



# Configuring VoIP

This chapter describes how to configure Voice-over-IP (VoIP) for the Catalyst 4500 series switches.

This chapter consists of these sections:

- [Hardware and Software Requirements, page 29-1](#)
- [Overview of IP Phones, page 29-2](#)
- [Configuring VoIP on a Switch, page 29-3](#)

## Hardware and Software Requirements

The hardware and software requirements for the Catalyst 4500 series switches and Cisco CallManager are as follows:

- Catalyst 4006, Catalyst 4500 series, Catalyst 5000 family, and Catalyst 6500 series switches running supervisor engine software release 6.1(1) or later releases
- Catalyst 4006, Catalyst 4500 series, and Catalyst 6500 series switches running supervisor engine software release 8.1 or later releases for IEEE 802.3af compliance
- Cisco CallManager release 3.0 or later releases
- If you want to utilize inline power, [Table 29-1](#) lists the Catalyst 4500 series components that support inline power.
- If you do not want to utilize inline power, then you can plug a powered device with an external power source into any 10/100 or 10/100/1000 switching module.

**Table 29-1 Catalyst 4500 Series Components Supporting Inline Power**

| Switch Chassis                 | Modules                     | Power Supplies                                |
|--------------------------------|-----------------------------|---|
| Catalyst 4006                  | WS-X4148-RJ45V <sup>1</sup> | Catalyst 4000 Family Power Entry Module (PEM) |
| Catalyst 4503<br>Catalyst 4506 | WS-X4148-RJ45V              | 1300 W AC<br>2800 W AC<br>1400 W DC           |

1. The Catalyst 4006 switch can only provide a maximum 400 W of inline power per module.

# Overview of IP Phones

Catalyst 4000, 4500, 2926G, 2948GX-TX, or 2926 series switches can connect to an IP Phone and carry IP voice traffic. If necessary, the switch can supply electrical power to the circuit connecting it to an IP Phone.

Cisco classifies three types of IP phones based on the discovery methods that are used to discover the phone:

- Legacy Cisco IP Phone—Uses a Cisco proprietary discovery method to detect an IP phone and uses “link disconnect” to verify an IP phone has been removed from the network
- Cisco/IEEE 802.3af compliant—Uses enhanced Cisco Discovery Protocol (CDP) and /or IEEE 802.3af to discover and remove an IP phone
- Third party IEEE 802.3af compliant—Uses IEEE 802.3af specified “detection of phone” to detect an IP phone and “detection of phone removed” to verify that an IP phone has been removed from the network.

An IP phone contains an integrated three-port 10/100 switch. The ports are dedicated connections as described below:

- Port 1 connects to the switch or other device that supports VoIP.
- Port 2 is an internal 10/100 interface that carries the phone traffic.
- Port 3 connects to a PC or other device.

Figure 29-1 shows one way to configure an IP Phone.

**Figure 29-1 IP Phone Connected to a Catalyst 4000 Family Switch**



When you connect an IP phone to a 10/100 port on the Catalyst 4500 series switch, you can use the *access port* (PC-to-phone jack) of the IP phone to connect a PC.

Packets to and from the PC and to and from the phone share the same physical link to the switch and the same port of the switch.

Introducing IP-based phones into existing switch-based networks raises the following issues:

- The current VLANs might be configured on an IP subnet basis and additional IP addresses might not be available to assign the phone to a port so that it belongs to the same subnet as other devices (PC) that are connected to the same port.
- The data traffic on the VLAN that supports the phones might reduce the quality of VoIP traffic.

You can resolve these issues by isolating the voice traffic onto a separate VLAN on each of the ports that are connected to a phone. The switch port that is configured for connecting a phone would have separate VLANs that are configured for carrying the following:

- Voice traffic to and from the IP phone (auxiliary VLAN)
- Data traffic to and from the PC that is connected to the switch through the access port of the IP phone (native VLAN)

Isolating the phones on a separate, auxiliary VLAN increases the quality of the voice traffic and allows a large number of phones to be added to an existing network where there are not enough IP addresses (a new VLAN requires a new subnet and a new set of IP addresses).

## Configuring VoIP on a Switch

To make an IP phone work in your voice network, you must do the following:

- Configure the auxiliary VLANs for the port.

For more information on setting the auxiliary VLANs, see the [“Configuring Auxiliary VLANs” section on page 10-13](#).

- Configure inline power if necessary.

The Catalyst 4500 series switch can sense if it is connected to a Cisco IP Phone. The Catalyst 4006 or Catalyst 4500 series switch can supply inline power to an IP Phone if there is no power on the circuit. An IP Phone can also be connected to an AC power source, in which case, the phone provides the power to the voice circuit. If there is power on the circuit, the switch does not supply it.

You can configure the switch to stop supplying power to an IP Phone and to disable the detection mechanism. See the [“Configuring Inline Power” section on page 28-18](#) for the CLI commands that you can use to supply inline power to an IP Phone.

