General Information and Planning

Version 4.2
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About this information

IBM® Unified Messaging for WebSphere® Voice Response is an application that runs on IBM WebSphere Voice Response for AIX® Version 4.2 and Version 6.1. IBM Unified Messaging for WebSphere Voice Response: General Information and Planning introduces you to unified messaging in general, describes the many functions of IBM Unified Messaging for WebSphere Voice Response, and gives you the information you need to prepare for using it.

Throughout this book, IBM Unified Messaging for WebSphere Voice Response is generally referred to simply as Unified Messaging, and IBM WebSphere Voice Response for AIX is generally referred to as WebSphere Voice Response.

Who should read this book

This book is for anyone who wants to know about Unified Messaging, and particularly for those preparing to install and operate it.

If you're reading this book simply to get familiar with Unified Messaging and what it can do for your business, you probably don't need to know the details about unified messaging applications or the voice processing systems on which they run. However, if you're reading it as a first step to installing and operating a Unified Messaging system, you should be familiar with AIX for use on the System p®, or BladeCenter® computer and WebSphere Voice Response. You also need a basic knowledge of telephony and an understanding of the connectivity of your switch, or Voice over IP connectivity.

How to use this book

This book contains background information about how to complete tasks using Unified Messaging procedures. This background information explains when to use the procedures, and contains prerequisites for using them successfully.

If you are an existing user of IBM Unified Messaging for WebSphere Voice Response, start reading at Chapter 1, “What's new in this release?,” on page 1. If you are new to the product, or to unified messaging in general, start at Chapter 2, “Introducing Unified Messaging,” on page 7.

The tasks and procedures are described in detail in the IBM Unified Messaging for WebSphere Voice Response: Administrator's Guide. Use this book to give you the knowledge you need before moving on to that book.
Typographic conventions

This book uses the following typographic conventions:

**boldface**
Identifies an item in a WebSphere Voice Response window. The item could be a keyword, an action, a field label, or a pushbutton. Whenever one of the steps in a procedure includes a word in boldface, look for an item in the window that is labeled with that word.

**boldface italics**
Are used for emphasis. *Take extra care* wherever you see bold italics!

**italics**
Identify one of the following:
- New terms that describe Unified Messaging components or concepts. A term printed in italics is usually followed by its definition.
- Parameters for which you supply the actual names or values.
- References to other books.

**monospace**
Text that you type in an AIX window. Because AIX is case sensitive, make sure you type the uppercase and lowercase characters exactly as shown.

Accessibility

The Unified Messaging application is developed to run on WebSphere Voice Response and provide telephone access to business data and services. In this way, Unified Messaging provides accessibility for people who cannot access the data and services by using regular Web pages or traditional graphical interfaces. These telephone user interfaces are fully accessible to people who are blind or have low vision and, if speech recognition is implemented, to people with mobility impairments or limited hand use. Speech recognition capability can be provided by products such as IBM WebSphere Voice Server. In addition, support for users of Telephony Devices for the Deaf (TDD) is provided as part of the WebSphere Voice Response product.

With Unified Messaging and WebSphere Voice Response you can perform many application development and system administration tasks using a text editor or line commands – these are accessible if you use a screen reader product to interface with them. Also, the default settings of the WebSphere Voice Response graphical user interface can be changed to produce large fonts and high contrast colors. Details of how to use these accessibility features can be found in the WebSphere Voice Response for AIX: User Interface Guide.

General Information and Planning
Alternatively, application development can be done using Java™ or VoiceXML
development tools supplied by IBM and third parties.

You can also use a screen-reader product to access the Unified Messaging and
WebSphere Voice Response publications in HTML format (for details of
availability refer to “Product documentation” on page 111).

Notes on terminology

- A glossary of commonly-used terms is provided at the end of this book
- The full product name of Websphere Voice Response for AIX with DirectTalk®
  Technology is generally abbreviated in this book to WebSphere Voice Response.
- The term IBM System p® is generically used in this book to refer both to
  PCI-based RS/6000® computers and to appropriate models of the IBM
  System p® and pSeries® ranges. (Consult your IBM representative for details
  of models that are supported for use with Websphere Voice Response.)

Throughout this book, IBM Unified Messaging for WebSphere Voice Response
is generally referred to simply as Unified Messaging, and IBM WebSphere Voice
Response for AIX is generally referred to as WebSphere Voice Response.

Where to find more information

Apart from this and other books in the Unified Messaging library, your main
source of information is likely to be the WebSphere Voice Response for AIX
library. Becoming familiar with the WebSphere Voice Response for AIX library
will help you accomplish tasks more quickly.

Details of all available books in the Unified Messaging library, as well as other
product related documentation can be found in “Product documentation” on
page 111.

Useful Web sites

The following Web sites are useful sources of information about WebSphere
Voice Response and related products:

IBM WebSphere voice products
Select the Products link on the Pervasive Computing Software home
page at http://www.ibm.com/software/pervasive

VoiceXML Version 2.1 specification
http://www.w3.org/TR/voicexml21

VoiceXML Version 2.0 specification
http://www.w3.org/TR/2001/WD-voicexml20-20011023
Making comments on this book

If you especially like or dislike anything about this book, feel free to send us your comments.

You can comment on what you regard as specific errors or omissions, and on the accuracy, organization, subject matter, or completeness of this book. Please limit your comments to the information in this book only and the way in which the information is presented. Speak to your IBM representative if you have suggestions about the product itself.

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United Kingdom Laboratories,
Mail Point 095, Hursley Park,
Winchester, Hampshire, SO21 2JN, United Kingdom

Please ensure that you include the book title, order number, and edition date.
Chapter 1. What's new in this release?

This release, Version 4.2, provides a number of enhancements to IBM Unified Messaging for WebSphere Voice Response, including:

- **WebSphere Voice Response Version 4.2** Unified Messaging Version 4.2 now works in conjunction with WebSphere Voice Response Version 4.2 and takes advantage of the WebSphere Voice Response Version 4.2 enhancements.

- **Support for VoIP using SIP** Unified Messaging can function within a Voice over Internet Protocol (VoIP) network using Session Initiation Protocol (SIP). Using the SIP function in WebSphere Voice Response Version 4.2, a combination of Unified Messaging and WebSphere Voice Response can attach natively to an IP network. This means that callers and subscribers can interact with Unified Messaging using 'hard' or 'soft' IP telephones. Call transfer is possible using tromboning. VoIP is introduced in "The Unified Messaging telephony environment" on page 73.

- **SMDI** The operation of the Simple Message Desk Interface (SMDI) custom server has been modified to simplify the inclusion of third-party SMDI add-ins, such as Local Number Portability (LNP). The IMC_SMDI_Gateway custom server has been replaced by IMC_SMDI_Client.

- **Voice Interface supports VXML2** All Voice XML components in the Voice Interface have been updated to Voice XML 2.0. Voice XML 1.0 is no longer supported.

A reminder of the enhancements made to IBM Unified Messaging for WebSphere Voice Response at previous releases can be found in *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*, "Appendix F. If you’ve used IBM Message Center for DirectTalk or DirectTalkMail before...".

### Enhancements made to Unified Messaging in V4.2 PTFs

Since Unified Messaging V4.2 first became available, the following enhancements have been delivered in V4.2 PTFs:

**Support for WebSphere Voice Response Version 6.1**

Unified Messaging V4.2 also works with WebSphere Voice Response Version 6.1, with the following restrictions:

- The Unified Messaging Simple Message Desk Interface (SMDI) is not currently supported.

- State table speech recognition and TTS functionality is not currently available for use with Unified Messaging.
Survey Mailboxes
Unified Messaging now supports survey mailboxes, allowing subscribers or administrators to record a series of questions that callers can answer. The answers are then mailed to the e-mail address of the subscriber or administrator.

Web Services Voicemail API
The Web Services Voicemail API allows Unified Messaging to be accessed from a Web services environment. A supplied WSDL file contains all the information necessary to expose your Unified Messaging voice messaging system as a Web service.

User-defined key processing during playing of messages
Unified Messaging now provides the capability to invoke the available actions using any key sequence the customer wishes, within current state table capabilities.

Enhanced load_splits utility
The load_splits utility creates the IMC_CHK_SPLITS state table which allows other state tables (such as IMC_STARTUP, IMC_LOGON, and so on) to check if a called number can be converted to another number during periods when a number might have more than one possible area code or other prefix. This could happen if a range of telephone numbers were being migrated to another range of telephone numbers, for example.

Confirmation of message deletion
Unified Messaging now provides an option that enables subscribers to listen and delete expired messages, after logging on. The number of days after which new or saved messages are automatically expired, can be configured for individual subscribers by the Unified Messaging administrator.

FindMe FollowMe caller screening
Unified Messaging now provides a Find-me follow-me caller screening option that allows subscribers to route callers to their FindMe number without callers first having to record their name.

New entry labels in IMC_START_UP state table
An unlimited number of logon numbers for the system and for every partition can now be added by using new entry labels.

Simplified call flow for save/undelete messages
In the Telephone User Interface (TUI), a verbose prompt explaining about undeletion and message expiry can now be played only the first time that a message is deleted or saved. For all subsequent actions of this type, a shortened prompt is played (subscriber types 5, 6, 7 or 8 only).
Functionality of XML Provisioning custom server enhanced
A list of subscribers within a Unified Messaging partition can be retrieved using XML Provisioning.

Option to switch off Find Me Follow Me feature at partition level
Unified Messaging can now be configured so that the Find Me Follow Me options are not available for Home and Small Business subscribers (types 6 and 7).

The limit of allowed MQ queues for XML Provisioning increased
The number of available MQ queues for XML Provisioning is no longer limited to ten, allowing greater flexibility for testing and also allowing wholesale customers to self-manage their accounts more easily.

The IMC_Broadcast custom server can now handle large broadcasts
The sending of broadcast messages can now be staggered to minimize any degradation of system performance. Distribution lists can now be nested to make it possible to create very large user and system distribution lists.

Shared numbers can now have aliases
This allows multiple telephone numbers that are not answered to point to the same main mailbox number, which also can have multiple sub-mailboxes. This means that aliases and shared numbers are no longer mutually exclusive.

The Apple Safari web browser is now supported
For accessing the Unified Messaging web interface, the Apple Safari web browser is now supported for use by Home, Small Business, and Corporate subscribers (types 5, 6, 7 or 8).

Transfer to operator from caller dynamic menu for Small Business subscribers is now possible
Callers to Small Business subscribers can now be transferred to an operator by pressing 0 from the caller dynamic menu. (This feature was already available for other subscriber types.) Subscribers can specify the operator number from the Unified Messaging web interface Find Me page. (Subscriber type 7)

Simplified customization of e-mail and pager notification templates
Creating a new language is no longer necessary when customizing e-mail and pager notification templates. It is now easier to customize these templates for wholesale customers so that each such notification has its own look and feel.
Language preference setting now provided on web GUI for Corporate subscribers
Type 5 (Corporate) subscribers can now select a language preference for the Telephony User Interface (TUI) from the Telephone Interface settings web page.

Distribution lists have been extended
Distribution lists can now be nested to make it possible to create very large user and system distribution lists. Previously the limit was 90 subscribers.

The maximum number of configurable notification schedules is now ten
One notification schedule can now be set for each day of the week. The total number of available notification schedules is set by the system administrator, but individual schedules are configured by subscribers using the Unified Messaging web interface.

Subscribers can now configure menu-routing destinations
Subscribers can now configure a menu-routing mailbox menu to transfer a caller directly to a mailbox or to a telephone extension.

Easier mailbox switching with multiple (shared) mailboxes
Home and Small Business subscribers with a multiple (shared) mailbox no longer need to log off from the web and hang up from the Telephony User Interface (TUI) interfaces to switch from one mailbox to another.

Home and Small Business subscribers can now choose detailed or short prompts
Home and Small Business subscribers can specify detailed or short Telephone User Interface (TUI) prompts using the TUI.

Improved XML Provisioning mailbox transaction control
Partition information can now be specified in XML Provisioning mailbox transactions that delete mailboxes, add a subscriber, or change the details of an existing subscriber.

Improved multiple (shared) mailbox facilities
Subscribers with a multiple (shared) mailbox can now record a main greeting for the primary phone number.

IOBI platform now integrated with Unified Messaging platform
IOBI is a desktop application, providing event notification to end users. The Unified Messaging platform has been enhanced to allow IOBI event messages to be sent to an IOBI server as well as to allow incoming IOBI IMAP4 requests.
Menu-routing schedules
Unified Messaging now supports different menu-routing application behavior at different times of the day and on different days of the week, or in an emergency.

Extension Dialing
Unified Messaging can now be configured so that subscribers and callers can dial a short number (for example, 1001) to address a longer user ID in the database (for example, 1230001001). This can be used when specifying:

- A destination address for a message
- A transfer destination, for example, when using an auto-attendant

Interoperability improvements
Unified Messaging now allows subscribers within particular partitions to search an LDAP server by number (only) to send a message to another vendor’s voice mail platform supporting AMIS or VPIM.
Chapter 2. Introducing Unified Messaging

Unified Messaging uses WebSphere Voice Response's voice processing capabilities to help you manage a wide range of voice mail, fax, and e-mail functions.

Voice mail systems are often considered to be simple answering machines, collecting messages for people when they can't answer the phone. However Unified Messaging offers significantly more, including a unified, fully integrated system that lets you access and process voice, fax, and e-mail messages.

This chapter discusses some of the ways in which you can use Unified Messaging. We start with an overview of how Unified Messaging helps you get your communications media under control. We then look at the environment in which Unified Messaging operates. We look at the different types of service you can provide with Unified Messaging, from a basic voice mail system, all the way to a system that integrates voice, fax, and e-mail messages. Finally, we look in more detail at the functions that make up Unified Messaging.

Unified Messaging: managing the communications muddle

We live and work in a world rich in communications media. Mobile phones, answerphones, IP phones, voice mail systems, e-mail, pagers, fax, personal digital assistants, message services...the list seems endless. The reality of today's high pressure society is that people want instant communication, instant answers, mobility, and total flexibility. But do all these communications devices make it easier to communicate, or more difficult?

Unified Messaging can help you make the diversity work to your advantage. It provides a central service that coordinates and provides access to all communications formats through the interface that is most appropriate to you at the time. Unified Messaging frees the caller from needing to know the devices you have with you, and it frees the subscriber to use the most convenient communications medium for access.

At the heart of Unified Messaging is the message store. This store acts as a repository for the different possible formats of message, including voice messages, which can be stored in a highly compressed form, and e-mail and fax messages.
Physically, the store need not be a single repository, but can be a set of separate, but connected, mechanisms. This ensures that the performance of the voice services is not delayed by concurrent activity with large, content-rich e-mail attachments.

Messages are managed (whatever their format) through a single, consistent set of interfaces. These interfaces include the telephone, e-mail, and the Web. Message management includes general features such as message forwarding, message deletion, and message reply, as well as personalized features such as private directories.

Once a message has been stored, Unified Messaging can generate a notification. The subscriber can select the format of the notification, which may include e-mail, voice, pager, short message service (SMS) interfaces, or the message waiting indicator on a telephone handset.

As a subscriber, once you know that you have a message, you can select how you receive it. Your choices depend on the source message type, and the options installed on your system. In general terms, however, you can get your messages through the telephone, your e-mail system, or a Web interface.

The Unified Messaging environment

Unified Messaging runs as an application on the WebSphere Voice Response voice processing system. Voice processing lets you bring together your telephone and data communications networks to access information stored in databases directly from a telephone.

For VoIP connection, the WebSphere Voice Response voice processing system comprises:

- The WebSphere Voice Response for AIX licensed program product, Version 4.2 or Version 6.1
- One or more appropriate System p servers or BladeCenter® computers. No specialized hardware adapter is required to communicate with the telephone network over VoIP

For trunk connection, the WebSphere Voice Response voice processing system comprises:

- The WebSphere Voice Response for AIX licensed program product
- One or more appropriate IBM System p computers with specialized hardware to communicate with the telephone network: (Digital Trunk Telephony Adapter (DTTA): full name IBM Quad Digital Trunk PCI Adapter (feature number 6312 and 6313))
The following specialized hardware for communicating with the telephone network has been withdrawn from marketing but is still supported by WebSphere Voice Response Version 4.2:

- Digital Trunk Extended Adapter (DTXA): full name IBM ARTIC960RxD
- Quad Digital Trunk PCI Adapter (this adapter is superseded by the DTTA)
- Digital Trunk Ethernet Adapter (DTEA): full name Quad Digital Trunk Ethernet PCI Adapter

With WebSphere Voice Response for AIX Version 4.2, DTTA and DTXA cards provide connection to a PSTN telephone network. DTXA and DTTA adapters cannot be mixed in the same system unit. WebSphere Voice Response Version 6.1 supports DTTA and DTEA, but not DTXA. Details of the number of adapters you can use in each of the currently supported system units and the possible configurations can be found in the WebSphere Voice Response for AIX: General Information and Planning book.

WebSphere Voice Response is connected to callers through the telephone network (PSTN or IP), and to information in databases through the data communications network.

WebSphere Voice Response is an application enabler. It provides the capabilities people need to create their own voice applications: answering or initiating phone calls, accessing local or remote databases, playing voice responses to customers, and so on.

**Unified Messaging's voice mail services**

Unified Messaging helps you make better use of your time by letting you send and receive voice messages when personal intervention isn't necessary. You can record personal greetings that callers hear when you're not available, and Unified Messaging takes any messages they leave for you to deal with when it's convenient to you.

Provided that your switch and telephony environment can support them, Unified Messaging has all the capabilities described in the *IBM Unified Messaging for WebSphere Voice Response: Subscriber's Guide (Types 0,1,2,3,4 and 9)* and *IBM Unified Messaging for WebSphere Voice Response: Subscriber's Guide (Types 5,6,7 and 8)*. Some subscribers will use Unified Messaging simply as an answer-phone; others will want to take advantage of its many other capabilities.

**Unified Messaging as a transaction messaging system**

Because Unified Messaging runs under WebSphere Voice Response, it can interface to other WebSphere Voice Response voice applications to provide a voice messaging capability linked to other business transactions carried out over the telephone.
For example, a caller using a telephone banking system to complete a financial transaction might want to leave a message containing special instructions. Unified Messaging can take such messages and link them to the caller's bank account number. Staff at the bank can then use Unified Messaging to access the messages and deal with them.

**Unified Messaging as an integrated mail system**

Unified Messaging is not just an off-the-shelf voice mail application. You can customize it to integrate it with e-mail and fax mail servers to provide a complete messaging system for your enterprise.

Fast and efficient communications are a crucial part of today’s competitive business environment, as demonstrated by the rapid growth of e-mail and fax communications. People now have an increasing number of mailboxes (e-mail, fax, and voice mail) that they must monitor, with the result that many important messages may remain unopened for a long time.

In an ideal integrated mail system, people want to be able to access all their mail, when they want to, and in the way that they want to. Naturally, Unified Messaging lets its users access mail using the telephone. But, in the growing world of e-business, it also lets you provide a visual interface for Internet users to work with their voice, fax, and e-mail messages from a Web page. It’s an exciting and powerful alternative to the normal telephone key pad method.

**Subscribers and callers**

Before moving on to look at Unified Messaging’s capabilities, we need to look briefly at a concept that lies at its heart: the difference between *subscribers* and *callers*.

**Subscribers**

Subscribers are people who own a mailbox on your system. They can use all the voice mail functions you have chosen to make available on your system, from simple answering machine functions, all the way up to fax and e-mail message handling.

Subscribers can have different levels of service made available to them. The various *subscriber types* offer different combinations of features, as described below in “Subscriber types.”

**Callers**

In the context of Unified Messaging, callers are people who might leave messages for your subscribers.

**Subscriber types**

Unified Messaging lets you define different types of subscriber. *IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 0,1,2,3,4 and 9)*
and IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 5,6,7 and 8) describe in detail the facilities available to each type, and they are summarized in Table 1 on page 13.

The subscriber types are:

**Standard (Subscriber type 0)**
A standard (or default) Unified Messaging subscriber has access to a range of voice and fax capabilities. They can request notification of new messages by e-mail, SMS message or by pager. Callers have extensive transfer options, the ability to page subscribers, and the option to leave a message.

*(StandardUnified Messaging subscribers have a similar set of functions, available from a similar set of menus, to those available to all subscribers in IBM DirectTalkMail.)*

**Business - local and remote (Subscriber type 1)**
Business - local and remote subscribers are identical to Business - local subscribers, but with the added ability to access e-mail messages that reside on a remote IMAP4-compliant or POP 3-compliant e-mail server.

**Business - local (Subscriber type 2)**
Business - local subscribers have similar functions to standard subscribers, but with some minor differences, including named greetings and dynamic caller menus. They can request notification of new messages by e-mail, SMS message or by pager. Callers have extensive transfer options, the ability to page subscribers, and the option to leave a message.

**Residential (Subscriber type 3)**
Residential subscribers have a simplified interface that allows them to receive voice messages only and to record one greeting. They do not have the full feature set available to the other subscriber types.

**Remote e-mail only (Subscriber type 4)**
Remote e-mail only subscribers do not have access to any voice or fax messaging features. They have access only to their e-mail messages residing on a remote IMAP4 or POP3-compliant e-mail server.

**Corporate (Subscriber type 5)**
Corporate subscribers have access to the normal send and receive message features. They have access to five different greetings including a greeting that can be automatically played to callers outside of specified office hours. They can request notification of new messages by e-mail, SMS message or by pager. Corporate subscribers can give their callers the option to page them or transfer to an attendant as well as leaving a message.
Home (Subscriber type 6)
Home subscribers can receive, but not send messages. They have access to five different greetings including a greeting that is automatically played to callers if the subscriber is already using the telephone. They can request notification of new messages by e-mail, SMS message or by pager. Home subscribers can set Unified Messaging to either accept messages or to try to contact the subscriber on up to three specified telephone numbers, and forward the call.

Small Business (Subscriber type 7)
Small Business subscribers have access to the normal send and receive message features. They have access to five different greetings including a greeting that is automatically played to callers if the subscriber is already using the telephone. They can request notification of new messages by e-mail, SMS message or by pager. Small Business subscribers can give their callers the option to page them or try to reach them on up to three specified telephone numbers. They can also set Unified Messaging to automatically try to forward the call using these contact numbers before playing a greeting.

Enterprise (Subscriber type 8)
Enterprise subscribers have access to the normal send and receive message features. They have access to five different greetings including a greeting that is automatically played to callers if the subscriber is already using the telephone. They can request notification of new messages by e-mail, SMS message or by pager. Enterprise subscribers can provide their callers with various options in addition to leaving a message. Callers can choose to page the subscriber or to be transferred to a number on which they might be reached. Alternatively, they can choose to transfer to the attendant or to a colleague or to another number of the caller's choosing.

Telephony Portal (Subscriber type 9)
Telephony portal subscribers can retrieve e-mail messages that reside on an IMAP4-compliant or a POP3-compliant e-mail server. They can also receive voice messages that are automatically forwarded to their e-mail account as a .wav file attachment.

For each type of subscriber, the administrator can define different:
• Menus available to subscribers
• Menus available to callers to those subscribers
• Control menu functions available to callers or subscribers

Table 1 on page 13 below shows the different features available to each subscriber type.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Standard</th>
<th>Business - local</th>
<th>Business - local and remote</th>
<th>Residential</th>
<th>Remote e-mail only</th>
<th>Corporate</th>
<th>Home</th>
<th>Small Business</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive local voice mail messages</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Receive local faxes (fax server needed)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Retrieve remote e-mail messages</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Have multiple greetings</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Set preferences using Web page</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Access local messages using Web page</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Access remote e-mail messages using Web page</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Maintain personal directory</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Besides the various subscriber types defined above, Unified Messaging allows the system administrator to give subscribers voice mail access without the burden of maintaining subscribers within Unified Messaging. All the necessary subscriber profile information is stored in a LDAP server. If subscribers are configured this way, all their voice messages are forwarded to an IMAP4 or POP3 compliant e-mail server. The subscribers can then retrieve the voice and e-mail messages from this e-mail server. These subscribers are referred to as Telephony Portal (subscriber type 9) subscribers.

**Note:** In all the descriptions of Unified Messaging capabilities that follow, assume the Standard subscriber type, unless stated otherwise.

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**Unified Messaging: responding flexibly to your needs**

By tailoring Unified Messaging, you can offer your users everything from a basic voice mail system to a complete unified messaging system. In this section, we'll describe various combinations of mailbox you can use to meet your needs for voice, fax, and e-mail message handling.

Of course, what you can do depends on what type of Unified Messaging you have purchased. You order Unified Messaging (and receive a license for using it) according to the total number of mailboxes you need. You can also select the level of function you want for each mailbox from the following list:

1. Voice mail messaging mailbox (the basic version of Unified Messaging)
2. Fax mailbox enablement (provides fax handling in addition to basic messaging)
3. e-mail mailbox enablement (provides IMAP4 and POP3-compliant e-mail handling in addition to fax and basic messaging)

For each fax or e-mail option you want, you need a messaging mailbox.

In the sections that follow, starting at "The elements in designing a Unified Messaging system" below, we give you an idea of the range of options available in all flavors of Unified Messaging.

**The elements in designing a Unified Messaging system**

Figure 1 on page 15 shows the three areas involved in any Unified Messaging system: the inputs from callers, a means of storing those inputs, and reception of those inputs by subscribers.
You start your design with the callers, and the information that they will leave—one or more of: voice messages, fax messages, or e-mail messages.

Once you know which of these message types will be left, you'll know what systems you need to store that information. Then you need to decide how your subscribers will access the information. As Figure 1 shows, there are several ways available: the telephone (optionally including a fax machine), the Web, a WAP device, and your e-mail system.

If your caller input is limited, one means of access may be enough. For example, if all that your subscribers receive are voice messages, telephone access might be enough. Alternatively, if callers have all methods available, you might want to unify on one subscriber access method. You can, for example, use the Web to access all message types. You might also provide your subscribers with alternatives. For example, they might usually use the telephone for voice, but have the ability to use the Web for all types.
Of course, the technology drives some of these decisions. You can't listen to e-mails without text-to-speech; you can't currently listen to fax at all. Figure 2 shows the elements in making your design decisions fit together.

Let's start in the middle with the data storage. In this example, we have voice mail and e-mail stored on separate servers. Fax mail can be stored on either system. We don't show a separate fax mail server because, in the Unified Messaging environment, it is used as a sending and receiving mechanism, not as a storage system.
Note that the servers are linked. This enables us to manage the different types of data efficiently, while presenting what appears to be a single source to the subscribers.

Remember, deciding how best to store the data depends on:
1. Your business requirements (and those of your customers)
2. The underlying technology

The technology should always serve your business needs.

Let's turn now to your subscribers, and what could be available to them. As shown in Figure 2 on page 16, the range of possible options is very wide:

**Using the telephone, they could:**
- Listen to voice messages
- Print faxes on a fax machine
- Listen to e-mail, using text-to-speech.

**Using a Web browser, they could:**
- Listen to voice messages in the form of .wav or .au files using a PC audio card or built-in audio chip
- Listen to voice messages by using the system to dial out to the subscriber
- Display faxes on the screen using a fax (TIFF) viewer and print them on a local printer
- Display e-mail text
- Send e-mail text
- Reply to messages
- Forward messages

**Using an e-mail system, they could:**
- Listen to voice messages in the form of .wav or .au files using a PC audio card or built-in audio chip
- Display faxes on the screen using a fax (TIFF) viewer and print them directly on a local printer
- Display e-mail text.
- Send e-mail text
- Reply to messages
- Forward messages

**Using a WAP device, they could:**
- Send e-mail text
• Reply to messages
• Forward messages
• Print fax on a fax machine.

Again, what you provide from this range depends on your business needs, and the technology you have in place to meet those needs. You could, for example, separate subscribers’ access to phone and fax messages from their e-mail. They would need an ID on each system. Alternatively, you could allow them access to everything from the Web. In that case, they’d need only one logon ID.

**Different mailbox combinations**

This section describes the types of voice mail systems you can provide using Unified Messaging:

• “Basic voice mail system”
• “Voice messaging system” on page 19
• “Integrating voice, fax, and e-mail messaging systems” on page 23

**Basic voice mail system**

You can easily configure Unified Messaging to work just as an efficient answering service which records and plays back voice messages left in response to subscriber greetings.

Figure 3 on page 19 shows a basic voice mail system, allowing subscribers to record, play back, and manage messages.

**Note:** In Figure 3 on page 19 and in the three figures following it, we use a simple convention to show communication between Unified Messaging and its users:

- shows users communicating with Unified Messaging.
- shows Unified Messaging communicating with users.

Arrows in both directions means two-way communication.
Basic voice mail system with fax:

On top of the basic system shown above, you can add the ability to receive and store faxes in the same mailbox for transmission to fax machines.

Accessing messages:

When subscribers access their mailbox using the telephone, Unified Messaging tells them how many new and saved messages are in it. If you’ve implemented fax support, the fax messages will be included in this list.

Voice messaging system

Moving on from the basic system described above, you can configure Unified Messaging to support sending and forwarding voice mail to other user mailboxes on the same system or on external systems.

Using voice messaging, not only can subscribers exchange messages between each other on their Unified Messaging system, but they can also transfer messages to other mail systems using one of the following methods:
AMIS-A protocol
where a telephone call is made from one system to another system to transfer a message.

This is an industry standard supported by most voice mail systems. Unified Messaging can therefore exchange messages with other manufacturers’ voice mail systems, as long as both systems are on the same telephone network.

DTM-D protocol
which transfers a message to another IBM Unified Messaging system over a LAN.

This is much faster and more efficient than AMIS-A and preserves the digital quality of the original recording. However, you can use it only to exchange messages between Unified Messaging systems.

Voice Protocol for Internet Mail (VPIM) protocol
which enables Unified Messaging to exchange messages with other voice mail systems which support it, as well as with e-mail systems.

This digital industry standard uses the Internet mail Simple Mail Transfer Protocol (SMTP) services with Multipurpose Internet Mail Extensions (MIME).

Figure 4 on page 21 shows what such a messaging system looks like.
Voice messaging system with fax:

Just as you can with a basic voice mail system, you can add fax handling to your voice messaging system. In addition to handling their voice messages, this lets your subscribers store and retrieve faxes in the same mailbox.

Accessing messages:

To access messages within their mailboxes, subscribers can use a telephone, a Web browser, an IMAP4 or POP3–compliant e-mail client like Microsoft® Outlook Express or a WAP device:
Using a telephone (including IP phone)
Subscribers can access voice mail messages from the local Unified Messaging database. Unified Messaging tells them how many new and saved messages are in the mailbox.

For fax messages, subscribers can receive fax mail messages on the same call to the Unified Messaging system, or transmit them to a fax machine on another line.

They can then send and forward messages with comments, set special message attributes such as urgent, private, and acknowledge, and set a message to be delivered at some future date and time. Subscribers can also configure their mailboxes using the telephone.

Using a Web browser (IE 6.0 recommended)
on a multimedia PC provides a visual method for managing messages.

Subscribers can list, view, forward and reply to messages. The type of viewer used depends upon the message type. Voice messages can be played using a PC audio card, or directed to a telephone. E-mail messages can also be displayed. If fax support has been enabled, faxes can be displayed using a TIFF viewer, or printed on a local printer.

Subscribers can also use a Web browser to configure their mailboxes.

Using an IMAP4 or POP3 e-mail client
Subscribers can access all their voice messages using a full-fledged e-mail client. They can listen to the voice messages and view their faxes if fax support has been enabled in Unified Messaging. They can delete and forward their messages and organize them into folders.

Using a WAP device
Subscribers can configure their mailboxes, send e-mails, reply to messages and forward messages.

Figure 5 on page 23 shows how using the Web browser and WAP fits into the voice messaging system pictured in Figure 4 on page 21. It also introduces fax into the picture. To implement WAP, the Web server needs a TCP/IP connection to a WAP gateway. WAP devices communicate with the web server via the WAP gateway, which translates the protocol from WAP to HTTP.
Integrating voice, fax, and e-mail messaging systems

You can configure Unified Messaging to support voice mail, optional fax mail, and also to interface with external e-mail systems.

Integrating and e-mail systems using SMTP/MIME:

You can configure Unified Messaging mailboxes to forward voice and fax messages automatically to an e-mail server, using SMTP/MIME. This allows the voice or fax messages to be stored on the e-mail server and accessed by e-mail clients:

- Voice mail can be sent to the e-mail system in the form of an e-mail with a .wav or .au format file attachment.
- Fax mail can be sent to the e-mail server in the form of an e-mail with a .TIFF/F format file attachment.
Unified Messaging forwards the voice or fax messages automatically to the e-mail server, with or without storing a copy of the message in the Unified Messaging system for retrieval by telephone.

The SMTP/MIME protocol is defined only for sending mail items. Therefore, the Unified Messaging system cannot retrieve any mail items from the e-mail server using this protocol, nor can it synchronize the deletion of messages between itself and the e-mail server.

**Integrating and e-mail using IMAP4 or POP3:**

Assuming that messages are stored within Unified Messaging, subscribers can access their voice, fax, and e-mail from any IMAP4 or POP3-compliant e-mail client, the telephone, or using a Web browser.

To access messages from an IMAP4–compliant e-mail client, you set up two links:
- From the IMAP4 client to Unified Messaging so that subscribers can access voice and fax
- From the client to a remote IMAP4-compliant e-mail server so that subscribers can access their e-mail.

Using multimedia-capable workstations, subscribers can listen to their voice messages in one of two formats:
- Streamed RealAudio
- .wav files

They can also view any faxes they may have, as long as they have an appropriate TIFF file viewer installed on their PCs.

If you set up Unified Messaging so that subscriber mailboxes can access e-mail from an IMAP4 or POP3-compliant e-mail server, e-mail can be played back to them using a process called *text-to-speech*. Unified Messaging does not come prepackaged with its own text-to-speech engine; typically it uses the text-to-speech engine provided in WebSphere Voice Server for AIX. Your IBM representative will be able to give you guidance on other text-to-speech engines that are compatible with Unified Messaging.

**Accessing messages:**

When the messaging systems are integrated using either SMTP/MIME, IMAP4, or POP3, subscribers can access messages:

**Using an e-mail client,**
- to manage voice, fax, and e-mail messages with all the capabilities of
that client: usually listening to or displaying the messages, forwarding
them, saving them, deleting them, and so on.

Using the telephone, when copies of voice and fax messages are stored in
Unified Messaging or accessed using IMAP4 or POP3,
you get all the telephone access capabilities of a voice and fax
messaging system (see “Voice messaging system” on page 19).

In addition, if Unified Messaging mailboxes receive e-mail that has
been sent to Unified Messaging directly (instead of to an e-mail
server), Unified Messaging can play the e-mail to a caller using
text-to-speech technology.

Figure 6 on page 26 shows messaging system integration.
System partitioning

You can divide a single Unified Messaging system into multiple voice mail partitions, where each partition can have its own system administrator. For example, you could use this feature to:

- Have multiple companies share a single voice mail system where it isn’t cost effective for each to have its own. This lets you use specific greetings to personalize the business, route calls, and so on.
- Group subscribers in a large organization into functional departments, with each department being administered locally.
- Group residential subscribers by state or county.
**Multiple companies sharing a single system**

You can configure Unified Messaging to support multiple companies on a single system. In this configuration, each company is isolated from all others. Each has its own system administrator responsible for day-to-day moves, additions, and changes for subscribers.

Subscribers within one partition cannot interact with subscribers in another partition. Similarly, an administrator of one partition cannot view, access, or manage subscriber profiles or data on another partition.

**Multiple departments within an organization**

You can configure Unified Messaging to divide a large organization into multiple partitions where the administrative responsibilities can be distributed to administrators within each department.

This is similar to the multiple company configuration, except that only the administrative responsibilities are isolated. Subscribers can interact with any other subscribers, regardless of the partition to which they belong.

**Unified Messaging for Telcos or service providers**

Telcos and service providers can deploy Unified Messaging either as an information service or inside the network as a value-added service offering.

**Telephony Portal**

You can configure Unified Messaging so that it acts only as an interface to the telephone system and it doesn’t have any mailboxes nor store any messages locally. When used in this configuration, Unified Messaging will obtain any subscriber information it needs from an LDAP server and it will store and retrieve messages, voice and e-mail, from either an IMAP4 or POP3-compliant e-mail server.

By using Unified Messaging as a telephony portal, you can eliminate any system administrative task from Unified Messaging and perform all of your administrative tasks on the LDAP server.

[Figure 7 on page 28](#) shows how to configure Unified Messaging as a telephony portal.
Providing some of the functions described might mean tailoring (customizing) Unified Messaging to suit your local environment. For example, you might need to customize it to suit your telephone switch or e-mail system.

Having looked briefly at the wide range of integrated mail systems you can build using Unified Messaging, let’s look in more detail at what you do to set up those systems. We’ll look at:

• “Routing telephone calls to Unified Messaging” on page 29
You can customize the system in many ways, from adding paging interfaces or configuring the Web interface, to recording your own prompt dialogs and changing the keys allocated to functions. Here, we describe the basics. You’ll find all the detail you need in the chapter, “Customizing Unified Messaging”, in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

Routing telephone calls to Unified Messaging

How Unified Messaging receives a call depends on who is calling:

Callers dialing in
Callers, trying to contact a subscriber, usually dial a specific telephone number. This is often referred to as Direct Inward Dialing (DID) from the telephone network to a telephone or extension on a PABX. The switch or PABX is usually set up to route the call to the subscriber’s telephone.

If the subscriber’s telephone is busy, rings for a specified number of times without answer, or has been forwarded to voice mail, the telephone switch forwards the call to Unified Messaging.

When the call is forwarded, it is useful if the called and calling numbers are passed to Unified Messaging so that it can select the mailbox in which to leave the message. If the call has come from a Voice over IP (SIP) network, the called and calling numbers are extracted from the ‘To’ and ‘From’ URIs in the SIP message. See “VoIP and Unified Messaging” on page 75.

Subscribers dialing in
Subscribers dialing in to Unified Messaging to log on to their mailbox usually have a single telephone number to access the whole system. This number is then routed by the switch or PABX directly to Unified Messaging. The more information the switch or PABX can pass to Unified Messaging about the called and calling numbers or extensions, the easier it is to process and the less information the subscriber has to provide to access the system.
How Unified Messaging processes incoming calls

Unified Messaging processes incoming calls in four ways, which you can configure to suit your voice messaging requirements:

**DID mode**
Unified Messaging tries to use the incoming called number to choose the appropriate mailbox to deposit a message or log on to. The switch can provide the called number in a variety of ways, including data links (such as SMSI or ACL, ISDN, or in-band DTMF signalling). If the switch doesn't provide the called number, the application profiles configured on the telephony lines themselves or the default application is invoked. You can configure the default application profile as *auto-attendant* or *quick message*, as described below.

**Auto-attendant mode**
In this mode, Unified Messaging can answer incoming calls and ask the caller for the number they want. If the auto-attendant application can't connect the caller to that number, it passes the called number to Unified Messaging, which plays the subscriber’s greeting.

**Quick message mode**
You can set up a central *quick message* number to let callers leave voice messages for mailboxes without actually calling the mailbox numbers. In this way, voice mail, like e-mail, need not interrupt the work of the recipient in the way that a telephone call often does.

The caller has to enter the mailbox number of the recipient at the *quick message* prompt, just as they do in auto-attendant mode. In *quick message mode*, Unified Messaging does not try to transfer. A caller who is another subscriber does not have to log on to the mailbox before being allowed to send a message to another subscriber.

**Menu-routing**
If the menu-routing application is called to respond to an incoming call, the caller is played a greeting which allows them to choose a destination by pressing a single key on their telephone keypad. The menu-routing application attempts to perform a transfer by calling the number for the destination chosen. If the called number answers, the menu-routing application connects the call between the caller and the number called, otherwise the menu-routing application sends the caller to the voice mail box for that number.

A greeting informs the caller of the choices available to them. The greeting, of up to 5 minutes in length, can be recorded using the telephone or uploaded using the Web interface. If such a greeting has not been recorded then a system default greeting is used. The system greeting takes the format: “press 1 for [recorded name for first number], press 2 for [recorded name for second number], press 3 for [recorded name for third number], etc.”
Virtual mailboxes

In a typical voice messaging environment, each subscriber has a physical telephone handset. But this is not absolutely necessary. Administrators can set up subscribers so that calls to their number do not ring on a phone, but go instead directly to their virtual mailbox. Such subscribers have all the features and functions available to them that all other subscribers have.

By tailoring the supplied Unified Messaging system, you can enable virtual mailboxes using one of:

- A DID number configured in the switch that routes to Unified Messaging. When that number is dialed by internal or external callers, the calls are picked up immediately by Unified Messaging.
- An auto-attendant. When callers dial the main auto-attendant number, they are prompted to enter the mailbox number of the person for whom they want to leave a voice message. Instead of trying to transfer the call to the subscriber, the auto-attendant puts the caller directly into the subscriber’s mailbox, first playing the greeting and then allowing the caller to record a voice message.

Subscribers with virtual mailboxes retrieve their messages using the same menus as other subscribers.

Note: As noted above, enabling virtual mailboxes with an auto-attendant involves tailoring Unified Messaging. For help with this, contact your IBM representative or business partner.

Leaving messages using the telephone

Callers can leave voice, and possibly fax, messages in a subscriber’s mailbox, depending on what type of mailbox that subscriber has:

Voice mailbox only
    If the mailbox supports only voice messages, access to it involves just one access number and path. DID, auto-attendant, and quick message can all be used.

Voice and fax mailbox
    If the mailbox supports both voice and fax, there are two ways of handling messages:
1. Have one number for both voice and fax messages.
The advantage of this is that it involves fewer telephone numbers in the system design. However, if you use DID access to the Unified Messaging system, subscribers may receive calls from callers trying to send faxes to their telephones. Make sure that your subscribers know how to transfer any such calls from fax machines back into Unified Messaging.

2. Have two numbers. The first is for callers leaving voice messages and for the subscriber to access the mailbox; the second is for leaving faxes. This allows direct dialing to subscribers’ telephones without the risk of the subscriber receiving calls from fax machines. Unified Messaging forwards any fax messages to the subscriber’s mailbox.

**Leaving voice messages**

Once Unified Messaging has answered an incoming call, the caller usually hears the subscriber’s pre-recorded greeting. The caller can then leave a message in the subscriber’s mailbox (unless the mailbox is full).

**Leaving fax messages**

Once a call reaches Unified Messaging, and assuming that the subscriber’s mailbox has been set up with fax support, WebSphere Voice Response’s background fax detection detects the initial fax tones and bypasses the greeting. As long as the subscriber’s mailbox is not full, Unified Messaging routes the incoming call to a fax server, as follows:

- If the fax server uses the SCbus fax interface, it receives the incoming fax directly on Unified Messaging’s own trunk lines and passes it to Unified Messaging as a .TIFF/F file to store in the subscriber’s mailbox.
- If the fax server uses the SMTP/MIME interface, Unified Messaging transfers the call to the fax server’s lines, and the fax server receives the incoming fax on its own lines and sends it to Unified Messaging as an SMTP/MIME message with a .TIFF/F file attached to store in the subscriber’s mailbox.

If the subscriber’s mailbox does not support fax, WebSphere Voice Response’s fax detector detects the fax and clears the call to prevent the voice mailbox recording a message full of fax tones.

**Accessing messages using the telephone**

To access their messages using the telephone, subscribers first dial their access number to the Unified Messaging system, with one of the following results:

1. If the answer mode is auto-attendant, Unified Messaging prompts subscribers to enter a number to which to transfer the call. If the number is the main logon number, Unified Messaging continues as described below.
2. If the answer mode is DID, and subscribers have called the main logon number, Unified Messaging can prompt them for their mailbox number. At this point, if subscribers have called from their own number, and the switch has provided this calling number information, they need only press #.

Unified Messaging then usually prompts subscribers for their PIN. However, you can configure Unified Messaging to skip prompting, both for the PIN and mailbox number, if subscribers have already been authorized by the fact that they are calling from their own number. This may not suit all environments, but may be appropriate for Residential subscribers, or those who have to use an authorization code to log on to their telephone handsets.

3. If the answer mode is DID, and subscribers call their own number, they can jump out from their greeting to the logon prompt by pressing just two keys (by default, *7). When Unified Messaging then prompts them for their mailbox number, they need only press # and Unified Messaging assumes that they want to log on to the called number. Unified Messaging then prompts for their PIN as described above.

Once into the mailbox, if the subscriber chooses to listen to the messages, Unified Messaging provides a summary of the number of new and saved messages. All messages are stored in first in first out (FIFO) order by default (last in first out (LIFO) can also be configured), so that the oldest new message left is accessed first. However, messages set to urgent or emergency priority jump straight to the head of the queue.

Voice and fax messages are stored in the same mailbox; there is not a separate sub-mailbox for fax messages to be processed independently.

You can configure Unified Messaging to play message header information as part of the message. A voice message with header information sounds like this:

New Message number 1 from caller 01962815000, received on Tuesday October 6 at 1:20pm. Hi, this is............

The same voice message with header information disabled would sound like this:

New Message number 1. Hi this is.......  

Similarly, a fax message with header information disabled would sound like this:

New Message number 5. This message is a fax.
Listening to voice messages

While playing back a message, there are a number of things you can do:

- Control the playback: stop, start again, fast forward, rewind; play the message faster, slower, quieter, louder
- Delete the message
- Return to the control menu

After you’ve played back a message, you can do a different set of things:

- Manage the messages: save and delete
- Control the play sequence: play again, go to the next message
- Get help, return to the control menu
- Call the sender if the number is known
- Reply by recording a message
- Forward the message to another subscriber

Note: Some of the options may not be available, depending on whether call transfer, replying to, and forwarding messages are enabled.

Listening to fax messages

The actions available during and after playing back voice messages are all available for a fax message. In addition, you can send a fax message to a fax machine on a separate call, or, if you’ve called from a fax machine and the fax server integrated with Unified Messaging uses the SCbus interface, on the same call. The fax goes either to the default fax number or to the number the subscriber enters.

Listening to e-mail messages

Subscribers of certain subscriber types can also retrieve remote e-mail messages that reside on an IMAP4 or POP3-compliant e-mail server. These e-mail messages are presented to the subscriber in a message queue separate from the one with their voice and e-mail messages.

The text parts of the e-mail messages are played to the subscriber using text-to-speech. After retrieving such e-mail messages, subscribers can:

- Manage the message: save and delete
- Play the message again
- Reply to the sender of the e-mail message by recording a message that is converted to a .wav file and sent back to the sender as an e-mail attachment
- Forward the e-mail message to someone else, adding a comment if they want.
When retrieving e-mail messages, subscribers have the ability to filter their messages so that only messages from certain people will be played. They can filter their messages based on entries in a personal directory or on an LDAP server.

**Accessing messages using the Web**

Assuming that messages are stored in Unified Messaging, subscribers can access their voice mail, fax, and e-mail from the Web, depending on:

- Whether you’ve set up a Web page.
- The solution you’ve implemented. All Unified Messaging solutions allow subscribers to access voice messages using the Web; only solutions with fax allow them to view fax attachments; only integrated messaging systems allow them to view e-mail as well.

If you are configured as a Business - local and remote or Remote e-mail only subscriber, you can also access your e-mail messages that reside on a remote IMAP4 or POP3-compliant e-mail server. For details of how to set up your system to access messages through a Web browser, see “Setting up Web access to Unified Messaging” on page 72.

**Figure 8** shows the logon Web page that subscribers see when they start up the Web interface.

![Logon Web page](image)

Figure 8. The Web page for logging on to Unified Messaging

To access your messages, type in your telephone number and password in the Unified Messaging logon page and then select the Logon button.
If you've provided the correct telephone number and PIN, the next page you will see will be your inbox. This will look similar to the example shown in Figure 9.

This page displays all the messages in your inbox - voice, fax and e-mail.

The types of messages you'll see will depend on the type of subscriber you are, as shown in Table 2.

Table 2. Messages displayed according to subscriber types

<table>
<thead>
<tr>
<th>Message Type</th>
<th>Standard</th>
<th>Business - local</th>
<th>Business - local and remote</th>
<th>Residential</th>
<th>Remote e-mail only</th>
<th>Corporate</th>
<th>Home</th>
<th>Small Business</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Fax (fax server needed)</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Your messages are presented in two groups. The first contains urgent messages, while the second group contains non-priority messages. Neither of these groups will be displayed if there are no messages in them. Messages can be in the format of voice messages, e-mails, or faxes.

To view an e-mail or fax message, click on the Subject of that message. A new window is displayed, containing the contents of that e-mail, with options to download attachments, to reply, or to forward the message.

To listen to a voice message, first click on the Subject of that message. A new window is displayed, giving the details about the message. By clicking on Voice Message under Attachments, the workstation’s default media player is started and plays the message.

You can delete messages by selecting the checkbox to the left of the message you want to delete (this puts a tick in the checkbox) and then clicking the delete tab.

To save a message, first select the checkbox to the right of the message (this puts a tick in the checkbox), and then click the save tab.

If at any stage you’re not sure what to do on this page, click the Help tab. If you have finished accessing Unified Messaging or if you want to start over again, click Logout to return you to the page that you signed on to.

**Accessing messages using a WAP**

If a WAP gateway has been defined and the WAP pages have been installed then, depending upon your subscriber type, you can do the following from a WAP device:

<table>
<thead>
<tr>
<th>Message Type</th>
<th>Standard</th>
<th>Business - local</th>
<th>Business - local and remote</th>
<th>Residential</th>
<th>Remote e-mail only</th>
<th>Corporate</th>
<th>Home</th>
<th>Small Business</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote e-mail</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Table 2. Messages displayed according to subscriber types (continued)**

Chapter 2. Introducing Unified Messaging 37
• If the WAP device is a mobile phone, listen to your messages in the same way as from a normal phone by dialling in to Unified Messaging
• List messages
• Delete messages
• Read e-mail (not attachments)
• Send e-mail
• Reply to message (using e-mail)
• Forward message

Currently, you cannot play/view voice and fax messages on a WAP device when it’s being used in WAP mode.

Messages are sent as e-mails. Therefore only Business - local and remote and Remote e-mail only subscribers have access to the last 4 functions in the list above.

On accessing the system from a WAP device, you will be presented with a logon screen. Enter your profile and PIN. If valid, you will be presented with a list of your messages - voice, fax and remote e-mail (depending upon your subscriber type). You’ll only be able to view your e-mails. You’ll be able to reply to all message types, by sending an e-mail to the source of the message.

You can also access your preferences through the WAP interface. These are described in the IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 0, 1, 2, 3, 4 and 9).

Exchanging messages between mailboxes
Unified Messaging subscribers can exchange messages without calling each other. This is a useful way of getting a message to someone when you know that an interruption would be unwelcome, or when you don’t have time for a lengthy conversation.

Here’s what you can do:
• Reply to messages you receive with further voice messages.
• If you already have a message that you want to share with someone else, you can forward that message to their mailbox.
• Sign on to Unified Messaging, choose who to send a message to, then record the message and send it. (You can also do it the other way round: record the message, and then decide who to send it to.)
• Send messages to people on other voice mail systems, as long as you have configured Unified Messaging to recognize the numbers of mailboxes on those systems, and those systems conform to AMIS-A or VPIM, or are Unified Messaging systems with DTM-D.
• Send messages to people on e-mail systems, as long as you have configured Unified Messaging to translate certain numbers (or dial-by-name entries) into e-mail addresses.

Before you send a message, you can change its attributes, setting a priority, a privacy level, a delayed delivery, and so on.

**Communicating with external notification interfaces**

You can customize Unified Messaging to communicate with multiple external notification devices, such as:

• E-mail systems
• *Message Waiting Indicators (MWI)* on telephone sets (if the switch provides interfaces allowing them to be set)
• Paging devices
• *Short Message Service (SMS)* interfaces on wireless systems to communicate with the screens on cellular telephones

Unified Messaging has e-mail messaging facilities built in; all you need to do to enable e-mail for notification is to define an e-mail address in each subscriber profile.

WebSphere Voice Response can set MWIs on most switches, using *exchange data link*. However, to integrate Unified Messaging with pagers or SMS servers, you need either:

• A command-line utility that runs under AIX and communicates with the server, or
• An understanding of the server network communications protocol that is sufficient for you to perform your own services development.

You can get help with this from your IBM representative or IBM business partners.

**Exchanging messages with other messaging systems**

You can set Unified Messaging up so that subscribers can send messages to, and receive messages from, subscribers on other mail systems. This is known as *external messaging*.

Unified Messaging *remote nodes*, or remote destinations, are identified by a numeric code, the *node code*. This code is used as a prefix to the receiving mailbox ID.

As explained in the previous section, Unified Messaging supports the following protocols for external messaging:
Simple Mail Transfer Protocol (SMTP) with Multipurpose Internet Mail Extensions (MIME), the standard for the digital exchange of data (such as voice and fax messages) between e-mail systems.

Voice Protocol for Internet Mail (VPIM), the standard for the digital exchange of voice messages between different voice mail systems. This is a special case of the SMTP/MIME protocol.

Audio Messaging Interchange Specification (AMIS-A), an analog specification for exchanging voice messages between different systems. This is an industry standard supported by most voice mail systems. Unified Messaging can therefore exchange messages with other manufacturers’ voice mail systems, as long as both systems are on the same telephone network.

DirectTalkMail Digital (DTM-D), a digital protocol for exchanging voice messages very rapidly between Unified Messaging systems.

Note: You cannot use DTM-D with other manufacturers’ voice mail systems.

SMTP/MIME and VPIM

Voice Protocol for Internet Mail (VPIM) is a standard for transferring voice messages between different voice mail systems using internet e-mail. It is based on the Internet e-mail standards, Simple Mail Transfer Protocol (SMTP) and Multipurpose Internet Mail Extensions (MIME). Different voice mail systems can exchange messages if they can send and receive e-mail with sound attachments. Unified Messaging can exchange messages with VPIM-enabled voice mail systems.

In addition, Unified Messaging and e-mail systems can exchange messages using sound files attached to Internet-style e-mails based on SMTP/MIME. To define VPIM and SMTP/MIME destinations, you (or your IBM business partner) use the utility described in the section, “Unified Messaging Interface Tool ” in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

To define the mailboxes on your Unified Messaging system as able to receive VPIM or SMTP/MIME mail, change the AIX mail aliases file, as explained in the section, “Implementing VPIM or SMTP/MIME external messaging”, in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

You can also define mailboxes to forward copies of messages to an e-mail address automatically. This provides some level of integration of voice mail and e-mail, or an alternative way of defining external message destinations. See the section, “Change Details of a Subscriber (changeuser)”, in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide for details.
Audio Messaging Interchange Specification (AMIS-A)

Unified Messaging also supports the Audio Messaging Interchange Specification (AMIS) analog specification for exchanging voice messages between different systems. Subscribers can reply to AMIS-compliant messages from another system, and forward messages to AMIS-compliant destinations. You can also include AMIS-compliant destinations in a distribution list.

**AMIS analog protocol**

Subscribers can use Unified Messaging to send messages to, and receive messages from, any other voice messaging system using the same protocol.

Using the AMIS analog protocol, the sending system calls the receiving system and the message is recorded in real time. For this reason it is not suitable for sending large numbers of messages.


**AMIS analog protocol with proprietary extensions**

Subscribers can send messages to compatible Unified Messaging systems using a proprietary implementation of the AMIS analog protocol, which allows additional information, such as the security level and the urgency, to be sent with the message.

When a message is sent to more than one mailbox at another Unified Messaging node, only one copy of the message is transmitted, with a list of the receiving mailboxes. (The standard AMIS analog method sends a copy of the message to each receiving mailbox.)

To define AMIS-A remote nodes, you (or your IBM business partner) use the utility described in the section, “Unified Messaging Interface Tool” in the *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*.

DirectTalkMail Digital (DTM-D)

DirectTalkMail Digital (DTM-D) transfers messages directly from one Unified Messaging system to another, using WebSphere Voice Response compressed format. If only Unified Messaging systems are involved, this is the fastest way of transferring messages; it involves little packaging and no uncompression or encoding.

Before deciding to use DTM-D, however, you need to decide whether speed is what is most important to you. DTM-D doesn’t try repeatedly to deliver messages. If the receiving Unified Messaging system is not available, it returns the message to the sending mailbox with an appropriate message. So,
if reliable delivery is more important to you than speed, use VPIM instead. In the same situation, VPIM carries on trying to deliver the message (it uses the standard AIX sendmail process).

To define DTM-D remote nodes, you (or your IBM business partner) need to use the utility described in the section, “Unified Messaging Interface Tool ” in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

**Remote audio names**

Audio names identify the senders and recipients of messages. When a Unified Messaging subscriber receives a message, the message header gives the date and time of receipt, and, if there is one, plays the audio name of the sender. When you’re sending a message to another subscriber, Unified Messaging reads the audio name of the intended recipient so that you can check that the message is going to the correct person.

*Remote* audio names identify senders and recipients not on the local Unified Messaging system. You can configure remote audio names:

* By allowing VPIM to pack them with a message, then unpack them on the receiving system
* Using *network file system* (NFS) to mount a copy of the remote Unified Messaging system’s audio name directories
* Using *file transfer protocol* (FTP) to copy the directories from the remote Unified Messaging system

For detailed information, see the section, “Setting up remote audio names and location names”, in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

**Accessing e-mail on a remote server**

Business - local and remote or Remote e-mail only subscribers can retrieve e-mail that resides on an IMAP4- or POP3-compliant e-mail server.

**Creating an integrated mail system**

In a ‘mail rich’ world, people have more mail items, and many different kinds of mail. The ideal integrated mail system must therefore provide:

* Access to any e-mail, fax, or voice message
* Immediate notification of any message
* Sufficient data to indicate to the recipient whether to look at the message immediately or leave it for later
Unified Messaging and WebSphere Voice Response can be customized to form the basis of an integrated mail system that satisfies these requirements: a single point of access to voice, fax, and e-mail for office, home-based, or mobile workers.

**Converting voice mail to e-mail**

The VPIM support in Unified Messaging lets you convert voice mail to SMTP/MIME e-mail. This gives the individual subscriber the option of having all voice messages converted to SMTP/MIME e-mail notes and sent to the subscriber’s Internet e-mail address.

Also, Unified Messaging can receive e-mail notes containing sound files (in .wav or .au format) and save them as voice messages in the receiving mailbox.

**Converting e-mail to voice mail**

You can view your e-mail messages as text on the Web.

You can also use SMTP/MIME and VPIM to convert simple text-based e-mail received by Unified Messaging into text-to-speech mail messages. If an e-mail system can forward e-mail to Unified Messaging, subscribers can retrieve it from a telephone using text-to-speech.

In addition, IMAP4 and POP3 support lets you listen to e-mail on remote e-mail systems that support IMAP4 or POP3 using text-to-speech, as explained in Integrating and e-mail using IMAP4 or POP3.

**Integrating fax and voice mail**

Unified Messaging also supports fax attachments as part of its VPIM standard. You can configure it to:

- Accept faxes from, and deliver them to, any VPIM-compliant fax server
- Work with the Brooktrout Technology Inc. fax solution as a fax mail system

Unified Messaging tells subscribers that they have a fax. They can look at it using the Web or an IMAP4 or POP3 e-mail client, forward it automatically to an SMTP/MIME-compliant e-mail server, or send it to a fax machine.

**Mobile access**

You can also customize Unified Messaging to enable mobile users to receive notification from a paging device, and then access all types of incoming mail from a cellular or ordinary phone. They can listen to voice messages, ask for
faxes to be sent to the nearest local fax machine, and have e-mail messages read to them using text-to-speech.

**Unified Messaging Web and WAP Interface Software Architecture.**

The software architecture that supports the Web and WAP interface is a layered model, and is illustrated in this section.

---

**Unified Messaging Java Interface**

- **Application** (e.g. Web interface JSPs)
- **Application** (e.g. WAP interface JSPs)
- **Unified Messaging Java Interface**
- **IMC_MessageCenterAPI** (custom server)
- **POP3 server**
- **IMAP4 Server**
- **SMTP Server**
- **LDAP Server**

**Figure 10. Web/WAP interface architecture**

**IMC_MessageCenterAPI** is a custom server which acts as an interface to Unified Messaging, and is described in more detail in *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*. This interface is used to manage subscriber settings, and to access Unified Messaging messages.

Unified Messaging messages can be voice, fax or e-mail messages sent to the Subscriber’s telephone. Fax messages are presented as a voice message ("This is a fax message") with the fax as an attached TIFF/F file. E-mails are presented as a voice message with the e-mail body as an ASCII attachment. E-mails are sent out via the SMTP server, the settings of which are obtained from the IMC_MessageCenterAPI custom server.

Depending upon their type, subscribers may have a remote e-mail account which is accessed from either an IMAP4 or POP3-compliant e-mail server.

**IMC_MessageCenterAPI** is also used to access a subscriber’s personal directory, though the architecture also allows access to a remote LDAP server for searching of system-wide and corporate directories. Each subscriber can specify (in their preferences) a different corporate address book.
The Unified Messaging Java interface forms a layer that encapsulates the functionality provided by these different servers. This layer deals with the sockets interface and other low-level concerns.

At the presentation layer, we use Java™ Server Pages (JSP) which invoke the Unified Messaging Java interface methods, and present the data to the client’s Web browser or WAP device.
Chapter 3. Your users and their needs

Before moving on to the planning aspects of the messaging system, the following sections consider what features Unified Messaging offers to its primary users:

- “What Unified Messaging offers subscribers” below
- “What Unified Messaging offers system administrators” on page 54

After describing the facilities available to each of these types of user, we’ll look at the support and education they need.

What Unified Messaging offers subscribers

Unified Messaging subscribers have a wide range of facilities available. Setting up some of them is under the control of the system administrator, but most, however, are under the control of subscribers themselves.

Setting up facilities under the control of the system administrator is described in “What Unified Messaging offers system administrators” on page 54.

Of course, what you can do to control your environment depends primarily on what kind of subscriber you are. As explained in “Subscriber types” on page 10, there are nine different types of subscriber, each with different capabilities. This section provides an overview of what subscribers can do to control their own environment, distinguishing where necessary between the different subscriber types. For full details of the capabilities available to each type of subscriber, see the IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 0,1,2,3,4 and 9) and the IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 5,6,7 and 8).

Managing incoming calls

We now consider the ways in which subscribers can configure their incoming call environment, using the following headings:

- “Setting up greetings”
- “Additional caller options” on page 48
- “Alternative setup for incoming calls” on page 48

Setting up greetings

The greeting that a subscriber creates for callers normally consists of two parts; a greeting header, and the actual greeting message itself. There are up to five types of selectable greeting message available, in addition to an
announcement-only greeting and a "busy" greeting, all of which can be recorded by a subscriber in addition to the greeting header.

The greeting header and greeting message can be played back together. The usual way of setting up greetings is to create the greeting messages as phrases that do not normally require changing (such as “I’m busy now, but please leave a message”, or “I’ve left for the day. If you leave a message, I’ll get back to you tomorrow”), and then update the greeting header each day to assure people that your message is up-to-date. For example, your greeting header could be “Hello. This is Jordan Baker on Monday the third of January, 2000.”

Additional caller options

When a caller rings in, there are some optional functions that a subscriber can make available in addition to just leaving a message, such as:

- Transfer to an attendant
- Transfer to a colleague
- Transfer to a ReachMe number (or a FindMe number in the case of Home or Small Business subscriber types).
- Page the subscriber

To set these up, the subscriber sets the appropriate parameters in the mailbox and informs the caller, in the greeting, of the options that are available. The parameters are defined as special phone numbers and can be updated by the subscriber, either through the Web or the telephone.

Subscribers can also set up a call-forwarding number to which Unified Messaging will try to transfer callers before they hear the subscriber's greeting. If the transfer doesn’t work, the caller hears the subscriber’s greeting and has all the same options as above. This option is also known as the referral number.

Alternative setup for incoming calls

In Unified Messaging, some of the subscriber types have a slightly different greetings structure. Instead of having greetings identified by numbers, these have named greetings which they can record and make active. In addition, they can provide different options to callers, depending on the greeting that the subscriber has active.

Table 3 on page 49 shows the named greetings that are available and the default settings for the options available to callers.
Table 3. Named greetings and associated options

<table>
<thead>
<tr>
<th>Greeting</th>
<th>Leave a message</th>
<th>Pager</th>
<th>ReachMe (or FindMe)</th>
<th>Colleague</th>
<th>Attendant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available and working at the office</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Available, but working away from the office</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unavailable, but accepting messages</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unavailable and not accepting messages</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Left for the day</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>On the phone</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The caller options available for each named greeting can be configured by the system administrator on a system-wide basis. For detailed information about changing the settings, see the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

Managing messages

Most subscribers have some control over how they manage the messages in their mailbox, and how the mailbox itself behaves. This section considers the available options, as follows:

- “Listening to messages”
- “Receiving notification of incoming messages” on page 50
- “Sending messages” on page 52
- “Working with outgoing mail” on page 52
- “Distribution lists” on page 52
- “Other mailbox options” on page 54

Listening to messages

At any time, subscribers can:

- Get an indication of how many new and saved messages are in the mailbox
- Listen to specific voice messages
- Manage their voice mail items

While playing back a message, they can:
• Control the playback: stop, start again, fast forward, or rewind; play the message faster, slower, quieter, or louder
• Delete the message
• Return to the control menu

After the message has been played, they can:
• Save or delete the message
• Control the play sequence: go to the next message, play again
• Get help, return to the main menu
• Call the sender
• Reply by recording a message
• Forward the message to another subscriber, with comments

If your installation supports fax messages, subscribers can also:
• Send the fax to a fax machine as specified in the default fax number mailbox parameter
• Send the fax to a fax machine and enter the number of the fax machine
• Receive the fax on the current call if the subscriber called from a fax machine

**Setting personal preferences for listening to messages:**

Subscribers can set some optional preferences that affect listening to messages:
• New message deletion: whether new messages can or cannot be deleted before you’ve listened to the whole message.
• Automatic saving: whether messages are saved automatically after you’ve listened to them.
• Message headers: whether to play message headers on listening to messages. (Message headers tell you who sent the message, if this information is available, and the date and time the message arrived.)
• Clock: whether to use the 12- or 24-hour format for times.

**Receiving notification of incoming messages**

When a new message is sent into a subscriber’s mailbox, this can be indicated in different ways, depending on how the system interfaces with the telephone switch or PABX, what kind of telephone the subscriber has, or options, such as choosing to get the indication by e-mail. In any organization, some of these options may be mandatory (set by the system administrator), and some optional (under subscriber’s control).
If you want to enable immediate notification in any of the following ways, you need to configure WebSphere Voice Response or Unified Messaging appropriately:

- By telephone message waiting indicator (MWI)
  This is set up and configured by the system administrator; there are no mailbox parameters to control this.

- By e-mail address
  Subscribers must have defined their e-mail address (set by the system administrator or through the Web interface). In addition, there are several remote delivery options:
  - The remote delivery address (set by the system administrator or through the Web interface)
  - The message delivery preference, which can be set as follows:
    - Keep message locally; do not forward it to e-mail
    - Keep message locally; forward a copy to e-mail
    - Do not keep message locally; forward it to e-mail
  - The remote voice type (such as .wav, .au)

Both immediate notification methods above are provided by default. You can also link to paging or SMS devices for this form of notification.

**Notification schedules:**

For schedule-based notification, subscribers can control how they get notified about messages. By setting up optional notification schedules, they can define how, when, and where they get notification. Some of these may depend on how the system interfaces with the telephone switch or PABX, whether the subscriber has a pager or SMS indication on their cell-phone, or whether they want a particular telephone number to be called.

Subscribers can set up four different notification schedules, with values for aspects such as:

- The time period of the schedule
- The days when the schedule is active
- The telephone or paging number
- The type of number (telephone, pager, SMS)
- The pager reference number
- What level of messages is to be notified (emergency, urgent, or all)
- One temporary notification schedule that overrides all others

The schedules can be reviewed, and can be turned on or off.
Sending messages

Assuming that the system is set up with voice messaging (for the mailbox to support sending messages to other mailbox subscribers), subscribers can select another subscriber to whom they want to send the message, either by:

- Keying in the number or extension of the subscriber, or
- Keying in the digit name of the subscriber (using the letters on the phone keypad)

After recording the message, the subscriber can:

- Send the message
- Review and rerecord the message
- Add to the beginning or end of the message
- Set the date of delivery (future delivery)
- Specify the privacy and urgency levels
- Specify whether the message is to be acknowledged
- Cancel the message

If the subscriber has recorded an audio name, Unified Messaging plays it back when the message is received. For ease of communication, subscribers should normally record audio names.

Working with outgoing mail

Assuming again that the system is set up with voice messaging, subscribers can work with their outgoing mail: messages recorded and sent, but not yet received by the recipient subscriber.

While listening to their list of outgoing mail, subscribers can:

- Listen to the header of the message
- Listen to the message
- Delete (cancel sending) the message
- Go to the next message

Distribution lists

To send the same message to several people, you need to set up a distribution list. This is a list of the recipients' telephone numbers and is identified by a number (ID) that you can enter using the telephone keypad. A distribution list cannot contain the IDs of other distribution lists.
Distribution lists are available only to Corporate, Small Business, and Enterprise subscribers. Once again, for the mailbox to support sending messages to users in a distribution list, the system must be configured with voice messaging.

Subscribers can create, work with, review, and delete distribution lists, as shown in Figure 11. To create a new distribution list, enter a number not currently in use and click **Create new distribution list**. To work with an existing list, click on the list number.

![Distribution Lists Web page](image)

**Figure 11. The Web page for maintaining distribution lists**

You can find more detailed information about using distribution lists in the *IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 5,6,7 and 8)* book.

**Maintaining a personal directory of addresses**

The following types of subscribers can maintain a personal directory of people that they regularly contact:

- Business - local and remote
- Remote e-mail only
You can maintain a personal directory using a Web browser or a WAP device. Figure 12 shows the sort of Web page you would see.

![Figure 12. The Web page for maintaining a personal address book](image)

**Other mailbox options**

Other mailbox features include the ability of subscribers to:
- Change their PIN
- Choose whether to use bilingual greetings
- Select normal (detailed) or expert (terse) prompt level

**Searching LDAP Servers**

Business - local and remote and Remote e-mail only subscribers can use LDAP servers when filtering their e-mail messages. They can use either a system-wide server, or they can specify a particular LDAP server to use via the WWW preferences page.

**What Unified Messaging offers system administrators**

Unified Messaging uses the voice messaging support in the base WebSphere Voice Response product, so you can use the WebSphere Voice Response interfaces to manage the voice messaging part of Unified Messaging. However, to manage the advanced capabilities of Unified Messaging that
make it a unified messaging system, you should use the Unified Messaging Interface Tool or other Unified Messaging utilities.

In all, the administrator of a Unified Messaging system will probably use:
- The X-windows menu interface of the WebSphere Voice Response base product
- The ASCII console interface of the WebSphere Voice Response base product
- The command-line utilities of the WebSphere Voice Response base product
- Other interfaces of the WebSphere Voice Response base product, such as SNMP
- The Message Center interface tool
- The special Unified Messaging utilities

As an authorized system administrator, you can:
- Set up different partitions for different businesses, or parts of your business
- Place each subscriber, or groups of subscribers, into one of the nine subscriber types:

<table>
<thead>
<tr>
<th>Subscriber Type</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Standard</td>
</tr>
<tr>
<td>1</td>
<td>Business - local and remote</td>
</tr>
<tr>
<td>2</td>
<td>Business - local</td>
</tr>
<tr>
<td>3</td>
<td>Residential</td>
</tr>
<tr>
<td>4</td>
<td>Remote e-mail only</td>
</tr>
<tr>
<td>5</td>
<td>Corporate</td>
</tr>
<tr>
<td>6</td>
<td>Home</td>
</tr>
<tr>
<td>7</td>
<td>Small Business</td>
</tr>
<tr>
<td>8</td>
<td>Enterprise</td>
</tr>
</tbody>
</table>

- Delegate day-to-day tasks to *partition administrators*. These administrators can add, delete, and change subscribers belonging to the partition that they manage.
- Specify the number of invalid PIN attempts, after which the call is dropped and the mailbox is locked until you unlock it.
- Broadcast messages to every mailbox on the system, or arrange for others to do so. You can also create an exclusion file of mailboxes that should not receive the broadcast.
• Create a standard banner message to be played to all subscribers who call in to Unified Messaging. A banner message can similarly be played to all callers before the greeting selected by the subscriber (for example “Please note that today is a public holiday”).

• Create shared distribution lists for the convenience of all subscribers.

• Build distribution lists from an external data base, using a custom server that can convert a standard ASCII file into a Unified Messaging distribution list.

• Update any field in a WebSphere Voice Response application profile from a command-line interface.

• Enforce a change of PIN for each subscriber after a specified period. Unified Messaging also includes an exit in which you can specify location PIN rules and have new PINs checked for conformance. Whether or not you use the exit, Unified Messaging checks that a new PIN is not the same as the current PIN.

• Move a subscriber, with all messages, greetings and so on, from one telephone number to another, or from one Unified Messaging system to another, or both. Batch moves are also possible, based on a list of subscribers to be moved.

• Configure Unified Messaging as a telephony portal which would use an LDAP server for all subscriber information needed and store and retrieve messages from an IMAP4 or POP3-compliant e-mail server.

For a complete description of what you can do, and how to do it, see the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

**Customizing Unified Messaging**

If Unified Messaging does not suit your requirements exactly, you can customize it, following instructions in the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide. This section summarizes the main areas you can customize.

All menus comply with International Standards Organization (ISO/IEC Draft International Standard 13714). The standard requires the use of a control function available on the * key.

In addition, the flexible menu structure allows you to assign:
- Any function to any menu
- Any DTMF key to any function on any menu

You can enforce one or more of the following when a new subscriber first calls in:
- The subscriber must change the PIN
- The subscriber must record an audio name
The subscriber must record and select a greeting.

You can provide three different logon methods:
- Prompt for mailbox number and PIN.
- Use the mailbox number passed from another application and prompt for the PIN only.
- Use both the mailbox number and the PIN passed from another application that has already done its own authorization.

If the switch supports logging-on to the telephone with a security code, or the users are Residential subscribers or mobile phone users who need no further authorization other than having called from their own phone, you can allow subscribers to access their mail without entering a mailbox number or PIN.

You can customize the help that is available on all menus, and you can assign any single key to access it from each menu (if the ISO-compliant key combination *0 is unacceptable).

You can customize Unified Messaging to provide:
- Message notification, using the message waiting indicator if your switch supports this
- Statistics and accounting

You can use custom servers to provide external interfaces to:
- Electronic mail (e-mail) and fax
- Pager notification applications
- Other applications, such as accounting systems

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**Support and education**

Before implementing Unified Messaging, you need to plan for:
- Supporting the users
- Educating the users
- Planning for IBM support
- Educating the system implementer

**Supporting the users**

In a small organization, one system administrator may be able to provide day-to-day subscriber administration, as well as being the help line. In a larger organization, you may need more system administrators and a specialized help line.
Unified Messaging can be managed from a graphical display, using X-windows menu interfaces, or from an ASCII display, using ASCII menu interfaces and some additional command-line utilities. You can use either of these methods or both. You should decide which interface, graphical or ASCII, the system administrators are going to use, and whether you need to order additional graphical displays for them. See Websphere Voice Response for AIX: General Information and Planning for more information.

**Educating the users**

If you have decided to implement Unified Messaging in a large organization, you can start planning the documentation and education necessary for subscribers, and, in some cases, callers.

1. Decide what type of documentation and training you need and who is to develop and print the documentation and training materials:
   - Consider whether the documentation and training should be separate from, or integrated with, other telephone-related or systems-related documentation and training.
   - Consider the management guidance you ought to include. Does your organization have a telephone-use policy? Is there a recommended greeting format that subscribers should use? Do you need to develop such a policy if voice messaging is new in your organization?
   - Consider using the Subscriber’s Guides, IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 0,1,2,3,4 and 9) and IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 5,6,7 and 8), and the appropriate Quick Reference cards as the basis for your own guide for users. By tailoring the relevant information for the subscriber types in your organization, you can create your own personalized set of Unified Messaging information.

2. Decide whether you need to inform regular callers about the voice messaging system by producing a leaflet or card, or leave it to subscribers to inform callers on an informal basis.

3. In a large organization, run a ‘teach the teachers’ course.

4. Develop and run education sessions for your subscribers, and possibly for staff running a help line. Make sure that you provide education at the right time: before implementation, but not too long before. Back up the education by providing documentation to take away.

**Planning for IBM support**

Nominate a single point of contact for support. This person should know what information to give when calling for help. See “Before you call IBM support” in Websphere Voice Response for AIX: Problem Determination.
You should also plan to provide a fast modem or a TCP/IP link so that you can send files to and receive files from IBM Support.

**Backing up your system**

You should back up information on your Unified Messaging system on a regular basis. For information about what to back up and how to do it, see the *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*. 
Chapter 4. Planning for Unified Messaging

This chapter is for the person responsible for implementing Unified Messaging. Implementing Unified Messaging involves installing the voice application, and then integrating it with your telephone system and defining mailboxes for users. If the supplied application does not meet your requirements exactly, you can customize it. To understand the information in this chapter, you need to know rather more about WebSphere Voice Response, AIX, and telephony than you do for the rest of this book.

Before you start to install, integrate, and customize Unified Messaging, you need to consider:

- Whether to run Unified Messaging on a standalone or single system image (SSI) WebSphere Voice Response system
- The hardware and software requirements associated with the Unified Messaging options (Fax, E-mail and Text-to-Speech)
- Requirements for Web access
- Requirements for WAP access
- The telephony environment and the capabilities of the switch
- The capacity of your Unified Messaging system

We deal with the system setup first, starting with "Standalone or single-system image (SSI)?" on page 62 below. Then we look at the telephony environment in "Capabilities of the switch" on page 76. This is followed by "Unified Messaging system planning" on page 82.

Note:

1. Above all other requirements, Unified Messaging requires a particular base level of WebSphere Voice Response:
   - IBM WebSphere Voice Response Version 4.2 or Version 6.1

2. If you are an existing user of IBM DirectTalkMail or Message Center, you’ll want to know about migrating to IBM Unified Messaging. "Migrating to IBM Unified Messaging for WebSphere Voice Response" on page 85 gives an overview; you’ll find detailed information in the installation chapter of the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.
Standalone or single system image (SSI)?

Whether you use Unified Messaging in a standalone or SSI environment depends on your system setup, and your requirements for voice messaging services.

In this section, we describe standalone and SSI systems, then discuss what you should consider when choosing the appropriate setup for your requirements.

A standalone WebSphere Voice Response system

A standalone WebSphere Voice Response system has WebSphere Voice Response, the telephony connection, the application data, and the voice mailboxes and messages all installed on the same IBM System p, or BladeCenter computer. If you want to create an additional system, you must install all these items on a new standalone system. Figure 13 shows a standalone WebSphere Voice Response system. The system is not connected to any other WebSphere Voice Response systems. The data it uses, both application data and voice mailboxes and messages, is stored on the same IBM System p, or BladeCenter computer as WebSphere Voice Response.

A single system image (SSI) WebSphere Voice Response system

You can connect together a cluster of WebSphere Voice Response systems using a local area network. All the systems can then share all the application data in the cluster (such as state tables and custom servers) and all the voice data (such as voice segments and voice messages). When the systems are connected in this way, you can install Unified Messaging server option on the server system in the cluster. It is then available on all the systems that have
the client option installed. Any changes you make on the server system are automatically reflected on the client systems. This means that, as your business grows, you can add more systems with little additional work.

The cluster of WebSphere Voice Response systems is known as a Single System Image (SSI).

You’ll find a detailed description of SSI systems in *WebSphere Voice Response for AIX: General Information and Planning*. The rest of this section provides an overview of SSI systems, and points you to detailed information on migrating to an SSI system in the *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*.

**Systems in an SSI cluster**

Each system in an SSI cluster is known as a *node*. Each node is configured either as a client or as a server:

**Client node**

A client node handles the interactions with callers. It runs WebSphere Voice Response (configured as a client), and it must be connected to your telephony environment. A client node contains no application data: it gets this from the server, to which it is connected by a local area network.

**Database server node**

The database server node contains the application object database. This is a DB2 database that contains all the state tables and prompts that all the WebSphere Voice Response systems in the SSI can use, together with information about the custom servers that are installed. The server node has WebSphere Voice Response installed, configured as a server. You can add a connection to your telephony environment, if you want the server node to handle interactions with some callers.

This is the node where applications, mailboxes, and all data about the mailboxes are stored.

**Voice server node**

A voice server node contains the voice data for all the voice applications that run on the SSI. It also contains the program files for the custom servers that are installed on the SSI. The node stores its information in an AIX file system. This node need not have WebSphere Voice Response installed, unless you want it to handle interactions with some callers; in this case, the node must also have a connection to your telephony environment.

This is the node where voice messages are stored.
The database server and the voice server will usually be the same IBM System p, or BladeCenter computer, but you can install them on two separate systems if you are creating a large SSI and you want to spread the processing load across two IBM System p, or BladeCenter computers. Note that under the terms of the license for DB2, when supplied with WebSphere Voice Response, DB2 must be installed on the same workstation as the WebSphere Voice Response software, and must not be used with any other applications.

The nodes of a SSI must be connected together using a local area network. The type of network you use depends on the size of the voice solution you are implementing. For a large cluster, such as that needed for a voice messaging service, you might require a network providing high capacity and performance, such as an asynchronous transfer mode (ATM) network.

**Examples of SSI systems**

Figure 14 shows a small SSI. Each of the clients has 4 trunks of telephony, and the server has two trunks installed. However, you do not have to install telephony components on the server. The SSI shown in the figure is suitable for running a medium-sized voice messaging service.

Figure 15 on page 65 shows a larger SSI. This configuration has more clients installed and there are no telephony components on the server. This
configuration is suitable for a large voice messaging system, and it is likely that the server will perform no functions other than to serve the WebSphere Voice Response single system image.

A system such as that shown in Figure 15 lets subscribers and callers access mailboxes from any client.

You’ll find a general description of migrating to a single system image in “Migrating to a single system image” on page 86. For a detailed description of how to do it, see the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide.

Choosing what’s appropriate for you

Whether you decide to use the single system image architecture available in WebSphere Voice Response depends on several factors:

Critical Business Operations

For critical business operations, the impact caused by the loss of voice mail through loss of power, flood, or other major disaster, could be offset by causing a network of standalone systems communicating with each other using VPIM or DTM-D, for example. A disaster on one system will still allow subscribers of other systems to retrieve their mail. Furthermore, if calls for the unavailable system can be rerouted, callers might still be able to leave messages for subscribers on that system. The mail could be stored as VPIM messages until the unavailable system comes up again.
In a single system image cluster, a single system image client can fail, while the cluster remains operational. However, the single system image server still provides a central point of failure unless you protect it from such a central failure using IBM’s High Availability Cluster Multiprocessing (HACMP/ES) or other high availability strategies.

Size of your system
If your system is intended only for a few hundred users, or you estimate that traffic will never reach or exceed the number of lines that you can install on a standalone system, you may not be interested in a single system image cluster.

However, if traffic is likely to reach or exceed the number of lines that you can install on a standalone system, or your system is intended for many thousands of users, you are likely to need a single system image just to cope with the traffic, and are likely to benefit from the improved performance that the distribution of processing in a single system image cluster provides.

Ease of maintaining and upgrading your system
In a single system image cluster, the client nodes can often be upgraded with fixes without severely impacting your callers, as other client nodes are still available to take calls. (The instructions on the PTF package will tell you if this is possible for that PTF.)

Similarly, you can remove client nodes or add new ones while other client nodes are still running and taking calls. This gives you more flexibility and control over maintaining and upgrading your systems than is possible on standalone systems.

Specialized functions on different systems
Your decision between standalone and SSI might depend on whether you want to provide different functions to different users. For example, if you want to provide fax capabilities to only some of your subscribers, it may be economical to run a standalone system with the fax capabilities rather than install the fax hardware and software on all client nodes in a single system image cluster.

If you have a single system image it is best to make all client nodes as similar to each other as possible in terms of their installed hardware and software. This avoids the situation of services available on one client node being unavailable on another.

Cost of your system
A single system image cluster contains more hardware and software, and is therefore a more expensive option than a standalone system.

High Availability Cluster Multiprocessing
Unified Messaging can be deployed in an HACMP/ES configuration. If high availability for all callers and subscribers is essential, a single
system image cluster with an HACMP/ES server may provide your best insurance against failure. This configuration will have a redundant SSI data base server to take over the shared voice application and voice database for improved system redundancy. See the Websphere Voice Response for AIX: General Information and Planning for more information, and then contact your IBM representative if you are interested in configuring HACMP/ES on your WebSphere Voice Response single system image server.

Unified Messaging options and their requirements

You order Unified Messaging (and receive a license for using it) according to the total number of mailboxes you need. You can also select the level of function you want for each mailbox from the following list:

1. Messaging mailbox (the basic version of Unified Messaging)
2. Fax mailbox enablement (adds fax handling)
3. e-mail mailbox enablement (adds IMAP4 and POP3-compliant e-mail handling)

For each fax or e-mail option you want, you need a messaging mailbox.

The table that follows summarizes the mailbox solutions you can set up using Unified Messaging. The first two rows show the basic solutions - those where all messages are stored in the Unified Messaging database. In the advanced solutions that follow, some of the messages may be stored in the Unified Messaging messaging database, while others may be stored on an e-mail server.

<table>
<thead>
<tr>
<th>Solution Needed</th>
<th>Messaging Mailbox?</th>
<th>Fax mailbox option?</th>
<th>Fax server?</th>
<th>e-mail mailbox option?</th>
<th>e-mail server?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic voice mail or voice messaging</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Basic voice mail or voice messaging</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>with fax</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voice messaging with SMTP/MIME e-mail integration.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Voice messaging and fax with SMTP/MIME e-mail integration.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 4. Unified Messaging solutions (continued)

<table>
<thead>
<tr>
<th>Solution Needed</th>
<th>Messaging Mailbox?</th>
<th>Fax mailbox option?</th>
<th>Fax server?</th>
<th>e-mail mailbox option?</th>
<th>e-mail server?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unified messaging using IMAP4 or POP3 protocol between Unified Messaging and e-mail.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Unified messaging, including fax, using IMAP4 or POP3 protocols between Unified Messaging and e-mail.</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

What you need with Fax mailbox enablement

If you choose to purchase Fax mailbox enablement, you’ll also need a fax server solution that supports sending and receiving faxes in .TIFF/F format. You can:

- Customize a fax server to work with Unified Messaging. (Refer to your IBM representative or business partner, for further information).
- Use the fax processing adapter card, firmware, BTBIOS, Bfv interface layer and associated software and drivers supplied by Brooktrout Technology Inc. You can use this solution without customizing the fax server.

Figure 16 on page 69 shows the kind of setup you need when using a fax server either with a local fax server or with a remote server connected through a LAN. Note fax operations are not currently supported when using VoIP.
Figure 17 on page 70 shows the kind of setup you need when using an integral fax server with the DSP Resource Adapter.
For a detailed account of using fax, see the chapter “Fax applications” in *WebSphere Voice Response for AIX: Designing and Managing State Table Applications*.

For information on restrictions on the use of adapters with Fax mailbox enablement, see "Adapters supported with the Fax mailbox option" below. For further details on the pricing or specification of the Fax Server services offering contact your IBM representative.

### Adapters supported with the Fax mailbox option

IBM offers a fax solution incorporating a fax card manufactured by Brooktrout Technology Inc. which can be integrated into Unified Messaging without any user programming. IBM supplies the custom server, state tables and all other Direct Talk components required to support the use of the Brooktrout fax server solution for faxes in .TIFF/F format.

**What you need with e-mail mailbox enablement**

If you want to use Unified Messaging to process e-mails, you need to set your system up accordingly:
• If you’re using Voice Protocol for Internet Mail (VPIM), you need a Simple Mail Transfer Protocol/Multipurpose Internet Mail Extensions (SMTP/MIME) server. See “SMTP/MIME and VPIM” on page 40 for an introduction to setting this up.

• If you’re using IMAP4, you need to set up two links:
  – From the IMAP4 client to Unified Messaging so that subscribers can access voice and fax and manage their messages
  – From the client to a remote IMAP4-compliant e-mail server so that subscribers can access their e-mail

You might also need a RealAudio encoder; see the IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide for information on obtaining one and setting it up.

Figure 18 shows the setup for e-mail, fax, and voice mail retrieval and management controlled by an IMAP4 e-mail client.

Figure 18. IMAP4 e-mail client setup

Figure 19 on page 72 shows the IMAP4 e-mail server setup for e-mail retrieval and management controlled by telephone and Web interfaces.
Text-to-Speech

Text-to-Speech (TTS) conversion may be deployed with Unified Messaging to convert e-mail information to speech which can be heard over the telephone. Consult your IBM representative for further information.

Setting up Web access to Unified Messaging

If you want to provide your subscribers with a visual user interface to Unified Messaging, using a Web browser (IE 6.0 is recommended), then the Unified Messaging Web interface must be deployed on a web application server that is compliant with J2EE 1.3 or later.

If your web server is on a different system from that running Unified Messaging (which is recommended for best performance) then the two systems must be connected by TCP/IP. All the files required to set up the Unified Messaging Web interface are contained in

/$CUR_DIR/Web_Interface/IMC_Web_Interface.war

which is located on the workstation on which Unified Messaging was installed.

Setting up WAP access to Unified Messaging

To be able to provide your subscribers with a WAP interface to Unified Messaging, you need to satisfy the following:

- Your Web application server must support J2EE 1.3 and WML 1.2
- Your Web server must be connected to a WAP gateway via a TCP/IP connection
The Unified Messaging telephony environment

This section describes how Unified Messaging with WebSphere Voice Response can be configured to receive calls from either PSTN or Voice over IP networks.

Prior to the Version 4.2 release of WebSphere Voice Response, the only way in which Unified Messaging could receive and make telephone calls was via "digital telephony trunks", that is, T1 or E1 connections. This was done using PCI cards such as the DTXA and DTTA which each supported 96 (T1) or 120 (E1) channels of digital telephony. This type of digital telephony is usually referred to as Time Division Multiplexed (TDM) PSTN.

The WebSphere Voice Response Version 4.2 release now supports the ability for Unified Messaging to receive (and make) telephone calls via a standard Ethernet IP connection using a signaling protocol known as Session Initiation Protocol (SIP).

For standard (non Voice over IP) digital telephony calls using E1 or T1, the connection to the network (see Figure 20 on page 74) can be achieved in a number of ways:

- For Enterprise customers, directly to a local Private Branch Exchange (PBX) or Automatic Call Distribution (ACD).
- For Enterprise customers, directly to a Network via a Telco provided interface, such as ISDN.
- For Telco (Service Provider customers) within the network directly to the Central Office switch or using a network interface such as SS7 or ISDN.
With Voice over IP, the situation is more complicated in that networks may have a mixture of traditional PSTN/TDM and newer Voice over IP equipment, as shown in Figure 21 on page 75.

For example, you may be an Enterprise customer who has implemented a Voice over IP strategy and require WebSphere Voice Response and/or WebSphere Voice Response with Unified Messaging to attach to a VoIP network on your premises and then connect to a Telco network, or your own PBX, in a traditional T1/E1 connection. In this case, WebSphere Voice Response VoIP support will be used to connect to your network and a gateway will act as the bridge between the worlds of traditional and VoIP Telephony.

Callers in your network will either use standard telephones connected to the PBX or they could be using SIP ‘hardphones’ or ‘softphones’ connected to the VoIP network.

**Note:** Softphones are a way of converting a PC into a phone using some software, a headset and a network attachment.
A SIP proxy may be used within the VoIP network to keep track of user 'registrations' and route calls to the correct person regardless of where they are located within the VoIP network.

If you are a Telco customer looking to add Unified Messaging to an existing network you can either do this using:

1. Direct TDM connection to TDM network (standard Unified Messaging configuration)
2. Indirect VoIP connection to TDM network via gateway (see Figure 21)
3. Direct VoIP connection to VoIP network.

**VoIP and Unified Messaging**

Unified Messaging references subscribers using a 15 character numeric ID (the profile) which very often is directly equivalent to a telephone number. With SIP, telephone numbers are replaced with IP Uniform Resource Locators (URLs), for example, andy@acme.com. This information is sent to the SIP endpoint using 'TO' and 'FROM' headers in the SIP 'INVITE' message (which correspond to telephony called and calling party numbers).

WebSphere Voice Response SIP support removes these headers and passes them to the application where they can be analysed and, if necessary, translated into an numeric profile from where they can be used by Unified Messaging. For Unified Messaging, the incoming call state table can be changed to do this in a way specific to your system.
An alternative way of working with SIP is to use a numbering scheme where the user part of the URL is numeric, for example, 5125551234@acme.com (a proxy server within the VoIP network can be used to do the mapping between user name and number). In this case, WebSphere Voice Response SIP support will remove the numeric URL user parts, 5125551234 in the above example, and insert them directly into the called and calling party numbers such that Unified Messaging can be used ‘out of the box’ without modifications.

The *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide* provides details of the implementation of VoIP using SIP.

### Planning and configuring the telephony environment

Because WebSphere Voice Response works with a large variety of telephone switches and telephony protocols, it's important that you configure it to work correctly in your telephony environment.

To help you configure WebSphere Voice Response to work correctly in your telephony environment, fill in the “Planning Checklist” in *Websphere Voice Response for AIX: General Information and Planning*.

When you have installed WebSphere Voice Response, use *Websphere Voice Response for AIX: Configuring the System* to configure the telephony environment accordingly. In most cases, you need enter only your country name and switch type and all the other configuration parameters are set automatically. In some cases, you may need to consult a switch specialist for advice.

### Capabilities of the switch

The capabilities of the telephone switch determine:

- How to identify the caller
- How to identify the correct mailbox
- How to provide sign-on to Unified Messaging
- How to provide call transfer
- How to provide message waiting indication

For an overview of telephony concepts, see *Websphere Voice Response for AIX: Configuring the System*.

### How to identify the caller

The *calling number* is used to identify a caller who leaves a message. If callers are also subscribers, with a mailboxes of their own, their audio names are inserted into the message header, so that the recipient knows who left the
message. The audio name specially recorded for external callers ("an external caller") is used for any unknown callers.

In a transaction-related voice message, the transaction identifier should be passed to Unified Messaging instead of the calling number.

**How to identify the correct mailbox**

The called number is fundamental to the operation of Unified Messaging. This is the number that identifies each mailbox. It’s known as the called number because, in a direct inward dialing (DID) system, it is convenient to use the number that callers dial to reach each subscriber.

Typically, a caller dials a subscriber’s phone number and either the subscriber answers the call or Unified Messaging answers it instead. When Unified Messaging answers, it uses the called number to identify the mailbox assigned to the subscriber. See [Figure 22 on page 78](#) which shows how DID is handled. The mailbox is defined to WebSphere Voice Response by an application profile with the subscriber’s phone number as the profile ID.

**Using the called number to identify the mailbox**

If your WebSphere Voice Response system is integrated with your telephone switch through an exchange data link, or you are using CallPath, the called number can be passed directly from the switch to Unified Messaging. If you are operating in a Voice over IP (using SIP) environment, the called number will be extracted from the 'To' URI. Refer to the SIP section in the installation chapter of IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide for details.

A voice bridge is a device that connects the telephone switch to WebSphere Voice Response. It communicates with the switch using special protocols known to the switch, and simulates a standard exchange data link to WebSphere Voice Response. From the point of view of Unified Messaging the voice bridge is identical to an exchange data link.

If there is a data link to your switch that is not currently supported by WebSphere Voice Response, you can write your own signalling process to support it. The signalling process is implemented as a custom server, written using C language subroutines. See Websphere Voice Response for AIX: Programming for the Signaling Interface for details.
Asking the caller to identify the mailbox

If direct inward dialing (DID) is not available or if, for some other reason, the called number cannot automatically be passed from the switch to Unified Messaging, callers must be asked to identify the subscribers required:

- Your switchboard operator can pass an incoming call to Unified Messaging. Just before call transfer, the operator can supply the called number to Unified Messaging using Dual Tone Multi-Frequency (DTMF) tones.
- An auto-attendant voice application can answer incoming calls and ask the caller for the number they want. If the auto-attendant is unable to connect the caller to that number, it passes the called number to Unified Messaging, which plays the subscriber’s greeting. See Figure 23 on page 79 which shows how a caller reaches a subscriber’s mailbox using an auto-attendant Unified Messaging includes a sample auto-attendant that you can use unchanged or customize to match your requirements.

The supplied auto-attendant asks for the called number (the mailbox number) and calling number, but you can easily change it to ask only for the mailbox number.
Mixing DID and auto-attendant

You can mix the two ways of identifying the mailbox. If you can’t get the called number when the call origin is external, because you don’t have DID, but you can get the called number when the call origin is internal, you can have two startup state tables, as shown in Figure 24 on page 80.

Figure 23. A caller reaches a subscriber’s mailbox using an auto-attendant

Mixing DID and auto-attendant
Integrated transaction and voice messaging application

In an integrated transaction and voice messaging application, the called number can be any number that identifies a mailbox; it need not be an actual phone number. The calling application supplies the called number. For example, a banking application might have different numbers for recording:

- Change-of-address
- Complaints
- Special instructions
- Personal messages for the manager

The application passes the number to Unified Messaging, which stores the message in the associated mailbox.

How to provide sign-on to Unified Messaging

To sign on to Unified Messaging in a direct inward dialing (DID) system, subscribers dial the phone number allocated to Unified Messaging itself. There is an application profile with Unified Messaging’s phone number as the profile ID.

If direct inward dialing is not available or if, for some other reason, the called number cannot automatically be passed from the switch to Unified Messaging, subscribers must specify that they want to sign on to Unified Messaging by some other means: either by speaking to an operator or by interacting with an auto-attendant.
How to provide call transfer

The following functions depend on the use of some form of call transfer:

• Transferring out of a greeting to the operator, the subscriber’s assistant number, or to another telephone number
• Calling the sender of a message
• Forwarding incoming calls to another number
• Explicitly transferring to another telephone number

The ability to transfer can be provided either by the switch to which WebSphere Voice Response is connected, or by WebSphere Voice Response ability to trombone calls. Tromboning calls means connecting the voice channel of an inbound call with the voice channel of an outbound call. Tromboning is the only supported method of transfer on a Voice over IP (SIP) network.

Using WebSphere Voice Response trombone capability lets Unified Messaging provide more flexibility in what happens after a transfer. The caller can transfer a call, then optionally return to exactly where they were in the Unified Messaging menus when the call transfer finishes. This can be particularly useful for a subscriber who, while working with messages, wants to speak to the sender of a message and then return to working with the rest of the messages.

If you want to use the trombone feature, it is important to bear in mind that, when the call is transferred, and throughout the entire call, two WebSphere Voice Response channels are in use. (In a switch transfer, the single channel performing the transfer is released). This can increase the use of WebSphere Voice Response channels considerably, and you may need many more WebSphere Voice Response channels to support your Unified Messaging installation.

How to provide message waiting indication

The method of providing message waiting indication (MWI) can vary from switch to switch. WebSphere Voice Response can set message waiting: to enable this, set the MWI Automatically Set system parameter in the Exchange Data Link parameter group. For information on WebSphere Voice Response system parameters see Websphere Voice Response for AIX: Configuring the System. Alternatively, you can customize your Unified Messaging system to provide message waiting indications for your local environment. Some options are:

• Message-waiting light or special dial tone on a telephone handset, set by dialing a feature code
• Interface to an e-mail system
• Interface to alphanumeric or tone pager

Additional data can be provided with some forms of MWI. For example, an e-mail note or a pager message might contain a summary of the number of new and saved messages in the subscriber’s voice mailbox.

You should have a clear plan for how MWI will be achieved in your environment before installing Unified Messaging.

### Unified Messaging system planning

This section deals with various aspects of planning for a Unified Messaging system:

- “Unified Messaging capacity planning”
- “Calculating the telephony traffic” on page 83
- “Checking your system setup” on page 84
- “Migrating to IBM Unified Messaging for WebSphere Voice Response” on page 85
- “Migrating to a single system image” on page 86

### Unified Messaging capacity planning

The following questions help you to estimate the capacity of your Unified Messaging system. If you are also planning for text-to-speech and Web interface access, then a more detailed sizing needs to be taken. Contact your IBM Sales Representative for further assistance. You need to consider the following:

#### On the Unified Messaging system

How many subscriber mailboxes do you need?

What’s the maximum number of messages that the mailboxes can store (the maximum messages per mailbox multiplied by the number of mailboxes)?

Is Unified Messaging the only application running on the WebSphere Voice Response system?

If not, what percentage of the calls are for Unified Messaging?

What percentage of calls are voice mail and what percentage of calls are text-to-speech calls?
For each Unified Messaging subscriber, what is the...

Average number of voice, fax and e-mail messages present in the mailbox at any time?

Average length, in seconds, of voice mail messages?

Average number of calls made by subscribers per day into the mailbox?

Average amount of time, in seconds, that a subscriber spends accessing the mailbox? This includes navigating round the menus as well as listening to messages, sending faxes to be printed, and so on.

Proportion of incoming calls handled in the busiest hour of the working day (the busy hour)? This refers to subscribers accessing their mailboxes.

Maximum blocking rate of subscriber calls in the busy hour? (The percentage of subscribers who get the busy tone.)

For Unified Messaging callers, what is the...

Average number of callers per day to the mailbox?

Average duration of each call? This is the average of people actually leaving a message and those who listen only to the initial voice mail message.

Proportion of callers who ring up during the busy hour?

Maximum blocking rate of caller calls in the busy hour? (The percentage of callers who get the busy tone.)

With this information you can calculate the telephony traffic and the maximum storage needed for the whole system, as described in “Calculating the telephony traffic” below.

Calculating the telephony traffic

To calculate the telephony traffic, refer to the Websphere Voice Response for AIX: General Information and Planning section on “Estimating telephony traffic”. You need two parameters:

\[ c \] the number of busy hour calls

\[ t \] the length of each call in seconds

The traffic in erlangs is \((c \times t) / 3600\).

You’ll find the erlang lookup tables in the “Estimating Telephony Traffic” section of Websphere Voice Response for AIX: General Information and Planning.
**Subscriber traffic**

For subscriber traffic:

\[ c \] is the average number of calls made by subscribers per day, multiplied by the proportion of incoming calls handled in the busy hour, multiplied by the total number of mailboxes.

\[ t \] is the average amount of time, in seconds, that subscribers spend accessing their mailboxes.

For example, for a voice messaging system with a total of 10 000 mailboxes, where there is an average of 3 queries per day to a mailbox, and 20% of the queries are during the busy hour:

\[ c = 3 \times 0.2 \times 10000 = 6000 \]

If the average time spent accessing the mailbox is 60 seconds, \( t = 60 \), so:

\[ \text{erlangs} = \frac{(6000 \times 60)}{3600} = 100 \]

**Caller traffic**

For caller traffic:

\[ c \] is the average number of callers per day to the mailbox, multiplied by the proportion of callers who ring during the busy hour, multiplied by the total number of mailboxes.

\[ t \] is the average amount of time, in seconds, that a caller spends leaving a message in the mailbox.

**Calculating the total number of channels you need**

The total number of channels required is:

- The number of channels required for the subscriber traffic at the blocking rate specified for subscriber calls, plus
- the number of channels required for the caller traffic at the blocking rate specified for caller calls.

**Checking your system setup**

Apart from the capacity of your Unified Messaging system, there are some basic things that you need to check before considering installing Unified Messaging:

**Do you have the appropriate IBM System p, or BladeCenter computer?**

Consult your IBM representative to agree the type of machines best suited to your environment, and the number of these machines required to handle the number of mailboxes and channels you need.
How much disk space do you need?

Determine the amount of disk space required on the IBM System p, or BladeCenter computers:

1. *Websphere Voice Response for AIX: Installation* tells you how to calculate the space required for WebSphere Voice Response and other associated licensed programs. For the Unified Messaging system and its files, you need at least an additional 50 megabytes.

2. Determine the space needed for voice messages by estimating the average number of messages per mailbox and the average length of a message. The messages, together with the greetings and audio names recorded by subscribers, are stored as *compressed voice data*. Each second of voice data occupies 1600 bytes. This means that you need 5 760 000 bytes to store an hour of voice data.

For example:

- 1200 subscribers, with an average of four messages each and an average message length of 30 seconds, have a total of 40 hours of voice data, which requires 230MB of storage space.

3. Although the average number of voice messages calculated in step 2 above may give a guideline for the minimum storage requirements, you will need, in addition, at least enough storage space for a day’s worth of new messages. If in doubt, try to allow too much rather than hope that the minimum will be enough.

Refer to *Websphere Voice Response for AIX: General Information and Planning* in the “Memory and storage planning” section for more information.

What level of WebSphere Voice Response telephone connectivity do you need? Refer to *Websphere Voice Response for AIX: General Information and Planning* for the checklist on “Telephony connectivity”.

What other voice applications will you use?

Refer to *Websphere Voice Response for AIX: General Information and Planning* for the checklist on “Voice applications”.

What data communications setup do you need?

Refer to *Websphere Voice Response for AIX: General Information and Planning* for the checklist on “Data communications”.

**Migrating to IBM Unified Messaging for WebSphere Voice Response**

IBM Unified Messaging for WebSphere Voice Response supports migration from Version 3.1 to Version 4.2. The migration procedure is described in the installation chapter of *IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide*.

Migration enables you to move to a new version of Unified Messaging with a minimum of disruption to your subscribers.
Migrating to a single system image

The IBM Unified Messaging for WebSphere Voice Response: Administrator’s Guide tells you how to migrate existing WebSphere Voice Response systems to a single system image.

Briefly, you migrate all the systems to standalone IBM Unified Messaging for WebSphere Voice Response systems. You then use four utilities provided by Unified Messaging to move your data to the machine that will become the SSI server. The process is:

1. Ensure that each system in the single system image has a unique range of message Ids.
2. Back up all the voice message and mailbox data on a system before you merge systems.
3. Restore all the data.
4. Identify and fix any discrepancies with the voice messaging database created by the merge.

Fax and E-mail

For fax and e-mail loading and configuration assistance, contact your IBM representative.

Summary

This chapter has outlined the things you need to consider before installing Unified Messaging. You should now be able to write an implementation strategy before proceeding to plan the installation process itself. Here are the main points you should take into consideration:

- Are you going to implement Unified Messaging on a standalone or single system image system?
- Do you need to be able to exchange messages with other voice mail systems?
- Does your organization need to integrate voice mail with other forms of correspondence such as fax and e-mail?
- Have you tried the Web demonstrations, to see if this would work for your organization?
- Have you considered the requirements of your other voice applications for transaction-related messaging?
- Does the switch pass the called number and the calling number to WebSphere Voice Response?
- Do you need to implement an exchange data link, voice bridge, or signalling process?
- How does call transfer work on your switch?
- Do you need to limit the numbers to which subscribers can transfer?
• How does message waiting indication work on your switch? And how are you going to provide notification of new messages?
• How many subscribers are there and what functions do they require? Do they already have a voice mail system? If so, how will you migrate them to the new system?
• How many calls do the subscribers receive? How many messages are likely to be left? How many are likely to be stored? How long are they likely to be?
• How many channels do you need?
• How much disk space do you need?
• Are you going to customize prompts, voice segments, or key assignments? Do you need to disable some functions? Are you going to use multiple languages?
• Are you going to order more documentation for your users and/or write your own? How are you going to provide training for users and system administrators? Does the system implementer need to go on a training course?
• What information on your system are you going to back up? How often are you going to back it up?

Note: Both AIX and WebSphere Voice Response include functions that can modify or interfere with the way that the system operates. You should keep the computer in a lockable room. Never leave it so that unauthorized people can access or interfere with the system or mistakenly power it off.

Ensure that all passwords are non-trivial and that they are changed regularly. Whenever the system is left unattended, log off from WebSphere Voice Response, close the WebSphere Voice Response Welcome window (this leaves the runtime system active), or use a password-controlled screen lock.
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For country-specific notes on the use of WebSphere Voice Response, refer to the README file located in the directory /usr/lpp/dirTalk/homologation. The file name is in the format README_homologation.xxxx, where xxxx is the country/region identifier.

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Glossary

The following terms and abbreviations are defined as they are used in the context of Unified Messaging. You'll find a more complete glossary of WebSphere Voice Response terms in the WebSphere Voice Response information. If you still do not find the term or abbreviation you are looking for, see IBM Dictionary of Computing, McGraw-Hill, 1994 or the AIX: Topic Index and Glossary, SC23–2513.

Numerics

6310 Digital Trunk Extended Adapter
See Digital Trunk Extended Adapter.

A

table  action  See state table action.

adresssee
In Unified Messaging, the subscriber to whom a message will be sent.

administrator profile
Data that describes a WebSphere Voice Response user. Information in an administrator profile includes ID, password, language preference, and access privileges.

alarm
Any condition that WebSphere Voice Response considers worthy of documenting with an error message. Strictly speaking, the term alarm should include only red (immediate attention) and yellow (problem situation) conditions, but it is also used to refer to green (a red or yellow message has been cleared) and white (informational) conditions.

Alias
An alternative number for a mailbox. Aliases allow several users access to a single mailbox using different numbers.

AMIS
See AMIS analog.

AMIS-A
See AMIS analog (AMIS-A).

AMIS analog (AMIS-A)
The audio messaging interchange standard that specifies the use of DTMF tones to send control information, and analog signals for the message itself. It is the AMIS standard to which Unified Messaging conforms.

analog
Data in the form of continuously variable signals, such as voice or light signals.

announcement-only greeting
In voice mail, a greeting that does not give the caller an opportunity to leave a voice message.

application
See voice application.

application connectivity link (ACL)
A service that transmits out-of-band information between WebSphere Voice Response and the Siemens Hicom 300 switch.

application profile
Data that describes initial actions to be performed when the telephone is answered. Information in an application profile indicates to the channel process what state table to load.
Audio Messaging Interchange Specification (AMIS)
A set of voice messaging standards designed to enable messages from different voice messaging systems to be interchanged. See also AMIS analog.

audio name
The audible name that corresponds to a specific application profile ID and mailbox.

auto-attendant
Automated attendant. A voice application that answers incoming calls and asks the caller which number or other service they’d like. In Unified Messaging, an auto-attendant can be used to access subscribers' mailboxes when direct inward dialing (DID) is unavailable.

called number
The number that a caller dialled. This typically identifies the mailbox that is to receive a message in a Unified Messaging system.

called party
Any person, device, or system that receives a telephone call. Contrast with caller.

caller
(1) Any person, device, or system that makes a telephone call. (2) Often used to refer to any user of a voice application, even when WebSphere Voice Response has made an outbound call and the user is really the called number. (3) In Unified Messaging, any person who makes a telephone call to a subscriber.

CallPath
Software that provides basic computer-telephony integration (CTI) enablement and comprehensive CTI functionality. This includes access to, and management of, inbound and outbound telecommunications.

call transfer
A series of actions that directs a call to another telephone number.

CAS
See channel associated signalling (CAS).

central office
A telephone switching system that resides in the telephone service provider’s network. There are different types of central office switches, depending upon the role of the switch within the telephone network. Commonly, a central office switch connects customer lines to other customer lines or trunks and is the point at which local calls pass through to the next level of switching.
subscriber lines terminate for switching to other lines or trunks.

**CGI**
See Common Gateway Interface (CGI).

**channel**
One of the 24 channels carried on a T1 trunk, or one of the 30 channels on an E1 trunk.

**channel associated signalling (CAS)**
A method of communicating telephony supervisory or line signalling (on-hook and off-hook) and address signalling on T1 and E1 digital links. The signalling information for each traffic (voice) channel is transmitted in a signalling channel permanently associated with the traffic channel.

**channel bank**
A device that converts an analog line signal to a digital trunk signal.

**channel number**
The identifying number assigned to a licensed channel on the T1 or E1 trunk that connects WebSphere Voice Response to the switch, channel bank, or channel service unit.

**channel process (CHP)**
The AIX process that executes the logic of the state table; each active caller session has one active channel process.

**clear message**
A message displayed by WebSphere Voice Response to tell the operator that a red or yellow error message has been cleared.

**Common Gateway Interface (CGI)**
An interface to programs that provide services on the Web.

**computer-telephony integration (CTI)**
Connecting a computer to a telephone so that they share information and commands. Events from the computer can trigger events on the telephone system, and vice versa. The CTI connection can be on the desk top for one person or on the switch for use by many people. CTI can include simple facilities such as call transfer and screen pops, as well as more complex services, such as intelligent call routing, load balancing, and coordinating multiple call centers.

**concatenative text-to-speech**
Text-to-speech that joins together samples of voice recordings to produce a more natural voice sound. See also formant text-to-speech.

**contact center**
A central point of front-line contact between an enterprise and its customers involving more than just the telephone. Contact centers can feature automated call handling, handle both inbound and outbound customer interactions, and conduct transactions using the Web or e-mail. Contrast with call center.

**CTI**
See computer-telephony integration (CTI).

**custom server**
A C language or C++ language program that provides data manipulation and local or remote data stream, database, or other services beyond those provided by the state table interface. Custom servers provide an interface between WebSphere Voice Response and business applications, functions, or other processes to give callers...
access to business information and voice processing functions such as speech recognition.

**D**

demon
In the AIX operating system, a program that runs unattended to perform a standard service.

dB  Decibel.

DBIM  WebSphere Voice Response's internal database manager.

DBS  WebSphere Voice Response's database server.

DDI  See direct inward dialing (DID).

development system
A WebSphere Voice Response system that is not used to respond to or make live calls; it is used only to develop and test applications.

dial
To initiate a telephone call. In telecommunication, this action is performed to establish a connection between a terminal and a telecommunication device over a switched line.

dial by name
To press the keys that correspond to a subscriber's name rather than their telephone number or extension.

dial tone
An audible signal (call progress tone) that indicates that a device such as a PABX or central office switch is ready to accept address information (DTMF or dial pulses).

dialed number identification service (DNIS)
A number supplied by the public telephone network to identify the number actually called. For example, two toll-free numbers might both be translated to the same real number. The DNIS information distinguishes which of the two numbers was dialed. DNIS can be used by CallPath Enterprise Client or WebSphere Voice Response to automatically select between several business database applications. Often used as a synonym for called number.

DID  See direct inward dialing (DID).

digital signal processing (DSP)
A set of algorithms and procedures used to process electronic signals after their conversion to digital format. Due to the specific mathematical models required to perform this processing, specialized processors are generally used.

Digital Trunk Ethernet Adapter
The IBM Digital Trunk Ethernet PCI Adapter. In WebSphere Voice Response this adapter is known as a DTEA. It allows you to connect an IBM System p computer that has a PCI bus directly to an IP network.

Digital Trunk Extended Adapter
The IBM ARTIC960RxD Quad Digital Trunk PCI Adapter. In WebSphere Voice Response this adapter is known as a DTXA. It allows you to connect directly to the telephony network an IBM System p computer that has a PCI bus; it doesn't need an external pack.

Digital Trunk Telephony Adapter (DTTA)
The IBM Quad Digital Trunk Telephony PCI Adapter. In WebSphere Voice Response, this adapter is known as a DTTA. It allows you to connect directly to the...
telephony network from a pSeries computer without the need for an external pack.

direct dial in (DDI)
See direct inward dialing (DID)

direct inward dialing (DID)
A service that allows outside parties to call directly to an extension of a switch. Known in Europe as direct dial in (DDI).

DirectTalk
An earlier name for WebSphere Voice Response, a voice processing system, bringing together telephone and data communications networks to use information stored in databases directly from a telephone.

DirectTalkMail
An earlier name for Message Center, which is now called Unified Messaging.

DirectTalkMail Digital (DTM-D)
A digital protocol for exchanging voice messages very rapidly between Unified Messaging systems.

disconnect
To hang up or terminate a call.

distribution list
In voice mail, a list of subscribers to whom the same message can be sent.

DNIS See dialed number identification service (DNIS)

double-trunking
See trombone

DSP See digital signal processing

DTMF See dual-tone multifrequency (DTMF)

DTEA See Digital Trunk Ethernet Adapter

DTTA See Digital Trunk Telephony Adapter

dtuser
The name of the AIX account set up during the installation process for the use of all users of WebSphere Voice Response.

DTXA See Digital Trunk Extended Adapter

dual-line call transfer
A call transfer method in which the primary and secondary lines remain bridged until a call is completed. (Also known as tromboning: see trombone).

dual-tone multifrequency (DTMF)
The signal sent by pressing one of the telephone keys. Each signal is composed of two different tones.

dynamic caller menu
A menu that is created on-the-fly and presented to the caller in a mailbox. The options on that menu are dependent on (1) the greeting that the subscriber has active, and (2) the options that the subscriber has configured.

E

E1 A digital trunking facility standard used in Europe and elsewhere, capable of transmitting and receiving 30 digitized voice or data channels. Two additional channels are used for synchronization, framing, and signalling. The transmission rate is 2048 kilobits per second. Contrast with T1.

e-business
A marketplace where businesses use Internet technologies and network computing to securely transform their business processes (using...
intranets), their business relationships (using extranets), and the buying and selling of goods, services, and information (using electronic commerce).

**EDL**  See exchange data link

**erlang** The international unit of telephony traffic, named after the Danish mathematician, Agner Krarup Erlang. The erlang has a very concise meaning for mathematicians and queuing theory experts. From a more practical standpoint, the erlang is a measure of traffic intensity, where one erlang represents one circuit occupied for one hour.

**error message** Any message displayed by WebSphere Voice Response in the System Monitor as an alarm and optionally written to the WebSphere Voice Response error log, or to the AIX error log. Strictly speaking, the term error message should include only red (immediate attention) and yellow (problem situation) messages, but it is also used to refer to green (a red or yellow message has been cleared) and white (informational) messages.

**exchange data link** A serial connection that carries messaging information between WebSphere Voice Response and a switch.

**exit** A point in a supplied application from which control can be passed to another custom-written application. On completion, the custom-written application passes control back to the supplied application. Exits are used in Unified Messaging to enable you to provide additional function.

**Extensible Markup Language** The universal format for structured documents and data on the Web.

**external messaging** In Unified Messaging, a system that lets subscribers send messages to, and receive messages from, subscribers on other voice mail systems.

**F**

**File Transfer Protocol (FTP)** In Transmission Control Protocol/Internet Protocol (TCP/IP), an application protocol used for transferring files to and from host computers.

**formant text-to-speech** Text-to-speech that uses standard synthesized voice sounds. See also concatenative text-to-speech.

**FTP** See File Transfer Protocol (FTP)

**G**

**gateway** A component of a Voice over IP network. A gateway provides a bridge between VoIP and circuit-switched networks.

**grammar files** Files listing words and phrases, that VoiceXML applications use to recognize speech.

**greeting** In voice mail, the recording heard by a caller when they reach a subscriber's mailbox. See also announcement-only greeting.
greeting header
In voice mail, a recording made by a subscriber and played to callers either before or instead of a personal greeting.

H
hang up
To terminate a call. See also disconnect.

HML
See Hyper Text Mark Up Language.

hook flash
A signal sent to a switch to request a switch feature (such as call transfer).

host application
An application residing on the host computer.

HTML
See Hyper Text Mark Up Language.

HTTP
See Hyper Text Transfer Protocol.

hunt group
A set of telephone lines from which a non-busy line is hunted to handle, for example, an incoming call.

integrated messaging
A messaging system in which more than one copy of a single message is stored, the copies being kept synchronized by the applications used to access them. Contrast with Unified Messaging.

Integrated Services Digital Network (ISDN)
A digital end-to-end telecommunication network that supports multiple services including, but not limited to, voice and data.

interactive voice response (IVR)
A computer application or telephony device that uses prerecorded voice responses to provide information in response to DTMF or voice input from a telephone caller.

Internet Engineering Task Force
An international organization that defines and develops internet standards and specifications.

IMAP4
See Internet Mail Access Protocol (IMAP4).

in-band
In the telephony voice channel, signals are said to be carried in-band.

incoming mail
In Unified Messaging, new messages recorded by callers or sent by subscribers.

input parameter
Data received by a program such as a prompt, custom server, or state table from the program that invoked it.

Internet Mail Access Protocol (IMAP4)
A text based way of describing data for transmission over the internet.
Internet Mail Access Protocol (IMAP4)
A standard protocol for accessing
e-mail on an e-mail server, as defined
in Internet Request for Comments
(RFC) 2060.

IP
See Internet Protocol.

Internet Protocol
A protocol defined by the IETF for
the transmission of information over
the internet

ISDN
See Integrated Services Digital
Network (ISDN).

IVR
See Interactive voice response (IVR).

J
Java and VoiceXML environment
The code that allows a Java voice
application to communicate with a
base WebSphere Voice Response
system.

jump out
See Call transfer.

K
key
One of the keys on the telephone
keypad. In some contexts, the
dual-tone multifrequency (DTMF)
signal that corresponds to a key.

key pad
The part of the telephone that
contains the push-button keys.

key pad mapping
The process of assigning special
alphanumeric characters to the keys
on a telephone key pad so that the
telephone can be used as a
computer terminal keyboard.

L
label
An optional name for a state in a
state table.

LDAP
See Lightweight directory access
protocol (LDAP).

licensed program product (LPP)
A separately-priced program and its
associated materials that bear an
IBM copyright and are offered
under the terms and conditions of a
licensing agreement.

Lightweight Directory Access Protocol
(LDAP)
A standard protocol for accessing
directory entries on a directory
server, as defined in Internet
Request for Comments (RFC) 1777.

local area network (LAN)
A network in which computers are
connected to one another within a
limited geographical area.

local node
See Local system.

local system
A system that forms part of the
Unified Messaging single system
image (SSI). Unified Messaging
sends voice messages to, and
receives voice messages from,
profiles on such systems, using
built-in WebSphere Voice Response
functions.

local variable
A user-defined temporary variable
that can be accessed only by the
program (state table or prompt) for
which it is defined.

M
mailbox
In a voice mail system, the place
where voice messages are stored.
mailbox number
An application profile with a profile ID that is usually the subscriber's extension number.

MB Megabyte.

MCIT See Message Center Interface Tool (MCIT).

megabyte
(1) For processor storage and real and virtual memory, 1 048 576 bytes. (2) For disk storage capacity and transmission rates, 1 000 000 bytes.

menu A list of selectable actions available at different points in the operation of a program. In Unified Messaging the menus are spoken.

Menu-routing
A Unified Messaging voice application that allows a caller to select from up to ten destinations to which they want to transfer. This transfer is achieved by pressing a single key on the telephone keypad. If the requested number answers, the application connects the call between the caller and the number called. Otherwise, the application sends the caller to the voice mailbox for that number.

message attributes
In Unified Messaging, the priority, privacy, delivery date, and acknowledgment status of a voice message.

Message Center
An earlier name for Unified Messaging, a unified messaging application that runs on WebSphere Voice Response for AIX.

Message Center Interface Tool (MCIT)
An earlier name for the Unified Messaging Interface Tool a menu-based application used to administer a Unified Messaging system.

message delivery preference
The subscriber's choice of whether their voice mail is stored as voice mail only, as e-mail only, or as both voice mail and e-mail.

message delivery type
The format in which a voice message is delivered.

message header
In Unified Messaging, information about the sender of a voice message and the date and time it was sent, which is usually played before the message itself.

message waiting indicator
A visible or audible indication (such as a light or a stutter tone) that a voice message is waiting to be retrieved.

MIME See Multipurpose Internet Mail Extensions (MIME).

Multipurpose Internet Mail Extensions (MIME)
A protocol used on the Internet for extending e-mail capability and integrating it with other forms of communication, such as voice mail and fax.

MWI See message waiting indicator.

N

Network File System (NFS)
A protocol, developed by Sun Microsystems, Incorporated, that allows any host in a network to gain access to another host or netgroup and their file directories. In a single system image (SSI), NFS
is used to attach the WebSphere Voice Response DB2 database.

node code
In Unified Messaging, the numeric code that identifies remote nodes.

notification schedule
In Unified Messaging, the specification of times and phone numbers at which the subscriber is to be notified about incoming messages. The priority of messages required to trigger a notification is also specified in the schedule.

O

off-hook
A telephone line state, usually induced by lifting a receiver, in which the line is ready to make a call.

on-hook
A telephone line state, usually induced by hanging up a receiver, in which the line is ready to receive a call.

out-of-band
Within the telephony signalling channel, as opposed to the voice channel, signals are said to be carried out-of-band.

outgoing mail
In voice mail, messages sent by a subscriber to another subscriber on the same system, which have not yet been accessed by the addressee.

P

PABX
See private automatic branch exchange (PABX).

pack
A component that fits in the 9295 Multiple Digital Trunk Processor. See also RPACK, SPACK, and VPACK.

Pack Configuration
A WebSphere Voice Response for AIX tool that simplifies the process of configuring a telephony environment.

partition
A logical division of a Unified Messaging system that has its own administrator and subscribers who can be isolated from other subscribers outside that partition.

partition administrator
An administrator with permission to perform subscriber administration only for a particular partition.

password
A unique string of characters known to a computer system and to a user, who must specify the character string to gain access to the system and to the information stored in it.

PBX
See private branch exchange (PBX).

PCI
See peripheral component interconnect (PCI).

peripheral component interconnect (PCI)
The rules that define how subsystems and adapters use the Intel® bus in a computer.

personal directory
A directory of up to ten entries that certain subscribers can maintain using a Web interface. This personal directory enables subscribers to (1) filter their remote e-mail messages based on a particular person or group of people, and (2) forward remote e-mail messages to other people listed in this directory.
personal greeting
In voice mail, a greeting recorded by a subscriber. Contrast with system greeting.

plug-in
An accessory program used to alter, enhance or extend the operation of a parent application program. Plug-ins are used in the Java and VoiceXML environment to provide text-to-speech and speech recognition services.

POP
See Post Office Protocol.

Post Office Protocol
A protocol used to retrieve e-mail from a web server.

POP3
A standard protocol for accessing mail on an e-mail server, as defined in Internet Request for Comments (RFC) 1725.

port
In time-slot management, one end of a 64 kbps unidirectional stream which can be attached to the SCBus.

port set
In time-slot management, a collection of ports which can be connected using a single CA_TDM_Connect() API call to a complementary collection of ports.

private automatic branch exchange (PABX)
An automatic private switching system that services an organization and is usually located on a customer's premises. Often used synonymously with private branch exchange (PBX).

private branch exchange (PBX)
A switch inside a private business that concentrates the number of inside lines into a smaller number of outside lines (trunks). Many PBXs also provide advanced voice and data communication features. Often used synonymously with private automatic branch exchange (PABX).

process a call
To answer the telephone and perform the appropriate tasks.

production system
A WebSphere Voice Response system that is used to respond to or make live calls. A production system can also be used to develop new applications.

program temporary fix (PTF)
An update to IBM software.

program data
Application-specific data that can be associated with a call transfer from CallPath to WebSphere Voice Response, or in the opposite direction. This is equivalent to CallPath program data, but WebSphere Voice Response imposes the restriction that the data must be a printable ASCII character string, with a maximum length of 512 bytes.

prompt
(1) A message requesting input or providing information. Prompts are seen on the computer display screen and heard over the telephone. (2) In WebSphere Voice Response, a program that uses logic to dynamically determine the voice segments to be played as a voice prompt.

prompt directory
A list of all the prompts used in a particular voice application. Used by the state table to play the requested voice prompts.
protocol
A set of semantic and syntactic rules that determines the behavior of functional units in achieving communication.

PSTN An ITU-T abbreviation for public switched telephone network.

PTF See program temporary fix (PTF)

pushbutton
(1) A key on a telephone key pad. 
(2) A component in a window that allows the user to invoke a specific action.

pushbutton telephone
A type of telephone that has pushbuttons. It may or may not send tone signals. If it does, each number and symbol on the key pad has its own specific tone.

Q
quick message number
In Unified Messaging, the number that callers can dial to send messages to subscribers without ringing their phone and without having to sign on to Unified Messaging.

quiesce
To shut down a channel, a trunk line, or the entire system gracefully. The shutdown is performed on a channel-by-channel basis. Channels in an idle state are shut down immediately. Channels processing calls are shut down at call completion.

R
reboot To reset or restart the IBM System p, or BladeCenter computer.

reduced instruction set computer (RISC)
The system on which WebSphere Voice Response runs, specifically referred to as an IBM System p, or BladeCenter computer.

referral number
The phone number to which calls are routed when call forwarding is active.

remote e-mail
E-mail stored on a separate e-mail server rather than within the Unified Messaging system. In order to be accessible by Unified Messaging, such remote e-mail servers must be Internet Mail Access Protocol (IMAP4)-compliant.

remote name
A voice file for the spoken names of profiles on a remote system.

remote node
See remote system.

remote system
Any system with which Unified Messaging can exchange voice messages, including other Unified Messaging systems and other suppliers’ voice mail systems.

result
An indicator of the success or failure of a state table action, returned by WebSphere Voice Response to the state table.

result state
The state following each of the possible results of an action.

return code
A code that indicates the status of an application action when it completes.

RISC See reduced instruction set computer (RISC).
**RPACK**
Resource pack. A specialized adapter card which is housed in the 9295 Multiple Digital Trunk Processor. This adapter is used for speech recognition support. Contrast with **RPACK** and **VPACK**.

**S**

**SCbus** See **Signal Computing bus (SCbus)**.

**segment ID number**
One or more numbers used to identify a voice or prompt segment.

**Session Initiation Protocol (SIP)**
A signaling protocol used for VoIP telephony.

**Shared number**
A single telephone number that hosts multiple Unified Messaging mailboxes. A caller can choose to leave a message with one of the mailboxes.

**Signal Computing System Architecture (SCSA)**
An architecture that supports the interoperability of software and hardware components developed by different vendors in the computer telephony industry.

**Signal Computing bus (SCbus)**
A time division multiplexed (TDM) hardware bus that interconnects different vendors' computer telephony adapters. Specified as part of Signal Computing System Architecture (SCSA).

**Signal Computing System Architecture (SCSA)**
An architecture that supports the interoperability of software and hardware components developed by different vendors in the computer telephony industry.

**signaling**
The exchange of control information between functional parts of the system in a telecommunications network.

**signaling process**
A WebSphere Voice Response component that controls signaling for an exchange data link or common channel signaling protocol. Some signaling processes are supplied with WebSphere Voice Response, and others can be custom-written.

**Signaling System Number 7 (SS7)**
A signaling protocol used to communicate between telephony equipment.

**Simple Mail Transfer Protocol**
The base TCP/IP protocol for sending and receiving e-mail.

**Simple Message Desk Interface (SMDI)**
A messaging protocol used by Unified Messaging to send message waiting indications.

**sign-on prompt**
In Unified Messaging, the prompt that asks subscribers to enter their extension number and password (heard when subscribers dial Unified Messaging's number or select sign-on when listening to a greeting).

**Simplified Message Service Interface (SMSI)**
A protocol running on a serial connection (see **exchange data link**) that carries messaging information between WebSphere Voice Response and Lucent or AT&T switches.
**Single System Image (SSI)**
A cluster of WebSphere Voice Response systems that are connected together using a local area network. Each system (known as a node) in the cluster is configured as either a client or a server.

**SIP**
See Session Initiation Protocol (SIP).

**SMDI**
See Simple Message Desk Interface.

**SMIT**
See System Management Interface Tool (SMIT).

**SMSI**
See Simplified Message Service Interface (SMSI).

**SMTP**
See Simple Mail Transfer Protocol.

**SNA**
Systems Network Architecture.

**SPACK**
A logical component consisting of a base card, which connects to the digital trunk adapter in the pSeries®, and a trunk interface card (TIC), which manages the trunk connection to the switch. The SPACK is required to implement common channel signalling protocols, for example, SS7. Contrast with RPACK and VPACK.

**special character**
A character that is not alphabetic, numeric, or blank. For example, a comma (,) or an asterisk (*).

**speech synthesis**
The creation of an approximation to human speech by a computer concatenating basic speech parts together. See also text-to-speech technology.

**state**
One step in the logical sequence of actions that comprises a WebSphere Voice Response voice application.

**state table**
A list of all the actions used in a particular voice application. A component of WebSphere Voice Response.

**state table action**
One instruction in a set of instructions contained in a WebSphere Voice Response state table that controls how WebSphere Voice Response processes various operations such as playing voice prompts or recording voice messages. See also state.

**SS7**
See Signaling System Number 7 (SS7).

**SSI**
See Single System Image (SSI).

**subscriber**
In voice mail, any person who owns a mailbox. Contrast with caller.

**subscriber class**
A named set of variables used to define a specific level of service available to telephone subscribers, such as maximum number of messages per mailbox and maximum number of members per mailbox distribution list.

**subscriber type**
A setting for a subscriber that determines which menu options and features are available to that subscriber and to callers into that subscriber's mailbox. There are a Standard set of menus and options, and an additional four subscriber types: Business - local & remote, Business - local, Remote e-mail only, and Residential.

**super administrator**
An administrator who can create and delete partitions. This
administrator can also perform subscriber administrator for any partition.

**switch** A generic term used to describe a telecommunications system that provides connections between telephone lines and trunks.

**system administrator** The person who controls and manages the WebSphere Voice Response system by adding users, assigning account numbers, and changing authorizations.

**system greeting** In voice mail, a default greeting heard by callers to the mailboxes of subscribers who have not recorded a personal greeting or who have selected the system greeting. Contrast with personal greeting.

**System Management Interface Tool (SMIT)** A set of utilities that can be used for various purposes, such as loading WebSphere Voice Response software, installing the exchange data link, and defining SNA profiles.

**system parameter** A variable that controls some the behavior of WebSphere Voice Response or applications running under WebSphere Voice Response. System parameters are set using System Configuration or Pack Configuration options on the Configuration menu. Some system parameter values are assigned to system variables when an application is initialized.

**system variable** A permanent global variable defined by WebSphere Voice Response for use by state tables. Many system variables are loaded with values when the state table is initialized. Some values are taken from system parameters.

**T**

**T1** A digital trunking facility standard used in the United States and elsewhere, capable of transmitting and receiving 24 digitized voice or data channels. The transmission rate is 1544 Kilobits per second. Contrast with E1.

**tag image file format/fax (TIFF/F)** A graphic file format used to store and exchange scanned fax images.

**TCP** See [Transport Control Protocol](#).

**TCP/IP** See [Transmission Control Protocol/Internet Protocol (TCP/IP)](#).

**telephone keypad interface** The original interface for Unified Messaging. Subscribers dial in from a telephone that generates tones, and select menu choices using the telephone's keypad.

**telephony portal** The use of Unified Messaging solely for telephony. All messages and required subscriber information is retrieved from external e-mail and LDAP servers.

**text-to-speech (TTS)** The process by which ASCII text data is converted into synthesized speech. See also [speech synthesis](#).

**TIFF/F** See [tag image file format/fax (TIFF/F)](#).

**time slot** The smallest switchable data unit on
a data bus, consisting of eight consecutive bits of data. One time slot is equivalent to a data path with a bandwidth of 64 Kbps.

token-ring network
A local area network that connects devices in a ring topology and allows unidirectional data transmission between devices by a token-passing procedure. A device must receive a token before it can transmit data.

tone
An audible signal sent across a telephone network. There are single (one-frequency) tones, tritones (three sequential tones at different frequencies), dual tones (two simultaneous tones at different frequencies), and dual sequential tones. Each has a different meaning.

transaction
A specific, related set of tasks within an application that retrieve information from a file or database. For example, a request for the account balance or the available credit limit.

transaction messaging
The ability to associate an item of data, such as a transaction identifier, with a voice message. The voice message can subsequently be retrieved by referencing the data value.

transfer
See call transfer.

Transmission Control Protocol/Internet Protocol (TCP/IP)
A communication subsystem that is used to establish local area and wide area networks.

Transport Control Protocol
A protocol defined by the IETF, used for communicating across the internet

trombone
A connected voice path that enters an IVR from a switch on one circuit, then returns to the same switch on a parallel circuit. Two IVR ports and two circuits are used, but in some circumstances this might be the only way to make a connection between two callers if the attached switch does not support a Call Transfer function. Also known as double-trunking.

trunk
A telephone connection between two central offices or switching devices. In WebSphere Voice Response, a trunk refers to 24 or 30 channels carried on the same T1 or E1 digital interface.

TTS
See text-to-speech technology.

trunk interface card (TIC)
The component of the VPACK that manages the trunk connection to the switch.

U

unified messaging
A messaging system in which a single copy of a message is stored and accessed by multiple applications (for example, voice mail and e-mail). Contrast with integrated messaging.

Unified Messaging Interface Tool
A menu-based application used to administer a Unified Messaging system.

user
Someone who uses Unified Messaging as a system.
administrator, application developer, or similar. Contrast with caller.

V

variable
A system or user-defined element that contains data values used by WebSphere Voice Response voice applications.

voice application
A WebSphere Voice Response application that answers or makes calls, plays recorded voice segments to callers, and responds to the caller's input.

voice bridge
A device that connects a telephone switch to WebSphere Voice Response.

voice directory
A list of voice segments identified by a voice directory name. Voice directories can be referenced by prompts and state tables.

Voice Interface
A VoiceXML application that allows voice access to Unified Messaging. By dialling-in from any telephone, a subscriber can use spoken commands to access, process, and send voice mail, fax, and e-mail messages.

voice mail
The capability to record, play back, distribute, and route voice messages.

voice mailbox
The repository for incoming messages for a voice mail subscriber. It may also contain data about how incoming calls or messages are to be handled. For example, it may identify the ReachMe number, notification schedules, e-mail address to which messages are to be sent, and so on.

voice message
In Unified Messaging, a recording made by a caller for later retrieval by a subscriber.

voice messaging
The capability to record, play back, distribute, route, and manage voice recordings of telephone calls through the use of a processor, without the intervention of agents other than the callers and the message recipients.

Voice Protocol for Internet Messaging (VPIM)
Standard for digital exchange of voice messages between different voice mail systems, as defined in Internet Request For Comments (RFC) 1911.

voice recognition
The capability of a computer to understand the spoken word for the purpose of receiving commands and data input from the speaker.

voice response beans
Java beans with which you can build voice applications.

voice response node
A node where a base WebSphere Voice Response system is running, providing access to voice processing resources, and optionally running applications.

voice segment
The spoken words or sounds that comprise recorded voice prompts. Each segment in an application is identified by a language, a voice
directory name, and a segment ID and usually includes accompanying text.

**voice table**
A grouping of voice segments in a table for access using an index, such as the numbers 0 to 9 or the letters A to Z. Voice tables can be referenced by prompts, but not directly by state tables.

**VoIP** See *Voice over IP*

**Voice over IP**
The sending of telephony voice over Internet Protocol (IP) data connections instead of over existing dedicated voice networks, switching and transmission equipment. See *gateway*.

**VPACK**
A component consisting of a base card, which connects to the digital trunk adapter in the pSeries, and a trunk interface card (TIC), which manages the trunk connection to the switch. The single digital trunk processor contains one VPACK, and the multiple digital trunk processor contains slots for up to five VPACKs. Contrast with RPACK and SPACK.

**VPIM** See *Voice Protocol for Internet Messaging (VPIM)*

**W**

**WAP** See *Wireless Application Protocol*

**WebSphere Application Server**
An IBM Web application server. It provides software to deploy, integrate and manage business applications, including handling transactions and extending back-end business data and applications to the Web.

**WebSphere Voice Response**
A voice processing system, bringing together telephone and data communications networks to use information stored in databases directly from a telephone.

**WebSphere Voice Server**
An IBM voice middleware product that enables developers to create and deploy voice applications. It includes speech recognition and text-to-speech engines, development tools, and a telephony platform connector.

**Web interface**
An interface for Unified Messaging. Subscribers access and manage their messages using a Web browser.

**Wireless Application Protocol**
An open specification based on XMP and IP that enables standard data formats and transmissions for wireless devices.

**Wireless Markup Language**
A subset of *Extensible Markup Language* developed for *Wireless Application Protocol*.

**window**
An area of the screen with defined borders in which information is displayed. A window may be equal in size to the entire screen, or may share the screen with other windows.

**WML** See *Wireless Markup Language*

**X**

**XML** See *Extensible Markup Language*
Product documentation

This section contains a list of the documentation for Unified Messaging, WebSphere Voice Response for AIX and associated products. Hardcopy books, where available, can be ordered through your IBM representative or through the IBM Publications Center at http://www.ibm.com/shop/publications/order. At this Web site you can also obtain PDF and HTML versions of the documentation.

Unified Messaging publications can also be found by going to the IBM Pervasive software Web site at http://www.ibm.com/software/pervasive, selecting the products link, and then selecting the library link from the WebSphere Voice Response page.

PDF and HTML versions of the Unified Messaging publications are available on the CD-ROM supplied with the product (order number SK2T-1787). Only the IBM Unified Messaging for WebSphere Voice Response: General Information and Planning book is available as a printed book. In addition, WebSphere Voice Response for AIX and WebSphere Voice Response for Windows publications are available together in PDF and HTML formats on a separate CD-ROM.

- IBM Unified Messaging for WebSphere Voice Response: General Information and Planning, GC34–6398
- IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 0,1,2,3,4 and 9), SC34–6403
- IBM Unified Messaging for WebSphere Voice Response: Subscriber’s Guide (Types 5,6,7 and 8), SC34–6400
- IBM Unified Messaging for WebSphere Voice Response: Voice Interface, SC34–6401
- IBM Unified Messaging for WebSphere Voice Response: Web Services Voicemail API, SC34-6975

Note: To read PDF versions of books you need to have the Adobe Acrobat Reader (it can also be installed as a plug-in to a Web browser). It is available from Adobe Systems at http://www.adobe.com.
WebSphere Voice Response base software

Version 4.2

- Websphere Voice Response for AIX: General Information and Planning, GC34-6379
- Websphere Voice Response for AIX: Installation, GC34-6380
- Websphere Voice Response for AIX: Configuring the System, SC34-6381
- Websphere Voice Response for AIX: Managing and Monitoring the System, SC34-6384
- Websphere Voice Response for AIX: Designing and Managing State Table Applications, SC34-6388
- Websphere Voice Response for AIX: Application Development using State Tables, SC34-6387
- Websphere Voice Response: Developing Java applications, GC34-6377
- Websphere Voice Response for AIX: Deploying and Managing VoiceXML and Java Applications, GC34-6378
- Websphere Voice Response for AIX: Custom Servers, SC34–6389
- Websphere Voice Response for AIX: 3270 Servers, SC34–6390
- Websphere Voice Response for AIX: Problem Determination, GC34–6382
- Websphere Voice Response for AIX: Fax using Brooktrout, GC34–6385
- Websphere Voice Response for AIX: Programming for the ADSI Feature, SC34–6392
- Websphere Voice Response for AIX: Programming for the Signaling Interface, SC34–6392
- Websphere Voice Response for AIX: Voice over IP using Session Initiation Protocol, GC34–6383
- Websphere Voice Response for AIX: Using the CCXML Browser, GC34–6368

Version 6.1

- Websphere Voice Response for AIX: General Information and Planning, GC34-7084
- Websphere Voice Response for AIX: Installation, GC34-7095
- Websphere Voice Response for AIX: Configuring the System, SC34-7078
- Websphere Voice Response for AIX: Managing and Monitoring the System, SC34-7085
- Websphere Voice Response for AIX: Designing and Managing State Table Applications, SC34-7081
Websphere Voice Response for AIX: Application Development using State Tables, SC34-7076
Websphere Voice Response for AIX: Developing Java applications, GC34-7082
Websphere Voice Response for AIX: Deploying and Managing VoiceXML and Java Applications, GC34-7080
Websphere Voice Response for AIX: Custom Servers, SC34-7079
Websphere Voice Response for AIX: 3270 Servers, SC34-7075
Websphere Voice Response for AIX: Problem Determination, GC34-7087
Websphere Voice Response for AIX: Fax using Brooktrout, GC34-7083
Websphere Voice Response for AIX: Programming for the ADSI Feature, SC34-7088
Websphere Voice Response for AIX: Programming for the Signaling Interface, SC34-7089
Websphere Voice Response for AIX: Voice over IP using Session Initiation Protocol, GC34-7093
Websphere Voice Response for AIX: Using the CCXML Browser, SC34-7092

For the latest information on Websphere Voice Response Version 6.1, refer to the Websphere Voice Response for AIX: Infocenter at: [http://publib.boulder.ibm.com/infocenter/wvraix/v6r1m0/index.jsp](http://publib.boulder.ibm.com/infocenter/wvraix/v6r1m0/index.jsp)

**WebSphere Voice Response related products**

**WebSphere Voice Server; Use with IBM WebSphere Voice Response for AIX**
- WebSphere Voice Server for AIX: Application Development using State Tables, G210–1562


AIX

- AIX: Operating System Installation: Getting Started, SC23–4388
- AIX: Installation Guide and Reference, SC23–4389
- AIX: System User’s Guide; Communications and Networks, SC23–4122
- AIX: System Management Guide; Communications and Networks, SC23–4127

Computers running AIX

- RS/6000 and pSeries: Site Hardware and Planning Information, SA38–0508
- System p5: IBM Systems Hardware Information Center. Information on physical site planning and preparation is provided in the information center: http://publib.boulder.ibm.com/infocenter/eserver/v1r3s/index.jsp
- BladeCenter: BladeCenter Information Center. Information on physical site planning and preparation is available through the information center: http://www-03.ibm.com/systems/bladecenter/

Brooktrout Fax

The following publications provide further information on Brooktrout Fax

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