



Cisco IPC Express Integrated Voice Mail

Cisco Unity Express is a typical voice mail system that includes all the common features available from entry-level voice-mail systems. These features include: personal mailboxes; subscriber login control; sending, listening to, saving, deleting, and forwarding voice messages; recording greetings and a spoken name for each mailbox; and directing calls to voice mail after a user phone has rung for a configurable number of cycles.

Additionally, Cisco Unity Express offers voice mail networking between different sites in your network, broadcast messaging, and distribution lists. Cisco Unity Express provides a number of general delivery mailboxes (GDMs) that you can use for functions in your organization (such as the factory or the sales desk) as opposed to being assigned to an individual employee.

Key topics addressed in this application note are presented in the following sections:

- [Cisco Unity Express Voice Mail Overview, page 39](#)
- [Subscriber Features, page 47](#)
- [Caller Features, page 55](#)
- [Administrator Features, page 57](#)
- [Call Redirection into Voice Mail, page 74](#)
- [Working with Users and Names, page 76](#)
- [Dial Plan Considerations, page 80](#)
- [Voice Mail Networking, page 81](#)
- [Voice Mail Deployment Considerations, page 85](#)

Cisco Unity Express Voice Mail Overview

Cisco Unity Express is a small-to-medium office or enterprise branch office voice mail system that you can use with either Cisco CME or Cisco CallManager as the call control agent for directing the calls and managing the IP phones. When deployed with Cisco CME, Cisco Unity Express is a local, collocated voice mail system integrated into the same router chassis as Cisco CME. With Cisco CallManager, Cisco Unity Express represents a distributed voice mail system with a centralized call control agent in the network. This application note covers only Cisco CME network deployments and operation in detail. If you are interested in how you can use Cisco Unity Express voice mail in Cisco CallManager networks, consult Cisco.com for more information (<http://www.cisco.com/go/cue>). Cisco Unity Express voice mail capabilities are the same for both deployment choices.

Cisco Unity Express is offered in two hardware form factors: a Network Module (NM-CUE) and an Advanced Integration Module (AIM-CUE). The Cisco Unity Express hardware provides for a fully self-contained software and hardware system with an onboard CPU and operating system, memory, and storage capacity (a hard disk on the NM and compact Flash [CF] on the AIM). This relieves requirements for the router to process tasks needed to execute and manage AA menus and voice mail messaging. For this reason, Cisco Unity Express does not impact router performance.

The Cisco Unity Express hardware draws power from the router chassis. All communication between the router and Cisco Unity Express software is carried across the router's backplane. The Cisco Unity Express module is inserted into the router, an IP address is assigned, and the system is active. This complete integration means that Cisco Unity Express requires no external servers or cabling and only minimal configuration and setup to deploy as a fully functional voice mail system.

Cisco Unity Express requires a minimum of Cisco IOS software 12.3.4T (Cisco CME 3.0) on the router, using the IP Plus or IP Voice minimum software image. The AIM-CUE was introduced later and requires Cisco IOS software 12.3.7T (Cisco CME 3.1) or later. It is recommended that Cisco Unity Express deployments use Cisco CME 3.2 (12.3.11T) or later.

The following sections further explain the following aspects of Cisco Unity Express:

- [Cisco Unity Express Licensing, page 40](#)
- [Personal and General Delivery Mailboxes, page 42](#)
- [Users and Groups, page 43](#)

Cisco Unity Express Licensing

Cisco Unity Express offers an entry-level voice mail system that is cost-effective for offices requiring up to 120 total mailboxes. You can purchase mailbox licenses at the 12, 25, 50, and 100 personal mailbox levels. Future enhancements in Cisco Unity Express s beyond 2.1 may offer higher mailbox levels. The mailbox license you purchase equals the number of personal mailboxes on the Cisco Unity Express system. In addition, you get a small number of GDMs with the license (the difference between the 100-mailbox license and getting 120 total mailboxes on the system). GDMs are discussed in more detail in the next section. [Table 8](#) summarizes the Cisco Unity Express system parameters controlled by the system license for Cisco Unity Express software releases up to 2.0.

Table 8 Cisco Unity Express Voice Mail Licensed Parameters for Cisco Unity Express Up to Release 2.0

Hardware Form Factor	Parameters	12-Mailbox License	25-Mailbox License	50-Mailbox License	100-Mailbox License
NM-CUE	Personal mailboxes	12	25	50	100
	GDM	5	10	15	20
	Total mailboxes	17	35	65	120
	Hours of storage	100	100	100	100
	Ports	4	4	8	8
	Default mailbox size (minutes)	352	171	92	50
AIM-CUE (512 MB)	Hours of storage	8	8	8	—
	Ports	4	4	4	
	Default mailbox size (minutes)	28	13	7	
AIM-CUE (1 GB)	Hours of storage	14	14	14	—
	Ports	4	4	4	
	Default mailbox size (minutes)	49	23	13	

As of Cisco Unity Express 2.1, changes in the licensing parameters caused the following changes to information in [Table 8](#):

- The number of ports is no longer associated with the license. Instead, it depends only on the hardware module (NM-CUE or AIM-CUE) and the router platform where the module is housed.
- There is no longer a fixed separation between the number of personal mailboxes and GDMs allowed per license. Instead, the total number of mailboxes per license remains the same as shown in [Table 8](#) (for example, 120 for a 100-mailbox license), but you can configure any combination of personal mailboxes and GDMs up to that total.
- An additional NM-CUE type (NM-CUE with 512 MB dynamic random-access memory [DRAM]) is introduced with more memory (DRAM) than the existing one (NM-CUE with 256 MB DRAM) for higher-end applications.

[Table 9](#) summarizes the number of ports supported on the various hardware modules as of Cisco Unity Express 2.1.

Table 9 Cisco Unity Express 2.1 Port Support

Hardware Form Factor	Platform	Number of Ports
NM-CUE (256 MB DRAM)	All	8
NM-CUE (512 MB DRAM)	All	16
AIM-CUE (512 MB and 1 GB CF)	Cisco 2600XM series and the Cisco 2691	4
AIM-CUE (512 MB and 1 GB CF)	Cisco 2800, Cisco 3700, and Cisco 3800 series	6

A valid license file must be present on the system at all times to determine the system parameters and identity controlled by licensing.

**Note**

The features described in this application note are generally applicable to Cisco Unity Express 2.1, except where noted. Not all of these features are present in earlier releases. Consult the Cisco Unity Express documentation on Cisco.com (<http://www.cisco.com/go/cue>) for details on features in various releases.

Licenses are installed on Cisco Unity Express using package (.pkg) files. In summary, the following are the package files corresponding to the licenses available for Cisco Unity Express 2.0:

- cue-vm-license_12mbx_cme_2.0.1.pkg
- cue-vm-license_25mbx_cme_2.0.1.pkg
- cue-vm-license_50mbx_cme_2.0.1.pkg
- cue-vm-license_100mbx_cme_2.0.1.pkg
- cue-vm-license_12mbx_ccm_2.0.1.pkg
- cue-vm-license_25mbx_ccm_2.0.1.pkg
- cue-vm-license_50mbx_ccm_2.0.1.pkg
- cue-vm-license_100mbx_ccm_2.0.1.pkg

Separate license files exist for Cisco Unity Express used with Cisco CME (the license files that contain cme in the name) and Cisco Unity Express used with Cisco CallManager (the license files that contain ccm in the name).

Personal and General Delivery Mailboxes

Cisco Unity Express voice mail lets subscribers defined on the system receive voice messages when they are unavailable to answer calls, because they are busy or away from the phone when the call arrives. The voice mail system allows subscribers to access each voice message and then skip it, play it, save it, or delete it, or reply to the sender. Subscribers can also compose and send messages to other subscribers on the same voice mail system or across the network to a voice mail system at another location.

A personal mailbox is associated with an individual subscriber. Only this person can access the mailbox to review the voice messages. The subscriber logs in to the mailbox with a personal identification number (PIN) to retrieve or compose voice messages or change personal parameters, such as a greeting or spoken name. Calls to the subscriber phone are forwarded using the call forward busy (CFB), call-forward-no-answer (CFNA), or call-forward-all (CFA) Cisco CME features to the voice mail pilot number.

A general delivery mailbox (GDM) is associated with a group of subscribers. It allows callers to leave messages for a function of your business, such as your customer service desk or the sales department. The caller does not know any employees within that business function and does not care who in the group responds to the voice mail as long as the matter he or she is calling about is taken care of. For example, suppose you own or manage a grocery store and a customer calls the bakery with an order for a birthday cake. Any employee in the bakery can retrieve the message, enter the order into your computer system, and return the customer call or send an e-mail to confirm the order. The employee identity is unimportant to the caller.

Any subscriber who is a member of the group associated with the GDM, has equal rights to access the GDM to retrieve, reply to, forward, save, or delete the messages left in the GDM. When a member of the group saves a message, it is available for other members of the group to hear (as a saved message). If a member deletes a voice message, no one else has a chance to listen to it. Messages in the GDM are not sent to all individual mailboxes. The GDM is not a broadcast mechanism; it is a shared mailbox.

A subscriber does not log in to a GDM directly. To access a GDM, a subscriber must be a member of the group associated with the mailbox. The subscriber logs in to his or her personal mailbox first. From there a special menu branch (menu item 9) allows the subscriber to access messages in all the GDMs of which he or she is a member. A single subscriber can be a member of multiple GDMs and can select the appropriate GDM from a menu list. To prevent multiple subscribers from trying to listen to and delete the same message, only one subscriber at a time can be active inside a GDM.

Up to Cisco Unity Express 2.0, the maximum number of GDMs on the system is defined by the license installed on the system, as shown earlier in [Table 8 on page 41](#). As of release 2.1, only the total number of mailboxes is counted against the system license, and any number of personal and GDMs up to the total can be defined.

A physical phone need not be associated with a GDM, but an extension must be associated with the mailbox to forward calls to voice mail. If the GDM extension appears on any phone (perhaps as a secondary button on the phones of the employees in the department associated with the GDM), message waiting indicator (MWI) is set on this phone (or phones) when new messages are left in the GDM. A GDM does not automatically enable MWI on every group member phone, unless all group members have an appearance of the GDM extension on all phones.

Users and Groups

Cisco Unity Express defines a user profile to contain the parameters of a voice mail subscriber. A user is associated with a personal mailbox. [Figure 14](#) shows a typical user profile defining the user name, extension, and password.

Figure 14 Subscriber User Profile

User Profile - System Administration - Cisco Unity Express - Microsoft Internet Explorer

User Profile - User

Apply Cancel Help

Profile Groups Mailboxes

User ID: User1

First Name *: User

Last Name *: One

Nick Name *: User

Display Name*: User

Primary E.164 Number: xxxyyy3001

Associated Phone: 0009.B7F7.5793 Add/Edit Remove

Primary Extension:

 3001

 Other:

Language: English (United States)

Password options: Password specified below

Password:

 Confirm Password:

PIN options: PIN specified below

PIN:

 Confirm PIN:

* indicates a mandatory field

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Using the tabs across the top of the window, you can see the user profile, the groups he belongs to, and his mailbox definition, as shown in [Figure 15](#).

Figure 15 Subscriber Mailbox Definition

Mailbox Profile - System Administration - Cisco Unity Express - Microsoft ...

Personal Mailbox Profile of "User1"

Apply Cancel Help

Description: User1 mailbox

Zero Out (Operator Assistance): 3100

Mailbox Size *: 5520 seconds

Maximum Caller Message Size *: 60 seconds

Message Expiry Time *: 30 days

Play Tutorial: No

Greeting type: Standard

Enabled:

Total Time used: 188

Total messages: 6

New messages: 6

Saved messages: 0

In use: No

* indicates a mandatory field

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Cisco Unity Express defines a group as lists of users or members. If a mailbox is associated with a group, it is a GDM. Only one member can log in to a particular mailbox, including a GDM, at any one time. Groups can have multiple members and multiple owners, and these designations afford an employee different privileges. The same employee might be both a member and an owner of the group.

- A group member can log in to the GDM and manage its voice message content.
- A group owner can make changes to the group membership.

For example, assume that the customer service hotline in your office is extension 3050 (mapping to a Public Switched Telephone Network [PSTN] number of 4xx.5yy.3050). User1 and User2 are the employees who staff this function—one on the morning shift and the other on the afternoon shift. The User1 personal extension is 3001 and the User2 personal mailbox s is 3002. The customer service group profile is shown in [Figure 16](#).

Figure 16 Group Profile

The screenshot shows a web browser window titled "Group Profile - System Administration - Cisco Unity Express - Microsoft Internet Explorer". The page content is titled "Group Profile - customer-service". At the top, there are buttons for "Apply", "Cancel", and "Help". Below these are four tabs: "Profile", "Owners/Members", "Owner/Member of Groups", and "Mailboxes". The "Profile" tab is selected. The form contains the following fields:

- Group ID: customer-service
- Full name *: Customer-Service
- Description: Customer Service
- Primary Extension: 3050
- Primary E.164 Number: 4445553050

Under the "Capabilities" section, there are two checkboxes:

- Super Users:
- Greeting Manager:

The browser's status bar at the bottom right shows the address "146114".

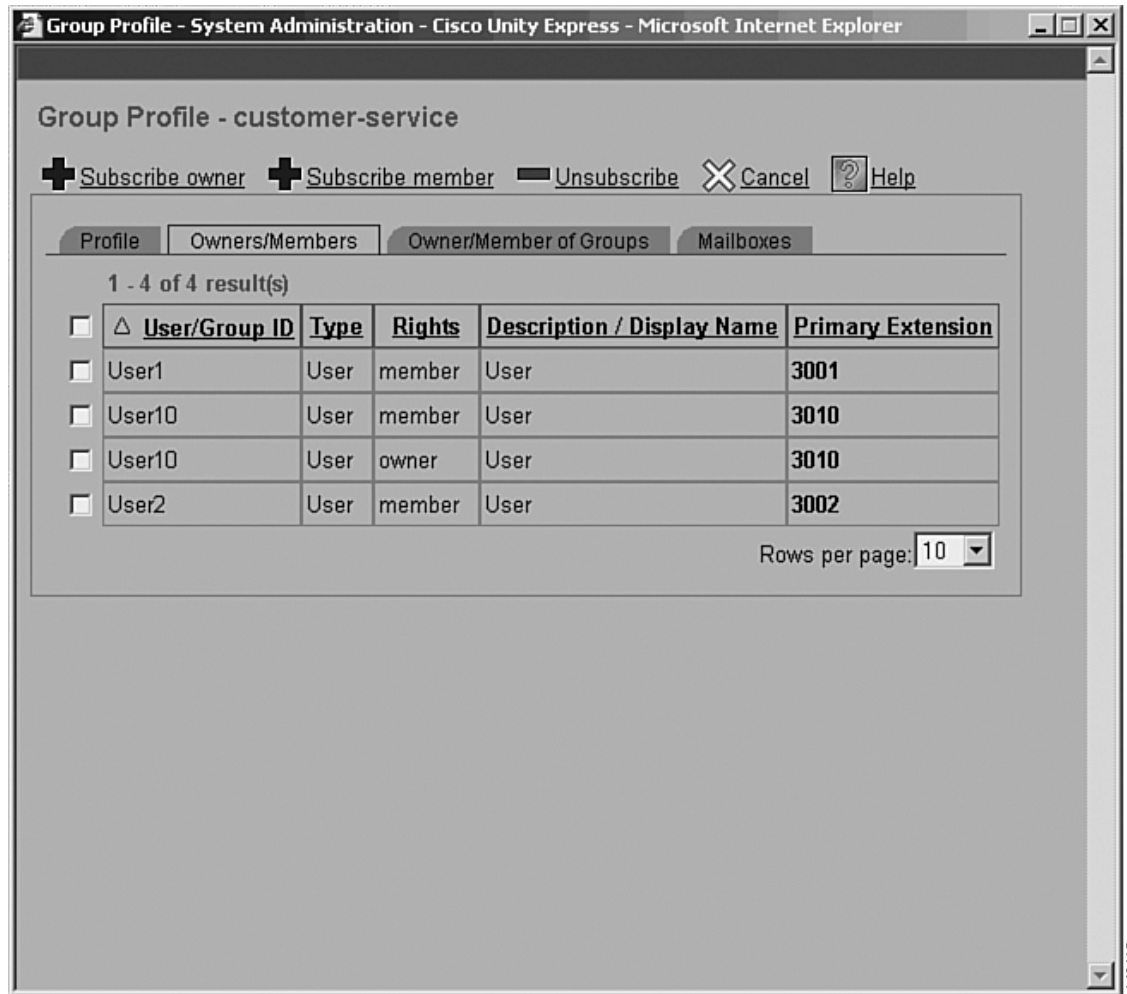
The customer service group is defined containing User1 and User2 as well as User10, who is the supervisor. User10 is defined as both a member and an owner of the group, as shown in Figure 17. Being a member of the group means that User10 can staff the customer service function if required, because the User10 group membership allows login access to the GDM associated with extension 3050. Being an owner of the group means that User10 also has access rights to change the group membership.



Note

The terms user and subscriber are used largely interchangeably in this application note. In general, the term user is preferred, because that is how the Cisco Unity Express graphical user interface (GUI) and command-line interface (CLI) address the profiles of people who are configured on the system. The term subscriber is used in this application note to specifically indicate someone who has a mailbox on the Cisco Unity Express system. User is a more generic term that includes subscribers, but it also includes people who have user definitions on Cisco Unity Express but do not necessarily have mailboxes.

Figure 17 Group Membership Definition



Subscriber Features

A subscriber is the person who owns the voice mailbox. A subscriber can access the voice mailbox, listen to the messages in it, and take action on these messages using the Telephony User Interface (TUI). Cisco Unity Express is not a unified messaging system and, therefore, does not allow access to voice messages by any means other than the TUI.

The following voice mail features are available to a subscriber:

- [Mailbox Login and PIN, page 48](#)
- [Mailbox Tutorial, page 49](#)
- [Personal Greeting, page 50](#)
- [Alternate Greeting, page 50](#)
- [Spoken Name, page 50](#)
- [Message Management, page 50](#)

- [Message Playback Controls, page 51](#)
- [Message Waiting Indicator, page 51](#)
- [Mailbox-Full Notification, page 52](#)
- [Message Reply and Forward, page 52](#)
- [Private or Urgent Messages, page 52](#)
- [Message Playout Sequence, page 53](#)
- [Envelope Information, page 53](#)
- [Zero-Out Destination, page 53](#)
- [Nondelivery Notification, page 53](#)
- [Distribution Lists, page 54](#)
- [GUI Access, page 54](#)

The following sections describe each of these functions in detail.

Mailbox Login and PIN

PINs are mandatory; subscribers must enter a valid PIN to log in to their mailboxes. The administrator assigns the PIN when the mailbox is created and tells the subscriber what it is. The system default may be a blank PIN.

When a subscriber logs in to the TUI for the first time, she is prompted (forced) to change her system-assigned default PIN to a private PIN. Only the subscriber knows this private PIN (the administrator cannot see or access this value) and can change it through either the TUI or GUI.

If a subscriber forgets a PIN, the administrator must reset it. Administrator control over PINs is discussed further in the [“Setting Subscriber PINs and Passwords” section on page 68](#).

If the caller ID on an incoming call to the voice mail system matches a subscriber extension, the subscriber is prompted only to enter a PIN for login. This caller ID may be his or her local extension (for example, 3001) or a PSTN number (for example, a home phone number). Only a single extension can be associated with a mailbox, but an alternate field—the Primary E.164 Number field, as shown in [Figure 18](#)—can contain a PSTN number or an alternate extension that is also matched to this mailbox.

You can use the Primary E.164 Number field to enter a PSTN phone number to enable the subscriber mailbox login from home (you are prompted for the PIN only, not the extension number and PIN). However, this is unlikely to be the most effective use of this field. Usually, as shown in [Figure 18](#), this field is set to the subscriber direct inward dial (DID) number (4xx.5yy.3001 for a subscriber at extension 3001) so that both local and PSTN callers can leave the subscriber a message. If you use this field to direct DID calls (which is likely), a subscriber calling from home to retrieve his messages must log in with both his extension and PIN to access his mailbox, instead of being prompted for only his PIN. On the other hand, if you do not need to direct DID numbers to mailboxes, you can use this field for a PSTN number for mailbox login purposes.



Note

Note that the extension used to transfer from an AA or for MWI is always the Primary Extension field, not the Primary E.164 Number field.

Figure 18 Primary E.164 Field Associated with a Mailbox

User Profile - System Administration - Cisco Unity Express - Microsoft Internet Explorer

User Profile - User

Apply Cancel Help

Profile Groups Mailboxes

User ID: User1

First Name *: User

Last Name *: One

Nick Name *: User

Display Name*: User

Primary E.164 Number: xxxxyy3001

Associated Phone: 0009.B7F7.5793 Add/Edit Remove

Primary Extension: 3001 Other:

Language: English (United States)

Password options: Password specified below

Password:

Confirm Password:

PIN options: PIN specified below

PIN:

Confirm PIN:

* indicates a mandatory field

If the caller ID on an incoming call to the voice mail system does not match any subscriber extension, the voice mail system plays the “Please enter your ID” prompt, which is followed by a prompt for the PIN.

If a subscriber (for example, User1) calls into voice mail from a neighboring phone (User2, who is also a subscriber on the system), the system matches the caller ID to the User2 mailbox and prompts User1 only for the PIN. User1 must press the star (*) button to exit this prompt, and the system reverts to the “Please enter your ID” prompt to allow User1 to log in from any phone on the system.

Mailbox Tutorial

A mailbox tutorial is automatically enabled for any new mailbox created on the system, unless you specifically choose to bypass this feature. The tutorial walks subscribers through basic setup options the first time they log in to the voice mailbox, including the following:

- Recording a spoken name (this is optional and can be bypassed by pressing the # key)

- Recording a standard greeting (this is optional and can be bypassed by pressing the # key)
- Changing the PIN for the mailbox from the system-assigned PIN to a private user-assigned PIN

You can also reenable the tutorial for an existing voice mailbox. As soon as the subscriber has logged in and worked through the tutorial, it automatically turns off.



Note

When a new mailbox is set up, the mailbox tutorial can be accessed only if the subscriber logs in from the primary extension associated with the mailbox. If first-time logins from other locations must be available to subscribers, set the PIN to a nonblank value, and ensure that the subscriber knows this initial PIN setting before attempting to log in for the first time.

Personal Greeting

A caller hears the personal greeting, or standard greeting, upon reaching the voice mailbox. A subscriber can record her own personal greeting. If she does not, the Cisco Unity Express standard system greeting is played out to a caller. After it is recorded, the greeting cannot be deleted, but it can be rerecorded at any time.

Alternate Greeting

The alternate personal greeting is useful when the subscriber wants to set a special notification to callers, such as a vacation notification. The original personal (standard) greeting is still stored but is inactive. The subscriber can switch between the standard personal greeting and alternate personal greeting without erasing either of the recordings. Both the TUI and GUI have a toggle where the subscriber can activate either the standard or alternate personal greeting for the mailbox. The current setting for the User1 mailbox is shown in the following example:

```
Cue# show voicemail detail mailbox User1
Description:                User1 mailbox
...
New Message Count:         6
Saved Message Count:       0
Expiration (days):        30
Greeting:                   standard
```

Either of the two greetings can also be rerecorded at any time.

Spoken Name

When a subscriber logs in to the TUI for the first time, he is allowed to record a spoken name to identify himself as the mailbox owner. The subscriber can change the spoken-name recording at any time but cannot delete it. The system plays the spoken name as verification when another subscriber sends a message, or in the AA if the caller chooses the subscriber extension. If a spoken name is not recorded for a mailbox, the system plays a default announcement including the extension number.

Message Management

A subscriber can log in to his or her mailbox and manage messages as follows:

- Play and replay
- Save
- Forward
- Reply
- Delete and undelete
- Skip
- Send and edit (or rerecord)

When a subscriber sends a message, he or she can address it either by extension or by dial-by-name. If the recipient is local, spoken-name confirmation is played during the addressing step. If spoken name is unavailable because the recipient has not recorded it, the system reads the recipient extension. If the recipient is remote, spoken-name confirmation is played if available in the system local directory or cache (both of which can be disabled if this functionality is not desired). Otherwise, the location and extension are read.

If a subscriber deletes a message during a voice mail login session, the message is marked for deletion. An option under the Listen to Saved Messages TUI menu allows a subscriber to undelete any message deleted during the current session before logging out. When a subscriber logs out of the mailbox, all messages marked for deletion are physically deleted from the system and can no longer be recovered. The undelete feature requires a minimum of Cisco Unity Express 2.1.

Message Playback Controls

When listening to messages, a subscriber can fast-forward (advance), pause, or rewind a message. Cisco Unity Express currently does not support speed acceleration or deceleration controls. The rewind and fast-forward actions skip by 3-second increments within the message.

Message pause halts playout of the current message. The subscriber is prompted every 50 seconds to restart the message playout, up to a maximum of 2.5 minutes, at which point the call is disconnected. In pause mode, the subscriber can take the following actions:

- *Rewind and resume*—Rewinds 3 seconds and restarts message playout
- *Resume*—Restarts message playout
- *Fast-forward and resume*—Skips forward by 3 seconds and restarts message playout

At any time during message playout, a subscriber can press 7 (rewind) to repeat the last 3 seconds of the voice message. This is useful if the caller left his or her phone number and the subscriber wants to repeat this segment.

Message Waiting Indicator

When a new message is left in a personal mailbox, the message waiting indicator (MWI) is enabled for the subscriber phone. When the last new message is either saved or deleted, MWI is disabled. All the phones with an appearance of a specific subscriber extension receive MWI.

If a manager and his or her assistant both have an appearance of the specific manager extension on their respective phones, MWI comes on for both phones when a new message is left in the mailbox.

**Note**

The MWI may take the form of a light or a flashing envelope in the phone display, depending on the extension's line appearance.

Mailbox-Full Notification

If a subscriber mailbox is full, he or she is notified of this situation upon login to his or her mailbox. The Cisco Unity Express system calculates the percentage of space used in a mailbox every time the subscriber accesses it. If the use level exceeds 90 percent the allocated space in the mailbox, the following system prompts are given:

- If mailbox use exceeds 90 percent but is less than 100 percent, the subscriber hears “Your mailbox is almost full. Please delete some messages.”
- If mailbox use reaches 100 percent, the subscriber hears “Your mailbox is full. Please delete some messages.”

If a subscriber attempts to send or forward a message to a recipient whose mailbox is full, the sender hears “Sorry. Your message xxx cannot be delivered to extension yyy. To send another message....” (The Cisco Unity Express system plays your current voice message where xxx appears and reads the recipient extension where yyy appears.) The sending subscriber can rerecord a shorter message because the mailbox may have a little bit of space left, but not enough for the longer message he or she first attempted to send.

If a subscriber sends a message to several other subscribers, all recipients receive the message if at least one recipient's mailbox has sufficient space to contain the message.

**Note**

The mailbox MWI is not used to alert a subscriber to a message-full situation.

An administrator cannot delete messages from a subscriber mailbox (unless he has the PIN from the subscriber and can log in to the mailbox himself). But the administrator can see from the system statistics that the mailbox is full and can tell the subscriber by other means (perhaps an e-mail) to delete some messages. Or the administrator can delete the entire mailbox from the system, thus deleting all messages in the mailbox.

Message Reply and Forward

A subscriber can reply to or forward messages to other local subscribers in the Cisco Unity Express system or another site. When replying or forwarding messages to local recipients, the subscriber can hear spoken-name confirmation of the receiving mailbox if that account has a spoken name recorded.

A subscriber can also forward a message with an introduction to other subscribers.

Private or Urgent Messages

When forwarding a message to another subscriber or sending a voice message, a subscriber can designate the message as urgent or private.

The recipient of a private message cannot forward the message to other subscribers. An urgent message is played at a higher priority than normal messages in the recipient's mailbox.

Message Payout Sequence

Messages in a subscriber mailbox are played in the following sequence of priority. If a message of a higher priority does not exist, the next priority is the first to be played:

1. *Broadcast messages*—Can be played, replayed, saved, and deleted.
2. *Expired messages*—Can be played, replayed, saved, and deleted.
3. *Urgent messages*—Are played before other new personal messages, regardless of when they arrived.
4. *New personal messages*—Can be skipped, played, replayed, saved, deleted, replied to, and forwarded. These are sequenced based on arrival time.
5. *Archived messages*—Can be skipped, played, replayed, saved, deleted, replied to, and forwarded.

Subscribers can interrupt playback of all messages except broadcast messages by pressing the pound key (#) on the phone keypad.

Envelope Information

Messages received by a subscriber contain an envelope with information, such as the time of day and the sender's name or extension. Envelope information is played to the subscriber when retrieving the message.

Zero-Out Destination

Upon hearing a subscriber greeting, a caller may choose not to leave a voice mail, but instead to press 0 to contact the subscriber at an alternate, preconfigured number. The subscriber can configure this zero-out destination number (perhaps a cell phone number, a home phone number, or an alternate extension in a lab in the building) where he or she can be reached.

Nondelivery Notification

Subscribers can send or forward voice messages to other subscribers who are on the same Cisco Unity Express system (a local destination) or on another Cisco Unity Express or Cisco Unity system at other sites in the network (a remote, or network, destination).

A send or forward operation to a local subscriber fails during the addressing step while the message is sent because the local system can do immediate error checking on the state of the recipient's mailbox. Sending or forwarding a message to a remote destination, however, does not fail immediately, because the checking does not happen until the message arrives at the destination system. In this case, the subscriber sends or forwards the message blindly and later receives a notification if an error is detected by the receiving system.

Local Nondelivery Notification

If an internal caller sends or forwards a message to another local subscriber that is longer than the remaining space in a recipient mailbox, the sender hears a system message announcing that the voice message cannot be delivered because the recipient mailbox is full. The sender can choose to rerecord a shorter message.

A similar system message is played if the subscriber attempts to send or forward a message to a local recipient mailbox that does not exist.

Network Nondelivery Notification

The Network Nondelivery Notification feature is also called Nondelivery Receipt (NDR). If a voice message is sent or forwarded to a subscriber at another site, the originating subscriber gets an NDR if the message cannot be delivered.

The voice message may be undeliverable for various reasons:

- A network outage or connectivity problem
- A problem with the addressing of the message
- A configuration problem at either the local or remote site
- The recipient mailbox is full
- The recipient mailbox does not exist

The NDR feature is discussed further in the [“Voice Mail Networking” section on page 81](#).

Distribution Lists

Distribution lists allow subscribers to build lists of other subscribers, so they can send or forward a single voice message to multiple coworkers at the same time. This is particularly useful if you want to address the same group of coworkers repeatedly, such as the other employees in your group or everyone involved in a particular project.

Cisco Unity Express defines two types of distribution lists:

- *Private*—Private distribution lists are maintained by a subscriber and are available only for his or her own use.
- *Public*—Public distribution lists are system-defined, maintained by the administrator, and visible to all subscribers.

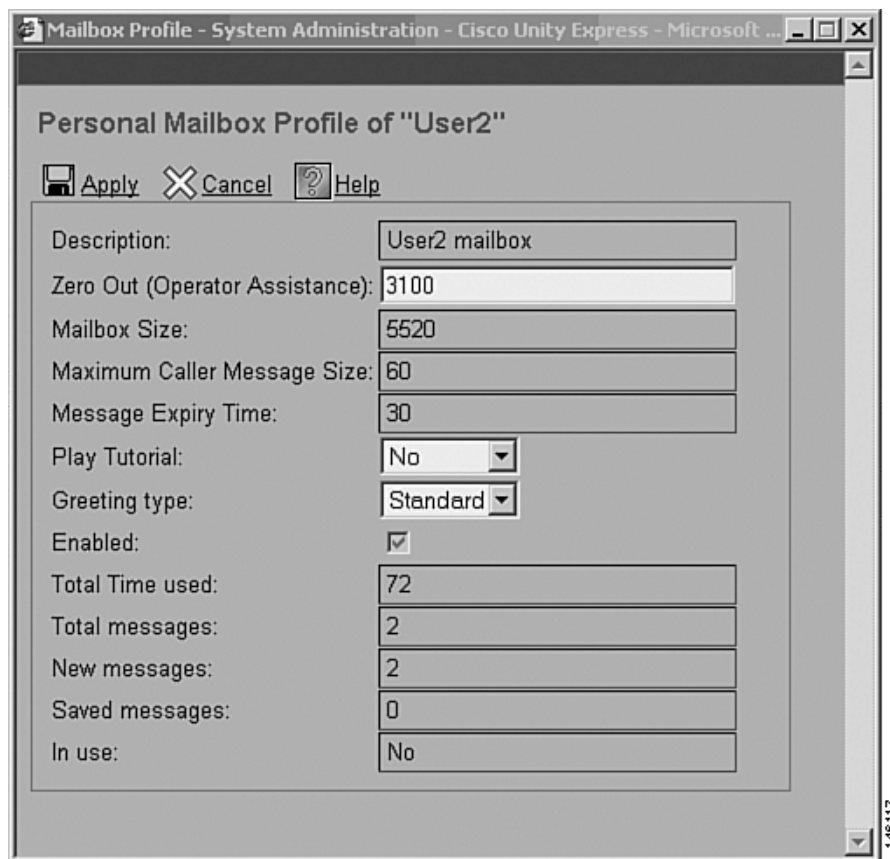
Subscribers create their own private distribution lists. The administrator cannot create them on behalf of the subscriber. Private distribution lists are inaccessible to other subscribers.

GUI Access

In addition to the TUI, subscribers can access their user and mailbox account parameters through the GUI and can review and change account information. The optional GUI access gives the subscriber flexibility and keeps the voice mail system administrator from having to make personal changes.

[Figure 19](#) shows an example of the GUI subscriber window (which is different from the view an administrator sees). The subscriber can change only certain user profile and mailbox parameters, which appear as white boxes as opposed to being grayed out.

Figure 19 Subscriber GUI Window



Caller Features

Two types of callers interact with a voice mail system:

- A customer or vendor who calls your business. The person he or she wants to speak to is unavailable or is already busy on the phone, and the call forwards to voice mail. The caller hears the greeting of the person he or she called and then leaves a voice message for that person.
- An employee of your business who calls into the voice mail system to check or retrieve his or her messages.

All callers interact with the voice mail system by using the TUI only. The following features are available to the first type of caller (the person calling to leave a message) and are covered in this section:

- [Outbound Greeting Bypass, page 56](#)
- [Message Editing, page 56](#)
- [Urgent Messages, page 56](#)
- [Mailbox-Full Indication, page 56](#)
- [Message Leaving and Mailbox Login, page 56](#)
- [Zero-Out Destination or Revert to AA, page 57](#)

The second type of caller is a subscriber. Features available to this type of caller were covered in the [“Subscriber Features” section on page 47](#).

Outbound Greeting Bypass

If callers are not interested in listening to the outgoing greeting of the mailbox reached, they can bypass the greeting and proceed immediately to the beep, where they can leave a message. The caller can bypass the outgoing greeting of a voice mailbox by pressing # on the phone keypad at any time during the greeting ployout.

Message Editing

After recording a message, a caller can listen to, edit, rerecord, or delete the message before sending. Or he or she can simply hang up, and the message is automatically sent.

Urgent Messages

If a caller hangs up after leaving a voice message for a subscriber, the message is sent with normal priority. If a caller presses the # key to end recording of a message, the Cisco Unity Express voice mail system provides a menu where the caller can choose to tag the message as urgent (among other options, such as rerecording the message, deleting it, or listening to the message before sending).

Urgent messages are played at higher priority in a mailbox so that a subscriber hears urgent messages before normal messages when he or she logs in to his or her mailbox.

Mailbox-Full Indication

If the mailbox is almost full (less than 5 seconds of available space), the caller is notified before recording a message and is not allowed to proceed. The caller hears “Sorry. The mailbox you are trying to reach is currently full. Please try again later.” After this prompt, the caller is transferred to the voice mail operator (typically the AA) for further choices.

If the mailbox has available space, a new message from a caller is limited to the minimum of the following:

- The remaining space available in the mailbox
- The maximum caller message size parameter set for the mailbox

Message Leaving and Mailbox Login

Cisco Unity Express has a single voice mail pilot number for both types of callers. If a call is redirected (by CFA, CFNA, or CFB), Cisco Unity Express treats the call as if the person called to leave a message and plays the mailbox greeting. The appropriate mailbox is selected from the last redirected number in the call information delivered to Cisco Unity Express. If the call was not redirected, Cisco Unity Express treats the call as if a subscriber is calling in to retrieve messages. The mailbox is selected from the calling number information delivered to Cisco Unity Express.

Zero-Out Destination or Revert to AA

When a caller leaves a message for a subscriber and does not hang up afterwards (you can press # and get a menu from the Cisco Unity Express voice mail system to, for example, tag a message as urgent), a caller can press 0 and have the call transferred to a preconfigured destination. This is called the zero-out destination for the mailbox or the revert to AA feature.

By default, the zero-out destination for all mailboxes is the system voice mail operator number, discussed in the “[Voice Mail Operator](#)” section on page 71. The default for this operator number, in turn, is the Cisco Unity Express AA pilot number. If a caller leaves a message for one subscriber in your business and wants to try to connect with another employee (who may be in the office), he or she can do so without redialing across the PSTN. For long-distance or international calls, this feature can be of significant benefit to avoid the inconvenience and expense of dialing into the called number multiple times.

If the AA is not the desired transfer destination, the zero-out number can be customized by the subscriber or administrator, per mailbox, as of Cisco Unity Express 1.1. The zero-out destination can be any destination that can be dialed within the Cisco CME dialplan, including PSTN locations.

Administrator Features

As the system administrator, you can use the GUI or CLI to manage voice mail system parameters and voice mail subscriber accounts. The GUI is more user-friendly for individual operations, and the CLI lends itself better to scripting from another management system for faster configuration.

The voice mail-related features available to a Cisco Unity Express system administrator include the following:

- [Voice Mail Pilot Number](#), page 58
- [Mailbox Management](#), page 59
- [MWI](#), page 60
- [Mailbox Storage Allocation](#), page 64
- [Maximum Message Size](#), page 66
- [Message Expiry](#), page 67
- [Setting Subscriber PINs and Passwords](#), page 68
- [Broadcast Messaging](#), page 71
- [Voice Mail Operator](#), page 71
- [Distribution Lists](#), page 72
- [Automatic Gain Control](#), page 73
- [Language Support](#), page 73
- [System Reports and Status](#), page 74

This section describes the features themselves and how they operate. It does not address configuration details.

Voice Mail Pilot Number

The voice mail pilot number is the number subscribers call to retrieve their voice messages (typically triggered by pressing the messages button on the phone), as well as the number IP phones are call forwarded to so that callers can leave a voice message.



Note

For Cisco Unity Express, the voice mail pilot number is always different from the AA pilot number. The same pilot number cannot be used for both applications. You can, however, define multiple pilot numbers for voice mail, as well as multiple numbers for the AA.

Cisco Unity Express uses a single voice mail pilot number for both types of calls. Whether the voice mail system plays a mailbox greeting or prompts for subscriber login depends on whether the call has been redirected before entering the voice mail system. How Cisco Unity Express makes this decision depends on the last redirected number and Calling Number fields of the incoming voice call. This process was explained in the [“Mailbox Login and PIN” section on page 48](#) and the [“Message Leaving and Mailbox Login” section on page 56](#)

The following Cisco IPC Express configuration elements must match for the voice mail pilot number to work correctly:

- A SIP dial peer must be defined on Cisco CME to direct calls to the pilot number to Cisco Unity Express. Ensure that calls to both the local extension pilot number (for example, 3105) and PSTN calls to the DID pilot number (for example, 4xx.5yy.3105) are all directed to Cisco Unity Express. Multiple dial peers can be defined—one for the extension, and another for the E.164 DID number—or digit manipulation can be used to translate the DID number to the extension.
- The **voicemail** parameter within Cisco CME **telephony-service** configuration must be set to the pilot number to ensure that pressing the message button on an IP phone calls the correct number.
- The IP phones must be configured to call forward calls to the voice mail pilot number to ensure that callers reach the voice mail greeting.

The following configuration example fragments show the Cisco CME and Cisco Unity Express configuration parameters relevant to the voice mail pilot number (3105, in this example). You can configure the Cisco Unity Express voice mail pilot number in the GUI by navigating to the **Voice Mail > Call Handling** window. The configuration in the following example uses Cisco IOS translation rules to translate the E.164 PSTN number to the pilot number extension. Translation profile to_aavm is attached to SIP dial peer 3100. The to_aavm profile, in turn, refers to translation rule 10 (applicable to called numbers only), where rule 2 substitutes a called number of 4xx5yy3105 with the digits 3105. Alternatively, you can also define a second SIP dial peer with a **destination-pattern 4xx5yy31..** statement.

Cisco CME router example:

```
voice translation-rule 10
  rule 1 /4xx5yy3100/ /3100/
  rule 2 /4xx5yy3105/ /3105/
!
voice translation-profile to_aavm
  translate called 10
!
dial-peer voice 3100 voip
  description VM-AA
  translation-profile outgoing to_aavm
  destination-pattern 31..
  session protocol sipv2
  session target ipv4:b.19.153.37
!
```

```
telephony-service
 ip source-address a.10.1.100 port 2000
  voicemail 3105
!
ephone-dn 1
 number 3001
 description User1
 call-forward busy 3105
 call-forward noan 3105 timeout 10
```

Cisco Unity Express example:

```
ccn trigger sip phonenumber 3105
 application "voicemail"
 maxsessions 8
 end trigger
```

Under the ephone-dn configuration for each extension, calls are forwarded on busy or no-answer (with a ringing timeout of 10 seconds) to extension 3105, which is the voice mail pilot number, defined by the **voicemail 3105** statement under **telephony-service**.

In the last few lines of the preceding example, the Cisco Unity Express CLI configuration is shown, where the voice mail pilot number 3105 is defined as a SIP trigger to the application. This means that when a call arrives at this number, it triggers the voice mail application.

Mailbox Management

The administrator can create mailboxes up to the maximum number of mailboxes supported by the license installed on the Cisco Unity Express system. When you create a mailbox, you must associate it with an existing user or group. You can modify mailbox parameters in the Mailbox Profile window in the GUI. You can navigate to this window either by going to **Voice Mail > Mailboxes** and clicking the appropriate mailbox or by going to the **Configure > Users** or **Configure > Groups** windows, clicking the appropriate user or group, and then selecting the **Mailbox** tab from the user or group profile.

GDMs cannot be reused as personal mailboxes, because logging in to a GDM requires that the member (subscriber) also have a personal mailbox. However, as mentioned, in the [“Cisco Unity Express Licensing” section on page 40](#), as of Cisco Unity Express 2.1 any number of personal mailboxes or GDMs can be defined, up to the maximum number of mailboxes allowed by the Cisco Unity Express license. An existing personal mailbox cannot be converted to a GDM (or the other way around) and keep the existing messages in the mailbox. Making such a configuration change requires you to delete the mailbox and redefine it as the new type, which means that the mailbox will be created new and will be empty of messages.

You may change mailbox parameters at any time, and you also may delete a mailbox. The user definition (information associated with the subscriber) is separate from that of the mailbox, and the user definition may exist without an associated mailbox. However, a mailbox may not exist without being associated with either a user or group.

Parameters such as mailbox size, expiry time, and maximum caller message size are assigned at mailbox creation time. The default mailbox size is calculated based on the hardware form factor and license you are using, as given earlier in [Table 8](#). Unless you override the values in the Configuration window, the system default values are automatically applied. If you change the system defaults, these changes apply only to mailboxes you create after the defaults have changed. Existing mailboxes continue to have the parameter values assigned to them at creation time.

If you foresee that your business will grow, you probably want to set the mailbox size defaults to be smaller than the system defaults. The reason for this is that the total system storage space is determined by the hardware form factor. For example, the NM-CUE provides 100 hours of storage, regardless of the mailbox license installed. If you first purchase your NM-CUE system with 50 mailboxes, the default system mailbox size allocates all 100 hours equally across the 50 mailboxes. If you later upgrade to the 100-mailbox license, there is still only 100 hours of storage in total, and there may not be enough unallocated storage space left to define the new mailboxes. To alleviate this situation, you must access the existing mailboxes and make

them smaller to release space for the new mailboxes you can now add to the system. The recommendation is to set the default mailbox size to the actual mailbox size you foresee using in your business, as opposed to simply using the system defaults.

MWI

The MWI on the IP phone is turned on when a new message is waiting in the mailbox associated with the extension that appears on the phone. MWI is turned off when the last new message in the mailbox is saved or deleted. Several topics related to MWI operation are discussed in the next sections:

- Understanding when each of the two MWI mechanisms on an IP phone (either a red lamp on the handset or a flashing envelope in the phone display) is used
- Controlling MWI on multiple phones for a single mailbox
- Controlling MWI for GDMs
- Understanding how MWI directory numbers (DNs) operate
- Refreshing MWI for an individual phone or the entire system if the indications become unsynchronized with the mailbox message content

Lamp or Flashing Envelope MWI

Cisco IP phones offer two types of MWI alerts: the red lamp on the handset and a flashing envelope icon that appears on the phone display next to a particular button. Not all phone models provide both types of indicators, but phones with multiple buttons (or lines) do.

Cisco CME and Cisco Unity Express do not offer a direct configuration option where you can select which type of MWI alert you want on the phone. The selection is based on where the extension associated with the mailbox appears on the phone's buttons. The red lamp MWI is used when the extension appears on button 1 of the phone. The flashing envelope MWI is used for extensions that appear on any button except button 1. Therefore, you can indirectly control the type of MWI by selecting the sequence in which extensions appear on a phone.

MWI on Multiple Phones for the Same Mailbox

MWI is turned on per extension, not per phone. A mailbox is associated with a user, the user is associated with an extension (the Primary Extension field in the Cisco Unity Express user profile), and the extension is associated with a button on one or more phones. All phones with extension appearances associated with the mailbox receive MWI. The type of MWI is determined individually per phone, as explained in the preceding section.

For example, assume that User1 is a manager at extension 3001 and User5 is the manager's assistant. Extension 3001 appears on button 1 of User1's phone and on button 2 of User5's phone. When a caller leaves a new message for User1, the red lamp MWI comes on for User1's phone, and the flashing icon MWI comes on for User5's phone. If you want the assistant to also receive a red lamp MWI for the manager's messages, the manager's extension (3001) must be moved to button 1 of the assistant's phone.

MWI for GDMs

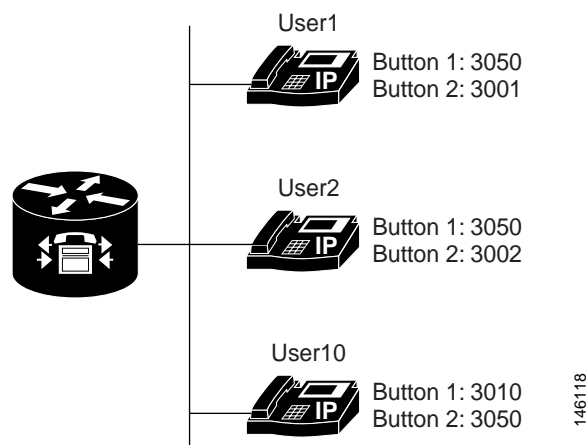
MWI for GDMs works exactly the same way as MWI for personal mailboxes. A GDM is associated with a group, a group is associated with an extension, and an extension appears on button 1 or higher of one or more phones.

For example, suppose User1 (3001) and User2 (3002) work in the customer service department of your business. Their manager is User10 (3010). The extension associated with customer service is 3050. The customer service group is associated with extension 3050 and has a GDM so that callers can leave a message for help, regardless of which employee is currently on shift. Both employees (User1 and User2) and their manager (User10) belong to the customer service group, so they all have access to the GDM to check for messages.

You want the customer service employees (User1 and User2) to receive a red lamp MWI for the GDM, because responding to customer service calls is their primary responsibility. The manager (User10) must receive a red lamp MWI for User10's personal mailbox, but the manager also wants to monitor the state of the GDM to respond to customer service messages if the employees in the group are overloaded or unavailable.

The way to achieve this is to put the customer service group extension 3050 on button 1 of User1 and User2's phones, as shown in [Figure 20](#). On the manager's (User10) phone you put the manager's own extension (3010) on button 1 and an appearance of 3050 on button 2 (or higher) so that the manager can see a flashing icon for the GDM message status.

Figure 20 MWI for General Delivery Mailboxes



You can use the Cisco CME silent ring option so that calls to extension 3050 do not disturb the manager while still allowing the manager to monitor message status for the GDM. This configuration is shown in [Figure 21](#) in the Ring Type/Mode field.

Figure 21 Silent Ring for GDM Monitoring

Change Phone

Phone Physical ID : 0002.FD06.D959
 Phone Sequence Number : 2
 Phone Type : 7960
 Call Blocking : Exempt Non Exempt
 Auto-Line Selection : In/Out Incoming Disable
 Login PIN :
 Receive Night Service Bell : No Yes

Phone Line Buttons

6 result(s)

Button	Extension(s)	Ring Type/Mode
1	2, 3002 [User2]	Normal Ring
2	42, 3050 [Customer Service]	Silent
3		
4		
5		
6		

Speed Dial Information

MWI DN Operation

Cisco Unity Express has no direct control mechanism over the IP phones and triggers MWI on a phone via the Cisco CME call control engine. When a new voice message is left in a subscriber's mailbox, Cisco Unity Express originates a call to a special extension type, an MWI DN or extension. Two separate MWI DNs must be defined on Cisco CME: an MWI ON DN and an MWI OFF DN. The Cisco CME configuration of the MWI DNs is shown in the following configuration example:

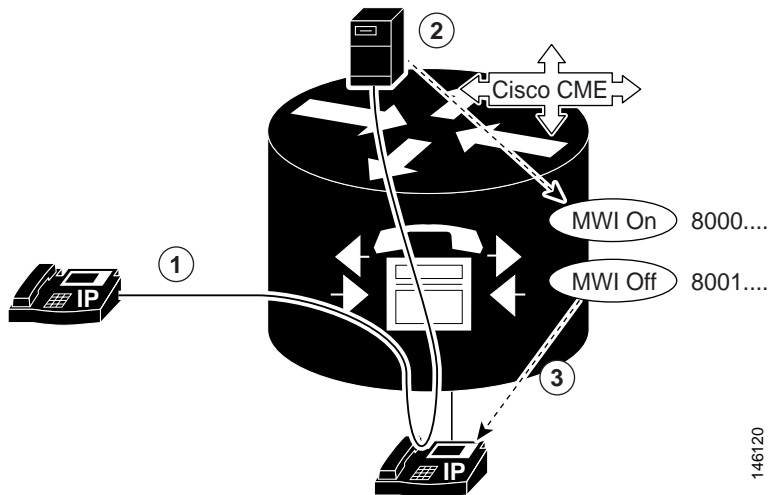
```
ephone-dn 51
 number 8000....
 mwi on
!
ephone-dn 52
 number 8001....
 mwi off
```

A call terminating on one of these DNs is handled by Cisco CME call control and results in a message sent to the IP phone of the extension matched by the wildcards in the MWI DN definition.

To illustrate how Cisco Unity Express triggers MWI, consider an example in which a new voice message is left for User1 at extension 3001. The MWI DN definition shown in the preceding example is configured on the Cisco CME system. The sequence of events that follow is illustrated in Figure 22:

1. A new voice message is left for User1 at extension 3001.
2. Cisco Unity Express originates a SIP call to destination number 80003001. 8000 is the MWI ON DN defined in the configuration, and 3001 is the extension where the lamp must be turned on. The call to 80003001 matches the ephone-dn definition for number 8000...., and Cisco CME extracts the wildcard portion of this match (that is, 3001) to determine which phone is to be controlled. The DN type matched by the SIP call destination number (MWI ON or MWI OFF) determines the type of control. In this case, 8000 is the MWI ON DN.
3. Cisco CME sends a Skinny Client Control Protocol (SCCP) message to every IP phone that has an appearance of extension 3001 defined to turn on its MWI.

Figure 22 MWI with Cisco CME



Similarly, when User1 has listened to this message and the lamp must be turned off on the phone, Cisco Unity Express originates a call to extension 80013001. Extension 8001 is the MWI OFF DN defined in the configuration. Therefore, Cisco CME knows to send an SCCP message to turn off the MWI on every IP phone with an appearance of extension 3001.



Note

It is important that the MWI ON and MWI OFF DN definitions contain enough wildcards (the dots) to match the extension length of the phones defined on the system. For example, if four-digit extensions are defined on the system, the MWI ON and MWI OFF DNs must contain four trailing dots. If the MWI DN is defined only as 8000, instead of 8000...., a call originated by Cisco Unity Express to 80003001 cannot match any ephone-dn, and MWI will not work. This process does not work in the same way as Cisco Unity MWI control. The MWI configurations for Cisco Unity and Cisco Unity Express are different.

MWI Refresh

If users complain that their MWI alerts are out of synchronization with the message content of their voice mailboxes, you can force a manual refresh of MWI either for an individual user, selected users, or the entire system. You can refresh MWI from the **Voice Mail > Message Waiting Indicators > Refresh** GUI window. When refreshing MWI for the entire system, Cisco Unity Express sends one MWI update every 4 seconds until all MWIs on all extensions have been updated.

Getting out of synchronization can happen in some situations when phones are disconnected from the network (and therefore powered off) or are rebooted, and Cisco Unity Express does not know that MWI was lost on the phone. If the phone was not moved or rebooted, getting out of synchronization usually indicates a software error. The Cisco Unity Express MWI refresh ability allows you to synchronize MWI for your users immediately, either individually or for the entire system. Follow the troubleshooting techniques described in the application note entitled "[Troubleshooting Cisco Unity Express Integrated Voice Mail Features](#)" to determine the root cause of the problem.



Note

Up to and including Cisco Unity Express 2.1, Cisco Unity Express does not contain any scheduled or automatic MWI refresh logic. MWI is refreshed either when the Cisco Unity Express system starts up or by a manual refresh triggered by administrator action.

Mailbox Storage Allocation

Cisco Unity Express stores voice messages and greetings in G.711 μ -law format. This means that every second of stored voice consists of 64,000 bits. You can calculate the size of the audio file representing a voice message with the following formula:

$$1 \text{ minute of stored voice} = 60 \text{ seconds} * 64000 \text{ bits} = 3840 \text{ Kb} = 480 \text{ KB}$$

This is a good minimum estimate of the size of your Cisco Unity Express backups. If you have 200 minutes of stored voice mail, your backup is at least 96,000 KB, or 96 MB, in size. You can see the total amount of voice mail storage allocation in your Cisco Unity Express system by using the **show voicemail usage** command, as shown in the following example. You can see the same information in the GUI by navigating to the **Reports > Voice Mail** window.

```
Cue# show voicemail usage
personal mailboxes:                20
general delivery mailboxes:        1
capacity of voicemail (minutes):   6000
allocated capacity (minutes):      1562.0
message time used (seconds):       1469
message count:                     25
average message length (seconds):  58.76
greeting time used (seconds):      149
greeting count:                    19
```

Cisco Unity Express does not provide any disk usage or disk statistics counters. Voice mail storage allocation is always reflected with respect to the number of hours of storage allowed by the license installed on your system.

If your Cisco Unity Express system's storage capacity starts filling up, you will see log file messages issued at 90 percent usage and 95 percent usage. Above 95 percent storage usage, you see another log file message at every additional one percent usage, reminding you that subscribers must start deleting voice messages to keep the system from running out of space.

Storage Allocation Per Mailbox

The administrator can specify, in seconds, the amount of message storage available independently for each individual subscriber's mailbox. This can be done at mailbox creation time or after the mailbox has been created. The total amount of storage allocated for all mailboxes cannot exceed the amount of message storage available on the Cisco Unity Express system. By default, all mailboxes created on a Cisco Unity Express system are the same size. The actual size depends on the hardware form factor (NM-CUE or AIM-CUE) and the mailbox license level on your system. [Table 8 on page 41](#) provided the different system defaults.

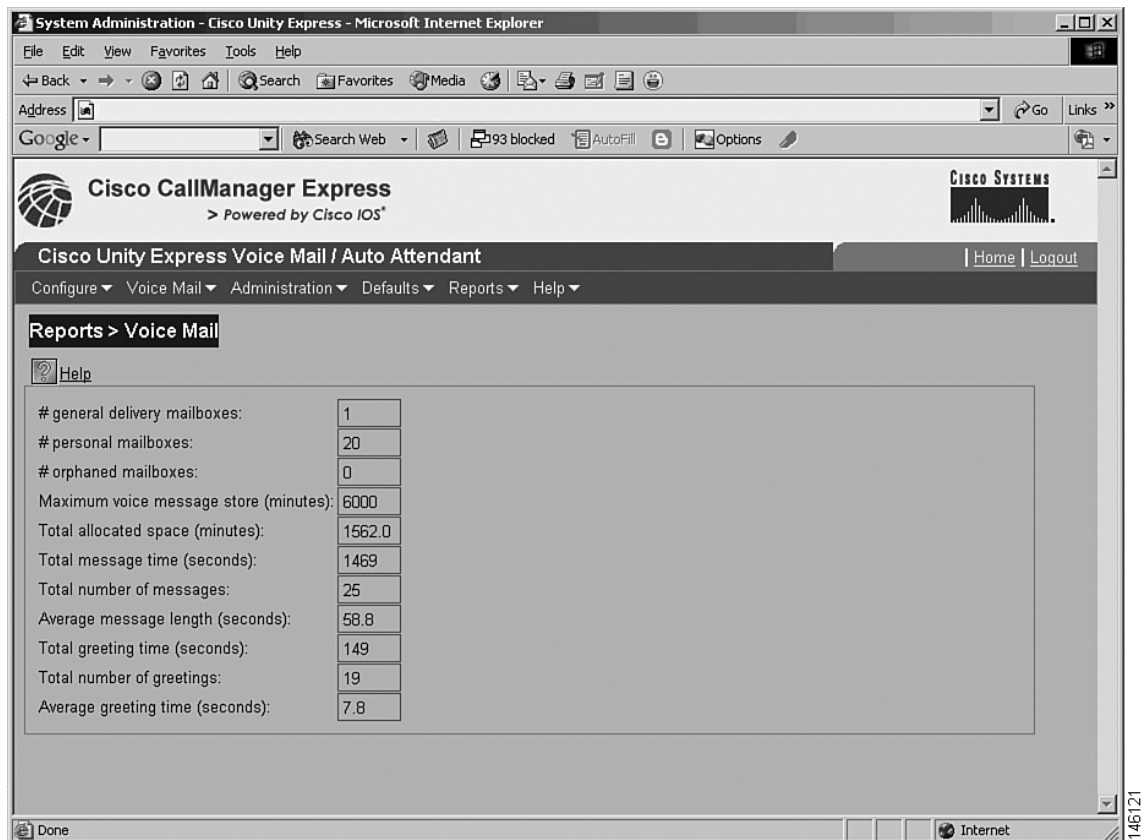
If you want to change the message storage size for a subscriber after the mailbox already has some messages stored, the new mailbox size cannot be less than the current used space.

System Settings and Defaults

You can configure your own default mailbox message storage size in the **Defaults > Mailbox** GUI window, which is used whenever a new mailbox is created.

The GUI window under **Reports > Voice Mail** shows you how much storage space has already been allocated to existing mailboxes and how much of the allocated space is used by existing messages in the system. This is shown in [Figure 23](#).

Figure 23 Voice Mail Storage Allocation Summary



In the GUI window **Defaults > Voice Mail**, you see the parameter maximum voice message store. This is the total amount of storage (in minutes) you have on your system, and this value depends on the Cisco Unity Express hardware platform you have. You can make this value smaller if you want to, but you cannot make it larger.

Maximum Message Size

Cisco Unity Express defines a maximum message size for both outbound (message send) and inbound (caller leaving a message) messages. These are independent values with defaults that you can control by setting your own desired system value.

Inbound Message Size

The inbound message size is the maximum size message a caller can leave in a mailbox. This maximum size prevents calls from maliciously or accidentally filling the voice mail system's storage with a single errant message. This inbound maximum message size is a system-wide parameter you can find in the **Defaults > Mailbox** GUI window called Maximum Caller Message Size. You can control this parameter individually per mailbox, as shown in [Figure 24](#), or you can leave the system default intact for all mailboxes.

Figure 24 Maximum Message Size Per Mailbox

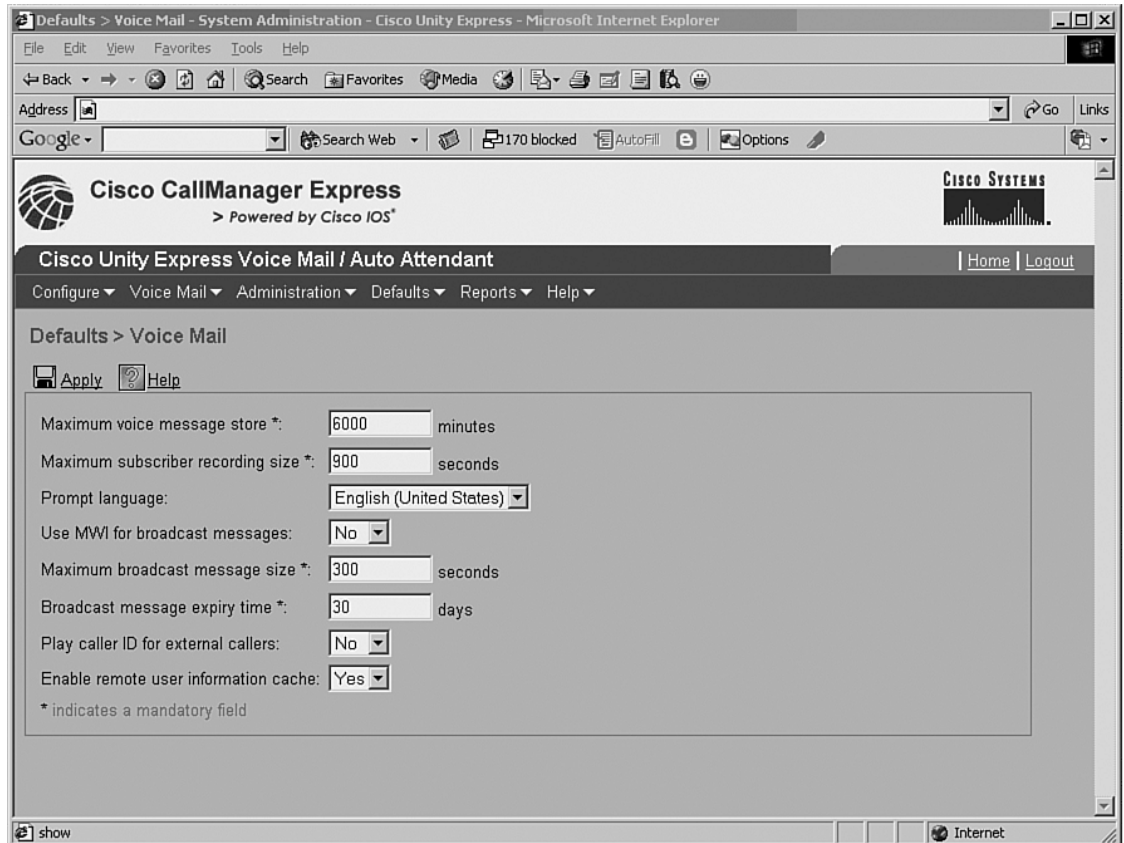


Outbound Message Size

The outbound message size is the maximum size message a subscriber can record and send to another mailbox. You cannot control this value individually per mailbox, but you can set the system default value to a value you desire. This single value applies to all subscribers on the system.

You can find this parameter in the **Defaults > Voice Mail** GUI window, in a field called Maximum Subscriber Recording Size (see [Figure 25](#)).

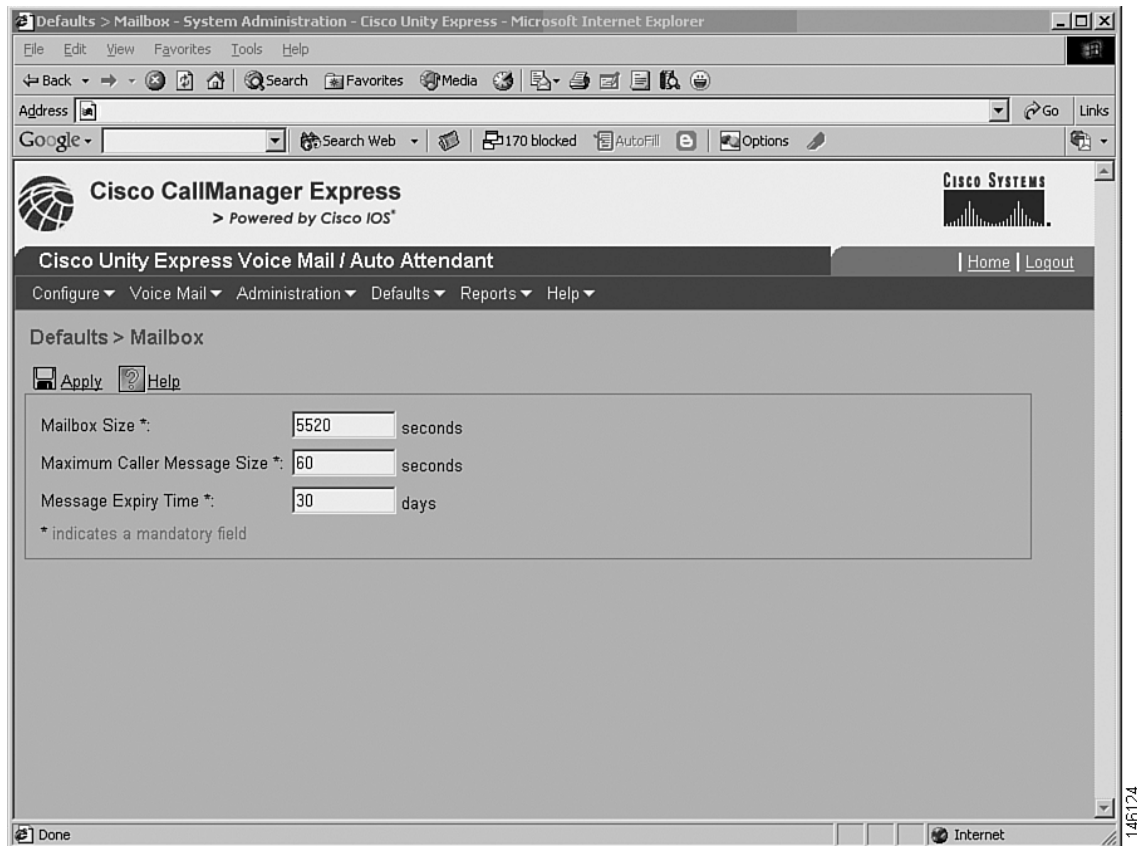
Figure 25 Maximum Subscriber Recording Size



Message Expiry

You can configure each mailbox individually to specify the maximum duration for which messages are stored in the mailbox before they expire. Or you can choose to have the single system-defined default (30 days) apply to all mailboxes. You can find this parameter in the **Defaults > Mailbox** GUI window, in a field called Message Expiry Time (see [Figure 26](#)).

Figure 26 Message Expiry Time



When a message, whether new or saved, has been in the mailbox for the specified expiry duration, it is automatically marked as expired. Cisco Unity Express does not automatically delete messages from a subscriber's mailbox.

When the subscriber next logs in to his or her mailbox, a system prompt announces that one or more messages have expired and that some action is necessary. The subscriber is prompted to either keep the message (which resets the message's expiry time) or delete the message.

Setting Subscriber PINs and Passwords

The administrator sets the initial value of a subscriber's PIN and password when the user profile is created. The administrator can reset the PIN or password to a known value if the subscriber forgets his or her PIN or password, but the administrator can never display the user-chosen values. After you have reset the forgotten PIN or password, the subscriber can log in again and change the PIN or password to a new private value.

Cisco Unity Express uses its own underlying user administration and authentication functions to keep track of a subscriber's PIN or password. External authentication mechanisms such as authentication, authorization, and accounting (AAA) cannot be used by Cisco Unity Express up to 2.1. PINs and passwords are stored in a one-way encrypted form and cannot be displayed or read in any way.

When you create a new user on Cisco Unity Express, a PIN and password are automatically assigned based on the Cisco Unity Express password policy. This policy can be either blank or randomly generated PINs and passwords (the latter policy is recommended). This policy is set in the **Defaults > User** GUI window.

The system-generated PIN and password for a new user are displayed in the GUI for you (as an administrator) to remind you what combination the system assigned to the user. You provide the new user with these initial values to log in to the system for the first time. The User Profile window in [Figure 27](#) shows that a new user's password is assigned as act772113, and the PIN as 5678.

Figure 27 PIN and Password for a Newly Created User

The screenshot shows the 'User Profile - User Twentyone' window. The 'Profile' tab is selected. The fields are as follows:

- User ID: User21
- First Name *: User
- Last Name *: Twentyone
- Nick Name *: User Twentyone
- Display Name*: User Twentyone
- Primary E.164 Number: xxxyyy3021
- Associated Phone: [Empty] Add/Edit Remove
- Primary Extension: None Other: 3021
- Language: English (United States)
- Password options: Password specified below
- Password: [Masked] Generated value: act772113
- Confirm Password: [Masked]
- PIN options: PIN specified below
- PIN: [Masked] Generated value: 5678
- Confirm PIN: [Masked]

* indicates a mandatory field

After the user logs on and changes his or her PIN or password, these values are never again displayed or viewable. You, as the administrator, can always reset the values of both fields, but you can never see the values the user chose. [Figure 28](#) shows the User Profile window after User21 has changed the password and PIN. Through the User Profile window, you can tell whether a user has reset the PIN or password or whether the user is still using the system-assigned defaults.

Figure 28 A User Who Has Changed His or Her PIN and Password

The screenshot shows a web browser window titled "User Profile - System Administration - Cisco Unity Express - Microsoft Internet Explorer". The page content is titled "User Profile - User Twentyone" and includes navigation buttons for "Apply", "Cancel", and "Help". There are three tabs: "Profile", "Groups", and "Mailboxes", with "Profile" selected. The form contains the following fields and options:

- User ID: User21
- First Name *: User
- Last Name *: Twentyone
- Nick Name *: User Twentyone
- Display Name*: User Twentyone
- Primary E.164 Number: 4445553021
- Associated Phone: [empty field] Add/Edit Remove
- Primary Extension:
 - None
 - Other: 3021
- Language: English (United States)
- Password options: Password specified below
- Password: [masked field]
- Confirm Password: [masked field]
- PIN options: PIN specified below
- PIN: [masked field]
- Confirm PIN: [masked field]

* indicates a mandatory field

PINs

PINs are mandatory in all releases of Cisco Unity Express. They are used to log in to a mailbox. Until Cisco Unity Express 2.0, PINs were 3 to 16 digits long, numeric only, and did not expire. As of 2.1, the administrator can configure a PIN's minimum length (the system default remains three digits) and assign an expiry time in days.

Passwords

Passwords are mandatory in all releases of Cisco Unity Express. Passwords are used to log in to the GUI using a web browser. Until Cisco Unity Express 2.0, PINs were 3 to 32 characters long, case-sensitive, allowed alphabetic and numeric characters, and did not expire. As of release 2.1, the administrator can configure a password's minimum length (the system default is four characters) and assigns an expiry time in days.

Broadcast Messaging

Broadcast messaging is a common voice mail system function. Broadcast capability requires Cisco Unity Express 2.1 or later software. This section describes sending and receiving broadcast messages.

Sending a Broadcast Message

Only users with broadcast privileges can send a broadcast message. Normal subscribers cannot send broadcast messages. You compose a broadcast message by using the Cisco Unity Express TUI Administration Via Telephony (AVT) (also called the Greeting Management System [GMS] in Cisco Unity Express releases before release 2.1) and selecting option 3 from the menu. logging in to the AVT requires the same user ID and PIN as your personal mailbox login. Therefore, you require a personal mailbox on the system and broadcast privileges assigned to your user ID to have access to sending a broadcast message.

Broadcast message addressing options include the following:

- Send to all users on the local Cisco Unity Express system.
- Send to all users at selected networked Cisco Unity Express locations by choosing the systems' location IDs. (This is explained further in the [“Voice Mail Networking”](#) section on page 81.)
- Send to all users at the local site, and select networked Cisco Unity Express locations. This requires selection of the local Cisco Unity Express site as one of the networked location IDs.

Receiving a Broadcast Message

A broadcast message is sent to all subscribers on any of the Cisco Unity Express systems (local or networked) the message was addressed to. It is played to the subscribers, as explained in the [“Message Playout Sequence”](#) section on page 53.

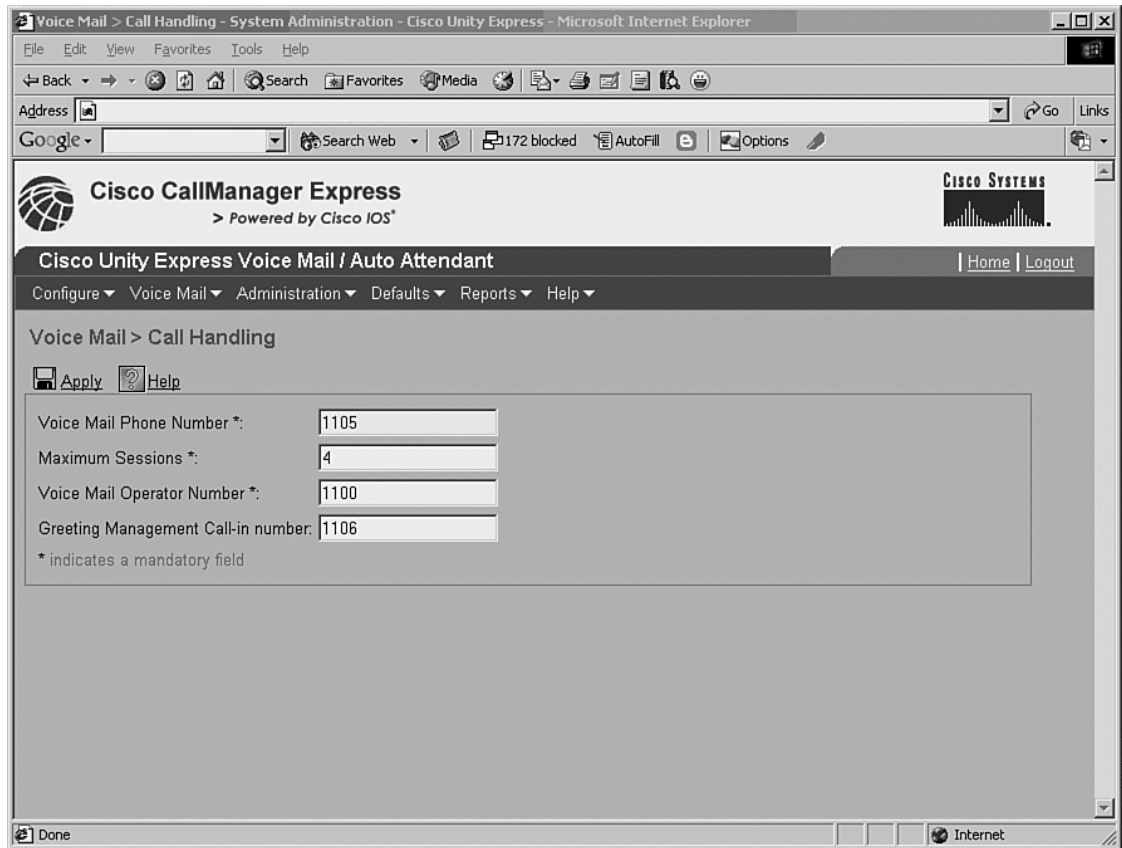
You can configure MWI for broadcast messages if you are the Cisco Unity Express system administrator. Whether MWI is turned on for broadcast messages is a property of the receiving Cisco Unity Express system; it is turned off by default. The same broadcast message sent to multiple destination Cisco Unity Express systems can, therefore, cause the MWI to light up in one destination Cisco Unity Express system and not on another Cisco Unity Express system, based on the broadcast MWI configuration in each recipient system.

Voice Mail Operator

Cisco Unity Express defines a system voice mail operator where calls are redirected if a caller does not respond to voice mail menus or does not hang up after leaving a voice message for a subscriber. The voice mail “operator” is triggered when the following voice mail prompt is reached: “If you have a mailbox on the system, please press #, or you will be transferred to the operator.”

By default, the Cisco Unity Express voice mail operator is set to the Cisco Unity Express AA pilot number. Alternatively, you can set this to the extension of any employee in your office or a PSTN location. To change this attribute, on the **Voice Mail > Call Handling** GUI window, change the Voice Mail Operator Number field, as shown in [Figure 29](#). (It's set to extension 1100, which is the AA pilot number.)

Figure 29 Voice Mail Operator Number



Distribution Lists

As covered in the [“Subscriber Features” section on page 47](#), Cisco Unity Express defines two types of distribution lists: private and public. As the system administrator, you maintain public distribution list definition and membership. Distribution lists may have as one or more of the following as members:

- A group
- A subscriber
- A GDM
- Other public distribution lists

Distribution lists have the following properties:

- If a user is removed from the Cisco Unity Express system, he or she is also removed as a member from all the public and private distribution lists in the system.
- A list is identified by a unique number or name.
- A list may contain a mix of local and networked Cisco Unity Express destinations.
- A spoken name may be recorded by the owner of a list for easier addressing.

Public Distribution Lists

If a voice message is sent to a distribution list that has all the member elements just described, the message is placed in the user's mailbox, in the GDM, and in the personal mailbox of each member of the group.

The Cisco Unity Express system has a system default everyone public distribution list. This list automatically contains all the local users of the system (no groups or GDMs are included) and is automatically maintained by the system. If a user is added to the system, that person is automatically also added to the everyone distribution list. Members cannot be manually added to or deleted from the everyone list.

In addition to the everyone list, a maximum of 15 public distribution lists can be defined irrespective of Cisco Unity Express mailbox license level. You can define a total of 1000 public distribution list entries per Cisco Unity Express system.

Private Distribution Lists

When you delete a user from the system, all the private lists owned by that user are also deleted from the system. As the administrator, you cannot create private lists for subscribers, but you can see the lists (and members) belonging to a particular subscriber if you have viewing privileges.

Each subscriber can define a maximum of five private distribution lists and a total of 50 private distribution list entries.

Automatic Gain Control

Cisco Unity Express contains Automatic Gain Control (AGC) code. This means that differences in volume levels between internal calls and PSTN locations are automatically compensated for when callers leave messages.

AGC is active on all calls into Cisco Unity Express and ensures that all messages recorded are of the same volume level. Incoming voice streams are normalized to a standard input value, and the adjusted audio is stored. You have no configuration control over these settings.

Language Support

Before Cisco Unity Express 2.0, the only language supported by Cisco Unity Express was U.S. English.

As of release 2.0, support for Spanish (European), German, and French (European) was introduced. Only a single language may exist on Cisco Unity Express at any one time. Cisco Unity Express does not yet support multiple simultaneous languages. You choose the language for your system during the Cisco Unity Express installation when language-specific prompts are installed and the appropriate language files are downloaded to the system.

Language customization on Cisco Unity Express affects only the voice mail and AA system prompts. The GUI, CLI, and system monitoring and debugging tools, such as log file messages, are always supported in English only.

Your own customized AA prompts and voice mail greetings can be recorded in any language you like, regardless of the system language installed on Cisco Unity Express. Clearly, it would make sense to have the system and custom prompts in the same language, but no Cisco Unity Express system knowledge forces this coordination. For example, your opening AA welcome greeting may be bilingual and in order to allow callers to choose a language to use with the remaining AA menus. But if callers encounter any

system AA or voice mail prompts during this interaction, the system prompts are provided only in the system language currently installed on your system. You cannot rerecord the system prompts or translate them.

System Reports and Status

Cisco Unity Express up to release 2.1 does not include formal reports, but you can use various GUI windows and CLI show commands to provide system status and statistics to monitor system use and performance:

- Cisco CME call detail records (CDRs)
- Cisco IOS router displays, such as `show voice call status` and `show voice call summary`
- Summary voice mail space usage displayed by the `show voicemail usage` Cisco Unity Express command or by the **Reports > Voice Mail** GUI window
- Summary voice mail space usage showing individual mailbox usage levels displayed by the `show voicemail mailboxes` Cisco Unity Express command
- Individual mailbox usage statistics displayed by the `show voicemail detail mailbox xxx` Cisco Unity Express command (where **xxx** is the user ID) or the mailbox profile displayed in the GUI by clicking a specific user ID in the **Voice Mail > Mailboxes** window
- System statistics such as memory usage (`show memory` and `show proc memory`) and CPU usage (`show proc cpu`)

Call Redirection into Voice Mail

As mentioned in the [“Message Leaving and Mailbox Login” section on page 56](#), Cisco Unity Express uses the last Redirected Number field in the call information to select the mailbox greeting to play to a caller. This field can be seen in the Diversion header in the SIP INVITE message delivering the call to Cisco Unity Express, as shown in the following example. In this example, 6800 is the voice mail pilot number, extension 7010 originates a call to extension 5010, and the call is redirected to voice mail by CFNA.

```
Router# debug ccsip messages
INVITE sip:6800@a.3.6.179:5060 SIP/2.0
Via: SIP/2.0/UDP a.3.6.4:5060
From: "7010" <sip:7010@a.3.6.4>;tag=691AB6E4-223C
To: <sip:6800@a.3.6.179>
Call-ID: E5D39E6A-8FC011D7-9025DAEC-459632B0@a.3.6.4
CSeq: 101 INVITE
Max-Forwards: 6
Remote-Party-ID: <sip:7010@a.3.6.4>;party=calling;screen=no;privacy=off
Timestamp: 1054070868
Contact: <sip:7010@a.3.6.4:5060>
Diversion: <sip:5010@a.3.6.4>;reason=no-answer;counter=1
```

Correct voice mailbox selection depends on the redirection information delivered with the call, which is extension 5010 in the preceding example. A call can be redirected to voice mail in numerous ways, and these ways may populate the redirection information differently. The following sections explore three ways for calls to be redirected to voice mail and their dependencies on voice mailbox selection and operation.

- [Call Forward into Voice Mail, page 75](#)

- [Transfer and Conference, page 75](#)
- [Transcoding, page 75](#)

Call Forward into Voice Mail

CFNA, CFB, and CFA are the typical ways to divert a call to voice mail. If a call is redirected multiple times before reaching voice mail, the value in the last Redirected Number field always selects the voice mail greeting that Cisco Unity Express plays to the caller. For example, if extension 3001 calls extension 3061, which CFAs to extension 5001, which in turn CFNAs to voice mail, the caller at extension 3001 hears the voice mail greeting of the subscriber associated with extension 5001.

Some voice mail systems use the original called Number Field for voice mailbox selection. In the call flow just described, that is extension 3061. This field does not change, regardless of how many times the call is subsequently diverted before reaching voice mail. Some voice mail systems, including Cisco Unity Express, use the last Redirected Number field. Other systems allow you to configure which field to use.

Transfer and Conference

Other possible ways for a call to enter a voice mail system are by using call modification features such as transfer and conference. Call transfer to voice mail is fairly common, but call conference is perhaps less so.

If your business has a receptionist or administrative assistant answering calls, a caller may choose to transfer to the employee's voice mail instead of waiting to speak to the person. This scenario is discussed in detail in the application note entitled

When a call is transferred to voice mail, the extension initiating the transfer is the last redirected number, and this extension's mailbox is selected. For example, suppose a PSTN caller calls the receptionist at extension 3001. The caller wants to speak to User5 at extension 3005. If the receptionist transfers the call to voice mail, extension 3001's mailbox is selected. The application note entitled "[Cisco IPC Express Automated Attendant Options.](#)" describes a workaround configuration that allows your receptionist to transfer a call without ringing the destination extension (3005) while having the caller hear extension 3005's voice mail greeting.

Conferencing with voice mail being one of the endpoints usually happens when you are talking to a caller and you want to add another employee to the call. You initiate a conference to the extension, but that person is unavailable, and your conference consultative call forwards to voice mail. You can choose to drop the consultative call at that point, and return to the original caller. Or you can complete the conference and have both of you leave a combined voice message for the unavailable person. If you decide to leave a combined message, you must hang up at the end of the voice mail session, because there is no manual way to disconnect the voice mail endpoint from your conference call while preserving the other conference participants.

Transcoding

Cisco Unity Express voice mail supports only G.711 voice streams. If you have a multisite network with voice over IP (VoIP) calling between the sites, it is likely that you are using G.729 between the sites to conserve bandwidth on your IP network. [Figure 30](#) shows a call from extension 2010 at a remote site calling to extension 3001 at your site. The call uses G.729 as it crosses your WAN backbone. If extension

- The **Configure > Users** window as the User ID field
- The **Voice Mail > Mailboxes** window as the Mailbox Owner (User/Group ID) field
- The ephone Username field in the router CLI

This user ID uniquely identifies each user. It cannot change after the user is defined. If it must change, the user must be deleted and reinserted into the system's configuration. You want to avoid doing this, so plan user ID assignments carefully before entering them into the system configuration.

**Note**

Deleting a user also deletes his or her associated voice mailbox. The action of changing a user ID, therefore, amounts to redefining the user's mailbox and losing (deleting) all of the user's current voice mailbox contents. Clearly this is undesirable, which is why user IDs typically never change after the system is configured and your employees start using it for their daily tasks.

If a user preexists in the Cisco CME configuration before Cisco Unity Express is installed and configured, this user ID is automatically imported from the Cisco CME configuration into the Cisco Unity Express Initialization Wizard.

**Note**

If the Cisco CME CLI **ephone-dn username** configuration is changed by using the router's CLI, and the Cisco Unity Express GUI is then synchronized with the latest changes, a new user is created and shows up in the configuration. The mailbox associated with the old user definition cannot be moved to the new user.

Name Fields

You can configure various Name fields associated with a user or a phone. This information is contained in multiple fields so that you can control different aspects or features of your Cisco IPC Express system independently, because the features often serve different purposes. However, it is instructive to know which fields affect which features so that you know what part of the configuration to change to activate the feature you are interested in. The different name fields and how they are used are discussed in the following sections.

Name Display on an On-Hook Phone

A username is displayed in the top-right corner of an idle IP phone display. This name is associated with the user's extension, which appears on button 1 of that phone. The Name field shows the phone number (extension) by default, but it can be configured to show the name of the person at that phone. This field shows up in the following locations in the system configuration:

- The **Extension > Description** GUI window
- The **ephone-dn description** configuration in the router CLI

The following example shows an ephone-dn configuration that shows User U3 on the display of the associated IP phone when the phone is idle. The phone display uses the **description** configuration to control the display, not the **name** configuration. User U3's extension is 3005. The fact that the **name** configuration is set to UserM U3a does not affect the idle IP phone display. The **name** configuration affects other aspects of the system's operation, but it is not relevant to the name displayed on an idle phone.

```
ephone-dn 5
  number 3005
```

```

description User U3
name UserM U3a
call-forward busy 3105
call-forward noan 3105 timeout 10

```

Caller ID Name

When a call is ringing on an IP phone, the caller's name appears in the top-left corner of the called party's phone display. This field shows up in the following locations in the system configuration:

- The **Extension > Name** GUI window
- The **ephone-dn name** field in the router CLI

In the preceding example configuration, if the employee at extension 3005 calls you, you see UserM U3a displayed on your ringing phone.

Extension Label

Extensions are associated with one or more buttons on your IP phone. By default, the extension number associated with each button is displayed on the idle phone console. Typically, this is your own extension on button 1 and additional extensions you monitor on higher-numbered buttons. You can configure a text string to be associated with a button. This field shows up in the following locations in the system configuration:

- The **Extension > Label** GUI window
- The **ephone-dn label** field in the router CLI

The following example shows a configuration in which User2 has his own extension, 3002, on button 1 of his phone and extension 3050 on button 2. Extension 3002 (ephone-dn 2) has no label configured, so it shows up as 3002 on the phone display. Extension 3050 has a Customer Service label assigned, so this text string shows up next to button 2 on the phone.

```

Router# show running-config
ephone-dn 2 dual-line
number 3002
name User2
call-forward busy 3105
call-forward noan 3105 timeout 10
!
ephone-dn 42
number 3050 secondary 4xx5yy3050
label Customer Service
description Customer Service
name Cust Svc
call-forward busy 3501
call-forward noan 3105 timeout 10
!
ephone 2
mac-address 0002.FD06.D959
speed-dial 4 3100 label "AA"
button 1:2 2:42

```

Dial-by-Name for Subscribers

The Cisco Unity Express AA has a dial-by-name feature in which a caller can spell the name of the user he or she wants to reach, and the system looks up the associated extension. The same feature is available when a voice mail subscriber composes (or sends) a message to another subscriber. The message addressing can be done by using the Cisco Unity Express dial-by-name feature. The Name field for this feature shows up in the following locations in the system configuration:

- The **User > First Name** GUI window
- The **User > Last Name** GUI window
- The **user fullname first** and **user fullname last** fields in the Cisco Unity Express CLI

The following example shows the Cisco Unity Express Dial-By-Name fields for User5.

```
Cue# show user detail username User5
Full Name:           User U3
First Name:          User
Last Name:           U3
Phone:               3005
Phone (E.164) :     4xx5yy3005
```

Cisco Unity Express's dial-by-name feature matches the Last Name field. If that field isn't unique, Cisco Unity Express proceeds to match the First Name field in the configuration. This sequence cannot be changed or customized.

However, if the system operation desired is to have First Name and then Last Name matching, the fields in the configuration can simply be reversed. These fields are not used for any other features, so no name displays or phone displays are altered by transposing the First Name and Last Name fields underlying the dial-by-name feature.



Note

Note that the dial-by-name prompt in the system AA script continues to ask for the last name followed by the first name. This system prompt cannot be changed or customized. If you want to change the AA prompt as well, you must write a custom AA script and record your own prompt, as covered in the application note entitled "[Cisco IPC Express Automated Attendant Options.](#)"

For example, suppose User (first name) U3 (last name) works for the company. In the normal configuration, dial-by-name matches U3 (the last name in the configuration) and then User (the first name in the configuration). If instead you want to have User matched first and then U3 in the dial-by-name applications, User must be configured as the last name and U3 as the first name, as shown in the following example.

```
Cue# show user detail username User5
Full Name:           User U3
First Name:          U3
Last Name:           User
Phone:               3005
Phone (E.164) :     4xx5yy3005
```

Dial-by-Name for Nonsubscribers

Your office may have users or employees who do not need a voice mailbox, but who must be available via the dial-by-name feature in the AA. If so, you can enter these employees in the Cisco Unity Express configuration as users without mailboxes. By virtue of the user profile (and its associated extension and phone), the employees appear in the Cisco Unity Express Lightweight Directory Access Protocol (LDAP) directory and, therefore, are recognized by the dial-by-name feature in the AA. Note that

without a mailbox defined, a user cannot have a spoken name recorded (because this configuration parameter is part of the mailbox definition). However, the names can be spelled via the dial-by-name facility and found in the database. If a spoken name does not exist, the system reads back the extension as confirmation to the caller.


Note

Users without a mailbox defined do not count against the Cisco Unity Express license. However, the number of users allowed to be defined on the Cisco Unity Express system is derived from the number of licensed mailboxes, and this may change over different software releases. Currently, in Cisco Unity Express the number of users allowed to be defined on a system is set to twice the number of mailboxes specified by the license. For example, if a 12-mailbox license is installed on the Cisco Unity Express system, a maximum of 24 user profiles can be defined in the configuration.

Spoken Name

When a call rings on an extension and then forwards into voice mail, the greeting may say, “Sorry. User U3 is unavailable,” and then the caller can leave a message. If the user’s spoken name is not recorded in the system, the greeting instead says, “Sorry. Extension 3005 is unavailable.” The Spoken Name field shows up in the voice mailbox login as the option Spoken Name in the subscriber TUI menu. This field cannot be entered, viewed, or controlled via either the GUI or the CLI.

A subscriber can record a spoken name only if he or she has a mailbox on the Cisco Unity Express system. Users who are accessible using the dial-by-name feature therefore might not have spoken names (because they do not necessarily have mailboxes). On the other hand, a user who has a spoken name must have a mailbox and, therefore, must have a user profile and must be accessible in the dial-by-name feature.

Dial Plan Considerations

Cisco Unity Express deployed with Cisco CME requires that the IP phones that have mailboxes all have extensions of the same length. The specific length of the extension does not matter: the length of the extensions can be anywhere between one and 16 digits (as supported by Cisco CME). What is important is that all extensions with mailboxes must be of the same length on a particular Cisco CME and Cisco Unity Express system.

There are various ways in which you can manipulate digits on dialed numbers to translate PSTN numbers (E.164 numbers) into local extensions. These include the following:

- Cisco IOS dial peer commands
- Cisco IOS translation rules
- Cisco CME dial plan pattern commands

Another way to configure the mapping from PSTN numbers to internal extensions is by using the E.164 number configuration of Cisco CME and Cisco Unity Express. These fields essentially associate a second number—the fully qualified E.164 number—with the extension or mailbox so that dialing either number terminates on the correct extension or mailbox.

Cisco CME has a Secondary Number field, as shown in the following example. You can access this same field by using the GUI by navigating to the **Configure > Extensions** window. Filling in the Secondary Number field on that window associates an additional number with the extension so that calls dialing the extension directly (likely other IP phones) and calls dialing the DID number (likely PSTN callers) terminate on the phone without further dialing plan assistance.

```
ephone-dn 1
  number 6001 secondary 5xx3yy3001
  description User U2
  name User U2
  call-forward busy 6800
  call-forward noan 6800 timeout 10
```

The effect of configuring the Secondary Number field is that an E.164 PSTN number can terminate directly on an extension without digit manipulation of the called digits. If this call forwards into Cisco Unity Express voice mail, the Called Digits field still contains the full E.164 number, which must be recognized by Cisco Unity Express as a mailbox owner. This requires the configuration of the Cisco Unity Express E.164 field.

Cisco Unity Express has a Primary E.164 Number field that you can also access by navigating to the **Configure** > **Users** window in the GUI and clicking a specific user to highlight that user's parameters. Filling in this field associates an additional number with the user (and therefore the user's mailbox) so that calls dialing this number directly can enter the mailbox for the correct user.

Voice Mail Networking

Cisco Unity Express 2.0 introduced basic voice mail networking between systems using blind addressing, and release 2.1 enhances this functionality with spoken-name and limited dial-by-name addressing using a local directory and cache. You can network voice mail messaging between Cisco Unity Express systems at different sites, as well as with Cisco Unity systems, using Voice Profile for Internet Mail (VPIM) connectivity between the systems. Cisco Unity Express does not support networking with any voice messaging systems other than Cisco Unity Express and Cisco Unity systems.

You can configure Cisco Unity Express networking using either Domain Name System (DNS) host names or explicit IP addressing. If you are networking with a Cisco Unity system, you must use a DNS configuration.

The following sections provide a brief overview of Cisco Unity Express voice mail networking operation, including the following topics:

- [Standards, page 81](#)
- [Locations, page 82](#)
- [Addressing, page 83](#)
- [Directories, page 84](#)
- [Network Broadcast Messages, page 84](#)
- [Message Formats, page 84](#)
- [Nondelivery Notification, page 85](#)

Standards

Voice mail networking uses the following Internet Engineering Task Force (IETF) standards:

- RFC 3801, Voice Profile for Internet Mail - Version 2 (VPIMv2)
- RFC 2821, Simple Mail Transfer Protocol (SMTP)
- RFCs 2045–2049, Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies

- RFC 822, Standard for the Format of ARPA Internet Text Messages

The Simple Mail Transfer Protocol (SMTP) and Multipurpose Internet Mail Extension (MIME) protocols are the basic protocols used to send and receive e-mail. Voice mail networking leverages the exact same protocols and infrastructure. The primary attributes of a voice mail (compared to an e-mail) are the address (voice mail uses a phone number and e-mail uses a user ID) and the message's payload type (voice mail uses an encoded form of a .wav file, and e-mail uses other formats, including text).

Cisco Unity is a unified messaging system and provides both voice mail and e-mail networking. Cisco Unity Express (up to 2.1) is only a voice messaging system. It does not provide any way to address, send, or receive e-mail messages.

Although Cisco Unity Express's voice mail networking implementation is compliant with the VPIM standard, the entire RFC is not supported. Cisco Unity Express and Cisco Unity also implement some extensions to VPIM to provide features such as broadcast messaging between sites that are not specified by the standard.

You can find more information on Internet Engineering Task Force (IETF) standards at <http://www.ietf.org/>.

Locations

You can enable voice mail networking by configuring the parameters of the locations in the network, including the local location and all remote locations that this site can exchange messages with. The network has no central directory or proxy location. Each Cisco Unity Express site must be configured with the identities of the other locations in the network that it can send messages to or receive messages from. For security reasons, Cisco Unity Express does not accept (receive) messages from any sites other than those configured in its database as a valid networking location.

Each location is defined in the Cisco Unity Express configuration with the following parameters:

- *ID*—A unique one- to seven-digit numeric identifier assigned to each site. The location ID is a sequence of digits that must be dialed before the extension when addressing a message to a remote site via the TUI. It is only locally significant (to select which remote site is being addressed) and is not sent with the VPIM message.
- *Abbreviation*—A one- to five-character alphanumeric abbreviated name for the location. This is spelled to the user as part of address confirmation if a spoken name for the location was not recorded or is unavailable.
- *Name*—A one- to five-character descriptive name for the location. Used only for human readability of the configuration information.
- *Extension Length*—The number of digits in extensions at this location. Used for a *level- of-error* checking in blind addressing.
- *Domain Name of IP Address*—This part of the address appears after the @ when messages are addressed. For example, for the VPIM address 34001@site2.xyz.com, site2.xyz.com is the domain name. This can be a DNS host name or an explicit IP address.
- *Phone Number Prefix (optional)*—A digit prefix added to the extension number to ensure that VPIM addresses are unique in the network. If your extensions are already unique (nonoverlapping), you generally are not required to configure this field. You can use the field to do a limited amount of digit manipulation on the extension portion of the VPIM address. Phone prefixes are prepended to the extension by the sending location and are removed from the address by the receiving location. Phone prefixes apply to both the To and From address fields in the VPIM header.

- *Spoken Name (optional)*—Specifies whether to send the spoken name of the voice mail originator as part of the VPIM message. If the spoken name is sent, it is played as the first part of the message envelope to the recipient. This feature is enabled by default.
- *Message Encoding (optional)*—Configures the encoding method used to send voice mail messages to this location. This is discussed further in the “[Message Formats](#)” section on page 84.

As soon as you have defined all the locations in the configuration, you indicate which one of these locations represents your local system by configuring the local location ID to match one of the locations in the list. A configuration with five sites is shown in the following example. You can view this same configuration in the GUI by navigating to the **Administration > Networking Locations** window. The local location is ID 8xx. This exact same configuration also appears in sites 2xx, 3xx, 4xx, and 6xx, except that their local location IDs are indicated as 2xx, 3xx, 4xx, and 6xx, respectively.

```
Cue# show network locations
ID          NAME                ABBREV DOMAIN
2xx        'Site2'             S2      site2.xyz.com
3xx        'Site3'             S3      site3.xyz.com
4xx        'Site4'             S4      site4.xyz.com
6xx        'Site6'             S6      site6.xyz.com
8xx        'Site8'             S8      site8.xyz.com
Local location id: 8xx
```

The following example shows the full configuration parameters of site 8xx from the configuration summary in the preceding example.

```
Cue# show network detail local
Location Id: 8xx
Name: Site8
Abbreviation: S8
Email domain: site8.xyz.com
Minimum extension length: 4
Maximum extension length: 4
Phone prefix:
VPIM encoding: dynamic
Send spoken name: enabled
Send vCard: enabled
State: enabled
VPIM broadcast ID: vpim-broadcast
```

Up to 500 sites may be defined on a Cisco Unity Express system for voice mail networking.

Addressing

A voice message to another site can be addressed in one of the following methods:

- *Blind addressing*—The sender explicitly specifies the location ID and the recipient’s extension at that location.
- *Spell-by-name*—The spell-by-name message sends facility searches for matches in both the local Cisco Unity Express user directory and the remote user information available in the sender’s local system directory, as described in the next section.
- *Spell-by-location*—If a sender uses the spell-by-name feature, but the name spelled matches a location name instead of the name of subscriber, the sender is prompted to add the recipient’s extension digits to complete the addressing.

As the Cisco Unity Express system administrator, you can record spoken names for remote locations so that when a subscriber addresses a message to a remote location, the address confirmation is not just simply numeric or the spelled-out abbreviation you configured, but plays the recorded name associated

with that location. For example, if a sender on Site2 addresses a message to extension 4001 at Site4, the address confirmation he or she hears says “San Jose” as opposed to just “4xx” or “S-4.” You can record these spoken names to make it as easy as possible for your subscribers to address messages correctly.

Directories

Cisco Unity Express keeps a small amount of information on remote users to aid in spoken-name confirmation during message addressing at the sending location. The Cisco Unity Express system reads the remote user’s location ID and extension by default as the address confirmation to the local sender during the message addressing step. If a spoken name has been recorded for the remote location, it is played instead of the location ID. If the remote user’s spoken name exists in the networking directory on the sender’s local system, it is played instead of the extension.

A Cisco Unity Express system keeps the following two local directories of information about remote users to provide spell-by-name and spoken-name confirmation support during a subscriber message send activity:

- *Static directory*—This directory is populated explicitly by the administrator with the names and extensions of frequently addressed remote users. You can enter this configuration by using the **Configure > Remote Users** GUI window or the remote username CLI command.
- *Cache*—A least-recently-used (LRU) cache of entries is kept, dynamically populated by the names on the incoming voice messages received by this Cisco Unity Express system.

Messages sent by Cisco Unity Express contain vCard information. On the receiving system, the Vcard information on an incoming voice message is used to populate or refresh the information in the local and LRU cache directories.

The static directory and the LRU cache each have a capacity of 50 user entries on an NM-CUE and 20 entries on an AIM-CUE.

Network Broadcast Messages

Cisco Unity Express supports sending broadcast messages to remote sites. All remote sites or a subset of remote sites can be selected in the addressing of a broadcast message. If a broadcast message is sent to a remote site, all users at that site receive the message.

Message Formats

The VPIM specifies G.726 (32K adaptive differential pulse code modulation [ADPCM]) encoding. Cisco Unity Express supports two formats of message encoding, which can be selected in the configuration of each site:

- *G.726*—Messages are converted to G.726 for transmission to a remote system. Although this format uses half the bandwidth of the G.711 format, VPIM voice messages are sent like e-mails (which means best-effort, non real-time-sensitive traffic), and bandwidth typically is not a concern.
- *G.711*—Messages are sent as .wav file format to the remote system. This format reduces the overhead of encoding and decoding messages between systems. This format is used when exchanging messages between two Cisco Unity Express systems.

When you configure the message encoding for a Cisco Unity Express site, you can choose either of the two methods explicitly, or you can use the default setting, which is dynamic. The dynamic option means that Cisco Unity Express automatically determines which of the two formats to use. If the destination system is another Cisco Unity Express, it uses the G.711 format. If the destination system is a Cisco Unity system, it uses the G.726 format.

If you configure the encoding method explicitly, Cisco Unity Express always sends messages in the configured format to the corresponding remote site. When configured with the dynamic option, Cisco Unity Express sends messages based on the capabilities advertised by the remote system in the SMTP session setup.

Nondelivery Notification

Cisco Unity Express attempts to send a message to a remote destination immediately. If it isn't successful, it retries every 15 minutes for 6 hours. If a message cannot be delivered during this time, a notification is returned to the sender and is placed in the sender's voice mailbox. This notification appears as a new message and informs the sending subscriber of a delayed delivery. Similarly, if the message cannot be delivered for reasons such as the recipient's mailbox is full, does not exist, or is disabled, an NDR is placed in the sender's mailbox along with a copy of the original message. When the subscriber plays the NDR, he or she can readdress and resend the message or delete it.

If Cisco Unity Express is unable to create an SMTP session for one day to deliver remote messages, an NDR message is returned to the message sender, as well as to the administrator's mailbox to inform him or her of a networking problem.

Voice Mail Deployment Considerations

Three primary deployment models with Cisco CME and voice mail using Cisco Unity Express were discussed:

- Standalone office
- Multisite business or enterprise
- Service provider managed multisite network

You can deploy Cisco CME without Cisco Unity Express, either completely without an AA or voice mail, or with alternate voice mail solutions. However, Cisco Unity Express was specifically designed to provide these applications with Cisco CME. It offers the greatest breadth of features and the highest level of integration.

You can choose to deploy Cisco Unity Express at only some sites in your network, while the remaining sites have either no voice mail or have voice mail provided by Cisco Unity or an alternate system. As explained in the preceding section, Cisco Unity Express can network voice messages with other Cisco Unity Express sites as well as with Cisco Unity sites.

Before Cisco Unity Express 2.0, if Cisco Unity Express and Cisco CME were deployed together at a site, they were required to be present in the same router chassis. As of Cisco Unity Express 2.0, you can house Cisco Unity Express on a router that is physically separate from the one that provides Cisco CME call processing services to your site. This is not a likely or preferred deployment option, but in some cases, you may have an existing router you want to redeploy, and it does not have enough slots to add Cisco Unity Express into the chassis. In this case, you can run Cisco CME on one router and physically house Cisco Unity Express on a different router at the same site.

Ensure that LAN connectivity exists between the two routers, however, as opposed to low-speed serial connectivity. Also, Cisco Unity Express can provide voice mail to only a single Cisco CME site. You cannot “centralize” one Cisco Unity Express system to provide voice mail to multiple remote Cisco CME sites, as you can do with a Cisco Unity system.