CHAPTER 1

An Overview of the Cisco Unified IP Phone

The Cisco Unified SIP Phone 3911 provides voice communication over an Internet Protocol (IP) network. The IP Phone functions like a digital business telephone, allowing you to place and receive phone calls and to access features such as mute, hold, transfer, speed dial, and call forward. The IP Phone also supports security features that include image and digest authentication.

The Cisco Unified SIP Phone 3911 is interoperable with RFC-3261, RFC-3264, RFC-3264, RFC-3311, RFC 3515, and RFC-3891.

An IP Phone, like other network devices, must be configured and managed. These phones support G.711a, G.711u, G.729(decode only), and G.729a. This manual describes the Cisco Unified SIP Phone 3911.

This chapter includes the following topics:

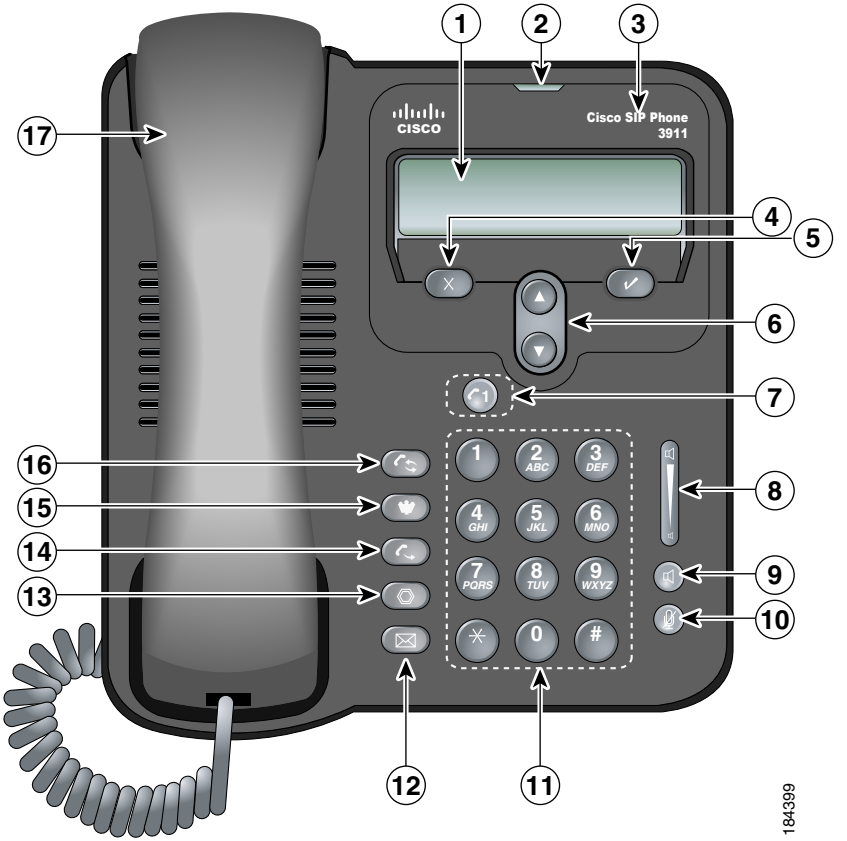
- Understanding the Cisco Unified SIP Phone 3911, page 1-2
- What Networking Protocols Are Used?, page 1-3
- What Features are Supported on the Cisco Unified SIP Phone 3911?, page 1-7
- Understanding Security Features for Cisco Unified SIP Phone 3911, page 1-9
- Overview of Configuring and Installing Cisco Unified IP Phones, page 1-10

Caution Using a cell, mobile, or GSM phone, or two-way radio in close proximity to a Cisco Unified IP Phone might cause interference. For more information, refer to the manufacturer's documentation of the interfering device.

Understanding the Cisco Unified SIP Phone 3911

Figure 1-1 shows the main components of the Cisco Unified SIP Phone 3911.

Figure 1-1 Cisco Unified SIP Phone 3911



1	Phone Screen	**10**	Mute Button
2	Message Waiting Indicator	**11**	Keypad
3	Cisco Unified IP Phone Series	**12**	Messages Button
4	Cancel Button	**13**	Hold Button
5	OK Button	**14**	Transfer Button
6	Navigation Bar	**15**	Conference Button
7	Line Button	**16**	Redial Button
8	Volume Button	**17**	HandSet
9	Speaker Button		

What Networking Protocols Are Used?

Cisco Unified IP Phones support several industry-standard and Cisco networking protocols required for voice communication. Table 1-1 provides an overview of the networking protocols supported on the Cisco Unified SIP Phone 3911.

Table 1-1 Supported Networking Protocols on the Cisco Unified IP Phone

Networking Protocol	Purpose	Usage Notes
Cisco Discovery Protocol (CDP)	CDP is a device-discovery protocol that runs on all Cisco-manufactured equipment. Using CDP, a device can advertise its existence to other devices and receive information about other devices in the network.	The Cisco Unified IP Phone uses CDP to communicate information such as auxiliary VLAN ID, per port power management details, and Quality of Service (QoS) configuration information with the Cisco Catalyst switch.
Dynamic Host Configuration Protocol (DHCP)	DHCP dynamically allocates and assigns an IP address to network devices. DHCP enables you to connect an IP phone into the network and have it become operational without you needing to manually assign an IP address or configure additional required network parameters.	DHCP is enabled by default. If disabled, you must manually configure the IP address, subnet mask, gateway, and a TFTP server on each phone locally. Cisco recommends that you use DHCP custom option 150. With this method, you configure the TFTP server IP address as the option value. For additional supported DCHP configurations, refer *Cisco Unified Communications Manager System Guide*.
Hypertext Transfer Protocol (HTTP)	HTTP is the standard way of transferring information and moving documents across the Internet and the web.	Cisco Unified SIP Phone 3911 supports HTTP.

Table 1-1 Supported Networking Protocols on the Cisco Unified IP Phone (continued)

Networking Protocol	Purpose	Usage Notes
Internet Protocol (IP)	IP is a messaging protocol that addresses and sends packets across the network.	To communicate using IP, network devices must have an assigned IP address, subnet, and gateway. IP addresses, subnets, and gateways identifications are automatically assigned if you are using the Cisco Unified IP Phone with Dynamic Host Configuration Protocol (DHCP). If you are not using DHCP, you must manually assign these properties to each phone locally.
Network Time Protocol (NTP)	NTP is a protocol that is used to synchronize timekeeping among a set of distributed time servers and clients.	When you configure Network Time Protocol (NTP) on Cisco Unified Communications Manager Administration, the Cisco Unified IP phones will get the date and time from an NTP server.
Real-Time Transport (RTP)	RTP is a standard protocol for transporting real-time data, such as interactive voice and video, over data networks.	Cisco Unified IP Phones use the RTP protocol to send and receive real-time voice traffic from other phones and gateways.
Session Description Protocol (SDP)	SDP is the portion of the SIP protocol that determines which parameters are available during a connection between two endpoints. Conferences are established using only the SDP capabilities that are supported by all endpoints in the conference.	SDP capabilities, such as codec types, DTMF detection, and comfort noise are normally configured on a global basis by the Cisco Unified Communications Manager or the Media Gateway in operation. Some SIP endpoints may allow these parameters to be configured on the endpoint itself.

Table 1-1 Supported Networking Protocols on the Cisco Unified IP Phone (continued)

Networking Protocol	Purpose	Usage Notes
Session Initiation Protocol (SIP)	SIP is the Internet Engineering task Force (IETF) standard for multimedia conferencing over IP. SIP is an ASCII-based, application-layer control protocol (defined in RFC 3261) that can be used to establish, maintain, and terminate calls between two or more endpoints.	Like other VoIP protocols, SIP is designed to address the functions of signaling and session management within a packet telephony network. *Signaling* allows call information to be carried across network boundaries. *Session management* provides the ability to control the attributes of an end-to-end call.
Transmission Control Protocol (TCP)	TCP is a connection-oriented transport protocol.	
Trivial File Transfer Protocol (TFTP)	TFTP allows you to transfer files over the network. On the Cisco Unified IP Phone, TFTP enables you to obtain a configuration file specific to the phone type.	TFTP requires a TFTP server in your network, which can be automatically identified from the DHCP server. If you want a phone to use a TFTP server other than the one specified by the DHCP server, you must manually assign the IP address of the TFTP server using the Network Configuration menu on the phone.
User Datagram Protocol (UDP)	UDP is a connectionless messaging protocol for delivery of data packets.	Cisco Unified IP Phones transmit and receive RTP streams, which utilize UDP.

Related Topics

- Understanding How the Cisco Unified IP Phone Interacts with Cisco Unified Communications Manager, page 2-2
- Understanding the Phone Startup Process, page 2-7
- Configuration Menus on the Cisco Unified IP Phone, page 4-3

What Features are Supported on the Cisco Unified SIP Phone 3911?

The Cisco Unified SIP Phone 3911 functions much like digital business phones, allowing you to place and receive telephone calls. In addition to traditional telephony features, the Cisco Unified IP Phone includes features that enable you to administer and monitor the phone as a network device.

This section covers the following topics:

- Feature Overview, page 1-7
- Configuring Telephony Features, page 1-8
- Configuring Network Parameters Using the Cisco Unified IP Phone, page 1-8
- Providing Users with Feature Information, page 1-9

Feature Overview

Cisco Unified IP Phones provide traditional telephony functionality, such as call forwarding and transferring, redialing, speed dialing, and voice messaging system access. Cisco Unified IP phones also provide a variety of other features. For an overview of the telephony features that the Cisco Unified IP Phone supports and for tips on configuring them, see the "Telephony Features Available for the Cisco Unified IP Phone" section on page 5-1.

As with other network devices, you must configure Cisco Unified SIP Phone 3911 so that it can access Cisco Unified Communications Manager and the rest of the IP network. By using DHCP, you have fewer settings to configure on a phone, but if your network requires it, you can manually configure an IP address, TFTP server, and subnet mask. For instructions on configuring the network settings on the Cisco Unified IP Phones, see Chapter 4, "Configuring Settings on the Cisco Unified IP Phone."

Finally, because the Cisco Unified IP Phone is a network device, you can obtain detailed status information from it directly. This information can assist you with troubleshooting any problems users might encounter when using their IP phones. See Chapter 6, "Viewing Status, Statistics, and Firmware Information on the Cisco Unified IP Phone," for more information.

Related Topics

- Configuring Network Settings, page 4-3
- Configuring Features and Users, page 5-1
- Troubleshooting and Maintenance, page 7-1

Configuring Telephony Features

You can modify additional settings for the Cisco Unified IP Phone from the Cisco Unified Communications Manager Administration application. Use this web-based application to set up phone registration criteria and calling search spaces. See the "Telephony Features Available for the Cisco Unified IP Phone" section on page 5-1, and refer to the Cisco Unified Communications Manager documentation for additional information.

For more information about the Cisco Unified Communications Manager Administration application, refer to Cisco Unified Communications Manager documentation, including *Cisco Unified Communications Manager Administration Guide*. You can also use the context-sensitive help available within the application for guidance.

You can access the complete Cisco Unified Communications Manager documentation suite at this location:

http://www.cisco.com/en/US/products/sw/voicesw/ps556/tsd_products_support_series_home.html

Related Topic

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

Configuring Network Parameters Using the Cisco Unified IP Phone

You can configure parameters such as DHCP, TFTP, and IP settings on the phone itself. You can also obtain statistics about a current call or firmware versions on the phone.

For more information about configuring features and viewing statistics from the phone, see Chapter 4, "Configuring Settings on the Cisco Unified IP Phone" and see Chapter 6, "Viewing Status, Statistics, and Firmware Information on the Cisco Unified IP Phone."

Related Topics

- Configuring Settings on the Cisco Unified IP Phone, page 4-1
- Troubleshooting and Maintenance, page 7-1

Providing Users with Feature Information

If you are a system administrator, you are likely the primary source of information for Cisco Unified IP Phone users in your network or company. To ensure that you distribute the most current feature and procedural information, familiarize yourself with Cisco Unified IP Phone documentation. Make sure to visit the Cisco Unified IP Phone web site:

http://www.cisco.com/en/US/products/hw/phones/ps379/tsd_products_support_series_home.htm

From this site, you can view access various user guides.

In addition to providing documentation, it is important to inform users of available Cisco Unified IP Phone features—including those specific to your company or network—and of how to access and customize those features, if appropriate.

Understanding Security Features for Cisco Unified SIP Phone 3911

Cisco Unified SIP Phone 3911 support the following security feature:

- Digest authentication—When the phone makes any request, Cisco Unified Communications Manager issues a challenge that requires the phone to respond with the correct password.

Overview of Configuring and Installing Cisco Unified IP Phones

When deploying a new IP telephony system, system administrators and network administrators must complete several initial configuration tasks to prepare the network for IP telephony service. For information and a checklist for setting up and configuring a complete Cisco Unified IP telephony network, refer to the "System Configuration Overview" chapter in *Cisco Unified Communications Manager System Guide*.

After you have set up the IP telephony system and configured system-wide features in Cisco Unified Communications Manager, you can add IP phones to the system.

The following topics provide an overview of procedures for adding Cisco Unified IP Phones to your network:

- Configuring Cisco Unified IP Phones in Cisco Unified Communications Manager, page 1-10
- Installing Cisco Unified IP Phones, page 1-14

Configuring Cisco Unified IP Phones in Cisco Unified Communications Manager

To add phones to the Cisco Unified Communications Manager database, you can use:

- Auto-registration
- Cisco Unified Communications Manager Administration
- Cisco Unified Communications Manager Bulk Administration (BAT)
- BAT and the Tool for Auto-Registered Phones Support (TAPS)

For more information about these choices, see the "Adding Phones to the Cisco Unified Communications Manager Database" section on page 2-9.

For general information about configuring phones in Cisco Unified Communications Manager, refer to the "Cisco Unified IP Phones" chapter in *Cisco Unified Communications Manager System Guide* and the "Cisco Unified IP Phone Configuration" chapter in *Cisco Unified Communications Manager Administration Guide.*

Checklist for Configuring the Cisco Unified IP Phone in Cisco Unified Communications Manager

Table 1-2 provides an overview and checklist of configuration tasks for the Cisco Unified IP Phone in Cisco Unified Communications Manager Administration. The list presents a suggested order to guide you through the phone configuration process. Some tasks are optional, depending on your system and user needs. For detailed procedures and information, refer to the sources in the list.

Table 1-2 Checklist for Configuring the Cisco Unified SIP Phone 3911 in Cisco Unified Communications Manager

Task	Purpose	For More Information
1. Gather the following information about the phone: • Phone Model • MAC address • Physical location of the phone • Name or user ID of phone user • Device pool • Partition, calling search space, and location information • Associated directory number (DN) to assign to the phone • Cisco Unified Communications Manager user to associate with the phone	Provides list of configuration requirements for setting up phones. Identifies preliminary configuration that you need to perform before configuring individual phones.	Refer to *Cisco Unified Communications Manager System Guide,* "Cisco Unified IP Phone" chapter. See the "Telephony Features Available for the Cisco Unified IP Phone" section on page 5-1.

Table 1-2 Checklist for Configuring the Cisco Unified SIP Phone 3911 in Cisco Unified Communications Manager (continued)

Task	Purpose	For More Information
2. Add and configure the phone by completing these required fields in the Phone Configuration window: • Phone type • Description (user name or ID) • MAC address • Device pool • Partition • Calling Search Space	Adds the device with its default settings to the Cisco Unified Communications Manager database.	Refer to *Cisco Unified Communications Manager Administration Guide*, "Cisco Unified IP Phone Configuration" chapter.
3. Add and configure directory number on the phone by completing these required fields in the Directory Number Configuration window: • Directory number • Partition • Multiple Calls and Call Waiting • Call Forwarding • Voice Messaging (if used)	Adds a directory number and features that are associated with a directory number to the phone.	Refer to *Cisco Unified Communications Manager Administration Guide*, "Cisco Unified IP Phone Configuration" chapter, "Directory Number Configuration" chapter, or "Creating a Cisco Unity Voice Mailbox" section. See the "Telephony Features Available for the Cisco Unified IP Phone" section on page 5-1.
4. Add user information by configuring required fields: • Name (last) • User ID	Adds user information to the global directory for Cisco Unified Communications Manager.	Refer to *Cisco Unified Communications Manager Administration Guide*, "End User Configuration" chapter. See the "Adding Users to Cisco Unified Communications Manager" section on page 5-5.

Table 1-2 Checklist for Configuring the Cisco Unified SIP Phone 3911 in Cisco Unified Communications Manager (continued)

Task	Purpose	For More Information
5. Associate a user with a phone (optional).	Provides users with control over their phone such as forwarding calls or adding speed-dial numbers. **Note** Some phones, such as those in conference rooms, do not have an associated user.	Refer to *Cisco Unified Communications Manager Administration Guide*, "End User Configuration" chapter, "Associating Devices to a User" section.
6. Configure a SIP Phone Dial Plan for the Cisco Unified SIP Phone 3911(optional).	To ensure successful call completion on systems that require digits to be sent one at a time.	Refer to *Cisco Unified Communications Manager Administration Guide*, "SIP Dial Rules Configuration" chapter. See the "Configuring a SIP Phone Dial Plan" section on page 4-9.
7. Configure the system to support the use of DTMF on the Cisco Unified SIP Phone 3911(optional).	Provide users access to voice-messaging systems or to navigate interactive voice response (IVR) applications by using the keypad to generate DTMFs.	Refer to *Cisco Unified Communications Manager Administration Guide*, "Media Termination Point Configurations" chapter and "Cisco Unified IP Phone" chapter. See the "Enabling the Cisco Unified SIP Phone 3911 to Use DTMF" section on page 4-9.

Installing Cisco Unified IP Phones

After you have added the phones to the Cisco Unified Communications Manager database, you can complete the phone installation. You (or the phone users) can install the phone at the users's location. The Cisco Unified IP Phone Installation Guide that ships in the box with each phone provides directions for connecting the phone handset, cables, and other accessories.

Note Before you install a phone, even if it is new, upgrade the phone to the current firmware image. You can find the latest firmware for the Cisco Unified Phone 3911 at http://www.cisco.com/cgi-bin/tablebuild.pl/ip-3900ser.

After the phone is connected to the network, the phone startup process begins and the phone registers with Cisco Unified Communications Manager. To finish installing the phone, configure the network settings on the phone depending on whether you enable or disable DHCP service.

If you used auto-registration, you need to update the specific configuration information for the phone such as associating the phone with a user, changing the button table, or directory number.

Checklist for Installing the Cisco Unified IP Phone

Table 1-3 provides an overview and checklist of installation tasks for the Cisco Unified IP Phone. The list presents a suggested order to guide you through the phone installation. Some tasks are optional, depending on your system and user needs. For detailed procedures and information, refer to the sources in the list.

Table 1-3 Checklist for Installing the Cisco Unified SIP Phone 3911

Task	Purpose	For More Information
1. Choose the power source for the phone: • Power over Ethernet (PoE) • External power supply	Determines how the phone receives power.	See the "Providing Power to the Cisco Unified IP Phone" section on page 2-3.
2. Assemble the phone, placement, and connect the network cable.	Locates and installs the phone in the network.	See the "Installing the Cisco Unified IP Phone" section on page 3-6.

Table 1-3 Checklist for Installing the Cisco Unified SIP Phone 3911 (continued)

Task	Purpose	For More Information
3. Monitor the phone startup process.	Verifies that phone is configured properly.	See the "Verifying the Phone Startup Process" section on page 3-10.
4. Configure these network settings on the phone by pressing the OK button. Choose **Settings** > **Network Configuration**. To enable DHCP: • Set DHCP Enabled to **Yes** • Enter the Cisco Unified Communications Manager **IP address** for TFTP Server 1 (optional) To disable DHCP: • Set DHCP Enabled to **No** • Enter the static IP address for phone • Enter the subnet mask • Enter the IP address for the default router • Enter the IP addresses for DNS Server 1 and DNS Server 2. • Enter the domain name where the phone resides • Enter the Cisco Unified Communications Manager IP address for TFTP Server	Using DHCP—The IP address is automatically assigned and the Cisco Unified IP Phone is directed to a TFTP Server. **Note** Consult with the network administrator if you need to assign an alternative TFTP server instead of using the TFTP server assigned by DHCP. Without DHCP—You must configure the IP address, TFTP server, subnet mask, domain name, and default router locally on the phone.	See the "Configuring Startup Network Settings" section on page 3-11. See the "Configuration Menus on the Cisco Unified IP Phone" section on page 4-3.

Table 1-3 Checklist for Installing the Cisco Unified SIP Phone 3911 (continued)

Task	Purpose	For More Information
5. Make calls with the Cisco Unified IP Phone.	Verifies that the phone and features work correctly.	Refer to the *Cisco Unified SIP Phone 3911 Phone Guide for Cisco Unified Communications Manager.*
6. Provide information to end users about how to use their phones and how to configure their phone options.	Ensures that users have adequate information to successfully use their Cisco Unified IP Phones.	See Appendix A, "Providing Information to Users Via a Website."