



Configuring Voice VLAN

This chapter describes how to configure the voice VLAN feature on your Catalyst 3550 switch. Voice VLAN is sometimes referred to as an *auxiliary VLAN* in the Catalyst 6000 family switch documentation.



Note

For complete syntax and usage information for the commands used in this chapter, see the command reference for this release.

This chapter consists of these sections:

- [Understanding Voice VLAN, page 13-1](#)
- [Configuring Voice VLAN, page 13-2](#)
- [Displaying Voice VLAN, page 13-6](#)

Understanding Voice VLAN

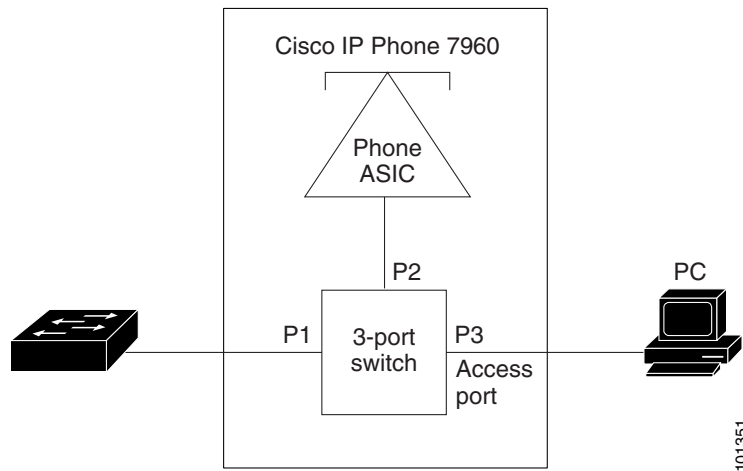
The voice VLAN feature enables access ports to carry IP voice traffic from an IP phone. The switch can connect to a Cisco 7960 IP Phone and carry IP voice traffic. Because the sound quality of an IP phone call can deteriorate if the data is unevenly sent, the switch supports quality of service (QoS) based on IEEE 802.1p class of service (CoS). QoS uses classification and scheduling to send network traffic from the switch in a predictable manner. For more information on QoS, see [Chapter 29, “Configuring QoS.”](#) The Cisco 7960 IP Phone is a configurable device, and you can configure it to forward traffic with an IEEE 802.1p priority. You can configure the switch to trust or override the traffic priority assigned by an IP Phone.

The Cisco 7960 IP Phone contains an integrated three-port 10/100 switch as shown in [Figure 13-1](#). 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 13-1 shows one way to connect a Cisco 7960 IP Phone.

Figure 13-1 Cisco 7960 IP Phone Connected to a Switch



When the IP Phone connects to the switch, the access port (PC-to-telephone jack) of the IP phone can connect to a PC. Packets to and from the PC and to or from the IP phone share the same physical link to the switch and the same switch port. For deployment examples that use voice VLANs, see the “[Network Configuration Examples](#)” section on page 1-10.

Configuring Voice VLAN

This section describes how to configure voice VLAN on access ports. It contains this configuration information:

- [Default Voice VLAN Configuration, page 13-2](#)
- [Voice VLAN Configuration Guidelines, page 13-3](#)
- [Configuring a Port to Connect to a Cisco 7960 IP Phone, page 13-3](#)

Default Voice VLAN Configuration

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.

The default CoS value is 0 for incoming traffic.

The CoS value is not trusted for IEEE 802.1p or IEEE 802.1Q tagged traffic.

The IP Phone overrides the priority of all incoming traffic (tagged and untagged) and sets the CoS value to 0.

Voice VLAN Configuration Guidelines

These are the voice VLAN configuration guidelines:

- You should configure voice VLAN on switch access ports.
- Before you enable voice VLAN, we recommend that you enable QoS on the switch by entering the **mls qos** global configuration command and configure the port trust state to trust by entering the **mls qos trust cos** interface configuration command.
- The 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 see if the VLAN is present (listed in the display). If the VLAN is not listed, see [Chapter 11, “Configuring VLANs”](#) for information on how to create the VLAN.
- The Port Fast feature is automatically enabled when voice VLAN is configured. When you disable voice VLAN, the Port Fast feature is not automatically disabled.
- 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 at least two plus the maximum number of secure addresses allowed on the access VLAN. When the port is connected to a Cisco IP phone, the IP phone requires up to two MAC addresses. The address of the IP phone is learned on the voice VLAN, and it might or might not be learned on the access VLAN. Connecting a PC to the IP phone requires additional MAC addresses.
- If any type of port security is enabled on the access VLAN, dynamic port security is automatically enabled on the voice VLAN.
- You cannot configure static secure or sticky secure MAC addresses on a 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 11-30 for more information.
 - Secure port. See the [“Configuring Port Security”](#) section on page 21-7 for more information.
 - IEEE 802.1x authenticated port. See the [“Using IEEE 802.1x with Voice VLAN Ports”](#) section on page 8-8 for more information.



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 Cisco IP Phone loses connectivity to the switch for up to 30 seconds.

- Protected port. See the [“Configuring Protected Ports”](#) section on page 21-5 for more information.

Configuring a Port to Connect to a Cisco 7960 IP Phone

Because a Cisco 7960 IP Phone also supports a connection to a PC or other device, a port connecting the switch to a Cisco 7960 IP Phone can carry mixed traffic.

You can configure the port to carry voice traffic in one of these ways:

- [Configuring Ports to Carry Voice Traffic in IEEE 802.1Q Frames, page 13-4](#)
- [Configuring Ports to Carry Voice Traffic in IEEE 802.1p Priority-Tagged Frames, page 13-4](#)

You can configure the IP phone to carry data traffic in one of these ways:

- [Overriding the CoS Priority of Incoming Data Frames, page 13-5](#)
- [Configuring the IP Phone to Trust the CoS Priority of Incoming Data Frames, page 13-6](#)

Configuring Ports to Carry Voice Traffic in IEEE 802.1Q Frames

Beginning in privileged EXEC mode, follow these steps to configure a port to carry voice traffic in IEEE 802.1Q frames for a specific VLAN:

| | Command | Purpose |
|--------|--|---|
| Step 1 | <code>configure terminal</code> | Enter global configuration mode. |
| Step 2 | <code>mls qos</code> | Enable QoS for the entire switch. |
| Step 3 | <code>interface interface-id</code> | Specify the interface connected to the IP phone, and enter interface configuration mode. |
| Step 4 | <code>mls qos trust cos</code> | Classify ingress traffic packets with packet CoS values. For untagged packets, use the port default CoS value. |
| Step 5 | <code>switchport voice vlan vlan-id</code> | Instruct the Cisco IP 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 from 1 to 4094. |
| Step 6 | <code>end</code> | Return to privileged EXEC mode. |
| Step 7 | <code>show interfaces interface-id switchport</code> or <code>show running-config interface interface-id</code> | Verify your voice VLAN entries. Verify your QoS and voice VLAN entries. |
| Step 8 | <code>copy running-config startup-config</code> | (Optional) Save your entries in the configuration file. |

To remove voice VLAN, use the `no switchport voice vlan` interface configuration command or the `switchport voice vlan none` interface configuration command.

Configuring Ports to Carry Voice Traffic in IEEE 802.1p Priority-Tagged Frames

Beginning in privileged EXEC mode, follow these steps to configure a port to instruct the IP phone to give voice traffic a higher priority and to forward all traffic through the native VLAN.

| | Command | Purpose |
|--------|-------------------------------------|--|
| Step 1 | <code>configure terminal</code> | Enter global configuration mode. |
| Step 2 | <code>mls qos</code> | Enable QoS for the entire switch. |
| Step 3 | <code>interface interface-id</code> | Specify the interface connected to the IP phone, and enter interface configuration mode. |
| Step 4 | <code>mls qos trust cos</code> | Classify ingress traffic packets with packet CoS values. For untagged packets, use the port default CoS value. |

| | Command | Purpose |
|--------|---|---|
| Step 5 | switchport voice vlan dot1p | Instruct the switch port 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. |
| Step 6 | end | Return to privileged EXEC mode. |
| Step 7 | 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 8 | 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.

Overriding the CoS Priority of Incoming Data Frames

You can connect a PC or other data device to a Cisco 7960 IP Phone port. The PC can generate packets with an assigned CoS value. You can configure the switch to override the priority of frames arriving on the IP phone port from connected devices.

Beginning in privileged EXEC mode, follow these steps to override the CoS priority received from the nonvoice port on the Cisco 7960 IP Phone:

| | Command | Purpose |
|--------|---|---|
| Step 1 | configure terminal | Enter global configuration mode. |
| Step 2 | interface <i>interface-id</i> | Enter interface configuration mode, and specify the interface connected to the IP phone. |
| Step 3 | switchport priority extend <i>cos value</i> | Set the IP phone access port to override the priority received from the PC or the attached device. The CoS value is a number from 0 to 7. Seven is the highest priority. The default is 0. |
| Step 4 | end | Return to privileged EXEC mode. |
| Step 5 | show interfaces <i>interface-id</i> switchport | Verify your entries. |
| Step 6 | copy running-config startup-config | (Optional) Save your entries in the configuration file. |

Use the **no switchport priority extend** interface configuration command or the **switchport priority extend cos 0** interface configuration command to return the port to its default setting.

Configuring the IP Phone to Trust the CoS Priority of Incoming Data Frames

You can connect a PC or other data device to a Cisco 7960 IP Phone port. The PC can generate packets with an assigned CoS value. You can configure the switch to trust the priority of frames arriving on the IP phone port from connected devices.

Beginning in privileged EXEC mode, follow these steps to trust the CoS priority received from the nonvoice port on the Cisco 7960 IP Phone:

| | Command | Purpose |
|--------|---|---|
| Step 1 | configure terminal | Enter global configuration mode. |
| Step 2 | interface <i>interface-id</i> | Enter interface configuration mode, and specify the interface connected to the IP phone. |
| Step 3 | switchport priority extend trust | Set the IP phone access port to trust the priority received from the PC or the attached device. |
| Step 4 | end | Return to privileged EXEC mode. |
| Step 5 | show interfaces <i>interface-id</i> switchport | Verify your entries. |
| Step 6 | copy running-config startup-config | (Optional) Save your entries in the configuration file. |

Use the **no switchport priority extend** interface configuration command or the **switchport priority extend cos 0** interface configuration command to return the port to its default setting.

Displaying Voice VLAN

To display voice VLAN for an interface, use the **show interfaces** *interface-id* **switchport** privileged EXEC command.

For detailed information about the fields in the display, see the command reference for this release.