlan-list*: Specify the ID or the ID list of the VLAN(s) for configuration. The ID ranges from 2 to 4094, for example, 2-3,5.
Step 3	**name** *descript* (Optional) Specify a VLAN description for identification. *descript*: The length of the description should be 1 to 16 characters.
Step 4	**show vlan** [**id** *vlan-list*] Show the global information of the specified VLAN(s). When no VLAN is specified, this command shows global information of all 802.1Q VLANs. *vlan-list*: Specify the ID or the ID list of the VLAN(s) to show information. The ID ranges from 1 to 4094.
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 create VLAN 2 and name it as RD :

Switch#configure

Switch(config)#vlan 2

Switch(config-vlan)#name RD

Switch(config-vlan)#show vlan id 2

VLAN Name Status Ports

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

2 RD active

Switch(config-vlan)#end

Switch#copy running-config startup-config

2.2.2 Configuring the PVID of the Port

Follow these steps to configure the port:

Step 1	**configure** Enter global configuration mode.
Step 2	**interface [fastEthernet** *port* **| range fastEthernet** *port-list* **| gigabitEthernet** *port* **| range gigabitEthernet** *port-list***]** Enter interface configuration mode. *port*| *port-list*: The number or the list of the Ethernet port that you want to configure.
Step 3	**switchport pvid** *vlan-id* Configure the PVID of the port(s). By default, it is 1. *vlan-id*: The default VLAN ID of the port with the values between 1 and 4094.
Step 4	**end** Return to privileged EXEC mode.
Step 5	**copy running-config startup-config** Save the settings in the configuration file.

The following example shows how to configure the PVID of port 1/0/5 as VLAN 2:

Switch#configure

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

Switch(config-if)#switchport pvid 2

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

Port Gi1/0/5:

PVID: 2

Member in LAG: N/A

Link Type: General

Member in VLAN:

Vlan	Name	Egress-rule
----	----------	---------------
1	System-VLAN	Untagged

Switch(config-if)#end

Switch#copy running-config startup-config

2.2.3 Adding the Port to the Specified VLAN

Follow these steps to add the port to the specified VLAN:

Step 1	**configure** Enter global configuration mode.
Step 2	**interface [fastEthernet** *port* **| range fastEthernet** *port-list* **| gigabitEthernet** *port* **| range gigabitEthernet** *port-list***]** Enter interface configuration mode. *port*| *port-list*: The number or the list of the Ethernet port that you want to configure.
Step 3	**switchport general allowed vlan** *vlan-list* **{** tagged **|** untagged **}** Add the port to the specified VLAN, and specify its egress rule in this VLAN. *vlan-id*: The default VLAN ID of the port with the values between 1 and 4094. tagged | untagged: Egress rule for the port.
Step 4	**show interface switchport [fastEthernet** *port* **| gigabitEthernet** *port***]** Verify the information of the port. *port*: Specify the ID of the port to show information.
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 add the port 1/0/5 to VLAN 2, and specify its egress rule as tagged:

Switch#configure

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

Switch(config-if)#switchport general allowed vlan 2 tagged

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

Port Gi1/0/5:

PVID: 2

Member in LAG: N/A

Link Type: General

Member in VLAN:

Vlan	Name	Egress-rule
1	System-VLAN	Untagged
2	rd	Tagged

Switch(config-if)#end

Switch#copy running-config startup-config

3 Example for Configuring 802.1Q VLAN

3.1 Network Requirements

- Offices of both Department A and Department B in the company are located in different places, and computers in different offices are connected to different switches.
- It is required that computers can communicate with each other in the same department but not with computers in the other department.

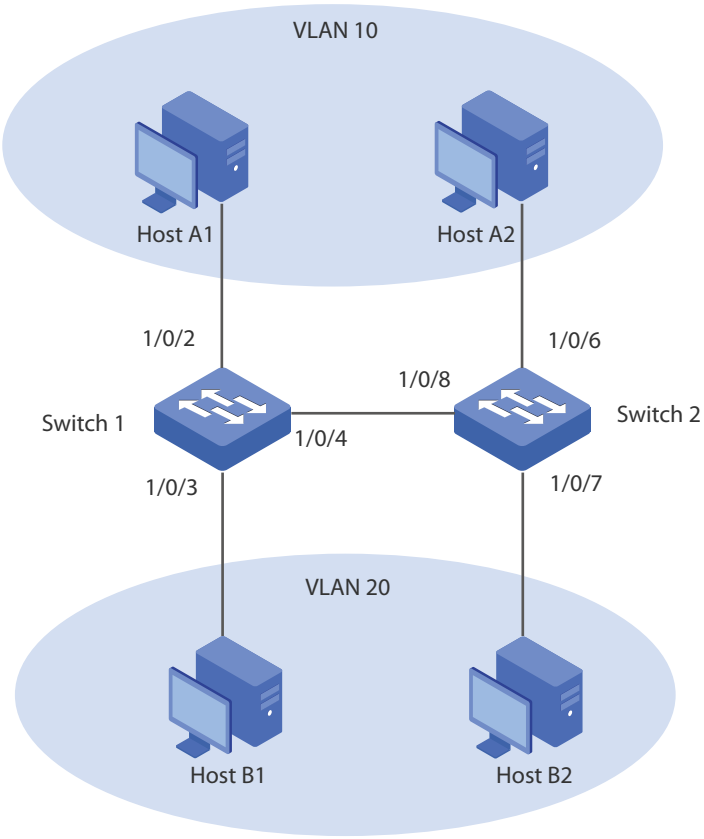
3.2 Configuration Scheme

- Divide computers in Department A and Department B into two VLANs respectively so that computers can communicate with each other in the same department but not with computers in the other department.
- Terminal devices like computers usually do not support VLAN tags. Configure the switch ports connected to the computers as Untagged. Then add the ports to the corresponding VLANs.
- The intermediate link between two switches carries traffic from two VLANs simultaneously. Configure the ports on both ends of the intermediate link as Tagged, and add the ports to both VLANs.

3.3 Network Topology

The figure below shows the network topology. Host A1 and Host A2 are used in Department A, while Host B1 and Host B2 are used in Department B. Switch 1 and Switch 2 are located in two different places. Host A1 and Host B1 are connected to port 1/0/2 and port 1/0/3 on Switch 1 respectively, while Host A2 and Host B2 are connected to port 1/0/6 and port 1/0/7 on Switch 2 respectively. Port 1/0/4 on Switch 1 is connected to port 1/0/8 on Switch 2.

Figure 3-1 Network Topology



Exampled with T1600G-52TS, the following sections provide configuration procedure in two ways: using the GUI and using the CLI.

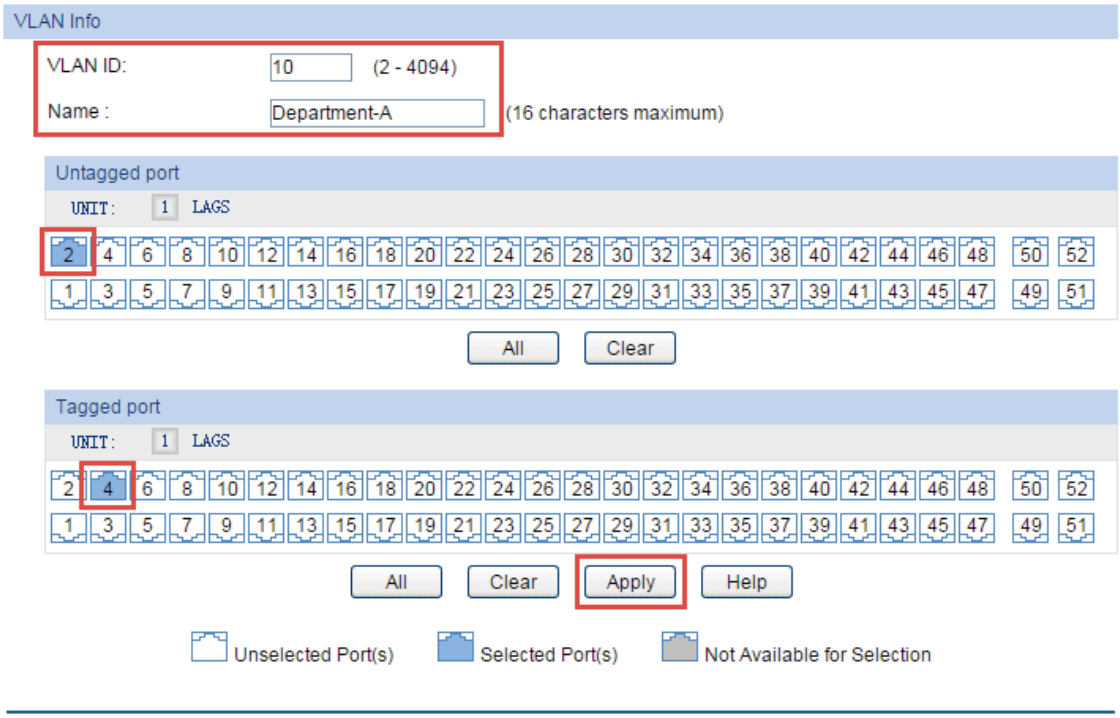
3.4 Using the GUI

Note:

The configurations of Switch 1 and Switch 2 are similar. The following introductions take Switch 1 as an example.

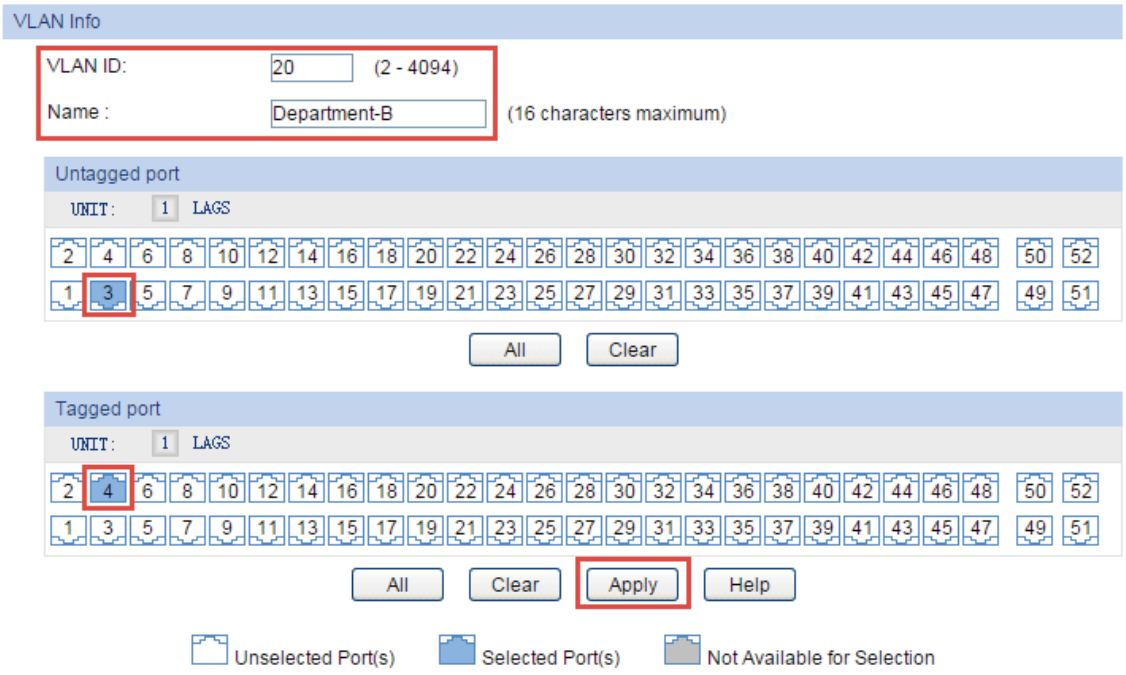
1) Choose the menu **VLAN > 802.1Q VLAN > VLAN Config** and click **Create** to load the following page. Create VLAN 10 with the description of Department-A. Add port 1/0/2 as an untagged port and port 1/0/4 as a tagged port to VLAN 10. Then click **Apply**.

Figure 3-1 Create VLAN 10 for Department A



2) Click **Create** again to load the following page. Create VLAN 20 with the description of Department-B. Add port 1/0/2 as an untagged port and port 1/0/4 as a tagged port to VLAN 20. Then click **Apply**.

Figure 3-2 Create VLAN 20 for Department B



3) Click **Save Config** to make the settings effective.

3.5 Using the CLI

Note:

The configurations of Switch 1 and Switch 2 are similar. The following introductions take Switch 1 as an example.

1) Create VLAN 10 for Department A, and configure the description as Department-A. Similarly, create VLAN 20 for Department B, and configure the description as Department-B.

Switch_1#configure

Switch_1(config)#vlan 10

Switch_1(config-vlan)#name Department-A

Switch_1(config-vlan)#exit

Switch_1(config)#vlan 20

Switch_1(config-vlan)#name Department-B

Switch_1(config-vlan)#exit

2) Set the port mode of port 1/0/2 and port 1/0/3 as Untagged, and then add port 1/0/2 to VLAN 10 and add port 1/0/3 to VLAN 20.

Switch_1(config)#interface gigabitEthernet 1/0/2

Switch_1(config-if)#switchport general allowed vlan 10 untagged

Switch_1(config-if)#exit

Switch_1(config)#interface gigabitEthernet 1/0/3

Switch_1(config-if)#switchport general allowed vlan 20 untagged

Switch_1(config-if)#exit

3) Set the port mode of port 1/0/4 as Tagged, and then add it to both VLAN 10 and VLAN 20.

Switch_1(config)#interface gigabitEthernet 1/0/4

Switch_1(config-if)#switchport general allowed vlan 10,20 tagged

Switch_1(config-if)#end

Switch_1#copy running-config startup-config

Configuration File

Switch_1#configure

Switch_1(config)#vlan 10

Switch_1(config-vlan)#name Department-A

Switch_1(config-vlan)#exit

Switch_1(config)#vlan 20

Switch_1(config-vlan)#name Department-B

Switch_1(config-vlan)#exit

Switch_1(config)#interface gigabitEthernet 1/0/2

Switch_1(config-if)#switchport general allowed vlan 10 untagged

Switch_1(config-if)#exit

Switch_1(config)#interface gigabitEthernet 1/0/3

Switch_1(config-if)#switchport general allowed vlan 20 untagged

```
Switch_1(config-if)#exit

Switch_1(config)#interface gigabitEthernet 1/0/4

Switch_1(config-if)#switchport general allowed vlan 10,20 tagged

Switch_1(config-if)#end

Switch_1#copy running-config startup-config
```

Verify the Configurations

```
Switch_1#show vlan

VLAN    Name            Status    Ports

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

1       Default 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,
                                  Gi1/0/29, Gi1/0/30, Gi1/0/31, Gi1/0/32,
                                  Gi1/0/33, Gi1/0/34, Gi1/0/35, Gi1/0/36,
                                  Gi1/0/37, Gi1/0/38, Gi1/0/39, Gi1/0/40,
                                  Gi1/0/41, Gi1/0/42, Gi1/0/43, Gi1/0/44,
                                  Gi1/0/45, Gi1/0/46, Gi1/0/47, Gi1/0/48,
                                  Gi1/0/49, Gi1/0/50, Gi1/0/51, Gi1/0/52
10      Department-A    active    Gi1/0/2, Gi1/0/4

20      Department-B    active    Gi1/0/3, Gi1/0/4
```

4 Appendix: Default Parameters

Default settings of 802.1Q VLAN are listed in the following table.

Parameter	Default Setting
VLAN ID	1
PVID	1
Egress rule	Untagged