



White Paper: Deploying Cisco Unity in Diverse Messaging Environments

Published September 21, 2001

Introduction

Deploying Cisco Unity in a messaging environment where Outlook clients are connected to Exchange 5.5 by using the MAPI protocol offers the Cisco Unity subscriber the tightest integration of the e-mail client, the TUI, and the mail server. This tight integration is particularly evidenced in the way that the state of a message (whether it is read or unread) is synchronized between the TUI and the e-mail client. For example, when a subscriber receives a new message, the MWI is lit on the phone. At the same time, that message is displayed as “new” in the subscriber’s Outlook Inbox. Once the subscriber plays the last new voice message (by using either the TUI or the Media Master control bar available with ViewMail for Outlook), the MWI is extinguished, and the message is displayed as “read” in the subscriber’s Outlook Inbox.

Often however, a corporate messaging environment is not comprised of Exchange 5.5 and Outlook exclusively. Instead, some Cisco Unity customers employ a varied collection of e-mail clients and mail servers, and by using the appropriate messaging protocols, they can configure miscellaneous clients to interact with



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Exchange 5.5 as well as other mail servers. This document focuses on the unique impact that each e-mail client/server/protocol combination has on the Cisco Unity subscriber's ability to access voice messages, how message state changes are conveyed to the subscriber, and how message state changes are kept synchronized between the TUI and an e-mail client for the subscriber.

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Overview: Cisco Unity, Exchange 5.5, and Outlook

Cisco Unity can be configured in several ways—from a stand-alone voice messaging server to a unified messaging server connected to an Exchange network. All configurations, use Exchange for address directory information and for message storage: Cisco Unity uses LDAP (Lightweight Directory Access Protocol) to access address information from the Exchange directory, and MAPI (Mail Application Programming Interface) to access voice messages in the Exchange message store. Voice messages are stored along with e-mail messages in Exchange, and are handled by Exchange in much the same way. Cisco Unity uses the Exchange message transfer agent (MTA) to route messages between servers.

Playing Voice Messages

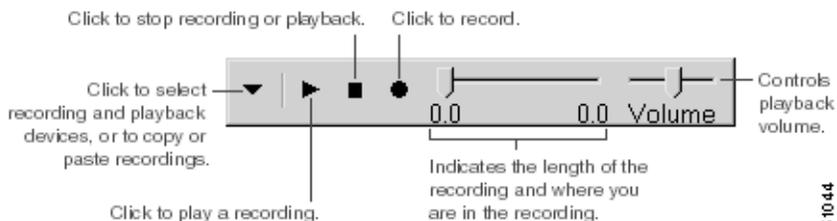
Cisco Unity voice messages arrive in the subscriber's Outlook Inbox as WAV attachments. To reduce network traffic when messages are played to subscribers, Cisco Unity uses a proprietary streaming process. Streaming allows the message to be sent in small parts, rather than as one large file, thus minimizing effects on network performance. In addition, streaming allows a message to begin playing before the entire message has been received.

The Cisco Unity subscriber can listen to a voice message in two ways:

ViewMail for Outlook (VMO)

By using the customized Outlook form known as ViewMail for Outlook (VMO), the subscriber can send, listen to, and manage voice messages from the Inbox without using the phone. VMO offers the Media Master control bar, a plug-in, with which subscribers can play and record voice messages. Note that the Media Master control bar relies on DCOM (Distributed Component Object Model), and does not work through a firewall.

Figure 1 *Media Master Control Bar*



When a subscriber listens to a voice message by using the Media Master control bar, the voice message is sent as a message stream from the subscriber's Exchange home server to the subscriber's Inbox. Streaming occurs on demand, regardless of network traffic. If the subscriber does not have VMO, the message cannot be streamed. Instead, it is sent to the subscriber's Inbox as an e-mail with a WAV attachment.

Note that by default, Cisco Unity uses the G711 codec to store and record messages, though the system can also be configured to use the G729a codec. However, if a Cisco Unity subscriber forwards a voice message that has been

recorded by using the G729a codec, the message recipient must also have this codec installed in order to play the message. Currently, most multimedia players, including Microsoft Windows Media Player, do not use the G729a codec.

Telephone User Interface (TUI)

When a subscriber listens to a message over the phone by using the TUI (Telephone User Interface), the message is streamed on demand from the Exchange home server to the Cisco Unity server.

Conveying and Synchronizing Message State

MAPI can be used as an online or offline connection to Exchange. When a Cisco Unity subscriber uses Outlook in online mode, message state is maintained in Exchange, and is kept synchronized between the subscriber's Inbox and the TUI. In other words, an MWI is activated on the subscriber phone at the same time that a voice message appears as “new” in the subscriber's Inbox; once the subscriber listens to the message, it appears as “read” in the Inbox, and the MWI is extinguished. In offline mode, messages are copied to the subscriber's local message store where the message state is maintained until an online connection with Exchange is reestablished. At that time, the message state of messages stored in Exchange are updated, and the Inbox and TUI are synchronized once again.

Additional Connections to Mail Servers and Mail Clients

By using the appropriate messaging protocols, Cisco Unity can be deployed in a diverse messaging environment without requiring subscribers to use Outlook for voice messages and another client for e-mail. Instead, other e-mail clients—such as Outlook Web Access, Eudora Pro, or Lotus Notes—can be configured to interact with Exchange 5.5. Alternatively, Outlook can be configured to interact with other mail servers in addition to Exchange.

It is important to note that VMO is available only with Outlook. Therefore, for subscribers using any other client, the Media Master control bar is not available to play and record messages. Instead, the subscriber must use an installed multimedia player or the TUI to listen to messages. To record replies, the subscriber must use the TUI.

The method for conveying message state changes to the subscriber, and how these changes are synchronized with the TUI, varies depending on the protocol used to connect a mail client with Exchange. Exchange 5.5 servers support several mail protocol standards, including IMAP4, POP3, and SMTP. Exchange also integrates with a Microsoft Internet Information Server (IIS), which can take HTTP requests from Web-based e-mail clients. Thus, several types of e-mail clients can connect to an Exchange server. In addition, by using gateway connectors, Exchange servers can connect to other non-Exchange mail servers.

The following section summarizes how various messaging protocols generally interact with Exchange, with particular emphasis given to how message state is affected.

Using HTTP

It is possible to use Web-based e-mail clients to access Exchange 5.5 through a Web server, such as Microsoft Internet Information Server (IIS). HTTP handles user requests to retrieve or send mail, passing these requests along to a Web server that back-ends Exchange. A Web-based e-mail client like Outlook Web Access (OWA) essentially presents a snapshot of the Exchange message store to the Cisco Unity subscriber, who uses a browser to access messages.

When a new voice message arrives, the subscriber's only immediate notification is the activation of an MWI on the phone. A Web-based e-mail client will not display the new message in the Inbox until the browser is refreshed. When the subscriber listens to a new message by using the TUI, the MWI on the phone is extinguished, but once again, the message state is not updated in the Inbox until the browser is refreshed. However, if the subscriber uses an installed multimedia player to listen to the WAV attachment from the e-mail client Inbox, message state changes are automatically synchronized with the TUI. This happens because the message state change is communicated when IIS sends the access request to Exchange.

Using IMAP4

IMAP4 (Internet Message Access Protocol, version 4) is used to retrieve, send, and manage messages stored on a mail server. E-mail clients with IMAP connections to a mail server allow users to access messages from more than one

computer, including remote computers. Only the message header and sender information is displayed in the Inbox, until the user chooses to download the entire message, including attachments, from the server.

When a new voice message arrives, the subscriber's only immediate notification is the activation of the MWI on the phone. New messages are displayed in the Inbox only after the client's local message store is updated with the Exchange message store. When the subscriber listens to a new message by using the TUI, the MWI on the phone is extinguished. In this case again, the message state is not updated in the Inbox until the client's message store is refreshed. However, if the subscriber uses an installed multimedia player to listen to the WAV attachment from the e-mail client Inbox, message state changes are automatically synchronized with the TUI.

E-mail clients using IMAP4 to access messages in Exchange behave similarly to MAPI-based clients in online and offline mode. Message state changes are reflected in the subscriber's Inbox and the TUI in real time. In offline mode, messages are copied to the subscriber's local message store where the message state is maintained until an online connection with Exchange is reestablished. At that time, the message state for the messages stored on the mail server is updated to reflect the changes made locally while the e-mail client was offline.

Using SMTP

SMTP (Simple Mail Transfer Protocol) is used to transfer e-mail between servers and clients on the Internet. E-mail clients and mail servers that use protocols other than MAPI can use the SMTP protocol to transfer a message from a client to the server, and then forward it on to a message recipient's server. To retrieve, send, and manage these messages from the e-mail client, POP3 or IMAP4 are employed.

Cisco Unity uses SMTP to route voice messages via the Internet Voice Connector (IVC) gateway between other Exchange servers that are not connected by using a Site Message Connector. There is an IVC gateway on either end of the SMTP connection between Exchange servers. This ensures that MAPI message attributes survive the outbound transit between SMTP connections. At the same time, it also ensures that the MIME-encoded attributes survive the inbound transit, and are included with the message stored in the Exchange message store.

How message state changes are conveyed to the Cisco Unity subscriber, and how these changes are synchronized with the TUI, depend on whether the subscriber's e-mail client is configured to use POP3 or IMAP4 to access Exchange.

Using POP3

POP3 (Post Office Protocol, version 3) is used to receive e-mail. With POP3-based e-mail clients, messages are downloaded to the user's local message store and can also be deleted from the mail server (deletion is optional in most clients).

When a new voice message arrives, the subscriber's only immediate notification is the activation of the MWI on the phone. New messages are displayed in the Inbox only after the client's local message store is updated with the Exchange message store. Once the subscriber downloads new messages, however, the message state automatically changes from "new" to "read" on the server, even though the subscriber has not actually listened to the voice messages yet. As a result, MWIs on the subscriber's phone are extinguished, and the message state between the TUI and the subscriber's Inbox is not synchronized.

Client Configuration Options

The following table summarizes the configuration options available with the most commonly deployed e-mail clients. Again, note that VMO is available only with Outlook. Therefore, for subscribers using any other client, the Media Master control bar is not available to play and record messages. Instead, the subscriber must use an installed multimedia player or the TUI to listen to messages. To record replies, the subscriber must use the TUI.

Table 1 Client Configuration Options

Mail Client	Protocol Support	Simultaneous Connection Available?
Outlook 2000	IMAP, MAPI, POP3, SMTP	Yes, with exceptions: Multiple e-mail accounts are supported (called “Identities”) to access multiple mail servers. Only one account is available at a time, and to switch between accounts, the subscriber must shut down Outlook. Currently, Outlook cannot be configured to use IMAP and MAPI connections simultaneously.
Outlook Web Access (OWA)	HTTP sends requests to an IIS server that back-ends Exchange	No: OWA can only connect to Exchange, and does not support multiple e-mail accounts.
Outlook Express	IMAP, POP3, SMTP	Yes: Multiple e-mail accounts are supported to access multiple mail servers. Users can switch between accounts without shutting down the client.
Eudora Pro 5.03	IMAP, POP3, HTTP, SMTP	Yes: Multiple e-mail accounts are supported (called “Personalities”) to access multiple mail servers. Users can switch between accounts without shutting down the client.
Lotus Notes	POP3, IMAP, NRPC	Yes: Multiple e-mail accounts are supported, and users can set up either online or offline connections to these accounts. Each account can be selected and refreshed. An offline IMAP connection imports mail during replication. There is no automatic synchronization with non-native Notes accounts.
Netscape Messenger	IMAP, POP3, SMTP	Yes: Multiple e-mail accounts are supported (called “Profiles”) to access multiple mail servers, but there is only a single outbound SMTP server active for all accounts. Users can switch between accounts without having to shut down the client.

Summary

The following table summarizes the options discussed in this document for deploying Cisco Unity in a corporate messaging environment that is not comprised exclusively of Exchange 5.5 and Outlook.

Table 2 *Deploying Cisco Unity in Diverse Messaging Environments*

Client/Server/Protocol	How Message State Is Conveyed	How Inbox Message State Is Synchronized with the TUI
Outlook/Exchange/MAPI	Unread mail is automatically marked “new” in Inbox (event driven notification).	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.
Dual Outlook connection: <ul style="list-style-type: none"> • MAPI connection to Exchange • POP3 connection to other mail server 	MAPI: Unread mail is automatically marked “new” in Inbox (event driven notification). POP3: New messages are displayed only after downloading messages to client.	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.
Outlook Express/Exchange/IMAP	New messages do not appear in Inbox until client is refreshed (either scheduled or manually).	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.
Outlook Express/Exchange/POP3	New messages do not appear in Inbox until client is refreshed (either scheduled or manually).	Messages are marked “read” when they are downloaded to the client, extinguishing MWIs on the phone even though the subscriber has not yet listened to the voice messages.
OWA/Exchange/IMAP	New messages do not appear in Inbox until client is refreshed (either scheduled or manually).	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.

Table 2 Deploying Cisco Unity in Diverse Messaging Environments

Client/Server/Protocol	How Message State Is Conveyed	How Inbox Message State Is Synchronized with the TUI
Dual Eudora Pro connection: <ul style="list-style-type: none"> • IMAP connection to Exchange • POP3 connection to other mail server 	IMAP: New messages do not appear in Inbox until client is refreshed (either scheduled or manually). POP3: New messages are displayed only after downloading messages to client.	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.
Lotus Notes/Exchange/IMAP	New messages do not appear in Inbox until client is refreshed (either scheduled or manually).	Message state is updated at end of message play, so MWI is extinguished at the same time the message is marked “read” in Inbox.

Acronyms and Definitions

AA	ActiveAssistant. The Web interface that gives subscribers the ability to customize personal settings—including recorded greetings and message delivery options—on their computers.
codec	An analog-to-digital coder/decoder; also referred to as a converter.
DCOM	Distributed Component Object Model.
GUI	Graphical User Interface.
HTTP	HyperText Transfer Protocol. A standard used to request and transmit files, especially Web pages and Web page components, over the Internet or other computer network.
IMAP4	Internet Message Access Protocol, version 4. A standard used to retrieve and send messages from a mail server to a mail client.

IVC	Internet Voice Connector. The gateway used to transfer e-mail between unconnected Microsoft Exchange 5.5 servers via an Exchange Site Connector. This gateway is also used to connect to non-Exchange SMTP servers.
LDAP	The standard used to provide access to information directories; supports TCP/IP.
MAPI	Messaging Applications Programming Interface. A standard defined by Microsoft and used to support e-mail applications that work together to provide various distributed services.
Media Master control bar	Allows subscribers to play and make recordings. It appears in the ViewMail for Microsoft Outlook form and on ActiveAssistant pages. In ViewMail for Outlook, it is used to play and to record voice messages. On the ActiveAssistant pages, it is used to record names and greetings.
MWI	Message Waiting Indicator. A phone system device (lamp, distinctive dial tone, or LCD display) that alerts a subscriber to the arrival of new messages.
new message	A message that has not been heard by a subscriber.
POP3	Post Office Protocol, version 3. A standard used to retrieve e-mail from a mail server.
SMTP	Simple Mail Transfer Protocol. A standard used to communicate between e-mail clients when sending mail, and with the mail server when performing message routing and delivery.
subscriber	Anyone enrolled on Cisco Unity.
TUI	Telephone User Interface. The set of prerecorded instructions and options that Cisco Unity plays over the phone to subscribers and external callers; it consists of the subscriber conversation and the unidentified caller conversation.

unified messaging A messaging system in which all types of messages can be managed from the same Inbox.

VMO ViewMail for Outlook. A form integrated with the Microsoft desktop clients (including Outlook 98 and Outlook 2000) that provides a graphical user interface accessible from any networked computer. Subscribers listen to voice messages by using VCR-style controls. VMO also offers the Media Master control bar, which subscribers can use to record and play messages. (Without VMO, subscribers can listen to voice messages from the Inbox, but other tasks must be done by phone.)

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