



Configuring Voice VLAN

This chapter describes how to configure Voice VLAN on the Cisco Industrial Ethernet 2000U Series (IE 2000U) and Connected Grid Switches, hereafter referred to as *switch*.

Voice VLAN is referred to as an *auxiliary VLAN* in some Catalyst 6500 family switch documentation.



Note

For complete syntax and usage information for the commands used in this chapter, see the documents listed in the “[Related Documents](#)” section on [page 16-7](#).

This chapter includes the following sections:

- [Information About Voice VLAN, page 16-1](#)
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Information About Voice VLAN

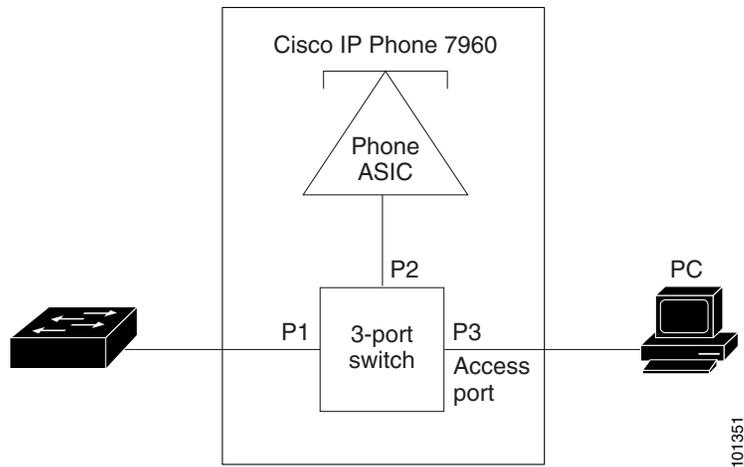
The Voice VLAN feature enables access ports to carry IP voice traffic from an IP phone.

When using a configurable IP phone, you can configure it to forward traffic with an IEEE 802.1p priority. You can also configure the switch to trust or override the traffic priority assigned by an IP phone. For example, a Cisco IP phone (such as 7960 series) contains an integrated three-port 10/100 switch as shown in [Figure 16-1](#). The ports provide dedicated connections to these devices:

- Port 1 connects to the switch or other voice-over-IP (VoIP) device.
- Port 2 is an internal 10/100 interface that carries the IP Phone traffic.
- Port 3 (access port) connects to a PC or other device.

Figure 16-1 shows one way to connect a Cisco IP phone.

Figure 16-1 Cisco 7960 IP Phone Connected to a Switch



Cisco IP Phone Voice Traffic

You can configure an access port with an attached Cisco IP phone to use one VLAN for voice traffic and another VLAN for data traffic from a device attached to the phone. You can configure access ports on the switch to send Cisco Discovery Protocol (CDP) packets.

Cisco IP Phone Data Traffic

The switch can also process tagged data traffic (traffic in IEEE 802.1Q or IEEE 802.1p frame types) from the device attached to the access port on the Cisco IP phone (see Figure 16-1). You can configure Layer 2 access ports on the switch to send CDP packets that instruct the attached phone to configure the phone access in trusted mode. In this case, all traffic received through the access port on the Cisco IP phone passes through the phone unchanged.



Note

Untagged traffic from the device attached to the Cisco IP phone passes through the phone unchanged, regardless of the trust state of the access port on the phone.

Prerequisites

- Be familiar with the information in the “[Information About Voice VLAN](#)” section on page 16-1 and “[Guidelines and Limitations](#)” section on page 16-3.
- Determine how you want the switch to process voice and data traffic.

Guidelines and Limitations

- Voice VLAN configuration is only supported on switch access ports; Voice VLAN configuration is not supported on trunk ports.



Note Trunk ports can carry any number of Voice VLANs, similar to regular VLANs. The configuration of Voice VLANs is not required on trunk ports.

Voice VLAN should be present and active on the switch for the IP phone to correctly communicate on the Voice VLAN. Use the **show vlan** privileged EXEC command to display the configured VLANs.

- You must enable CDP on the switch port connected to the Cisco IP phone to send the configuration to the phone. (CDP is globally enabled by default on all switch interfaces.)
- The Port Fast feature is automatically enabled. When you configure Voice VLAN, the Port Fast feature is disabled by default.
- If the Cisco IP phone and a device attached to the phone are in the same VLAN, they must be in the same IP subnet. These conditions indicate that they are in the same VLAN:
 - They both use IEEE 802.1p or untagged frames.
 - The Cisco IP phone uses IEEE 802.1p frames, and the device uses untagged frames.
 - The Cisco IP phone uses untagged frames, and the device uses IEEE 802.1p frames.
 - The Cisco IP phone uses IEEE 802.1Q frames, and the Voice VLAN is the same as the access VLAN.
- The Cisco IP phone and a device attached to the phone cannot communicate if they are in the same VLAN and subnet but use different frame types because traffic in the same subnet is not routed (routing would eliminate the frame type difference).
- You cannot configure static secure MAC addresses in the Voice VLAN.
- Voice VLAN ports can also be these port types:
 - Dynamic access port. (See the [“Configuring Dynamic-Access Ports on VMPS Clients”](#) section on page 6-57.)
 - IEEE 802.1x authenticated port. (See the “Configuring 802.1x Readiness Check” section within the “Configuring IEEE 802.1x Port-Based Authentication” chapter of the *Security Software Configuration Guide for Cisco IE 2000U and Connected Grid Switches*.)



Note If you enable IEEE 802.1x on an access port on which a Voice VLAN is configured and to which a Cisco IP phone is connected, the phone loses connectivity to the switch for up to 30 seconds.

- Protected port. (See the Configuring Protected Ports section within the [Configuring Port-Based Traffic Control](#) chapter of the *System Management Software Configuration Guide for Cisco IE 2000U and Connected Grid Switches*.)
- A source or destination port for a SPAN or RSPAN session.
- Secure port. (See the Configuring Port Security section within the [Configuring Port-Based Traffic Control](#) chapter of the *System Management Software Configuration Guide for Cisco IE 2000U and Connected Grid Switches*.)

**Note**

When you enable port security on an interface that is also configured with a Voice VLAN, you must set the maximum allowed secure addresses on the port to two plus the maximum number of secure addresses allowed on the access VLAN. When the port is connected to a Cisco IP phone, the phone requires up to two MAC addresses. The phone address is learned on the Voice VLAN and might also be learned on the access VLAN. Connecting a PC to the phone requires additional MAC addresses.

Default Settings

The Voice VLAN feature is disabled by default.

When the Voice VLAN feature is enabled, all untagged traffic is sent according to the default CoS priority of the port.

Configuring Voice VLAN

Because a Cisco IP phone also supports a connection to a PC or other device, a port connecting the switch to a Cisco IP phone can carry mixed traffic. You can configure a port to decide how the Cisco IP phone carries voice traffic and data traffic.

This section includes the following topics:

- [Configuring Cisco IP Phone Voice Traffic, page 16-4](#)
- [Configuring the Priority of Incoming Data Frames, page 16-5](#)

Configuring Cisco IP Phone Voice Traffic

You can configure a port connected to the Cisco IP phone to send CDP packets to the phone to configure the way in which the phone sends voice traffic. The phone can carry voice traffic in IEEE 802.1Q frames for a specified Voice VLAN with a Layer 2 CoS value. It can use IEEE 802.1p priority tagging to give voice traffic a higher priority and forward all voice traffic through the native (access) VLAN. The Cisco IP phone can also send untagged voice traffic or use its own configuration to send voice traffic in the access VLAN. In all configurations, the voice traffic carries a Layer 3 IP precedence value (the default is 5).

BEFORE YOU BEGIN

Review the [“Guidelines and Limitations”](#) section on page 16-3.

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface connected to the phone, and enter interface configuration mode.

	Command	Purpose
Step 3	switchport voice vlan { <i>vlan-id</i> dot1p none untagged }	Configure how the Cisco IP phone carries voice traffic: <ul style="list-style-type: none"> • <i>vlan-id</i>—Configure the phone to forward all voice traffic through the specified VLAN. By default, the Cisco IP phone forwards the voice traffic with an IEEE 802.1Q priority of 5. Valid VLAN IDs are 1 to 4094. • dot1p—Configure the phone to use IEEE 802.1p priority tagging for voice traffic and to use the default native VLAN (VLAN 0) to carry all traffic. By default, the Cisco IP phone forwards the voice traffic with an IEEE 802.1p priority of 5. • none—Allow the phone to use its own configuration to send untagged voice traffic. • untagged—Configure the phone to send untagged voice traffic.
Step 4	end	Return to privileged EXEC mode.
Step 5	show interfaces <i>interface-id</i> switchport or show running-config interface <i>interface-id</i>	Verify your Voice VLAN entries. Verify your QoS and Voice VLAN entries.
Step 6	copy running-config startup-config	(Optional) Save your entries in the configuration file.

To return the port to its default setting, use the **no switchport voice vlan** interface configuration command.

EXAMPLE

This example shows how to configure a port connected to a Cisco IP phone and how to use IEEE 802.1p priority tagging for voice traffic and use the default native VLAN (VLAN 0) to carry all traffic:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet0/1
Switch(config-if)# switchport voice vlan dot1p
Switch(config-if)# end
```

Configuring the Priority of Incoming Data Frames

You can connect a PC or other data device to a Cisco IP phone port. To process tagged data traffic (in IEEE 802.1Q or IEEE 802.1p frames), you can configure the switch to send CDP packets to instruct the phone how to send data packets from the device attached to the access port on the Cisco IP phone. You can configure the phone to not change (trust) or to override (not trust) the priority of frames arriving on the phone port from connected devices.

BEFORE YOU BEGIN

To set priority of incoming data frames, the switch must be running the LAN Base image.

DETAILED STEPS

	Command	Purpose
Step 1	configure terminal	Enter global configuration mode.
Step 2	interface <i>interface-id</i>	Specify the interface connected to the Cisco IP phone, and enter interface configuration mode.
Step 3	end	Return to privileged EXEC mode.
Step 4	show interfaces <i>interface-id</i> switchport	Verify your entries.
Step 5	copy running-config startup-config	(Optional) Save your entries in the configuration file.

Verifying Configuration

Command	Purpose
show interfaces <i>interface-id</i> switchport	Display Voice VLAN configuration for an interface

Configuration Example

This example shows how to configure a port connected to a Cisco IP phone and how to use IEEE 802.1p priority tagging for voice traffic, and to use the default native VLAN (VLAN 0) to carry all traffic:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet0/1
Switch(config-if)# switchport voice vlan dot1p
Switch(config-if)# end
```

This example shows how to configure a port connected to a Cisco IP phone to not change the priority of frames received from the PC or the attached device:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface gigabitethernet0/1
Switch(config-if)# end
```

To return the port to its default setting, use the **no switchport priority extend** interface configuration command.

Related Documents

- [Cisco IOS Master Command List, All Releases](#)
- [Cisco IOS Interface and Hardware Component Command Reference](#)
- [Security Software Configuration Guide for Cisco IE 2000U and Connected Grid Switches](#)
- [System Management Software Configuration Guide for Cisco IE 2000U and Connected Grid Switches](#)

Feature History

Platform	First Supported Release
IE 2000U	Cisco IOS Release 15.0(2)EH
CGS 2520 Switch	Cisco IOS Release 15.0(2)ED
Ethernet Switch Module (ESM) for CGR 2010	Cisco IOS Release 15.0(2)ED

