



CHAPTER 3

Configuring VLANs

This section describes how to configure a VLAN, and includes the following topics:

- [Information About VLANs, page 3-1](#)
- [Guidelines and Limitations, page 3-2](#)
- [Default Settings, page 3-3](#)
- [Configuring a VLAN, page 3-3](#)
- [Verifying a VLAN Configuration, page 3-9](#)
- [Additional References, page 3-9](#)
- [Feature History for VLANs, page 3-10](#)



Note

For information about private VLANs, see [Chapter 4, “Configuring a Private VLAN.”](#)

Information About VLANs

Physical NICs are always assigned as trunk ports, which transmit either VLAN tagged or untagged packets. A vswitch can have the following VLAN configurations:

Configuration	Description
External switch tagging (EST)	Physical NICs are untagged and all VNICs are access ports. EST is enabled by default and is used when the VLAN for the VNIC is set to 0 or left blank.
Virtual switch tagging (VST)	All physical NIC ports are tagged and VNICs are access ports. VST is enabled whenever the VNIC's VLAN is set to any value between 1 and 4094 inclusive.
Virtual machine guest tagging (VGT)	All physical NIC ports are tagged. VNICs are trunk ports. To configure VGT, the VLAN is set to 4095 on the VNIC connected to the virtual machine.

Physical ports are always trunk ports by default. The virtual machine interfaces can be either access ports or trunk ports. If a VEthernet interface is set as a trunk port, the VLAN is 4095.

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VEthernet interfaces assigned to specific VLANs are tagged with the VLAN when transmitted. A VEthernet interface that is not assigned to a specific VLAN, or assigned to VLAN 0, are transmitted as untagged on the physical NIC interfaces. On the transmit side, this is equivalent to the native VLAN available in Cisco switches. When the VLAN is not specified, it is assumed to be 0.

Table 3-1 summarizes the actions taken on packets received by the virtual ethernet module (VEM) based on VLAN tagging.

Table 3-1 VEM Action on VLAN Tagging

Port Type	Packet received	Action
Access	Tagged	The packet is dropped.
Access	Untagged	VEM adds access VLAN to the packet.
Trunk	Tagged	No action is taken on the packet.
Trunk	Untagged	VEM adds native VLAN tag to packet.

Guidelines and Limitations

This section includes the following topics:

- [Maximum Allowed VLANs and MAC Addresses per VLAN, page 3-2](#)
- [VLAN Numbering, page 3-2](#)

Maximum Allowed VLANs and MAC Addresses per VLAN

Table 3-2 lists the Cisco Nexus 1000V VLAN and MAC address limitations.

Table 3-2 Allowed VLANs and MAC Addresses per VLAN

Feature	Maximum Limit
Number of active VLANs	512
MAC addresses per VLAN within a VEM	1024

VLAN Numbering

In accordance with the IEEE 802.1Q standard, up to 4094 VLANs (numbered 1-4094) are supported in Cisco Nexus 1000V, and are organized as shown in Table 3-3.

Table 3-3 Cisco Nexus 1000V VLAN Numbering

VLANs Numbers	Range	Usage
1	Normal	Cisco Nexus 1000V default. You can use this VLAN, but you cannot modify or delete it.
2–1005	Normal	You can create, use, modify, and delete these VLANs.

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Table 3-3 Cisco Nexus 1000V VLAN Numbering (continued)

VLANs Numbers	Range	Usage
1006-4094	Extended	You can create, name, and use these VLANs. You cannot change the following parameters: <ul style="list-style-type: none"> State is always active. VLAN is always enabled. You cannot shut down these VLANs. Note The extended system ID is always automatically enabled.
3968-4047 and 4094	Internally allocated	You cannot use, create, delete, or modify these VLANs. You can display these VLANs. Cisco Nexus 1000V allocates these 80 VLANs, plus VLAN 4094, for features, like diagnostics, that use internal VLANs for their operation.



Note

For information about diagnostics, see the document, *Cisco Nexus 1000V System Management Configuration Guide, Release 4.0(4)SV1(2)*.

Default Settings

Table 3-4 lists the VLAN default settings.

Table 3-4 Default Private VLAN Setting

Parameters	Default
VLAN assignment for all interfaces and all ports configured as switchports	VLAN 1
VLAN name	VLANxxxx where xxxx represent four numeric digits (including leading zeroes) equal to the VLAN ID number.
Shut state	No shutdown
Operational state	Active
External switch tagging (EST)	Enabled
Physical ports	Trunk ports

Configuring a VLAN

This section includes the following procedures for configuring a VLAN:

- [Creating a VLAN, page 3-4](#)
- [Configuring VLAN Characteristics, page 3-6](#)

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Creating a VLAN

Use this procedure to do one of the following:

- Create a single VLAN that does not already exist.
- Create a range of VLANs that do not already exist.
- Delete an existing VLAN.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:



Note

All interfaces and all ports configured as switchports are in VLAN 1 by default.



Note

Be aware that the NX-OS commands may differ from those used in Cisco IOS.

- You are logged in to the CLI in EXEC mode.
- VLAN characteristics are configured in the VLAN submode. To configure a VLAN that is already created, see the procedure, [Configuring VLAN Characteristics, page 3-6](#).
- You are familiar with the section, [VLAN Numbering, page 3-2](#).
- Newly-created VLANs remain unused until Layer 2 ports are assigned to them.
- When you delete a specified VLAN, the ports associated to that VLAN are shut down and no traffic flows. When you delete a specified VLAN from a trunk port, only that VLAN is shut down and traffic continues to flow on all the other VLANs through the trunk port.

However, the system retains all the VLAN-to-port mapping for that VLAN, and when you reenables, or re-create, that specified VLAN, the system automatically reinstates all the *original* ports to that VLAN. Note that the static MAC addresses and aging time for that VLAN are not restored when the VLAN is reenables.

- For information about the following, see the document, *Cisco Nexus 1000V Interface Configuration Guide, Release 4.0(4)SV1(2)*.
 - Assigning Layer 2 interfaces to VLANs (access or trunk ports).
 - Configuring ports as VLAN access or trunk ports and assigning ports to VLANs.

SUMMARY STEPS

1. **config t**
2. **show vlan**
3. **{no}vlan {vlan-id | vlan-range}**
4. **exit**
5. **show vlan id <vlan-id>**
6. **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	<pre>config t</pre> <p>Example: n1000v# config t n1000v(config)#</p>	Places you in CLI Global Configuration mode.
Step 2	<pre>show vlan</pre> <p>Example: n1000v(config)# show vlan</p>	Displays the VLANs that already exist.
Step 3	<pre>{no} vlan {vlan-id vlan-range}</pre> <p>Example: n1000v(config)# vlan 5 n1000v(config-vlan)#</p> <p>Example: n1000v# config t n1000v(config)# vlan 15-20 n1000v(config-vlan)#</p> <p>Example: n1000v(config)# no vlan 3967 n1000v(config)#</p>	<p>Creates or deletes, and saves in the running configuration, a VLAN or a range of VLANs.</p> <p>To configure the VLAN, see the procedure, Configuring VLAN Characteristics, page 3-6.</p> <p>Note If you enter a VLAN ID that is already assigned, you are placed into the VLAN Configuration mode for that VLAN.</p> <p>Note If you enter a VLAN ID that is assigned to an internally allocated VLAN, the system returns an error message.</p> <p>Note From the VLAN Configuration mode, you can also create and delete VLANs.</p> <p>This example shows VLAN 5 being created.</p> <p>The VLAN is activated and you are automatically placed into a submode for configuring VLAN 5.</p> <p>This example shows the range, VLAN 15-20, being created.</p> <p>The VLANs in the range are activated, and you are automatically placed into a submode for configuring VLAN 15-20.</p> <p>Note If you create a range of VLANs that includes an unusable VLAN, all VLANs in the range are created except those that are unusable; and Cisco Nexus 1000V returns a message listing the failed VLANs.</p> <p>This example shows VLAN 3967 being deleted, using the no form of the command.</p>
Step 4	<pre>exit</pre> <p>Example: n1000v(config-vlan)# exit n1000v(config)#</p>	Exits the VLAN mode and returns you to CLI Global Configuration mode.

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	Command	Purpose
Step 5	show vlan id 5 Example: n1000v(config)# show vlan id 5	(Optional) Displays the VLAN configuration.
Step 6	copy running-config startup-config Example: n1000v(config)# copy running-config startup-config	(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

Example:

```
n1000v# config t
n1000v(config)# vlan 5
n1000v(config-vlan)# exit
n1000v(config)# show vlan id 5
```

```
VLAN Name                Status    Ports
-----                -
5      VLAN0005                active
```

VLAN Type

```
-----
5      enet
```

Remote SPAN VLAN

```
-----
Disabled
```

```
Primary  Secondary  Type          Ports
-----  -
```

```
n1000v(config)# copy run start
[#####] 100%
n1000v(config)#
```

Configuring VLAN Characteristics

Use this procedure to configure the following for a VLAN that has already been created:

- Name the VLAN.
- The operational state (active, suspend) of the VLAN.
- The VLAN media type (Ethernet).
- Shut down switching on the VLAN.

BEFORE YOU BEGIN

Before beginning this procedure, you must know or do the following:

- Some characteristics cannot be modified on some VLANs. For more information, see the [“VLAN Numbering” section on page 3-2](#).

**Note**

Commands entered in the VLAN configuration submode are immediately saved to the running configuration.

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SUMMARY STEPS

1. **config t**
2. **vlan** {*vlan-id* | *vlan-range*}
3. **name** *vlan-name*
4. **state** {**active** | **suspend**}
5. **no shutdown**
6. **exit**
7. **show vlan id**
8. **copy running-config startup-config**

DETAILED STEPS

	Command	Purpose
Step 1	config t Example: n1000v# config t n1000v(config)#	Places you into the CLI Global Configuration mode.
Step 2	vlan { <i>vlan-id</i> <i>vlan-range</i> } Example: n1000v(config)# vlan 5 n1000v(config-vlan)#	Places you into the VLAN Configuration mode for the specified VLAN. Note If the VLAN does not already exist, the system creates it and then places you in the VLAN Configuration mode for that VLAN.
Step 3	name <i>vlan-name</i> Example: n1000v(config-vlan)# name accounting	Names the VLAN and saves it in the running configuration. <ul style="list-style-type: none"> • Up to 32 alphanumeric characters • You cannot change the name of VLAN1 nor the VLANs reserved for internal use. • The default name is VLANxxxx where xxxx represent four numeric digits (including leading zeroes) equal to the VLAN ID number.
Step 4	state { active suspend } Example: n1000v(config-vlan)# state active	Changes the operational state of the VLAN and saves it in the running configuration. Allowable entries are: <ul style="list-style-type: none"> • Active (default) • Suspend While the VLAN state is suspended, the ports associated with this VLAN are shut down, and that VLAN does not pass any traffic. Note You cannot suspend the state for the default VLAN or VLANs 1006 to 4094.

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	Command	Purpose
Step 5	no shutdown Example: n1000v(config-vlan)# no shutdown	Enables VLAN switching in the running configuration. Allowable entries are: <ul style="list-style-type: none"> no shutdown (default) shutdown Note You cannot shut down the default VLAN, VLAN1, or VLANs 1006 to 4094.
Step 6	exit Example: n1000v(config-vlan)# exit n1000v(config)#	Returns you to CLI Global Configuration mode.
Step 7	show vlan [id <vlan-id>] Example: n1000v(config)# show vlan id 5	(Optional) Displays the VLAN configuration.
Step 8	copy running-config startup-config Example: n1000v(config)# copy running-config startup-config	(Optional) Saves the running configuration persistently through reboots and restarts by copying it to the startup configuration.

Example:

```
n1000v# config t
n1000v(config)# vlan 5
n1000v(config-vlan)# name accounting
n1000v(config-vlan)# state active
n1000v(config-vlan)# no shutdown
n1000v(config-vlan)# exit
n1000v(config)# show vlan brief
```

VLAN Name	Status	Ports
1 default	active	Eth2/1, Eth2/2, Eth2/3, Eth2/5 Eth2/7, Eth2/8, Eth2/9, Eth2/10 Eth2/15, Eth2/21, Eth2/22 Eth2/23, Eth2/24, Eth2/25 Eth2/46, Eth2/47, Eth2/48
5 accounting	active	
6 VLAN0006	active	
7 VLAN0007	active	
8 test	active	
9 VLAN0009	active	
10 VLAN0010	active	
50 VLAN0050	active	Eth2/6
100 trunked	active	
200 VLAN0200	active	
201 VLAN0201	active	
202 VLAN0202	active	
3966 VLAN3966	active	

n1000v(config)#

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Verifying a VLAN Configuration

Use the following commands to display and verify a VLAN configuration.

Command	Purpose
<code>show running-config vlan <vlan-id></code>	Displays VLAN information in the running configuration.
<code>show vlan [all-ports brief id <vlan-id> name <name> dot1q tag native]</code>	Displays VLAN information as specified.
<code>show vlan summary</code>	Displays a summary of VLAN information.

Example 3-1 `show vlan summary`

```
n1000v(config)# show vlan summary

Number of existing VLANs           : 13
Number of existing user VLANs      : 12
Number of existing extended VLANs  : 1

n1000v(config)#
```

Example 3-2 `show vlan brief`

```
n1000v(config)# show vlan brief

VLAN Name                Status      Ports
-----
1    default                active     Eth2/1, Eth2/2, Eth2/3, Eth2/5
                                   Eth2/7, Eth2/8, Eth2/9, Eth2/10
                                   Eth2/15, Eth2/21, Eth2/22
                                   Eth2/23, Eth2/24, Eth2/25
                                   Eth2/46, Eth2/47, Eth2/48

5    accounting             active
6    VLAN0006               active
7    VLAN0007               active
8    test                   active
9    VLAN0009               active
10   VLAN0010               active
50   VLAN0050               active     Eth2/6
100  trunked                 active
200  VLAN0200               active
201  VLAN0201               active
202  VLAN0202               active
3966 VLAN3966              active

n1000v(config)#
```

Additional References

For additional information related to implementing VLANs, see the following sections:

- [Related Documents, page 3-10](#)
- [Standards, page 3-10](#)

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Related Documents

Related Topic	Document Title
Private VLANs	Chapter 4, “Configuring a Private VLAN.”
Interfaces, VLAN interfaces (SVIs), IP addressing and port channels	<i>Cisco Nexus 1000V Interface Configuration Guide, Release 4.0(4)SV1(2)</i>
Getting Started with Cisco Nexus 1000V and the CLI	<i>Cisco Nexus 1000V Getting Started Guide, Release 4.0(4)SV1(2)</i>
System management	<i>Cisco Nexus 1000V System Management Configuration Guide, Release 4.0(4)SV1(2)</i>
Release notes	<i>Cisco Nexus 1000V Release Notes, Release 4.0(4)SV1(2)</i>
Complete command syntax, command modes, command history, defaults, usage guidelines, and examples	<i>Cisco Nexus 1000V Command Reference, Release 4.0(4)SV1(2)</i>

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

Feature History for VLANs

This section provides the release history for the VLAN feature.

Table 3-5

Feature Name	Releases	Feature Information
VLANs	4.0(4)SV1(1)	This feature was introduced.