# VLAN Configuration

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# Chapter 1   VLAN Configuration

## 1.1   VLAN Introduction

Virtual LAN (VLAN) refers to a group of logically networked devices on one or more LANs that are configured so that they can communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments. In 1999 IEEE established IEEE 802.1Q Protocol Standard Draft used to standardize VLAN realization project. Because VLANs are based on logical instead of physical connections, it is very flexible for user/host management, bandwidth allocation and resource optimization.

There are the following types of Virtual LANs:

●   Port-Based VLAN: each physical switch port is configured with an access list specifying membership in a set of VLANs.

●   802.1Q trunk mode is supported on the interface.

●   Access mode interface is supported.

Port-Based Vlan is to ascribe port to one subset of vlan that the switch supports. If this vlan subset has only one vlan, then this port is access port. If this vlan subset has multiple vlan, then this port is trunk port. There is one default vlan among the multiple vlan, and the vlan id is the port vlan id (PVID).

●   Vlan-allowed range is supported on the interface.

Vlan-allowed parameter is used to control vlan range that the port belongs. Vlan-untagged parameter is used to configure port to send packets without vlan tag to the corresponding vlan.

## 1.2   VLAN Configuration Task List

●   Adding/Deleting VLAN

●   Configuring switch port

●   Creating/Deleting VLAN interface

●   Monitoring configuration and state of VLAN

# 1.3   VLAN Configuration Task

## 1.3.1   Adding/Deleting VLAN

A virtual LAN, commonly known as a VLAN, is a group of hosts with a common set of requirements that communicate as if they were attached to the same wire, regardless of their physical location. A VLAN has the same attributes as a physical LAN, but it allows for end stations to be grouped together even if they are not located on the same LAN segment. A VLAN may have multiple ports and all unicast, multicast and broadcast message can only be forwarded from the same VLAN to the terminal. Each VLAN is a logistical network. If the data wants to reach another VLAN, it must be forwarded by router or bridge.

Run the following command to configure VLAN

| Run… | To… |
| --- | --- |
| **vlan** vlan-id | Enter the VLAN configuration mode. |
| **name** str | Name in the vlan configuration mode. |
| **Exit** | Exit vlan configuration mode, and establish vlan. |
| **vlan** vlan-range | Establish multiple VLANs at the same time. |
| **no vlan** vlan-id | vlan-range | Delete one or multiple VLANs. |

Vlan can perform dynamic addtion and deletion via vlan management protocol GVRP.

## 1.3.2   Configuring Switch Port

The switch port supports the following modes: access mode, trunk mode and dot1q-tunnel mode.

- The access mode indicates that this port is only subordinate to one vlan and only sends and receives untagged ethernet frame.

- The trunk mode indicates that this port is connected to other switches and can send and receive tagged ethernet frame.

- The dot1q-tunnel mode takes uncontionally the received packets as the ones without tag. The switch chip automatically adds pvid of the port as the new tag, therefore allowing switch to ignore the different vlan partitions that connected to the network. Then the packet will be delivered unchangedly to the other port in the other subnetwork of the same customer. The transparent transmission is realized in this way.

Each port has one default vlan and pvid,and all the data without vlan tag received on the port belong to the data packets of the vlan.

Trunk mode can ascribe port to multiple vlan and also can configure which kind of packet to forward and the number of vlan that belongs, that is, the packet sent on the port is tagged or untagged, and the vlan list that the port belongs.

Run the following command to configure the switch port:

| Run… | To… |
| --- | --- |

| switchport pvid *vlan-id* | Configure pvid of switch port. |
|---|---|
| **switchport mode access\|trunk\|dot1q-tunnel** | Configure port mode of the switch. |
| **switchport trunk vlan-allowed …** | Configure vlan-allowed range of switch port. |
| **switchport trunk vlan-untagged …** | Configure vlan-untagged range of switch port. |

**Note:** Not all switches support dot1q-tunnel feature. Some switches only support globally enabling/disabling this feature, and cannot configure different strategies for different ports.

The command to globally enable dot1q-tunnel is as follows:

| Command | Description |
|---|---|
| **double-tagging** | Globally enables double-tagging feature of the switch. |

The capability for switches of various models to support dot1q-tunnel is shown as follows:

| Model | Capability to suppor dot1q-tunnel |
|---|---|
| 2116 / 2224 / 2224M / 2226 / 2448B / 3224 / 3224M / 3424 / 6508 | Not support |
| 2224D | Global |
| 2448 / 2516 / 2524 / 3448 / 3512 | Interface |

For those models not listed in the table or the latest models, please consult our technicians or download the latest instructions from our website.

## 1.3.3   Creating/Deleting VLAN Interface

Vlan interface can be established to realize network management or layer 3 routing feature. The vlan interface can be used to specify ip address and mask. Run the following command to configure vlan interface:

| Run… | To… |
|---|---|
| **[no] interface vlan** *vlan-id* | Create/Delete a VLAN interface. |

## 1.3.4   Configuring Super VLAN Interface

The Super VLAN technology provides a mechanism: Hosts in different VLANs that run the same switch can be allocated in the same Ipv4 subnet; lots of IP addresses are, therefore, saved. The Super VLAN technology classifies different VLANs into a group. The VLANs in this group uses the same management interface. Hosts in the group use the same IPv4 network section and gateway. VLAN belonging to Super VLAN is called as SubVLAN. No SubVLAN can possess the management interface by configuring IP address.

You can configure a Super VLAN interface through the command line. The procedure of configuring a Super VLAN interface is shown as follows:

| Command | Description |
|---|---|
| **[no]**        **interface** | Enters the interface configuration mode . If the specified Super VLAN |

| supervlan *index* | interface does not exists, the system will create a Super VLAN interface. |
|---|---|
| | **index** is the index of Super VLAN interface. Its effective value ranges from 1 to 32. |
| | **no** means deleting Super VLAN interface. |
| [**no**] **subvlan** [*setstr*] [**add** *addstr*] [**remove** *remstr*] | Configures SubVlan in Super VLAN. The added Sub VLAN cannot possess the management interface. In original state, Super VLAN does not include Sub VLAN. Only one sub command can be used every time. |
| | **setstr** means to set the Sub VLAN list. For example, List 2,4-6 indicate VLAN 2, 4, 5 and 6. |
| | **add** means to add VLAN list in the original SubVLAN list. **addstr** means the character string whose format is the same as the above. |
| | **remove** means to delete VLAN list in the original SubVLAN list. remstr is the list's character string whose format is the same as the above. |
| | **no** means to delete all SubVLANs in SuperVLAN. The **no** command cannot be used with other sub commands. |

After you configure the Super VLAN interface, you can configure the IP address for the Super VLAN interface. The Super VLAN interface is also a routing port, which can be configured as other ports are.

### 1.3.5 Monitoring Configuration and State of VLAN

Run the following commands in EXEC mode to monitor configuration and state of VLAN:

| Run… | To… |
|---|---|
| **show vlan** [ **id** *x* | **interface** *intf* ] | Display configuration and state of VLAN. |
| **show interface** {**vlan** | **supervlan**} *x* | Display the states of vlan ports. |

## 1.4 Configuration Examples
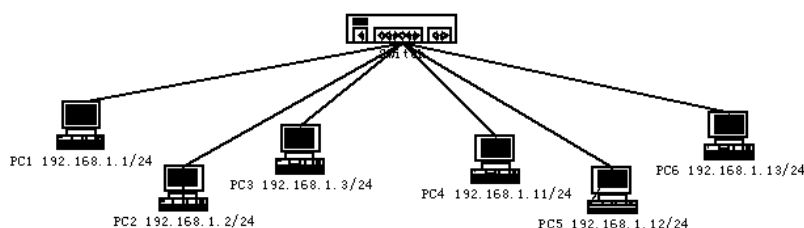


Users PC1~PC6 connect the switch through ports 1~6. The IP addresses of these PCs belong to the network section 192.168.1.0/24. Though group PC1~PC3 and group PC4~PC6 are located at different layer-2 broadcast domains, PC1~PC6 can ping each other and manage the switch through the IP address 192.168.1.100. To do this, you need to configure port 1~3 to VLAN1 and port 4~6 to VLAN. Then you need to add VLAN 1 and 2 to a SuperVlan as its SubVLANs. You need to perform the following configuration on the switch:

interface fastethernet 0/4

```
switchport pvid 2
!
interface fastethernet 0/5
switchport pvid 2
!
interface fastethernet 0/6
switchport pvid 2
!
interface supervlan 1
subvlan 1,2
ip address 192.168.1.100 255.255.255.0
ip proxy-arp subvlan
```