

# MAC-based VLAN Groups on Sx350 or Sx550 Switch using CLI

## Introduction

A Virtual Local Area Network (VLAN) allows you to logically segment a Local Area Network (LAN) into different broadcast domains. In scenarios where sensitive data may be broadcast on a network, VLANs can be created to enhance security by designating a broadcast to a specific VLAN. Only users that belong to a VLAN are able to access and manipulate the data on that VLAN. VLANs can also be used to enhance performance by reducing the need to send broadcasts and multicasts to unnecessary destinations.

**Note:** To learn how to configure the VLAN settings on your switch through the web-based utility, click [here](#). For CLI-based instructions, click [here](#).

Networking devices on which multiple protocols are running cannot be grouped to a common VLAN. Non-standard devices are used to pass traffic between different VLANs in order to include the devices participating in a specific protocol. For this reason, you cannot take advantage of the many features of VLAN.

VLAN groups are used to load balance the traffic on a Layer 2 network. The packets are distributed with respect to different classifications and are assigned to VLANs. Many different classifications exist, and if more than one classification scheme is defined, the packets are assigned to the VLAN in this order:

- Tag — The VLAN number is recognized from the tag.
- MAC-based VLAN — The VLAN is recognized from the source Media Access Control (MAC)-to-VLAN mapping of the ingress interface.
- Subnet-based VLAN — The VLAN is recognized from the source Subnet-to-VLAN mapping of the ingress interface.
- Protocol-based VLAN — The VLAN is recognized from the Ethernet type Protocol-to-VLAN mapping of the ingress interface.
- PVID — VLAN is recognized from the port default VLAN ID.

### [To configure VLAN groups on your switch, follow these guidelines:](#)

1. Create the VLANs. To learn how to configure the VLAN settings on your switch through the web-based utility, click [here](#). For CLI-based instructions, click [here](#).

2. Configure interfaces to VLANs. For instructions on how to assign interfaces to VLANs through the web-based utility of your switch, click [here](#). For CLI-based instructions, click [here](#).

**Note:** If the interface does not belong to the VLAN, the MAC-based groups to VLAN configuration setting will not take effect.

3. Configure MAC-based VLAN groups on your switch. For instructions on how to configure MAC-based VLAN Groups through the web-based utility of your switch, click [here](#).

4. (Optional) You can also configure the following:

- Subnet-based VLAN Groups Overview — For instructions on how to configure subnet-based

VLAN Groups through the web-based utility of your switch, click [here](#). For CLI-based instructions, click [here](#).

- Protocol-based VLAN Groups Overview — For instructions on how to configure Protocol-based VLAN Groups through the web-based utility of your switch, click [here](#). For CLI-based instructions, click [here](#).

## Objective

The MAC-based VLAN classification enables packets to be classified according to their source MAC address. You can then define MAC-to-VLAN mapping per interface. You can also define several MAC-based VLAN groups, which each group containing different MAC addresses. These MAC-based groups can be assigned to specific ports or LAGs. MAC-based VLAN groups cannot contain overlapping ranges of MAC addresses on the same port.

Forwarding of packets based on the MAC addresses of the devices requires setting up groups of MAC addresses and then mapping these groups to VLANs. You can configure up to 256 MAC addresses, host or range, which can be mapped to one or many MAC-based VLAN groups.

This article provides instructions on how to configure MAC-based groups on a switch through the CLI.

## Applicable Devices

- Sx350 Series
- SG350X Series
- Sx500 Series
- Sx550X Series

## Software Version

- 1.4.7.06 — Sx500
- 2.2.8.04 — Sx350, SG350X, Sx550X

## Configure MAC-based VLAN Groups on the Switch through the CLI

### Create MAC-based VLAN Group

Step 1. Log in to the switch console. The default username and password is cisco/cisco. If you have configured a new username or password, enter the credentials instead.

```
User Name:cisco
Password:*****
```

**Note:** The commands may vary depending on the exact model of your switch. In this example, the SG350X switch is accessed through Telnet.

Step 2. From the Privileged EXEC mode of the switch, enter the Global Configuration mode by entering the following:

```
SG350X#configure
```

Step 3. In the Global Configuration mode, configure a MAC-based classification rule by entering the following:

```
SG350X#configure
SG350X(config)#vlan database
SG350X(config-vlan)#
```

Step 4. To map a MAC address or range of MAC addresses to a group of MAC addresses, enter the following:

```
SG350X(config-vlan)#map mac [mac-address] [prefix-mask | host] macs-group [group-id]
```

The options are:

- **mac-address** — Specifies the MAC address to be mapped to the VLAN group. This MAC address cannot be assigned to any other VLAN group.
- **prefix-mask** — Specifies the prefix of the MAC address. Only a section of the MAC address is looked at (from left to right) and then placed in a group. The lower the length number, the fewer bits are looked at. This means you can assign a large number of MAC addresses to a VLAN group at once.
- **host** — Specifies the source host of the MAC address. The entire 48-bit MAC address is looked at and put into a group.
- **group-id** — Specifies the group number to be created. Group ID can range from one up to 2147483647.

```
SG350X#configure
SG350X(config)#vlan database
SG350X(config-vlan)#map mac 0a:1b:2c:4d:5e:6f host macs-group 1
SG350X(config-vlan)#map mac 00:11:00:22:00:00 32 macs-group 2
SG350X(config-vlan)#
```

**Note:** In this example, the MAC-based VLAN groups 1 and 2 are created. Group 1 filters the complete MAC address 0a:1b:2c:4d:5e:6f, while Group 2 filters the first 32 bits of the 00:11:00:22:00:00 MAC address.

Step 5. To exit the Interface Configuration context, enter the following:

```
SG350X(config-vlan)#exit
SG350X#configure
SG350X(config)#vlan database
SG350X(config-vlan)#map mac 0a:1b:2c:4d:5e:6f host macs-group 1
SG350X(config-vlan)#map mac 00:11:00:22:00:00 32 macs-group 2
SG350X(config-vlan)#exit
SG350X(config)#
```

You should now have configured the MAC-based VLAN groups on your switch through the CLI.

## Map MAC-based VLAN Group to VLAN

Step 1. In the Global Configuration mode, enter the Interface Configuration context by entering the following:

```
SG350X#Interface [interface-id | range interface-range]
```

The options are:

- interface-id — Specifies an interface ID to be configured.
- range interface-range — Specifies a list of VLANs. Separate nonconsecutive VLANs with a comma and no spaces. Use a hyphen to designate a range of VLANs.

```
SG350X#configure
SG350X(config)#vlan database
SG350X(config-vlan)#map mac 0a:1b:2c:4d:5e:6f host macs-group 1
SG350X(config-vlan)#map mac 00:11:00:22:00:00 32 macs-group 2
SG350X(config-vlan)#exit
SG350X(config)#interface ge1/0/12
SG350X(config-if)#
```

**Note:** In this example, interface ge1/0/12 is used.

Step 2. In the Interface Configuration context, use the **switchport mode** command to configure the VLAN membership mode:

```
SG350X(config-if)#switchport mode general
```

- general — The interface can support all functions as defined in the IEEE 802.1q specification. The interface can be a tagged or untagged member of one or more VLANs.

```
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#
```

Step 3. (Optional) To return the port to the default VLAN, enter the following:

```
SG350X(config-if)#no switchport mode general
```

Step 4. To configure a MAC-based classification rule, enter the following:

```
SG350X(config-if)#switchport general map macs-group [group] vlan [vlan-id]
```

The options are:

- group — Specifies the MAC-based group ID to filter the traffic through the port. The range is from one up to 2147483647.
- vlan-id — Specifies the VLAN ID to which the traffic from the VLAN group is forwarded. The range is from one to 4094.

**Note:** In this example, the interface is assigned to MAC-based group 1 which is mapped to VLAN 20.

```
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#switchport general map macs-group 1 vlan 20
SG350X(config-if)#
```

Step 5. To exit the Interface Configuration context, enter the following:

```
SG350X(config-if)#exit
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#switchport general map macs-group 1 vlan 20
SG350X(config-if)#exit
```

Step 6. (Optional) To remove the classification rule from the port or range of ports, enter the following:

```
SG350X(config-if)#no switchport general map mac-groups group
```

Step 7. (Optional) Repeat steps 1 to 6 to configure more general ports and assign to the corresponding MAC-based VLAN groups.

```
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#switchport general map macs-group 1 vlan 20
SG350X(config-if)#exit
SG350X(config)#interface range ge1/0/13-20
SG350X(config-if-range)#switchport mode general
SG350X(config-if-range)#switchport general map macs-group 2 vlan 30
SG350X(config-if-range)#
```

**Note:** In this example, interfaces that range from ge1/0/13 to 20 are assigned to MAC-based group 2 and assigned to VLAN 30.

Step 8. Enter the **end** command to go back to the Privileged EXEC mode:

```
SG350X(config-if-range)#end
SG350X#configure
SG350X(config)#vlan database
SG350X(config-vlan)#map mac 0a:1b:2c:4d:5e:6f host macs-group 1
SG350X(config-vlan)#map mac 00:11:00:22:00:00 32 macs-group 2
SG350X(config-vlan)#exit
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#switchport general map macs-group 1 vlan 20
SG350X(config-if)#exit
SG350X(config)#interface range ge1/0/13-20
SG350X(config-if-range)#switchport mode general
SG350X(config-if-range)#switchport general map macs-group 2 vlan 30
SG350X(config-if-range)#end
SG350X#
```

You should now have mapped MAC-based VLAN groups to the VLANs on your switch through the CLI.

## Show MAC-based VLAN Groups

Step 1. To display the MAC addresses that belong to the defined MAC-based classification rules, enter the following in the Privileged EXEC mode:

```
SG350X#show vlan macs-groups
SG350X(config)#interface ge1/0/12
SG350X(config-if)#switchport mode general
SG350X(config-if)#switchport general map macs-group 1 vlan 20
SG350X(config-if)#exit
SG350X(config)#interface range ge1/0/13-20
SG350X(config-if-range)#switchport mode general
SG350X(config-if-range)#switchport general map macs-group 2 vlan 30
SG350X(config-if-range)#end
```

Step 2. (Optional) To display the classification rules of a specific port on the VLAN, enter the following:

```
SG350X#show interfaces switchport [interface-id]
```

- interface-id — Specifies an interface ID.

**Note:** Each port mode has its own private configuration. The **show interfaces switchport command** displays all these configurations, but only the port mode configuration that corresponds to the current port mode displayed in Administrative Mode area is active.

```
SG350X#show interfaces switchport ge1/0/13
Gathering information...

Name: gi1/0/13
Switchport: enable
Administrative Mode: general
Operational Mode: up
Access Mode VLAN: 1
Access Multicast TV VLAN: none
Trunking Native Mode VLAN: 1
Trunking VLANs: 1,30
General PVID: 1
General VLANs: none
General Egress Tagged VLANs: none
General Forbidden VLANs: none
General Ingress Filtering: enabled
General Acceptable Frame Type: all
General GVRP status: disabled
Customer Mode VLAN: none
Customer Multicast TV VLANs: none
Private-vlan promiscuous-association primary VLAN: none
Private-vlan promiscuous-association Secondary VLANs: none
Private-vlan host-association primary VLAN: none
Private-vlan host-association Secondary VLAN: none

Classification rules:

Classification type Group ID VLAN ID
-----
MAC                2          30

SG350X#
```

**Note:** In this example, the administrative and operational statuses of interface ge1/0/13 are displayed. The Classification rules table shows that the interface has been mapped to a MAC-based VLAN Group 2 and its traffic will be forwarded to VLAN 30.

Step 3. (Optional) In the Privileged EXEC mode of the switch, save the configured settings to the startup configuration file, by entering the following:

```
SG350X#copy running-config startup-config
[SG350X] copy running-config startup-config
Overwrite file [startup-config]... (Y/N)[M] ?
```

Step 4. (Optional) Press **Y** for Yes or **N** for No on your keyboard once the Overwrite file [startup-config]... prompt appears.

```
SG350X#copy running-config startup-config
Overwrite file [startup-config]... (Y/N)[N] ?Y
16-May-2017 05:45:25 %COPY-I-FILECPY: Files Copy - source URL running-config destination
URL flash://system/configuration/startup-config
16-May-2017 05:45:28 %COPY-N-TRAP: The copy operation was completed successfully

SG350X#
```

You should now have displayed the MAC-based VLAN group and port configuration settings on your switch.

**Important:** To proceed with configuring the VLAN group settings on your switch, follow the [guidelines](#) above.