



Preparing to Install the Cisco Unified IP Phone on Your Network

Cisco Unified IP Phones enable you to communicate using voice over a data network. To provide this capability, the Cisco Unified IP Phones depend upon and interact with several other key Cisco Unified Communications Products, including Cisco Unified CallManager.

This chapter provides you with an important overview of the interaction between the Cisco Unified IP Phone 7905G and 7912G and other key components of the Voice over IP (VoIP) network.

This chapter includes the following topics:

- [Understanding Interactions with Other Cisco Unified Communications Products, page 2-2](#)
- [Understanding the Phone Startup Process, page 2-4](#)
- [Understanding Phone Configuration Files and Profile Files, page 2-8](#)
- [Providing Power to the Cisco Unified IP Phone, page 2-9](#)
- [Determining the MAC Address of a Cisco Unified IP Phone, page 2-12](#)
- [Adding Phones to the Cisco Unified CallManager Database, page 2-12](#)
- [Creating a SIP Profile, page 2-15](#)
- [Using Cisco Unified IP Phones with Different Protocols, page 2-17](#)

Understanding Interactions with Other Cisco Unified Communications Products

To function in the IP telephony network, the Cisco Unified IP Phone must be connected to a networking device, such as a Cisco Catalyst switch. You must also register the Cisco Unified IP Phone with a Cisco Unified CallManager system before sending and receiving calls.

This section covers the following topics:

- [Understanding How the Cisco Unified IP Phone Interacts with Cisco Unified CallManager, page 2-2](#)
- [Understanding How the Cisco Unified IP Phone Interacts with the Cisco Catalyst Family of Switches, page 2-3](#)

Understanding How the Cisco Unified IP Phone Interacts with Cisco Unified CallManager

Cisco Unified CallManager is an open and industry-standard call processing system. Cisco Unified CallManager software runs on a Windows 2000 or Linux server and sets up and tears down calls between phones, integrating traditional PBX functionality with the corporate IP network. Cisco Unified CallManager manages the components of the IP telephony system—the phones, access gateways, and the resources necessary for such features as call conferencing and route planning.

For information about configuring Cisco Unified CallManager to work with the IP devices described in this chapter, refer to *Cisco Unified CallManager Administration Guide* and *Cisco Unified CallManager System Guide*.

Related Topic

- [Chapter 5, “Configuring Telephony Features,”](#)

Understanding How the Cisco Unified IP Phone Interacts with the Cisco Catalyst Family of Switches

The Cisco Unified IP Phone 7912G has an internal Ethernet switch, enabling it to switch incoming traffic to the phone, to the access port, or to the network port. The Cisco Unified IP Phone 7905G do not include an internal Ethernet switch or an access port.

If a computer is connected to the access port, the computer and the phone share the same physical link to the switch and share the same port on the switch. This shared physical link has the following implications for the VLAN configuration on the network:

- The current VLANs may be configured on an IP subnet basis. However, additional IP addresses may not be available to assign the phone to the same subnet as other devices connected to the same port.
- Data traffic present on the VLAN supporting phones may reduce the quality of Voice-over-IP traffic.

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

- Voice traffic to and from the IP phone (auxiliary VLAN)
- Data traffic to and from the PC 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.

For more information, refer to the documentation included with the Cisco Catalyst switch.

Related Topics

- [Network and Access Ports, page 3-5](#)
- [Understanding the Phone Startup Process, page 2-4](#)
- [Network Configuration Menu Parameter Descriptions, page 4-10](#)

Understanding the Phone Startup Process

When connecting to the VoIP network, the Cisco Unified IP Phone goes through a standard startup process composed of the steps described in [Table 2-1](#).

Depending on your specific network configuration, not all of these steps may occur on your Cisco Unified IP Phone.

Table 2-1 Cisco Unified IP Phone Startup Process

Step	Configuration	Related Topics
1. Obtaining Power from the Switch	<p>You can connect the Cisco Unified IP Phone to a Cisco Catalyst switch with one of the modules that provides power to the phone (WS-X6348-RJ45V). See the “Providing Power to the Cisco Unified IP Phone” section on page 2-9 for details.</p> <p>If you use this optional configuration, the phone receives phantom power and powers up when you connect the Cisco Unified IP Phone to the switch. The phone then sends Cisco Discovery Protocol (CDP) notifications to the switch indicating that it is ready to receive CDP packets and indicating the power requirement for the phone. The switch allocates power and sends it over the network cable.</p>	<ul style="list-style-type: none"> • Understanding the Phone Startup Process, page 2-4 • Providing Power to the Cisco Unified IP Phone, page 2-9 • Resolving Startup Problems, page 7-2
2. Loading the Stored Phone Image	<p>The Cisco Unified IP Phone has non-volatile Flash memory in which it stores firmware images and user-defined preferences. At startup, the phone runs a bootstrap loader that loads a phone image stored in Flash memory. Using this image, the phone initializes its software and hardware.</p>	<ul style="list-style-type: none"> • Understanding the Phone Startup Process, page 2-4 • Resolving Startup Problems, page 7-2

Table 2-1 Cisco Unified IP Phone Startup Process (continued)

Step	Configuration	Related Topics
3. Configuring VLAN	If the Cisco Unified IP Phone is connected to a Cisco Catalyst switch, the switch next informs the phone of the voice VLAN defined on the switch. The phone needs to know its VLAN membership before it can proceed with the Dynamic Host Configuration Protocol (DHCP) request for an IP address.	<ul style="list-style-type: none"> • “Understanding the Phone Startup Process” section on page 2-4 • “Network Configuration Menu Parameter Descriptions” section on page 4-10 • “Resolving Startup Problems” section on page 7-2
4. Obtaining an IP Address	If the Cisco Unified IP Phone is using DHCP to obtain an IP address, the phone queries the DHCP server to obtain one. If you are not using DHCP in your network, you must assign a static IP address to each phone locally.	<ul style="list-style-type: none"> • “Understanding the Phone Startup Process” section on page 2-4 • “Network Configuration Menu Parameter Descriptions” section on page 4-10 • “Configuring IP Settings” section on page 4-7 • “Resolving Startup Problems” section on page 7-2

Table 2-1 Cisco Unified IP Phone Startup Process (continued)

Step	Configuration	Related Topics
5. Accessing a TFTP Server	In addition to assigning an IP address, the DHCP server directs the Cisco Unified IP Phone to a TFTP Server. If the phone has a statically defined IP address, you must configure the TFTP server locally on the phone; the phone then contacts the TFTP server directly.	<ul style="list-style-type: none"> • “Understanding the Phone Startup Process” section on page 2-4 • “Network Configuration Menu Parameter Descriptions” section on page 4-10 • “Resolving Startup Problems” section on page 7-2

Table 2-1 Cisco Unified IP Phone Startup Process (continued)

Step	Configuration	Related Topics
<p>6. Requesting the Configuration File and the Profile File</p>	<p>The TFTP server has configuration files and profile files. A configuration file includes parameters for connecting to Cisco Unified CallManager and information about which image load a phone should be running. A profile file contains various parameters and values for phone and network settings.</p>	<ul style="list-style-type: none"> • “Understanding Phone Configuration Files and Profile Files” section on page 2-8 • “Resolving Startup Problems” section on page 7-2
<p>7. Contacting Cisco Unified CallManager</p>	<p>The configuration file defines how the Cisco Unified IP Phone communicates with Cisco Unified CallManager. After obtaining the file from the TFTP server, the phone attempts to make a TCP connection to the highest priority Cisco Unified CallManager on the list.</p> <p>If the phone was manually added to the database, Cisco Unified CallManager identifies the phone. If the phone was not manually added to the database and auto-registration is enabled in Cisco Unified CallManager, the phone attempts to auto-register itself in the Cisco Unified CallManager database.</p> <p>Cisco Unified CallManager informs devices, using the following configuration file formats, of their load ID. Note that <i>mac</i> is the hexadecimal representation of the MAC address of the phone:</p> <ul style="list-style-type: none"> • For Cisco Unified IP Phone 7905G—ld<mac> or ld<mac>.x • For Cisco Unified IP Phone 7912G—gk<mac> or gk<mac>.x 	<ul style="list-style-type: none"> • “Understanding the Phone Startup Process” section on page 2-4 • “Resolving Startup Problems” section on page 7-2

Understanding Phone Configuration Files and Profile Files

Configuration files for a phone are stored on the TFTP server and define parameters for connecting to Cisco Unified CallManager. In general, any time you make a change in Cisco Unified CallManager that requires the phone to be reset, a change is made to the phone's configuration file automatically.

Configuration files also contain information about which image load the phone should be running. If this image load differs from the one currently loaded on a phone, the phone contacts the TFTP server to request the new image file.

The phone first requests the following configuration file, where *mac* is the hexadecimal representation of the MAC address of the phone:

- For Cisco Unified IP Phone 7905G—ld<mac> or ld<mac>.x
- For Cisco Unified IP Phone 7912G—gk<mac> or gk<mac>.x

If the phone cannot find a file of this naming convention, the phone then looks for the following file:

- For Cisco Unified IP Phone 7905G—lddefault.cfg or lddefault.cfg.x
- For Cisco Unified IP Phone 7912G—gkdefault.cfg or gkdefault.cfg.x

After the phone finds one of the profile files, or if it cannot find a profile file, it continues with its startup process.

**Note**

For information on using your phone in a secure Cisco Unified CallManager environment, see the [“Configuring the Encryption Key” section on page 4-7](#).

Related Topics

- [Understanding the Phone Startup Process, page 2-4](#)
- [Resolving Startup Problems, page 7-2](#)

Providing Power to the Cisco Unified IP Phone

You can power a Cisco Unified IP Phone by the following sources:

- External power—optional Cisco AC adapter and power cord for connecting to a standard wall receptacle.
- Inline power—inline power provider to the Cisco Unified IP Phone when connected to a Cisco Catalyst switch capable of providing inline power.



Note Only the network port supports inline power from the Cisco Catalyst switches.

- WS-X6348-RJ45V 10/100 switching module—Inline power provider to the Cisco Unified IP Phone when connected to a Catalyst 6000 family 10/100BaseTX switching module.

This module sends power on pins 1 & 2 and 3 & 6, which are also used to transmit Ethernet signals. Before the switch sends power, it tests for the presence of a Cisco Unified IP Phone, avoiding damage to other Ethernet devices.



Note Only the network port supports inline power from the Cisco Catalyst switches.

- WS-PWR-PANEL—power patch panel that allows the Cisco Unified IP Phone to be connected to existing Catalyst 4000, 5000, and 6000 family 10/100BaseTX switching modules.

This module sends power on pins 4, 5, 7, & 8, which are not used for Ethernet signaling. The power patch panel also attempts to verify that the attached device is a Cisco Unified IP Phone before providing power.

Related Topics

- [Understanding Interactions with Other Cisco Unified Communications Products, page 2-2](#)
- [Power Outage, page 2-10](#)

- [Power Source Design, page 2-10](#)
- [Redundancy Feature, page 2-11](#)
- [Installing the Cisco Unified IP Phone, page 3-6](#)

Power Outage

Your accessibility to emergency service through the phone is dependent on the phone being powered. If there is an interruption in the power supply, Service and Emergency Calling Service dialing will not function until power is restored. In the case of a power failure or disruption, you may need to reset or reconfigure equipment before using the Service or Emergency Calling Service dialing.

Power Source Design

The phone and switch automatically determine which power source the phone uses. If the power has to be switched to a different source, the phone user will experience different results based on which power source is being used by the phone.

Use the following information to choose a power source for the phone:

- If you plug a phone into the optional power supply before plugging it into the network, the phone is powered by the power supply.
- If you then unplug the phone from the power supply, the phone resets. If the switch port is configured for 10/100 Mbps, the switch recognizes the loss of power and brings the phone back up.
- If the switch port is configured for 10 Mbps only, then you must unplug the network connection and plug it back into the phone for the switch to recognize the phone's loss of power.
- If, however, you plugged the network connection into the phone before you plugged in the power cord, the phone receives power through the switch, and unplugging the power cord will not bring down the phone. If the switch reboots, the phone will then be powered by the power cord.

Related Topics

- [Understanding Interactions with Other Cisco Unified Communications Products, page 2-2](#)
- [Providing Power to the Cisco Unified IP Phone, page 2-9](#)
- [Installing the Cisco Unified IP Phone, page 3-6](#)

Redundancy Feature

For redundancy, you can use the Cisco AC adapter even if you are using inline power from the Cisco Catalyst switches. The Cisco Unified IP Phone can share the power load being used from the inline power and external power source. If either the inline power or the external power goes down, the phone can switch entirely to the other power source.

To use this redundancy feature, follow these steps:

Procedure

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- Step 1** Set the inline power mode to auto on the Cisco Catalyst switch.
 - Step 2** Connect the unpowered Cisco Unified IP Phone to the network.
 - Step 3** Connect the external power supply to the phone after the phone powers up.
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Related Topics

- [Understanding Interactions with Other Cisco Unified Communications Products, page 2-2](#)
- [Providing Power to the Cisco Unified IP Phone, page 2-9](#)
- [Installing the Cisco Unified IP Phone, page 3-6](#)

Determining the MAC Address of a Cisco Unified IP Phone

There are several procedures that require you to determine and enter the MAC address of a Cisco Unified IP Phone. These procedures include adding phones to the Cisco Unified CallManager database using Cisco Unified CallManager Administration or using BAT.

[Table 2-2](#) describes the methods that you can use to determine the MAC address of a phone.

Table 2-2 *Determining the MAC Address of a Phone*

Cisco Unified IP Phone	Method	Reference
7905G and 7912G	Choose Menu > Settings > Network Configuration and look at the MAC Address field	See Chapter 4, “Configuring Settings on the Cisco Unified IP Phone.”
7905G and 7912G	Display the Phone Configuration Web Page and look for the MAC address; enter: http://PHONE_IPAddress>	See Appendix A, “Reference List of Parameters.”

Adding Phones to the Cisco Unified CallManager Database

Before installing the Cisco Unified IP phone, you must choose a method for adding phones to the Cisco Unified CallManager database. The following sections describe these methods:

- [Adding Phones with Auto-Registration, page 2-13](#)
- [Adding Phones with Cisco Unified CallManager Administration, page 2-14](#)
- [Adding Phones with BAT, page 2-15](#)

Table 2-3 provides an overview of these methods for adding phones to the Cisco Unified CallManager database.

Table 2-3 Methods for Adding Phones to the Cisco Unified CallManager Database

Method	Requires MAC Address?	Notes
Auto-registration	No	Results in automatic assignment of directory numbers
Auto-registration with TAPS	No	Requires auto-registration and the Bulk Administration Tool (BAT); updates information in the Cisco Unified IP Phone and in Cisco Unified CallManager Administration
Using the Cisco Unified CallManager Administration only	Yes	Requires phones to be added individually
Using BAT	Yes	Allows for simultaneous registration of multiple phones

Adding Phones with Auto-Registration

You can add phones with auto-registration without first gathering MAC addresses from the phones.

When auto-registration is enabled, Cisco Unified CallManager begins the automatic startup process to obtain a directory number. During auto-registration, Cisco Unified CallManager automatically assigns the next available sequential directory number to the phone.

When you use this method, Cisco Unified CallManager automatically assigns directory numbers to new phones as they register with Cisco Unified CallManager.

You can use auto-registration to quickly enter phones into the Cisco Unified CallManager database. You can then modify any settings, such as the directory numbers, from Cisco Unified CallManager. Additionally, you can move auto-registered phones to new locations and assign them to different device pools without affecting their directory numbers.

Auto-registration is enabled by default if Cisco Unified CallManager is operating in non-secured mode.

For information about enabling and configuring auto-registration, refer to *Cisco Unified CallManager Administration Guide*.

Related Topics

- [Adding Phones with Cisco Unified CallManager Administration, page 2-14](#)
- [Adding Phones with BAT, page 2-15](#)

Adding Phones with Cisco Unified CallManager Administration

You can add phones individually to the Cisco Unified CallManager database using Cisco Unified CallManager Administration web pages. To do so, you first need to obtain the MAC address for each phone. See the “[Determining the MAC Address of a Cisco Unified IP Phone](#)” section on page 2-12 for instructions.

After you have collected MAC addresses, choose **Device > Phone > Add New** in Cisco Unified CallManager Administration to begin.

For additional instructions and conceptual information about Cisco Unified CallManager, refer to *Cisco Unified CallManager Administration Guide* and to *Cisco Unified CallManager System Guide*.

Related Topics

- [Determining the MAC Address of a Cisco Unified IP Phone, page 2-12](#)
- [Adding Phones with Auto-Registration, page 2-13](#)
- [Adding Phones with BAT, page 2-15](#)

Adding Phones with BAT

The Cisco Unified Bulk Administration Tool (BAT) is a plug-in application for Cisco Unified CallManager that enables you to perform batch operations, including registration, on multiple phones.

To add phones using BAT only (not in conjunction with TAPS), you first need to obtain the appropriate MAC address for each phone. See the [“Determining the MAC Address of a Cisco Unified IP Phone”](#) section on page 2-12 for instructions.

For detailed instructions about using BAT, refer to *Cisco Unified CallManager Administration Guide* and to *Cisco Unified CallManager Bulk Administration Guide*.

Related Topics

- [Determining the MAC Address of a Cisco Unified IP Phone, page 2-12](#)
- [Adding Phones with Auto-Registration, page 2-13](#)
- [Adding Phones with Cisco Unified CallManager Administration, page 2-14](#)
- [Adding Phones with Cisco Unified CallManager Administration, page 2-14](#)

Creating a SIP Profile

Each SIP IP phone on the network must be associated with a SIP profile. To create a SIP profile, navigate from Cisco Unified CallManager Administration to **Device > Device Settings > SIP Profile**. Most fields on the SIP Profile Configuration screen contain default values that you can use. However, some fields require configuration.

For complete information about SIP profiles and the SIP Profile Configuration screen, refer to the *Cisco Unified CallManager Administration Guide*.

To create a unique SIP profile for a phone on your network, follow these steps:

Procedure

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- Step 1** Click **Copy** to the right of the screen containing an existing SIP Profile.
 - Step 2** Make changes in the applicable fields that are specific to your new SIP profile.
 - Step 3** Name the unique SIP profile with a descriptive name.

Step 4 Click **Save**.



Note You must assign a SIP profile to each phone after you have configured and named your SIP profiles.

To select the applicable device profile, follow these steps:

Procedure

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- Step 1** From Cisco Unified CallManager Administration, navigate to **Device > Phone**.
 - Step 2** Click on the name of the phone you are configuring to bring up the Phone Configuration screen.
 - Step 3** In the Protocol Specific Information portion of the screen, use the arrow keys in the SIP Profile field to select the profile name you want.
 - Step 4** Click **Save**.
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Using Cisco Unified IP Phones with Different Protocols

The Cisco Unified IP Phone can operate with SCCP (Skinny Client Control Protocol) or SIP (Session Initiation Protocol). You can convert a phone that is using one protocol for use with the other protocol.

This section includes these topics:

- [Converting a New Phone from SCCP to SIP, page 2-18](#)
- [Converting an In-Use Phone from SCCP to SIP, page 2-18](#)
- [Converting an In-Use Phone from SIP to SCCP, page 2-19](#)
- [Deploying a Phone in an SCCP and SIP Environment, page 2-19](#)

Converting a New Phone from SCCP to SIP

A new, unused phone is set for SCCP by default. To convert this phone to SIP, perform these steps:

Procedure

- Step 1** Take one of these actions:
- To auto-register the phone, set the Auto Registration Phone Protocol parameter in Cisco Unified CallManager Administration to SIP.
 - To provision the phone using the Bulk Administration Tool (BAT), choose the appropriate phone and choose SIP from the BAT.
 - To provision the phone manually, make the appropriate changes for SIP on the Phone Configuration page in Cisco Unified CallManager Administration.
- Refer to *Cisco Unified CallManager Administration Guide* for detailed information about Cisco Unified CallManager configuration. Refer to *Cisco Unified CallManager Bulk Administration Guide* for detailed information about using the BAT.
- Step 2** If you are not using DHCP in your network, configure the network parameters for the phone.
- See the “Configuring Startup Network Settings” section on page 3-14.
- Step 3** Power cycle the phone.
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Converting an In-Use Phone from SCCP to SIP

You can use the Bulk Administration Tool (BAT) to convert a phone that is in use in your network from SCCP to SIP. To access BAT from Cisco Unified CallManager Administration, choose **Bulk Administration > Phones > Migrate Phones > SCCP to SIP**. For detailed information, refer to the “Migrating Phones” chapter in the *Cisco Unified CallManager Bulk Administration Guide*.

Converting an In-Use Phone from SIP to SCCP

To convert a phone that is in use in your network from SIP to SCCP, perform these steps. For more information, *Cisco Unified CallManager Administration Guide*.

Procedure

- Step 1** In Cisco Unified CallManager Administration, delete the existing SIP phone from the Cisco Unified CallManager database.
 - Step 2** In Cisco Unified CallManager Administration, create the phone as an SCCP phone.
 - Step 3** Power cycle the phone.
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Deploying a Phone in an SCCP and SIP Environment

To deploy Cisco Unified IP Phones in an environment that includes SCCP and SIP and in which the Cisco Unified CallManager Auto-Registration parameter is SCCP, perform these general steps:

Procedure

- Step 1** Set the Cisco Unified CallManager Auto Registration Phone Protocol parameter to SCCP.
To do so, from Cisco Unified CallManager Administration, choose **System > Enterprise Parameters**.
 - Step 2** Install the phones.
 - Step 3** Change the auto_registration_protocol parameter to SIP.
 - Step 4** Auto-register the SIP phones.
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