VLAN Extended Attribute Configuration

Contents

Chapter 1 VLAN Extended Attribute Configuration

1.1 Introduction to VLAN Extended Attributes

After a packet enters the switch, the PVID of the specified port of the switch is used as the VLAN ID of the packet. In addition, the VLAN ID can be specified based on other schemes, including:

- MAC address-based VLAN
- Protocol-based VLAN
- VLAN ID conversion based on the VLAN conversion table

1.2 VLAN Extended Attribute Configuration

1.2.1 VLAN Extended Attribute Configuration List

Table 1-1 MAC address-based VLAN configuration list

Configuration Task	Description	Detailed Configuration
Configuring a MAC address-based VLAN table	Mandatory	1.2.2
Configuring the protocol-based VLAN function	Mandatory	1.2.3
Configuring the VLAN conversion function	Mandatory	1.2.4
Configuring the N:1 VLAN conversion function	Mandatory	1.2.5

1.2.2 MAC Address-Based VLAN Configuration

Packets are assigned a VLAN ID and 802.1q priority based on their source MAC addresses.

Table 1-2 MAC address-based basic VLAN configuration

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Configure the vlan-mac table and allocate the VLAN ID and priority for the corresponding MAC address based on the configuration table.	**vlan-mac-table** *mac-address vlan priority*	Optional
Delete the configured vlan-mac entries.	**no vlan-mac-table** *[mac-address]*	Optional

1.2.3 Protocol-Based VLAN Configuration

Each packet is assigned a VLAN ID based on the protocol. The above-mentioned protocol refers to the frame type (**snap-llc** and **non-snap-llc** defined in ethernetv2,802.3) and the value of the Ethernet type (for example, 0806 for ARP).

Protocol-based VLAN configuration involves:

- In global configuration mode, configure the contents in the vlan-protocol table to specify the frame type and Ethernet type. A total of 12 entries can be configured.
- In port mode, specify a VLAN ID for a vlan-protocol entry and enable the protocol-based VLAN function for the port.

Table 1-3 Protocol-based VLAN configuration

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Configure the protocol-based vlan table and match packets based on the configured protocol number.	vlan-protocol table index <id> ethertype <type> protocol <encapsulation>	OptionalA total of 12 entries can be configured.
Delete the configured protocol-based VLAN entries.	no vlan-protocol table [index <id>]	Optional
Enter the port configuration mode.	interface ethernet interface-num	N/A
Specify the VLAN IDs to be allocated to the protocol-based VLAN entries configured in global configuration mode under this port.	vlan-protocol table index <id> vlan <vid>	Optional
Delete the protocol-based VLAN entries under this port and stop allocating the VLAN ID to the protocol number specified by the entry.	no vlan-protocol table [index <id>]	Optional
Enable the protocol-based VLAN function of the port.	vlan-protocol	Optional
Disable the protocol-based VLAN function of the port.	no vlan-protocol	Optional

1.2.4 Configuring the VLAN Conversion Function

VLAN conversion covers the ingress process and egress process. Different VLAN conversion tables are used in these two processes.

Table 1-4 Configuring the VLAN conversion function

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Configure the start VLAN in the VLAN conversion table and the new VLAN ID.	**vlan-translate { ingress | egress } table** *<startvid> <endvid> <new vid>*	Optional
Delete VLAN conversion entries.	**no vlan-translate { ingress | egress } table** *[<startvid> <endvid>]*	Optional
Enter the port configuration mode.	**interface ethernet** *interface-num*	N/A
Enable the VLAN conversion function of the port and perform conversion based on the rules configured in global configuration mode.	**vlan-translate { ingress | egress }**	Optional
Disable the VLAN conversion function of the port.	**no vlan-translate { ingress | egress }**	Optional

1.2.5 Configuring the N:1 VLAN Conversion Function

The N:1 VLAN conversion function is used when users A, B, and C use VLAN A, VLAN B, and VLAN C respectively but the upstream server uses VLAN D. In this case, VLANs A to C need to be converted into VLAN D for upstream data streams and VLAN D needs to be converted into VLANs A to C for downstream data streams.

For upstream data streams, the vlan-translate egress function is required for VLAN conversion at the egress.

For downstream data streams, the following schemes can be used to configure VLAN conversion:

- Static configuration: Run the **acl** command to match the MAC and IP addresses of the user for VLAN conversion.
- Dynamic configuration: Enable DHCP Snooping for N:1 VLAN function and perform automatic matching based on the user information obtained by using the DHCP snooping function for VLAN conversion.

Table 1-5 Configuring the N:1 VLAN conversion function

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Enable the automatic N:1 VLAN conversion function for downstream data in the **dhcp-snooping** command in the system.	**dhcp-snooping nto1-vlan**	Optional (The DHCP snooping function must be first enabled.)

Disable the automatic N:1 VLAN conversion function for downstream data in the **dhcp-snooping** command in the system.	**no dhcp-snooping nto1-vlan**	Optional

1.2.6 Configuring the vlan-trunking Function

This switch supports the function of transparently transmitting packets with an unknown VLAN. It neither modifies the packets to be transparently transmitted nor learns the MAC address for the packets with an unknown VLAN.

One device can be configured with only one VLAN transparent transmission group. Each transparent transmission group includes two ports that still process the packets with an existing VLAN based on the VLAN processing flow. The packet with an unknown VLAN is directly forwarded to another port, with no other operations performed.

Table 1-6 Configuring the vlan-trunking function

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Configure a vlan-trunking group and specify two interconnection ports.	**vlan-trunking ethernet** *interface-num* **ethernet** *interface-num*	Optional
Delete the vlan-trunking group.	**no vlan-trunking**	Optional
Display the current vlan-trunking group.	**show vlan-trunking**	This command can be run in all modes.

1.2.7 Configuring the vlan-swap Function

The switch supports the vlan-swap function based on port configurations to replace the VLAN ID of the packet whose VLAN ID is within the configured range with a new VLAN ID.

The effects of the vlan-swap function are the same as those of the vlan-translate function except that the vlan-translate function is globally configured and enabled under the port and the vlan-swap function is implemented directly by using ACL resources.

Table 1-7 Configuring the vlan-swap function

Operation	Command	Remarks
Enter the global configuration mode.	**configure terminal**	N/A
Enter the port configuration mode.	**interface ethernet** *interface-num*	N/A
Modify the VLAN ID of the packet whose VLAN ID ranges from **startvid**	**vlan-swap** *<startvid> <endvid> <new vid>*	Optional

and **endvid** to a new VLAN ID.		
Delete the vlan-swap function under the port.	**no vlan-swap {all / *<startvid> <endvid> <new vid>*}**	Optional
Display information about the configured vlan-swap function.	**show vlan-swap**	This command can be run in all modes.

1.3 Configuration Instance

1) To configure a MAC address-based VLAN entry and add a tag with the VLAN ID being 5 and 802.1q priority being 4 for the untagged packet whose source MAC address is 00:01:7f:00:01:02, run the following command:
   Switch (config)#vlan-mac-table 00:01:7f:00:01:02 5 4
2) To configure a protocol-based VLAN entry and add a tag with the VLAN ID being 5 for the untagged packet with the frame type being Ethernet II, Ethernet type being 0x900, and ingress port number being 4, run the following commands:
   Switch (config)# vlan-protocol table index 0 ethertype 900 protocol ethernetv2
   Switch (config)#interface ethernet 0/0/4
   Switch (config-if-ethernet-0/0/4)#vlan-protocol table index 0 vlan 5
   Switch (config-if-ethernet-0/0/4)#vlan-protocol
3) To change the VLAN ID of the packet entering the switch from port 4 from 5 to 8, run the following commands:
   Switch (config)#vlan-translate ingress table 5 5 8
   Switch (config)#interface ethernet 0/0/4
   Switch (config-if-ethernet-0/0/4)#vlan-translate ingress
4) To configure port 1 and port 4 as the vlan-trunking port group of the device, run the following commands:
   Switch(config)#vlan-trunking ethernet 0/0/1 ethernet 0/0/4
   Switch(config)#sho vlan-trunking
   vlan trunking : ethernet 0/0/1 ethernet 0/0/4
5) To change the VLAN ID of the packets with the VLAN ID ranging from 2 to 6 and the ingress port number being 4 to 8, run the following commands:
   Switch(config-if-ethernet-0/0/4)#vlan-swap 2 6 8
   Switch(config)#show vlan-swap
   port ID original start vlan original end vlan swap vlan
   0/0/4 2 6 8
   Total entries: 1 .