CHAPTER 2

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 IP Phones depend upon and interact with several other key Cisco IP Telephony components, including Cisco Unified Communications Manager.

This chapter focuses on the interactions between the Cisco Unified SIP Phone 3911 and Cisco Unified Communications Manager, DNS and DHCP servers, TFTP servers, and switches. It also describes options for powering phones.

For related information about voice and IP communications, refer to this URL:

http://www.cisco.com/en/US/partner/products/sw/voicesw/index.html

This chapter provides an overview of the interaction between the Cisco Unified IP Phone and other key components of the Voice over IP (VoIP) network. It includes the following topics:

- Understanding How the Cisco Unified IP Phone Interacts with Cisco Unified Communications Manager, page 2-2
- Providing Power to the Cisco Unified IP Phone, page 2-3
- Understanding Phone Configuration Files, page 2-6
- Understanding the Phone Startup Process, page 2-7
- Adding Phones to the Cisco Unified Communications Manager Database, page 2-9
- Adding Phones with Auto-Registration, page 2-10
- Adding Phones with BAT, page 2-12

- Determining the MAC Address for a Cisco Unified IP Phone, page 2-12

Understanding How the Cisco Unified IP Phone Interacts with Cisco Unified Communications Manager

Cisco Unified Communications Manager is an open and industry-standard call processing system. 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 Communications Manager system before sending and receiving calls.

Cisco Unified Communications Manager software sets up and tears down calls between phones, integrating traditional PBX functionality with the corporate IP network. Cisco Unified Communications Manager manages the components of the IP telephony system—the phones, the access gateways, and the resources necessary for such features as call conferencing and route planning. Cisco Unified Communications Manager also provides:

- Firmware for phones
- Authentication
- Configuration file via TFTP service
- Phone registration
- Call preservation, so that a media session continues if signaling is lost between the primary Cisco Unified Communications Manager and a phone

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

For an overview of security functionality for the Cisco Unified IP Phone, see the "Understanding Security Features for Cisco Unified SIP Phone 3911" section on page 1-9.

Note If the Cisco Unified IP Phone model that you want to configure does not appear in the Phone Type drop-down list in Cisco Unified Communications Manager Administration, go to the following URL and install the latest support patch for your version of Cisco Unified Communications Manager: http://www.cisco.com/kobayashi/sw-center/sw-voice.shtml

Related Topic

- Telephony Features Available for the Cisco Unified IP Phone, page 5-1

Providing Power to the Cisco Unified IP Phone

The Cisco Unified SIP Phone 3911 can be powered with external power or with Power over Ethernet (PoE). External power is provided through a separate power supply. PoE is provided by a switch through the Ethernet cable attached to a phone.

Note When you install a phone that is powered with external power, connect the power supply to the phone and to a power outlet before you connect the Ethernet cable to the phone. When you remove a phone that is powered with external power, disconnect the Ethernet cable from the phone before you disconnect the power supply.

The following sections provide more information about powering a phone:

- Power Guidelines, page 2-3
- Cisco Unified IP Phone Power Injector, page 2-4
- Obtaining Additional Information about Power, page 2-5

Power Guidelines

Table 2-1 provides guidelines for powering the Cisco Unified SIP Phone 3911.

Table 2-1 Guidelines for Powering the Cisco Unified SIP Phone 3911

Power Type	Guidelines
External power—Provided through the CP-PWR-CUBE-3 external power supply.	The Cisco Unified SIP Phone 3911 uses the CP-PWR-CUBE-3 power supply.
External power—Provided through the Cisco Unified IP Phone Power Injector external power supply.	The Cisco Unified IP Phone Power Injector external power supply may be used with any Cisco Unified IP Phone. Functioning as a midspan device, the injector delivers inline power to the attached phone. The Cisco Unified IP Phone Power Injector is connected between a switch port and the IP Phone, and supports a maximum cable length of 100m between the unpowered switch and the IP Phone. For more information, see the "Cisco Unified IP Phone Power Injector" section on page 2-4
Inline power—Provided by a switch through the Ethernet cable attached to the phone.	• The Cisco Unified IP Phones support IEEE 802.3af compliant inline power. • The inline power patch panel WS-PWR-PANEL is compatible with the Cisco Unified IP Phones. • To ensure uninterruptible operation of the phone, make sure that the switch has a backup power supply. • Make sure that the CatOS or IOS version running on your switch supports your intended phone deployment. Refer to the documentation for your switch for operating system version information.

Cisco Unified IP Phone Power Injector

The Cisco Unified IP Phone Power Injector is an external, single-port, midspan power injector for use with Cisco Unified IP Phones. It supports a maximum cable length of 100m between the unpowered switch and the Cisco Unified IP Phone. As a midspan device, it is connected between a switch port and the IP Phone, and may reside in either the switch closet or at the desk.

For more information, see the *Cisco Unified IP Phone Power Injector Installation Guide* at the following location:

http://www.cisco.com/en/US/products/hw/phones/ps379/prod_installation_guide09186a00806b0761.html

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.

Obtaining Additional Information about Power

For related information about power, refer to the documents shown in Table 2-2. These documents provide information about the following topics:

- Cisco switches that work with the Cisco Unified SIP Phone 3911
- The Cisco Unified IOS releases that support bidirectional power negotiation
- Other requirements and restrictions regarding power

Table 2-2 Related Documentation for Power

Document Topics	URL
Cisco Unified IP Phone Power Injector	http://www.cisco.com/en/US/products/hw/phones/ps379/prod_installation_guides_list.html
PoE Solutions	http://www.cisco.com/en/US/netsol/ns340/ns394/ns147/ns412/networking_solutions_package.html
Cisco Catalyst Switches	http://www.cisco.com/en/US/products/hw/switches/tsd_products_support_category_home.html

Table 2-2 Related Documentation for Power (continued)

Document Topics	URL
Integrated Service Routers	http://www.cisco.com/en/US/products/hw/routers/index.html
Cisco IOS Software	http://www.cisco.com/en/US/products/sw/iosswrel/products_ios_cisco_ios_software_category_home.html

Understanding Phone Configuration Files

Configuration files for a phone are stored on the TFTP server and define parameters for connecting to Cisco Unified Communications Manager. In general, any time you make a change in Cisco Unified Communications Manager 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 required load files.

The phone first attempts to access the SEP<MAC>.cnf.xml file. If this file does not exist, then it will look for the XMLDefault.cnf.xml from the TFTP server when the following conditions exist:

- You have enabled auto-registration in Cisco Unified Communications Manager
- The phone has not been added to the Cisco Unified Communications Manager Database
- The phone is registering for the first time

If auto registration is not enabled and the phone has not been added to the Cisco Unified Communications Manager Database, the phone registration request will be rejected. In this case, the phone will reset and attempt to register repeatedly.

If the phone has registered before, the phone will access the configuration file named SEPmac_address.cnf, where mac_address is the MAC address of the phone.

For more information on how a SIP phone interacts with the TFTP server, refer to the *Cisco Unified Communications Manager System Guide.*

SIP Dial Rules

For Cisco Unified SIP IP phones, the administrator uses dial rules to configure SIP phone dial plans. These dial plans must be associated with a SIP phone device to enable dial plans to be sent to the configuration file. If the administrator does not configure a SIP phone dial plan, the phone does not display any indication of a dial plan.

For more information on configuring SIP dial rules, refer to the *Cisco Unified Communications Manager Administration Guide*.

Understanding the Phone Startup Process

When connecting to the VoIP network, the Cisco Unified IP Phone go through a standard startup process that is described in Table 2-3. Depending on your specific network configuration, some of these steps may not occur on your Cisco Unified IP Phone.

Table 2-3 Cisco Unified IP Phone Startup Process

Step	Description	Related Topics
1. Obtaining Power from the Switch	If a phone is not using external power, the switch provides in-line power through the Ethernet cable attached to the phone.	• Adding Phones to the Cisco Unified Communications Manager Database, page 2-9. • Resolving Startup Problems, page 7-1.
2. Loading the Stored Phone Image	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.	Resolving Startup Problems, page 7-1.

Table 2-3 Cisco Unified IP Phone Startup Process (continued)

Step	Description	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.	• Configuration Menus on the Cisco Unified IP Phone, page 4-3. • Resolving Startup Problems, page 7-1.
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 static IP addresses to each phone locally.	• Configuration Menus on the Cisco Unified IP Phone, page 4-3. • Resolving Startup Problems, page 7-1.
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 enter information about the TFTP server locally on the phone; the phone then contacts the TFTP server directly. **Note** You can also assign an alternative TFTP server to use instead of the one assigned by DHCP.	• Configuration Menus on the Cisco Unified IP Phone, page 4-3. • Resolving Startup Problems, page 7-1.
6. Requesting the Configuration File	The TFTP server has configuration files, which define parameters for connecting to Cisco Unified Communications Manager and other information for the phone.	• Adding Phones to the Cisco Unified Communications Manager Database, page 2-9. • Resolving Startup Problems, page 7-1.

Table 2-3 Cisco Unified IP Phone Startup Process (continued)

Step	Description	Related Topics
7. Contacting Cisco Unified Communications Manager	The configuration file defines how the Cisco Unified IP Phone communicates with Cisco Unified Communications Manager and provides a phone with its load ID. After obtaining the file from the TFTP server, the phone attempts to make a connection to the highest priority Cisco Unified Communications Manager on the list. If the phone was manually added to the database,Cisco Unified Communications Manager identifies the phone. If the phone was not manually added to the database and auto-registration is enabled in Cisco Unified Communications Manager, the phone attempts to auto-register itself in the Cisco Unified Communications Manager database. **Note** Auto-registration is disabled when security is enabled on Cisco Unified Communications Manager. In this case, the phone must be manually added to the Cisco Unified Communications Managerdatabase.	Resolving Startup Problems, page 7-1.

Adding Phones to the Cisco Unified Communications Manager Database

Before installing the Cisco Unified IP phone, you must choose a method for adding phones to the Cisco Unified Communications Manager database. These sections describe the methods:

- Adding Phones with Auto-Registration, page 2-10
- Adding Phones with Cisco Unified Communications Manager Administration, page 2-11

- Adding Phones with BAT, page 2-12

Table 2-4 provides an overview of these methods for adding phones to the Cisco Unified Communications Manager database.

Table 2-4 Methods for Adding Phones to the Cisco Unified Communications Manager

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 the Cisco Unified Communications Manager database with the MAC address and DNs for the device when user calls TAPS from the phone
Using the Cisco Unified Communications Manager Administration	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 and TAPS, the Tool for Auto-Registered Phones Support, without first gathering MAC addresses from phones.

TAPS works with the Bulk Administration Tool (BAT) to update a batch of phones that were already added to the Cisco Unified Communications Manager database with dummy MAC addresses. Use TAPS to update MAC addresses and download pre-defined configurations for phones.

Note Cisco recommends you use auto-registration and TAPS to add less than 100 phones to your network. To add more than 100 phones to your network, use the Bulk Administration Tool (BAT). See the "Adding Phones with BAT" section.

To implement TAPS, you or the end-user dial a TAPS directory number and follow voice prompts. When the process is complete, the phone will have downloaded its directory number and other settings, and the phone will be updated in Cisco Unified Communications Manager Administration with the correct MAC address.

Auto-registration must be enabled in Cisco Unified Communications Manager Administration (**System > Cisco Unified Communications Manager**) for TAPS to function. To auto-register SIP phones, you must set the Auto Registration Phone Protocol parameter in Cisco Unified Communications Manager Administration to SIP.

Refer to *Cisco Unified Communications Manager Bulk Administration Guide* for detailed instructions about BAT and about TAPS.

Adding Phones with Cisco Unified Communications Manager Administration

You can add phones individually to the Cisco Unified Communications Manager database using Cisco Unified Communications Manager Administration. To do so, you first need to obtain the MAC address for each phone.

For information about determining a MAC address, see the "Determining the MAC Address for a Cisco Unified IP Phone" section on page 2-12.

After you have collected MAC addresses, in Cisco Unified Communications Manager Administration, choose **Device > Phone** and click **Add New** to begin adding phones to the Cisco Unified Communications Manager database.

For complete instructions and conceptual information about Cisco Unified Communications Manager, refer to *Cisco Unified Communications Manager Administration Guide* and to *Cisco Unified Communications Manager System Guide*.

Related Topics

- Adding Phones with Cisco Unified Communications Manager Administration, page 2-11
- Adding Phones with BAT, page 2-12

Adding Phones with BAT

Cisco Unified Communications Manager Bulk Administration (BAT) is a web-based application that enables you to perform bulk transactions, including registering, multiple phones to the Cisco Unified Communications Manager database.

Before you can use BAT to add phones, you must obtain the MAC address for each phone.

For information about determining a MAC address, see the "Determining the MAC Address for a Cisco Unified IP Phone" section on page 2-12.

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

Related Topics

- Adding Phones with Auto-Registration, page 2-10
- Adding Phones with Cisco Unified Communications Manager Administration, page 2-11

Determining the MAC Address for a Cisco Unified IP Phone

Several procedures described in this manual require you to determine the MAC address of a Cisco Unified IP Phone. You can determine a phone's MAC address in these ways:

- From the phone, press the **OK** button and select **Settings > Network Configuration > Mac Address** to display the MAC Address field.
- Look at the MAC label on the back of the phone.