AVAYA

Modular Messaging
Concepts and Planning Guide

Release 2 with Avaya Message Storage Server
Release 1.1 with Microsoft Exchange or IBM Lotus Domino
Message Stores

Notice
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- Avaya provided software applications, as well as their underlying hardware/software platforms and interfaces

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Preface

Overview

This guide provides:

- The concepts underlying Avaya Modular Messaging, including discussions of voice mail domains, addressing, and telephony.

- A description of the hardware and software components of Avaya Modular Messaging.

- A glossary of Avaya Modular Messaging terms.

Important: Modular Messaging Release 2 does not support Microsoft Exchange and IBM Lotus Domino message stores.
All information related to Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino is specific to Modular Messaging Release 1.1.

Audience

This guide is intended for use by anyone learning more about Avaya Modular Messaging, including those recommending, purchasing, designing, or installing Avaya Modular Messaging. In addition, readers that are interested in implementing and planning for Modular Messaging, either the Microsoft Exchange version or the IBM Lotus Domino version, should also be familiar with the concepts and operation of Microsoft Windows and Microsoft Exchange or IBM Lotus Domino server, as appropriate.

Conventions and definitions

This guide uses the following conventions:

Convention	Description
Initial capital letters	Names of applications, programs, menu items, and dialog boxes
italic type	Book titles
Avaya MSS	Information applicable only to Avaya Modular Messaging—Avaya Message Storage Server (MSS) version.
Microsoft Exchange	Information applicable only to Avaya Modular Messaging—Microsoft Exchange version.
IBM Lotus Domino	Information applicable only to Avaya Modular Messaging—IBM Lotus Domino version.

This guide uses the following terms and definitions:

Term	Definition
Text messages	The term 'text messages' refers to e-mail messages or messages with binary attachments, stored on the message store. The message store may be a Microsoft Exchange server, an IBM Lotus Domino server, or an Avaya Message Storage Server (MSS).
Corporate e-mail	The term 'corporate e-mail messages' refers to e-mail messages stored on the corporate e-mail system. The corporate e-mail system may be a Microsoft Exchange server, an IBM Lotus Domino server, or any other e-mail system.
Modular Messaging—MSS	Refers to the Modular Messaging—Avaya Message Storage Server system.
Modular Messaging—Exchange	Refers to the Modular Messaging—Microsoft Exchange system.
Modular Messaging—Domino	Refers to the Modular Messaging—IBM Lotus Domino system.

| Aria TUI | Unless otherwise noted, Aria TUI refers to the Aria telephone user interface for Modular Messaging. |
| AUDIX TUI | Unless otherwise noted, AUDIX TUI refers to the AUDIX telephone user interface for Modular Messaging. |

Avaya Modular Messaging documentation

The CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121 contains all documentation about Avaya Modular Messaging, including instructions for administration, installation, and maintenance.

For switch integration documentation, see the configuration notes available from the Avaya Modular Messaging support representative or from the Avaya Support Center at http://support.avaya.com. Configuration notes are general guidelines that provide integration information for several types of switches and fax devices. The configuration notes include comprehensive step-by-step instructions on various tasks including configuring the Modular Messaging system for switch integration and the related switch programming.

Important: Avaya has taken stringent security measures to address security concerns of Modular Messaging customers. This guide does not cover these security features.
For information on security, see 'System security' on the CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121. The document informs owners of the steps that Avaya has taken to secure the Modular Messaging system. It describes how to use the system administration tools to minimize unauthorized intrusions and provides safeguards and measures that customers should take to ensure that the Modular Messaging servers operate in a secure manner.

Avaya Modular Messaging support

For Avaya Modular Messaging support and for important, up-to-date information on Avaya Modular Messaging, visit the Avaya Support Center at http://support.avaya.com

Customer's responsibility for their system's security

No telecommunication system can be entirely free from the risk of unauthorized use.

Customers have ultimate control over the configuration and use of the product and are solely responsible for ensuring the security of their systems. Customers who administer and use the system can tailor the system to meet their unique needs and are in the best position to ensure that the system is secure to the fullest extent possible. Customers are responsible for keeping themselves informed of the latest information such as security patches, anti-virus updates and other relevant information for configuring their systems to prevent unauthorized use. System managers and administrators are also responsible for reading all the recommendations, installation instructions, and system administration documents provided with the product in order to understand the features that can introduce risk of toll fraud and the steps that need to be taken to reduce that risk.

Avaya does not warrant that this product is immune from or will prevent unauthorized use of telecommunication services or facilities accessed through or connected to it. Avaya will not be responsible for any damages or charges that result from either unauthorized uses or from incorrect installations of the security patches that are made available from time to time. To aid in combating these crimes, Avaya intends to strengthen relationships with its customers and its support of law enforcement officials in apprehending and successfully prosecuting those responsible.

Suspected security vulnerabilities with Avaya products should be reported to Avaya by sending mail to securityalerts@avaya.com. Reported vulnerabilities are prioritized and investigated. Any corrective actions resulting from the vulnerability investigation are posted at http://support.avaya.com/security. Whether or not immediate support is required, please report all toll fraud incidents perpetrated on Avaya services to Avaya Corporate Security. In addition to recording the incident, Avaya Corporate Security is available for consultation on product issues, investigation support, law enforcement, and education programs.

See 'Modular Messaging and Security' on CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121.

Section 1

Introduction

1

Introducing Avaya Modular Messaging

Avaya Modular Messaging is a unified messaging solution that addresses the different unified messaging needs of customers through the following versions:

- Modular Messaging—MSS version. With this version, voice and fax messages are stored on a separate message store from corporate e-mail messages. While corporate e-mail messages are stored on any existing e-mail infrastructure, voice and fax messages are stored on an Avaya-produced Message Storage Server (MSS).

- Modular Messaging—Microsoft Exchange version. This version makes use of a common, unified message store (Microsoft Exchange) for all types of messages.

  Note: Modular Messaging Release 2 does not support this version.

- Modular Messaging—IBM Lotus Domino version. This version makes use of a common, unified message store (IBM Lotus Domino) for all types of messages.

  Note: Modular Messaging Release 2 does not support this version.

Depending on the version, Modular Messaging can be used as any one of the following:

- A voice and fax messaging system, where all voice and fax messages are stored on an internal Modular Messaging Message Storage Server, the MSS. For more information, see Modular Messaging—MSS on page 2-2.

- A part of a unified messaging solution for access to messages. Voice, text, and fax messages are stored on the Avaya MSS, and

corporate e-mail is maintained on a separate corporate e-mail system. For more information, see Modular Messaging—MSS on page 2-2.

- A voice, fax, text, and e-mail messaging system, where all messages are stored on a common message store—either Microsoft Exchange or IBM Lotus Domino. For more information, see Modular Messaging—Exchange and Modular Messaging—Domino on page 2-4.

While all Modular Messaging versions have such functionality in common as Call Answer and telephone access to voice messages, they differ in their implementation, architecture, and configuration.

For more information, see Avaya Modular Messaging versions on page 2-2.

Benefits of Avaya Modular Messaging

Avaya Modular Messaging is compatible with several industry telecommunications systems, offering service from 4 to 690 ports[1] and up to 100,000[1] subscribers. Modular Messaging provides multilingual capabilities, thus supporting international operations of customers.

Scalability

Depending on the product version, Modular Messaging supports from 4 to 690 ports within a single voice mail domain. For more information on a voice mail domain, see Voice mail domain on page 4-33.

Modular Messaging—MSS supports a maximum of 144 ports per voice mail domain.

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino support a maximum of 690 ports per voice mail domain.

For more information on the number of subscribers Modular Messaging supports, see Chapter 11, System capacities.

A voice mail domain can serve a network of switches, provided the administrator ensures that the network uses a single switch as a gateway to the voice mail domain.

Mobility

With Avaya Modular Messaging, subscribers can send and retrieve messages even when they are away from the office.

Modular Messaging provides subscribers mobile access to their messages from any touch-tone telephone, using the Modular Messaging telephone user interfaces (TUIs). With the Microsoft Exchange or IBM Lotus Domino versions, the TUI provides access to voicemail and corporate e-mail messages. With the MSS version, the TUIs provide access only to voice, fax, and text messages stored on the Avaya message store server (MSS), and *not* to corporate e-mail messages stored on the corporate e-mail store. However, MSS subscribers that desire mobile access to corporate e-mail messages can use the Unified Communication Center (UCC) Speech Access client or Modular Messaging Web Client. UCC Speech Access provides speech access and voice control of corporate e-mail and voicemail messages, regardless of whether they are stored in

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1. The Modular Messaging version determines the number of ports and subscriber mailboxes the system supports. For more information, see Voice mail domain capacities on page 11-2.

separate or unified message stores. For more information, see Unified Communication Center Speech Access on page 4-27. Modular Messaging Web Client is a visual interface to the Modular Messaging mailbox. Using that interface, subscribers can create, send, receive, and organize messages. Subscribers can listen to voice messages, read text and corporate e-mail messages, view fax messages, and manage file attachments, all from your PC.

Modular Messaging also provides enhanced notification functionality, enabling quick response to any type of incoming communication, whether on site or remote. Subscribers can reply to a message, regardless of its original form.

Avaya Modular Messaging supports real-time Find Me capability, telephone notification, message waiting indicator (MWI), and other advanced notification mechanisms, thus increasing subscriber availability.

Note: Find Me is not supported for analog integrations.

Familiar telephone user experience

Subscribers can use the Modular Messaging TUIs from any touch-tone telephone to access, compose, and send messages, and to configure their mailboxes.

Current Avaya Octel 250/350 subscribers (using the Aria TUI), Avaya Intuity AUDIX, and DEFINITY AUDIX subscribers will have a consistent and familiar telephone user experience with the Avaya Modular Messaging telephone user interfaces.

Avaya Modular Messaging comes with the Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging. Administrators can assign subscribers their preferred TUI, based on a class-of-service (COS). The Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging are similar to, but not exactly the same as, the respective Aria or AUDIX product.

For more information on the TUIs, see Telephone user interfaces on page 4-2.

Multiple language support

Modular Messaging supports multiple languages and allows multinational companies to use the system in virtually any of their offices worldwide.

Table 1-1 describes the different announcement languages that Modular Messaging supports. Of the languages that Modular Messaging supports, one language is defined as the system default language, up to three languages can be defined for the system Automated Attendant and Call Answer, and one language can be specified per mailbox for logged in messaging sessions.

Table 1-1. Modular Messaging multiple language support

Language	Aria Caller interface Modular Messaging Release 1.1	Common Caller Interface Modular Messaging Release 2	Modular Messaging Aria TUI	Modular Messaging AUDIX TUI	Text-to-Speech[1]	Subscriber Options	Client Add-in for Microsoft Outlook (Modular Messaging— MSS)	Client Add-in for Microsoft Outlook (Modular Messaging—Exchange)	Modular Messaging Web Client	Avaya Voice Player
Chinese										
▪ Simplified						Y	Y	Y		
▪ Traditional						Y	Y	Y		
▪ PRC	Y	Y	Y	Y	Y					
▪ Taiwan	Y	Y	Y	Y	Y					
Dutch	Y	Y	Y	Y	Y	Y	Y	Y		
English										
▪ Australia		Y	Y							
▪ United Kingdom	Y	Y	Y	Y	Y					
▪ US						Y	Y	Y	Y	Y
▪ US-123	Y	Y	Y	Y						
▪ US-ABC				Y						
▪ US-TTY[2]	Y	Y	Y	Y						
French										
▪ Canada	Y	Y	Y	Y						
▪ France	Y	Y	Y	Y						

▪ Standard					Y	Y	Y	Y	Y	Y
German	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Italian	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Japanese	Y	Y	Y	Y	Y	Y	Y	Y		
Portuguese										
▪ Brazil	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Spanish										
▪ International						Y	Y	Y	Y	Y
▪ Latin American	Y	Y	Y	Y	Y					

1. In Modular Messaging—Microsoft Exchange version and Modular Messaging—IBM Lotus Domino version, the TUIs automatically provide text-to-speech (TTS) conversions based on the language of the e-mail message.
2. Customer systems that use TDD/TTY must use G.711 audio encoding.

> **Note:** Callers calling from TTY devices may not be able to leave Call Answer messages if their TTY device cannot dial touchtones after a call is in progress.

Ease of administration

All versions of Modular Messaging, irrespective of whether they have unified or separate message stores, provide certain administrative benefits.

Modular Messaging—MSS

Avaya MSS

Modular Messaging—MSS is based on industry standards, including Lightweight Directory Access Protocol (LDAP). Modular Messaging—MSS interoperates with the following Avaya administrative tools to facilitate common administration across multiple Avaya products:

- Avaya Site Administration (Release 2.0 or later) and Avaya MutliSite Administration (Release 2.1 or later): These applications support Modular Messaging subscriber data. For more information, see Avaya Integrated Management on page 4-29.

- ProVision: This application is used to provision users on an Avaya Communication Manager or a DEFINITY switch and Modular Messaging.

- The Mailbox Manager application: Modular Messaging—MSS administrators can use this application for mailbox

administration. For more information, see [Mailbox Manager](#) on page 4-28.

The MSS supports subscriber administration and subscriber directory updates from these products via LDAP. The internal LDAP directory is the primary storage location for names, e-mail addresses, extensions, and other subscriber data of subscribers of the Modular Messaging system.

Web-based administration of the MSS facilitates common organization-wide administration, diagnostics, and reporting. Administrators can use these Web-based administration pages to perform general system administration for the MSS and subscriber administration. Administration tasks include subscriber management and password administration. These administration pages also provide diagnostic logs.

Modular Messaging (Exchange and Domino)

Microsoft Exchange

IBM Lotus Domino

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino offer the following administrative benefits:

- Leveraging the existing Microsoft Exchange or IBM Lotus Domino infrastructure eliminates the need to retain and manage separate voice and corporate e-mail systems.

- For each subscriber, all voicemail, telephone answering, corporate e-mail, and fax messages are stored on the same message store server.

- A single administrator can handle all messaging administration.

- Management tools are combined into one application.

- A single directory for addressing of voice and corporate e-mail simplifies system management.

- Updates to the directory are automatically replicated to all systems, so that changes need to be made only once for voice and e-mail.

Switch integration

Modular Messaging supports multiple switch integrations (SWINs) for switches and private branch exchanges (PBXs) from several major manufacturers. Customers can choose a switch integration that requires only minimum changes to the current infrastructure to implement Modular Messaging.

Industry standards

Modular Messaging supports the following industry standards:

- Industry-standard platforms, telephony interfaces, and operating systems:

  — Intel processors

  — Dialogic Tip/Ring boards, Dialogic T1 and E1 port boards, and Dialogic Digital Set Emulation (DSE) port boards

  — Linux operating system (Avaya MSS) and Microsoft Windows operating system (Messaging application server)

- IP and Internet standards: IP for server-to-server transport, IP Networking, IMAP4 and POP3 client access to messages, SMTP/MIME for sending and receiving messages, and LDAP for attribute storage (for example, user and system data) and directory queries (for example, name, address)

- Switch integrations: H.323-based IP integration, Q.Signaling (QSIG), Enhanced Inband Analog, RS232 for serial switch integrations (SMSI/SMDI), and Digital Set Emulation (DSE)

- Audio encoding formats: Global System for Mobile Communications (GSM) and G.711 (A-law and μ-law). The amount of space required to store GSM-encoded messages is considerably smaller than the amount of space required to store G.711-encoded messages. For example, a voice message that is one minute long would require approximately 95.2 KB when encoded using the GSM format and approximately 468.8 KB when encoded using the G.711 format.

- Modular Messaging complies with standards established by the government and standards bodies, for mandatory compliance areas, such as Product Safety, Electro Magnetic Compliance (EMC), and Telecommunications.

Section 2

Concepts

2

Modular Messaging versions

This chapter introduces the Modular Messaging versions and provides a comparison of some key characteristics of these versions.

This chapter includes the following topics:

- Avaya Modular Messaging versions on page 2-2

- Comparing characteristics of Modular Messaging versions on page 2-6

Avaya Modular Messaging versions

To suit the particular architectural needs and e-mail infrastructure of customers, Avaya Modular Messaging is available in the following versions:

Avaya MSS

- Avaya Modular Messaging—Avaya Message Storage Server (Modular Messaging—MSS)

  This configuration, also known as Avaya S3400-family of servers, contains one or more Avaya MAS units and a single Avaya MSS (MSS—S, standard availability or MSS—H, high-availability). A private Ethernet LAN provided with the product connects the MAS and MSS.

Microsoft Exchange

- Avaya Modular Messaging—Microsoft Exchange version (Modular Messaging—Exchange)

  This configuration contains one or more MAS units connected to one or more Microsoft Exchange servers. The MAS units may be provided by Avaya, or may be provided by the customer. Avaya provides the Modular Messaging software that must be installed on the customer-provided MAS. The Microsoft Exchange servers are customer-provided.

  For information on the hardware and software requirements of a customer-provided MAS, see Messaging application server software requirements in Appendix B, Customer environment.

IBM Lotus Domino

- Avaya Modular Messaging—IBM Lotus Domino version (Modular Messaging—Domino)

  This configuration contains one or more MAS units connected to one or more IBM Lotus Domino servers. The MAS units may be provided by Avaya, or may be provided by the customer. Avaya provides the Modular Messaging software that must be installed on the customer-provided MAS. The IBM Lotus Domino servers are customer-provided.

  For information on the hardware and software requirements of a customer-provided MAS, see Messaging application server software requirements in Appendix B, Customer environment.

Modular Messaging—MSS

Avaya MSS

A Modular Messaging—MSS system can be configured for use as a voicemail system providing only voice and fax messaging, or as part of a unified messaging solution for access to messages. In the latter scenario, voice, text, and fax messages are stored on the MSS, and corporate e-mail

is stored on the corporate e-mail system. Subscribers can use the Modular Messaging telephone user interfaces (TUIs) to access messages stored on the MSS, and use Unified Communication Center (UCC) Speech Access for telephone access to voice messages and e-mails stored on Microsoft Exchange or IBM Lotus Domino. From the desktop, an IMAP4 compatible e-mail client provides access to messages stored on both the MSS and the corporate e-mail system.

As a standalone messaging solution, Modular Messaging—MSS is an ideal solution for organizations that have traditional voicemail usage and that intend to maintain separate e-mail and voicemail systems.

This configuration is likely to be attractive to customers that desire independent voicemail and corporate e-mail systems for reasons of overall messaging reliability. Modular Messaging mailboxes on the Avaya MSS store voice messages, fax messages, text messages, and binary attachments that subscribers receive. These Modular Messaging mailboxes are independent of the mailboxes on the corporate e-mail system that receive and store corporate e-mail messages. Because the voicemail and e-mail systems are independent of each other in this configuration, if one of the systems is down, the other is still likely to be available.

Subscribers can use different devices, such as a touch-tone telephone or a desktop PC, to access messages stored in their Modular Messaging mailboxes.

The following access media provide subscribers unified access to messages:

- A touchtone telephone for access to voice and fax messages.

- Unified Communication Center Speech Access (UCC Speech Access) for telephonic access to voice and fax messages and to corporate e-mail messages.

- Avaya Client Add-in for Microsoft Outlook for Outlook access to all messages. Voice, fax, and text messages in the Modular Messaging inbox can be accessed with the same client used to access corporate e-mail messages.

- Modular Messaging Web Client for access to voice, fax, and corporate e-mail messages from a Web browser.

- A standards-based e-mail client for desktop access to voice, text, and fax messages. Modular Messaging—MSS supports IMAP4 and POP3 e-mail standards and text messages, allowing subscribers to access their Modular Messaging mailbox by means of standards-based e-mail clients. These messages are stored in an inbox separate from the corporate inbox that receives e-mail messages from the corporate e-mail system.

> **Note:** Access to a subscriber mailbox from standard-based clients can be restricted by means of administrative settings. For more information, see The Privacy Enforcement Level privacy parameter on page 5-45.

A fax-capable solution, Modular Messaging—MSS makes use of native fax resources to enable subscribers to send fax messages and to enable callers to leave fax messages. Callers can also leave a message that contains a voice introduction, followed by a fax, resulting in a single message with both voice and fax components.

Note: H.323-based IP integration currently does not support fax messaging.

Modular Messaging—Exchange and Modular Messaging—Domino

A Modular Messaging—Microsoft Exchange or Modular Messaging—IBM Lotus Domino system is a voice messaging front-end that integrates with an existing Microsoft Exchange or IBM Lotus Domino e-mail system, providing a unified message store for all messages.

The existing e-mail system serves as the message store for corporate e-mail messages, voice messages, and fax messages.

In Modular Messaging with e-mail servers, voicemail is merged into, and hence relies on, the Microsoft Exchange or IBM Lotus Domino e-mail infrastructure. Modular Messaging is designed in a 'store-and-forward' fashion, so it continues to operate during network or e-mail outages. During such outages, full functionality is not available, but the system continues to provide basic Call Answer and limited access to recent Call Answer messages.

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino provides subscribers access to voice, fax, and e-mail messages from a single graphical user interface (GUI) - their existing e-mail client.

For unified access to messages, subscribers can use the following access media:

- A touchtone telephone for access to all messages.

- Unified Communication Center Speech Access (UCC Speech Access) for telephonic access to all messages.

- Microsoft Outlook e-mail client for desktop access to all messages, using the Client Add-in for Microsoft Outlook (Not applicable to Modular Messaging—IBM Lotus Domino).

- IBM Lotus Notes with IBM Lotus DUC[1]. Subscribers can integrate IBM Lotus Domino Unified Communications (DUC) software with their IBM Lotus Notes client for access to all messages (Not applicable to Modular Messaging—Microsoft Exchange).

    Note: DUC software is provided by IBM. Avaya does not provide DUC software.

- Web access to messages using Outlook Web Access (for Microsoft Exchange message stores only) and iNotes (IBM Lotus Domino message stores only).

- Any desktop client supported by Microsoft Exchange or IBM Lotus Domino.

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino interoperate with a customer-provided, third-party fax server to provide fax capabilities.

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1. IBM Lotus DUC cannot be integrated with the Microsoft Outlook e-mail client.

Comparing characteristics of Modular Messaging versions

Table 2-1 compares the characteristics of Modular Messaging—MSS, Modular Messaging—Microsoft Exchange, and Modular Messaging—IBM Lotus Domino versions.

Table 2-1. Comparing Modular Messaging versions

Characteristic	Modular Messaging—MSS	Modular Messaging—Exchange	Modular Messaging—Domino
Message store	Avaya Message Storage Server (MSS)	Microsoft Exchange	IBM Lotus Domino
Storage of messages	Voice, text, fax messages, and messages with binary attachments are stored on the MSS. Corporate e-mail messages, if any, are typically stored on a separate e-mail server.	All messages are stored on the Microsoft Exchange e-mail server	All messages are stored on the IBM Lotus Domino e-mail server.
Retrieving messages	Subscribers typically use a telephone to retrieve messages (Modular Messaging TUIs). Retrieval of messages from a desktop PC is also available. Subscribers cannot use the TUIs to retrieve corporate e-mail messages stored on a separate e-mail server.	Subscribers use a telephone or desktop PC to retrieve voice, fax, and corporate e-mail messages.	Subscribers use a telephone or desktop PC to retrieve voice, fax, and corporate e-mail messages.
Available TUIs	Aria TUI with Modular Messaging Release 1.1 Aria TUI and AUDIX TUI with Modular Messaging Release 2.	Aria TUI with Modular Messaging Release 1.1	Aria TUI with Modular Messaging Release 1.1

Table 2-1. Comparing Modular Messaging versions

Characteristic	Modular Messaging—MSS	Modular Messaging—Exchange	Modular Messaging—Domino
Desktop graphical user interfaces (GUIs) for accessing the inbox	The Modular Messaging inbox containing voice, fax, and text messages is separate from the corporate e-mail inbox. When using Microsoft Outlook (Client Add-in for Microsoft Outlook), or standards-based e-mail clients, subscribers have the benefit of accessing 2 separate inboxes in the same e-mail client.	Voice and fax messages in the subscriber's e-mail mailbox are accessible using any Microsoft Exchange (Microsoft Outlook or Outlook Web Access) client.	Voice and fax messages in the subscriber's e-mail mailbox are accessible using any IBM Lotus Domino (IBM Lotus Notes or iNotes) client.
Text-to-speech (TTS) conversion	TTS required for playing subscriber names (when not recorded), fax header information, and any text messages in the Modular Messaging mailbox.	TTS required for playing subscriber names (when not recorded), fax header information, and corporate e-mail messages.	TTS required for playing subscriber names (when not recorded), fax header information, and corporate e-mail messages.
Web messaging	Modular Messaging Web Client provides Web-browser access to voice, text, fax, and corporate e-mail messages.	Outlook Web Access (OWA) provides a single interface for access to voicemail and corporate e-mail messages, stored in a common inbox on the Microsoft Exchange message store.	iNotes, also known as IBM Lotus Domino Web Access, provides a single interface for access to voicemail and corporate e-mail messages, stored on the IBM Lotus Domino message store.
Compatibility with UCC Speech Access	UCC Speech Access provides: ■ Speech access to voicemail and corporate e-mail messages ■ Launching of telephone calls ■ Conferencing		

3

Modular Messaging server components

This chapter provides a description of the server components of Avaya Modular Messaging.

This chapter includes the following topics:

- [Messaging application server](#) on page 3-2

- [Message store](#) on page 3-9

- [Directory server](#) on page 3-11

Messaging application server

The voice server, also known as the messaging application server (MAS) in Modular Messaging, provides an interface between the message store (and directory) and the telephone system.

A Modular Messaging—MSS system consists of at least one MAS and an Avaya-produced Message Storage Server (MSS). Modular Messaging—MSS supports a maximum of five MAS units in a voice mail domain. The MAS software resides on the Avaya-provided S3400 server platform running Microsoft Windows 2000 Server.

> **Note:** For more information on a voice mail domain, see Voice mail domain on page 4-33.

A Modular Messaging—Microsoft Exchange or Modular Messaging—IBM Lotus Domino system consists of at least one MAS connected to at least one back-end message store server (Microsoft Exchange server or IBM Lotus Domino server). With Microsoft Exchange or IBM Lotus Domino, Modular Messaging supports a maximum of ten MAS units in a voice mail domain.

The MAS software resides either on the Avaya-provided S3400 server platform running Microsoft Windows 2000 Server, or on a customer-provided Microsoft Windows 2000 Server system that meets the minimum requirements Avaya specifies. For more information, see Messaging application server software requirements in Appendix B, Customer environment.

MAS services and functionality

A messaging application server (MAS) provides the following services and features:

- Inbound services

  An MAS provides support to inbound services, such as, Call Answer, subscriber access, offline access to Call Answer messages, dual-connect for GUI access[1], Automated Attendant, caller applications, and inbound fax

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1. Single-connect mode is where a subscriber plays or records messages by means of a multimedia PC. Dual-connect mode is where a subscriber uses the PC for command and control, and uses the telephone for listening to and recording a message.

- Outbound services

    An MAS provides support to outbound services, such as, Find Me, Call Me, Message Waiting Indicator (MWI), Automated Attendant transfers, and outbound fax (MSS only)

- Software components

    An MAS hosts server software components, such as MWI Server, Call Me Server, Mailbox Monitor Server, Fax Server (MSS only), and Tracing Server. For more information, see Modular Messaging software components on page 3-3.

- Key functions and applications

    An MAS provides switch integrations, the telephone user interface, voice encoding and decoding, alarming and event tracking, statistics and performance counters, operation history, fax capability, and text-to-speech (TTS) capability.

    Client applications, such as system administration tools and diagnostic and reporting tools are not uniquely associated with the MAS, but are required on each MAS.

Note: In a client-server architecture, a software server provides services to its related clients. A hardware server is the computer that runs one or many software applications and servers. An Avaya S3400 is a hardware server that is capable of running multiple software servers. For example, in a single MAS voice mail domain, all software-based servers will be run on a single S3400 hardware server.

Modular Messaging software components

The Avaya Modular Messaging software provides all the server software components that must be installed on a customer-provided MAS or an Avaya MAS.

In a voice mail domain that contains more than one MAS, the server components and services may be distributed across the MAS units.

See Table 3-1 on page 3-7 for information on distributing the MAS components in a multi-MAS voice mail domain.

The Modular Messaging software components are:

Administration and diagnostic tools   Modular Messaging administration and diagnostic tools include the Voice Mail System Configuration tool, Visual Voice Editor, Operation History Viewer, Port Monitor, and Reporting Tool. For information on these

administration and diagnostic tools, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS,* 11-300243.

Caller Applications Editor

The Caller Applications Editor, a software application that consists of Microsoft Management Console (MMC) snap-ins and extensions, is used to create Caller Applications. For more information on Caller Applications, see Caller Applications on page 4-5.

The Caller Application Editor can be installed on any machine, not necessarily an MAS. Caller Applications are saved as UMA files, which are often, though not necessarily originated and initially stored on the machine that hosts the Editor.

When administrators need to make the application available to callers, they use the Caller Application Editor to transfer a copy of the UMA file to the MAS units in the voice mail domain. This process is called deployment.

The Editor can be used to create one or more associations to specify the conditions under which a deployed Caller Application will be launched for callers.

Although anyone with access to a copy of the Caller Application Editor can create a Caller Application and save that Caller Application to a file, only Modular Messaging system administrators can deploy applications and modify the associations.

Tracing Server

The Tracing Server records operational information about activity related to the MAS service of Avaya Modular Messaging. Events, for example port activity, are passed from the MAS units in the voice mail domain and are stored in an operation history database. An administrator can use the Modular Messaging Reporting Tool application to generate reports that summarize voicemail activity. For information on using the Reporting Tool to generate reports, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

The Tracing Server maintains connections with all MAS units in a voice mail domain and performs the following tasks:

- Collects all events generated by each MAS in a voice mail domain that are of interest to an administrator for diagnostic purposes

- Writes the events to the operation history database

- Periodically extracts summary information for the entire voice mail domain from the operation history database and writes it to the transaction database (optional)

- Periodically cleans up expired events from the operation history database and from the transaction database (optional)

Mailbox Monitor Server

The Mailbox Monitor Server monitors mailboxes of Avaya Modular Messaging subscribers to determine when a new message meets Message Waiting Indicator (MWI) and Call Me rules.

The MWI Server and Call Me Server communicate frequently with the Mailbox Monitor Server, so the supported Modular Messaging configuration requires that they must all be co-resident on the same machine.

During installation of the Modular Messaging system, when installing the MWI Server or the Call Me Server, the Mailbox Monitor Server is automatically installed.

Call Me Server

With the Call Me feature, Modular Messaging makes calls to subscribers when messages meeting specified criteria arrive in their mailbox. A Call Me Server uses the Mailbox Monitor Server service for checking when new messages arrive. It performs the following tasks:

- Maintains a list of subscribers with active Call Me rules

- Stores information about each subscriber mailbox that has Call Me enabled

- Uses the Mailbox Monitor Server to periodically monitor subscriber mailboxes to determine whether a new message meets Call Me rules

- Requests that an MAS in the voice mail domain call the subscriber using subscriber-configured telephone lists when Call Me is required

For more information on Call Me, see Call Me on page 9-2.

Message Waiting Indicator Server

The Message Waiting Indicator (MWI) Server alerts subscribers when messages meeting specified criteria arrive in their mailbox. Subscribers are alerted, either by a lamp indicator on their telephone or an audible tone (stutter dialtone) when they pick up the receiver. An MWI Server uses the Mailbox Monitor Server for checking when new messages arrive and determines when the indicator on a subscriber telephone should be set or reset.

An MWI Server performs the following tasks:

- Maintains a list of subscribers with active MWI and stores information about each subscriber mailbox that has MWI enabled

- Uses the Mailbox Monitor Server to monitor subscriber mailboxes to determine when a new message meets MWI rules

- Requests any MAS in the voice mail domain that has been configured as an MWI service provider, to set or reset MWI

For more information on MWI, see Overview of Message Waiting Indicator (MWI) on page 9-6.

Fax Sender Server

Avaya MSS

Modular Messaging—Avaya MSS makes use of the Fax Sender Server to support fax messaging. The Fax Sender Server is only applicable to Modular Messaging—Avaya MSS systems.

Subscribers of Modular Messaging—Avaya MSS can receive, review, send, and print fax messages. When sending faxes, the feature attaches a cover page to the fax message.

From the telephone user interface (TUI), subscribers can send a fax or text message they have received, to a fax machine. Using a desktop client, subscribers can also send text messages, or TIFF files created using Windows features to fax machines by sending a message to the Fax Sender Server using a special 'fax' address.

On receiving the message, the Fax Sender Server converts the text message to TIFF format, places an outgoing call to the fax machine, sends the fax, and sends a message to the subscriber indicating whether the fax was successfully transmitted.

For more information, see Modular Messaging—MSS native fax server on page 7-2.

Note: H.323-based IP integration currently does not support fax capabilities.

Offline Call Answer Store

An MAS caches all Call Answer messages that it receives, in a local message store.

In a multi-MAS voice mail domain, each MAS migrates copies of messages in its local message store to a remote Offline Call Answer Store. The Offline Call Answer Store contains copies of messages from all MAS units in a voice mail domain.

For increased availability, Modular Messaging continues to offer Call Answer services to callers, even in the event that a message store is currently unreachable, for any reason. Further, Modular Messaging makes these offline Call Answer messages available to subscribers, from the TUI.

The Offline Call Answer Store can reside on an MAS that has the required storage capacity or on a separate machine. For more information, see Recommendations for the Offline Call Answer Store on page 13-9.

Distributing server components and services

Table 3-1 describes the distribution of MAS server components and services in a multi-MAS voice mail domain.

Table 3-1.   MAS server components and services

Server component	Notes
Components that are required on every MAS	
Administration tools and diagnostic tools	—
Language packs	The same set of languages are to be installed on each MAS.
Server components that are required on every MAS that will handle calls	
These software components are not required on an MAS that does not handle calls, such as a machine that has only the Tracing Server installed on it.	
Messaging Application Server software	This software includes the Alarming Server.
Prompt files	One set is required for each MAS that is running the Messaging Application Server software.
Components that are installed on any MAS	
Tracing Server	Must be installed only once per voice mail domain. Avaya recommends that the Tracing Server be installed on a different MAS than the one that is hosting the Call Me and/or MWI software. It is advisable to put the Tracing Server service on the MAS with the smallest number of ports. For large configurations, it is advisable to install the Tracing Server on a separate machine other than an MAS. For more information, see Recommendations for the Tracing Server on page 13-7.
Mailbox Monitor Server	By default, this is installed first if the Call Me or MWI Server is selected.
Call Me Server	Must be installed only once per voice mail domain. Includes the Mailbox Monitor Server.

Table 3-1. MAS server components and services

Server component	Notes
Message Waiting Indicator Server	Must be installed only once per voice mail domain. Includes the Mailbox Monitor Server.
	Avaya recommends that the Call Me Server and MWI Server software be installed on the same MAS. These services must be co-resident with the Mailbox Monitor Service, and should be installed on the MAS with the smallest number of ports if possible, or on the MAS with the second smallest number of ports if the Tracing Server is installed.
Fax Sender Server	Applicable only to Modular Messaging— Avaya MSS version.
Caller Applications Editor	—
	Caller Applications Editor can be installed on any machine, not necessarily on an MAS.

The Mailbox Manager application: For Modular Messaging—MSS systems, if the corporate network has a dynamic host configuration protocol (DHCP) environment, the Mailbox Manager application must be installed on an MAS.

Message store

A Modular Messaging—Avaya Message Storage Server (MSS) system is a turn-key solution that makes use of an internal message store.

A Modular Messaging—Microsoft Exchange system integrates with an existing Microsoft Exchange e-mail system, which acts as the message store.

A Modular Messaging—IBM Lotus Domino system integrates with an existing IBM Lotus Domino e-mail system, which acts as the message store.

Functions of a message store

A message store provides or supports the following functions:

- Modular Messaging mailboxes for subscribers of Modular Messaging—MSS. These mailboxes store messages, including multimedia components such as voice, fax, text, and binary attachments. These mailboxes also store recorded greetings and certain other items of subscriber data.

- Delivery of messages to local mailboxes.

- Message networking for delivery of messages to remote destinations.

- Directory services, including mailbox account information.

- Support for desktop messaging clients.

- Directory synchronization with remote systems.

- Backup or restore of subscriber mailboxes.

- Distribution lists.

- Broadcast messages (available only with Avaya Modular Messaging—Avaya MSS).

- Subscriber administration and system administration.

Avaya Message Storage Server

The Avaya Message Storage Server (MSS) software resides on the Avaya S3400 platform with a Linux operating system. The MSS is used for storing and administering subscriber mailboxes. The Avaya MSS stores all voice, fax, and text messages that a subscriber receives. The Avaya

MSS does not have access to messages that were sent to the subscriber's mailbox on a separate corporate e-mail server. To manage attributes for Avaya Modular Messaging subscribers and Modular Messaging system data, the MSS uses an LDAP directory service.

The Avaya MSS is available in two configurations:

- Avaya MSS—S, the standard-availability configuration

- Avaya MSS—H, the high-availability configuration

For information on the capacities of the Avaya MSS—S and MSS—H, see Avaya Message Storage Server capacities on page 11-4.

For increased security, performance, control, and application management, the Avaya MSS is connected to the messaging application server (MAS) by means of a private Ethernet LAN.

An Avaya Message Storage Server (MSS) is designed such that it has no administratively activated offline mode.

Microsoft Exchange server

Microsoft Exchange

Avaya Modular Messaging supports the Microsoft Exchange Server 2003, Microsoft Exchange 2000 server, and Microsoft Exchange 5.5 server. For each Modular Messaging subscriber, the Microsoft Exchange server provides a single message store that holds all messages—voice, text, corporate e-mail, and fax—that the subscriber receives. To manage attributes for Avaya Modular Messaging subscribers and MAS units, Microsoft Exchange server, except for Microsoft Exchange 5.5 server, uses Active Directory.

Note: New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

IBM Lotus Domino server

IBM Lotus Domino

For each Modular Messaging subscriber, the IBM Lotus Domino server provides a single message store that holds all messages—voice, text, corporate e-mail, and fax—that the subscriber receives. To manage attributes for Avaya Modular Messaging subscribers and MAS units, Domino uses the Domino Directory.

Avaya Modular Messaging—IBM Lotus Domino version supports the IBM Lotus Domino Server 6.5, IBM Lotus Domino Server 6.0, and IBM Lotus Domino Server 5.0.10.

> **Note:** Modular Messaging—IBM Lotus Domino requires IBM
> Lotus Domino Unified Communications (DUC) 1.2.2.

Directory server

A directory server is the server that contains information about
subscribers.

In Avaya Modular Messaging—Microsoft Exchange version (Exchange
2000 and Exchange 2003 environments), the directory server must be an
Active Directory Domain controller configured as a global catalog. This
server may be the same as the Exchange server, or it can be a separate
machine. In Avaya Modular Messaging—Microsoft Exchange version
(Exchange 5.5 environment), the directory server can be any Exchange
5.5 server.

> **Note:** New installations of Modular Messaging do not support
> Microsoft Exchange 5.5 server.

In Avaya Modular Messaging—IBM Lotus Domino version, the
Directory runs on each IBM Lotus Domino server. This Directory
manages addressing for IBM Lotus Domino and Modular Messaging
subscribers.

4

Modular Messaging interfaces

This chapter provides a description of the Modular Messaging interfaces that are available to subscribers and callers.

It also provides an introduction to voice mail domains.

This chapter includes the following topics:

- Telephone user interfaces on page 4-2

- Graphical user interfaces on page 4-14

- Unified Communication Center Speech Access on page 4-27

- Administrative and management interfaces on page 4-28

- Voice mail domain on page 4-33

Note: For information on Simple Network Management Protocol (SNMP), see SNMP with Modular Messaging on page 5-11.

Telephone user interfaces

A telephone user interface (TUI) provides subscribers and callers access to Avaya Modular Messaging, from a touch-tone telephone.

The Modular Messaging TUI presents two interfaces:

- The caller interface

- The subscriber interface

The caller interface

This interface interacts with unauthenticated callers that can, on successful authentication, reach the subscriber interface. The caller interface includes the Automated Attendant, if enabled. With Modular Messaging, Release 2, the caller interface is also known as the Avaya Common Caller Interface (CCI). The caller interface can also be extended with Caller Applications.

Automated Attendant

The Modular Messaging Automated Attendant greets callers and guides them through the process of calling subscribers. Administrators can configure the Automated Attendant to enable callers to dial subscribers by spelling the name using touchtone keys.

If the called subscriber is not reachable, callers are presented with the caller interface. Callers can leave voice messages or fax-only messages for subscribers. Callers calling in to a Modular Messaging—MSS system can also leave voice-and-fax messages for subscribers. For more information, see Avaya Common Caller Interface on page 4-3.

However, if the telephone system is configured to support supervised transfers, callers return to the Automated Attendant that guides callers through the process of leaving messages for subscribers. Callers can also page the subscriber or notify the subscriber, provided the system is suitably configured.

Callers can also transfer the call to a designated operator, or to a designated personal operator, provided an active schedule exists for the personal operator. An operator can be designated for the entire voice mail domain, and a personal operator can be designated on a per-subscriber basis.

If the telephone system supports Direct Inward Dialing (DID), callers can dial the extension number of subscribers, without having to go through the Automated Attendant. If such callers are not able to reach the called subscribers, they use the CCI to leave messages for subscribers.

Note: Avaya recommends that administrators set up the system to use the Automated Attendant if the telephone system does not support DID. If the Automated Attendant is disabled, some Call Answering functionality, such as transfers to subscriber telephones will not be available. The Automated Attendant is enabled by default.

The caller interface can be extended by means of Caller Applications. For more information, see

Scheduling capabilities of the Automated Attendant

Modular Messaging administrators can configure the TUI caller interface, excluding Caller Applications, to exhibit scheduled behavior with respect to the prompts that callers hear on connecting to the system.

The Voice Mail System Configuration (VMSC) tool on the MAS can be used for the first level of configuration, which relates to recurrent daily behavior. For each day of the week, the hours in which the office is open can be specified and the prompts to be played during those specific hours can be configured. These prompts greet callers during designated business hours.

Administrators can also set Holiday schedules for the Automated Attendant, which override any recurrent weekly behavior that may have been defined. The Automated Attendant Holiday prompts can be configured to play on specific dates, for example, when the office is closed for a public holiday.

The system supports up to 18 holiday prompts for a voice mail domain.

Avaya Common Caller Interface

Avaya MSS

Callers that reach the mailbox of an Avaya Modular Messaging subscriber, either because the extension is busy or because there is no response, are presented with the Avaya Common Caller Interface (CCI).

The CCI provides all callers with the same set of options, regardless of the TUI assigned to the called subscriber.

Note: The CCI is presented if the system setup does not support supervised transfer.

Selecting a language when leaving a Call Answer message

Messages that the caller leaves for a subscriber are known as Call Answer messages.

If the system Automated Attendant has been configured to support only one language, all system prompts and announcements played to Call Answer callers are played using the default system language.

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Planning Guide

If the system Automated Attendant has been configured to support multiple languages, Call Answer callers can select a language for all subsequent system prompts and announcements. Callers are given the opportunity to select a language before the system plays the subscriber's personal greeting or the system greeting.

For more information on selecting a language, see *Avaya Modular Messaging Release 2 Telephone User Interface Guide*, 11-300240.

Options available when using the CCI

When a caller reaches the mailbox of a subscriber and is presented the CCI, the CCI plays the options the caller can use to leave a message for the called subscriber.

Note: If a Caller Application is associated with a called extension and the call is then redirected to the TUI, the Caller Application is executed instead of the default CCI call handling.

When presented with the CCI, callers can:

- Listen to the active greeting

- Listen to the instructions for recording messages

- Record and send a voice message or send a fax message. Modular Messaging—MSS subscribers can also send a fax message with voice annotations.

- Set delivery options and send the message. Delivery options include marking a message urgent, marking a message private, and including a fax message.

  Note: An MAS-administrative setting determines if callers can leave private Call Answer messages. For more information, see Creating private Call Answer messages on page 5-44.

- Exit from the CCI

- Transfer the call to the system operator

- Log in to a mailbox

- Transfer to another mailbox

For more information on using the CCI, see *Avaya Modular Messaging Release 2 Telephone User Interface Guide*, 11-300240.

Caller Applications   Caller Applications are a collection of menus and prompts that enable administrators to extend those parts of the Modular Messaging telephone user interface (TUI) that are accessible to callers.

Using Caller Applications, administrators can extend the system Automated Attendant and the Common Caller Interface (CCI), depending on the requirements of the organization.

Some basic functions that a Caller Application can provide are transferring callers to a specified mailbox, allowing callers to record messages, sending messages to either a mailbox number or an e-mail address that is configured as part of the Caller Application, and providing directory assistance for callers to use the dial-by-name functionality of the TUI.

Caller applications can perform additional functions, such as:

- Automating call handling and routing incoming calls directly to departments within the organization

- Creating daily 'bulletin board' announcements for callers and subscribers

- Allowing for greater flexibility and more options with respect to system and personal greetings

Note: Caller Applications are created using the Caller Applications Editor. For more information, see Caller Applications Editor on page 3-4.

Difference between a Caller App and an Aria Mailbox Type

The Octel 250/350 series of voicemail systems allows extensive customization of the telephone user interface through the use of Enhanced Call Processing (ECP) mailboxes and other types of mailboxes.

A Caller Application is not a mailbox. Specifically, it does not require that a mailbox be created on the message store, or be dedicated to its use. A Caller Application contains one or more nodes, each of which can interact with the caller, and pass control to another node. The actions which a particular node performs will correspond, in many cases, to actions performed by a certain Aria mailbox type.

Not all Aria mailbox types are emulated by Caller Applications. A Caller Application is best thought of as a single-digit menu or as nested automated attendants, comprising a collection of actions of the various types supported, that is:

- Menu (simple, or with extension, mailbox or caller app)

- Transfer (operator, extension or mailbox)

- Goto

- Conditional goto

- Send message (to mailbox or e-mail address)

- Termination (disconnection, default automated attendant or to mailbox logon)

These actions can be combined as required to produce useful applications. There is enough flexibility to duplicate, or at least approximate, the functionality of certain Aria mailbox types.

Scheduling capabilities of Caller Applications

Caller Applications provide scheduling capabilities that determine the behavior of Caller Applications, depending on the time of day. The Caller Application routes callers as per the definitions of the schedule created for a conditional branch within the application.

For example, a schedule can be created such that:

- When the schedule is active, callers are transferred to live help

- When the schedule is inactive, callers are transferred to a mailbox, where they can record a message

Caller Applications also enable administrators to specify the hours during which the schedule is active, in a week.

Caller Application schedules are weekly and recurring and do not permit any exceptions to this recurrence.

For more information, see *Avaya Modular Messaging Caller Applications*, EF-MES2141-01, available in the Messaging White Papers Resource Library on the Avaya website (www.avaya.com).

The subscriber interface

The subscriber interface interacts with authenticated subscribers, providing them access to mailboxes, from a touch-tone telephone. When subscribers are away from the office, they can dial into their mailboxes from the TUI to check their messages. This interface cannot be extended.

Avaya MSS

Earlier versions of Modular Messaging provided only an Octel Aria-based telephone user interface (TUI). Modular Messaging—MSS Release 2 offers subscribers an additional TUI option that is similar to the TUI of Intuity AUDIX and Definity AUDIX voice messaging systems.

Administrators can assign subscribers the TUI of their choice, on a class-of-service (COS) basis.

The Modular Messaging TUIs make it easier for organizations to migrate from:

- An Intuity AUDIX voice messaging system or a DEFINITY AUDIX system to a Modular Messaging—Avaya MSS (Release 2) system

- An Aria (Octel 250/350) system to a Modular Messaging— Avaya MSS (Release 2) system

The Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging are similar to but not exactly the same as the Aria and Intuity AUDIX messaging systems.

Modular Messaging provides some interfaces that are common to all its subscribers, regardless of their assigned TUIs. Modular Messaging also provides callers, trying to leave a message, with a common caller interface and set of prompts, regardless of the TUI option that the target mailbox has configured against it.

Common subscriber login interface

All Modular Messaging subscribers use the same interface up to the point of logging in to their mailboxes.

When subscribers dial the access number, they are greeted by the system Automated Attendant. The Automated Attendant announces the options a subscriber must use to reach a mailbox. Depending on whether the extension that the subscriber is using has an associated mailbox on the system, the Automated Attendant prompts the subscriber for either the password or the mailbox number and password.

Common Call Me interface

Modular Messaging Call Me is a feature that enables the system to schedule calls to subscribers at one or more designated telephone numbers when messages that meet certain criteria arrive in the mailbox. When answering a Call Me call, the subscriber is invited to log in to Modular Messenger in order to review the message or messages.

All Modular Messaging subscribers use a common interface when answering Call Me calls. This interface identifies the called subscriber and provides a set of instructions for performing the following operations:

- Logging in to the mailbox by entering the mailbox number and password. After a subscriber logs in, the TUI assigned to the subscriber is used.

- Receiving the call

- Canceling further notifications for the current messages. This option deactivates Call Me for only the current messages. Call Me will continue to remain active for the next new message.

- Blocking all further calls to the called number. This option cancels all further calls to the called number.

Features of the subscriber interface

Using the TUIs, subscribers can:

- Retrieve, respond to, create, and send messages. The TUIs provide subscribers with a friendly and easy way to record, send, reply to, or forward messages.

  — Modular Messaging—MSS subscribers can access and respond to voice, fax, and text messages.

  — Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino subscribers can access and respond to text, corporate e-mail, fax, and voice messages. The Modular Messaging text-to-speech feature converts corporate e-mail messages to speech, so that subscribers can listen to them as conveniently as they can to voice messages.

- Reply to a Call Answer message and call the originator of a Call Answer message, provided the message was left by a caller in the same voice mail domain.

- Call the extension of the sender, provided the message was sent by a caller in the same voice mail domain and that the telephone system can handle extension number details.

- Access offline Call Answer messages. When the message store is not available, Modular Messaging continues to provide Call Answering services. Subscribers with the Modular Messaging Aria TUI can gain access to offline Call Answer messages. For more information, see Offline access to Call Answer messages on page 5-23.

  Note: Modular Messaging AUDIX TUI subscribers cannot access new Call Answer messages while the message store is offline.

- Access private messages (Modular Messaging—MSS only). With Modular Messaging—MSS Release 2, subscribers can access private messages from the TUIs. Depending on the Privacy Enforcement Level (PEL) setting administered for the system, the TUIs may restrict subscribers from forwarding the message and replying to the private message with the original attached. For more information on the PEL setting, see The Privacy Enforcement Level privacy parameter on page 5-45.

- Create private messages (Modular Messaging—MSS only). With Modular Messaging—MSS Release 2, subscribers can mark new messages as private.

- Access personal configuration options. Subscribers can set up call handling and customize greetings.

> **Note:** Modular Messaging AUDIX TUI subscribers cannot perform certain kinds of personal configuration, such as enabling or disabling Notify Me and Find Me. Modular Messaging AUDIX TUI subscribers cannot record Caller Application announcements.

- Create, modify, and delete Personal Distribution Lists (PDLs).

- Address messages to PDLs using the PDL Name or the PDL List number.

Common mailbox model

Modular Messaging provides a mailbox model that is common to subscribers of the Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging.

A common mailbox model includes:

- Common message categories

- Common Message Waiting Indicator status

- Common Call Answer greetings

Message categories

Modular Messaging messages are stored in two message categories— 'New' and 'Saved.' These categories are consistent with standards-based e-mail clients, and are also common to the Modular Messaging TUIs.

New messages

Messages that are received in a subscriber mailbox are stored in the New message category when they meet any of the following criteria:

- The subscriber has not accessed (listened to or viewed) the contents of the message, also known as the message body. The subscriber may or may not have accessed the envelope or header information of the message.

- The subscriber has accessed the message body and has used the available TUI options to explicitly retain the message as New.

- The subscriber has moved the message from the Saved category back to the New category.

- The subscriber has marked read messages as unread, from graphical user interface (GUI) clients.

The Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging present these messages as New messages. Standards-based e-mail clients may present these messages as New, Unseen, Unread, and so on.

Saved messages

Messages that are received in a subscriber mailbox are stored in the Saved message category when they meet any of the following criteria:

- AUDIX TUI for Modular Messaging. The subscriber has accessed the contents of the message. The subscriber may have accessed the whole message or may have partially accessed the message.

- Aria TUI for Modular Messaging. The subscriber has accessed the message and has used the available TUI option to save the message.

The Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging present these messages as Saved messages. Standards-based e-mail clients may present these messages as Old, Seen, Read, and so on.

When using Client Add-in for Microsoft Outlook, subscribers of Modular Messaging—Avaya MSS can mark read messages as unread, thus moving messages from the Saved category to the New category.

When subscribers move messages from the Saved category to the New category, the system activates or deactivates the following features:

- MWI. The system activates MWI for the moved message if the message meets the subscriber-defined MWI rule. Broadcast messages that are moved to the New category do not activate MWI.

- Call Me. The system activates Call Me for the moved message only if the delivery time of the message is after the time that the subscriber last logged in from the TUI.

- Notify Me. The system does not activate Notify Me for the moved message, as Notify Me is currently triggered only during Call Answer.

Message Waiting Indicator Status

The AUDIX TUI for Modular Messaging and the Aria TUI for Modular Messaging behave in a common fashion when activating and deactivating the Message Waiting Indicator (MWI) feature.

Note: Broadcast messages do not activate MWI.

New messages

When the mailbox of a subscriber has one or more new messages, the system activates MWI, provided the new messages meet the subscriber-defined MWI rules. When subscribers access a message and use a TUI option to retain the message in the New message category, or

when subscribers move a message from the Saved category to the New category, the system activates MWI.

Saved Messages

Messages in the Saved category do not activate MWI.

Call Answer greetings

Subscribers can set up the Modular Messaging TUIs to play personalized greetings to callers.

> **Note:** If a called extension is associated with a Caller Application and the call is redirected to the TUI, the Caller Application is executed instead of the default CCI call handling. In this case, when callers reach a subscriber mailbox, they hear the menus or announcements of the Caller Application, instead of the subscriber greeting.

The Modular Messaging TUIs support the following types of greetings:

■ Personal greeting

Subscribers can use this greeting to greet all callers that reach their mailboxes.

■ Extended Absence Greeting (EAG)

Subscribers can use the EAG to inform a caller that they are away from office and may have infrequent or no access to their messages. Callers cannot dial-through an EAG.

■ Optional greetings

Modular Messaging provides two optional greetings: Optional Greeting 1 and Optional Greeting 2. Subscribers can use these optional greetings to administer a call type, also known as Call Handling. With the Call Handling feature, subscribers can administer the system to differentiate between calls that reach a mailbox because an extension is busy (Busy calls) or because there is no answer (No Answer calls). Subscribers can decide which optional greeting to activate for Busy calls and No Answer calls.

> **Note:** Modular Messaging can differentiate between Busy calls and No Answer calls only if the telephone system provides this information for Call Answer calls.

Multilingual support

Administrators can configure the system so that the Modular Messaging telephone user interfaces (TUIs) supports multiple languages.

Administrators and subscribers can use these languages as follows:

- Administrators can identify one language as the default language for the system. The TUIs plays all announcements and prompts in this language, unless otherwise instructed.

- Administrators can assign up to three languages to the Automated Attendant. TTY/TDD may be assigned as one of the languages.

- Subscriber Options lets subscribers select their preferred TUI language for their mailbox, out of nine maximum languages loaded on the system. All TUI prompts are played in the selected language. If subscribers do not specify a language, the system uses the default language. The language selected for the mailbox is used for logged in messaging sessions and not for Call Answer sessions.

Multilingual support for subscriber log-in. The prompts that a subscriber hears when logging in to the system are played in the default language of the system, up to the point of logging in. Once the subscriber successfully logs in to the mailbox, all subsequent prompts are played in the language administered for the mailbox.

Multilingual support for Automated Attendant. Administrators can assign multiple languages to the Automated Attendant, so that when the Automated Attendant greets callers, callers can select the language they prefer. All subsequent prompts and announcements from the Automated Attendant, caller applications, and Call Answer during that call are played in the selected language. Callers calling from TTY devices can select TTY/TDD as a language.

Multilingual support for Call Answer. When callers reach the subscriber mailbox, they are given the opportunity to select a language, provided multiple languages are assigned to the Automated Attendant. All subsequent prompts and announcements during that Call Answer session are played in the selected language. If multiple languages are not defined for the system Automated Attendant, the default system language is used for the duration of the Call Answer session.

Note: Callers calling from TTY devices may not be able to leave Call Answer messages if their TTY device cannot dial touchtones after a call is in progress.
Modular Messaging presents a list of language options to callers as the first prompt they hear when calling in to the system. TTY is one of the language options provided. Callers can select the desired language by pressing the appropriate

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key on their touchtone keypads. Callers that are using a TTY device that cannot enter touchtones after a call is in progress cannot select the TTY language in order to leave a message.

Multilingual support for Caller Applications.

A Caller Application can contain interact with callers in different languages.

A Caller Application runs in the default TUI language for the voice mail domain, unless a caller has previously interacted with the Automated Attendant and has chosen a different language.

When a multilingual Caller Application replaces the system Automated Attendant, only the default TUI language defined for the voice mail domain is played to callers, provided this language exists in the Caller Application. Callers are not provided an opportunity to choose a language before the Caller Application starts to run. However, Caller Applications can be modified to offer callers a choice of languages by providing a suitable interface. One way to do this is to create a Caller Application that collects the caller's choice of language, and which branches to other Caller Applications according to their choice.

For more information, see *Avaya Modular Messaging Caller Applications*, EF-MES2141-01, available in the Messaging White Papers Resource Library on the Avaya website (www.avaya.com).

Graphical user interfaces

Depending on the system Privacy Enforcement Level setting, Modular Messaging subscribers can use graphical user interfaces (GUIs), such as Avaya GUI clients or standards-based clients to access their mailboxes. Graphical user interface clients are applications that enable subscribers to access their mailboxes from a desktop PC. These applications provide subscribers a visual interface to perform various operations, such as accessing and sending messages, managing messages, configuring mailboxes, and maintaining mailboxes, rules, greetings, and TUI and GUI preferences.

For more information on the Privacy Enforcement Level (PEL) setting and its impact on GUI-access to mailboxes, see The Privacy Enforcement Level privacy parameter on page 5-45.

Modular Messaging subscribers can use the following GUIs to access their mailboxes:

- GUIs for Modular Messaging—MSS subscribers

  — Client Add-in for Microsoft Outlook. This Avaya add-in creates a new inbox for Modular Messaging messages, separate from the corporate e-mail inbox. Subscribers can access, send, and manage messages from this new inbox, from within the Microsoft Outlook e-mail application. For more information, see Client Add-in for Microsoft Outlook on page 4-16.

  — Subscriber Options. An application that subscribers can use to modify their mailbox settings from a desktop PC. With Modular Messaging—MSS, Subscriber Options integrates with the Microsoft Outlook e-mail client. Subscriber Options also works as a standalone application for subscribers that do not use IMAP4 access, or that do not use the Microsoft Outlook e-mail client.

  — Avaya Modular Messaging Web Client. This Avaya client enables subscribers to access, send, and manage voice, text, fax, and corporate e-mail messages, from a Web browser. Modular Messaging Web Client cannot be used for mailbox configuration. For mailbox administration functions, subscribers can use the TUIs or Subscriber Options.

  — Standards-based clients. Subscribers can use IMAP4 and POP3 clients for message access. Standards-based clients cannot be used for mailbox configuration. For mailbox administration functions, subscribers can use the TUIs or Subscriber Options. For more information, see

Standards-based clients with Modular Messaging—MSS on page 4-25.

- GUIs for Modular Messaging—Microsoft Exchange subscribers

  — Client Add-in for Microsoft Outlook. This Avaya add-in enables subscribers to receive voicemail in their existing e-mail inbox. Just as with e-mail, subscribers can access, send, and manage voicemail, from within the Microsoft Outlook e-mail application. For more information, see Client Add-in for Microsoft Outlook on page 4-16.

  — Subscriber Options. An application that subscribers can use to modify their mailbox settings from a desktop PC. With Modular Messaging—Microsoft Exchange, Subscriber Options integrates with the Microsoft Outlook e-mail client. Subscriber Options also works as a standalone application for subscribers that do not use the Microsoft Outlook e-mail client.

  — Outlook Web Access (OWA). This Web client provides subscribers with a single interface for access to voicemail and corporate e-mail messages, stored in a common inbox on the Microsoft Exchange message store. OWA provides the ability to listen to messages, but does not provide recording capabilities for replying with voice or composing new voice messages.

  — Any other e-mail client that Microsoft Exchange supports.

- GUIs for Modular Messaging—IBM Lotus Domino subscribers

  — IBM Lotus DUC with IBM Lotus Notes. Subscribers can integrate IBM Lotus Domino Unified Communications (DUC) software with their IBM Lotus Notes client. When DUC is installed with Modular Messaging—IBM Lotus Domino, subscribers can use their IBM Lotus Notes e-mail client for access to voicemail and corporate e-mail messages.

  — iNotes. Also known as IBM Lotus Domino Web Access, iNotes is a Web client that subscribers can use to access their mailbox on the IBM Lotus Domino store. iNotes provides subscribers with a single interface for access to voicemail and corporate e-mail messages, stored on the IBM Lotus Domino message store. iNotes provides listen and record capabilities to facilitate replying and composing messages with voice.

  — Subscriber Options. With Modular Messaging—IBM Lotus Domino, Subscriber Options can be installed either by installing the DUC application or by installing Subscriber Options as a standalone application. For more information, see Subscriber Options on page 4-21.

— Any other e-mail client that IBM Lotus Domino supports.

Client Add-in for Microsoft Outlook

Client Add-in for Microsoft Outlook is an application that integrates with the Microsoft Outlook program and provides subscribers access to mailboxes.

The application allows subscribers to create new voice messages, reply to any message type with a voice message, and forward any message type with a voice message—all from within the Microsoft Outlook e-mail client application.

Note: Modular Messaging—IBM Lotus Domino does not support Client Add-in for Microsoft Outlook.

Avaya MSS

Modular Messaging—MSS

Client Add-in for Microsoft Outlook provides subscribers an integrated view of their messages, with voice and fax messages in the Modular Messaging inbox, that is separate from the corporate inbox.

The Modular Messaging inbox stores voice, text, and fax messages. In the Modular Messaging inbox, various messages types are differentiated by specialized icons. Subscribers can use Client Add-in for Microsoft Outlook to send, review, forward, and reply to messages, from within Outlook.

Client Add-in for Microsoft Outlook enables subscribers to create and to access private messages, under suitable administration of the privacy settings.

Subscribers can keep copies of messages that the Modular Messaging inbox receives. Subscribers can copy messages from the Modular Messaging inbox to other folders, such as a folder in the corporate inbox or on the desktop. However, subscribers cannot copy messages from other folders or inboxes into the Modular Messaging inbox.

When subscribers use Client Add-in for Microsoft Outlook to retrieve voice messages, they can either play the message locally on the PC or on the telephone. With Modular Messaging—MSS, when playing messages on the telephone, the audio content is streamed from the MSS to the client and then to an MAS for playback over the telephone. Because of this double transfer, Client Add-in for Microsoft Outlook is not recommended for remote use.

Microsoft Exchange

Modular Messaging—Microsoft Exchange

Client Add-in for Microsoft Outlook provides subscribers a unified view of all their voicemail, text, corporate e-mail, and fax messages. Voice messages are stored in the same inbox that receives corporate e-mail messages, and are differentiated by an icon. Subscribers can use Client Add-in for Microsoft Outlook to send, review, forward, and reply to voicemail, fax messages, text messages, and corporate e-mails, from within Outlook.

With Modular Messaging—Microsoft Exchange, when Client Add-in for Microsoft Outlook subscribers play a voice message on the telephone, the message is not transferred to the client. Hence, the connection rate from the client to the MAS does not affect responsiveness. For example, if a subscriber uses a dial-up connection to play a voice message, and if the subscriber has two telephones available, a message played on the telephone is likely to provide much better responsiveness than local play.

Client Add-in for Microsoft Outlook components

Client Add-in for Microsoft Outlook provides the following tools:

- Avaya Modular Messaging Voice Form. For more information, see Voice Form on page 4-17.

- Avaya Modular Messaging Voice Recorder. For more information, see Voice Recorder on page 4-19.

- Subscriber Options (Voice Mail tab). For more information, see Subscriber Options on page 4-21.

- Service Providers (Modular Messaging—Avaya MSS). For more information, see Service Providers (Modular Messaging—Avaya MSS) on page 4-19.

Voice Form

The Voice Form allows subscribers to review, record, and send voice messages from Microsoft Outlook. The Voice Form includes a voice control that can be used to create and play voice messages, using either a telephone or local multimedia. The voice control provides familiar audio controls, such as, pause, stop, skip ahead, and skip back. When playing multi-part voice content, such as voice messages forwarded with voice comments, the voice control presents the message as a single stream of audio.

Subscribers can use the Voice Form to also address messages to Personal Distribution Lists (MSS version) and global distribution lists (Exchange version).

For more information on addressing messages to Personal Distribution Lists, see Addressing from GUI clients on page 5-39.

The Voice Form provides the following features:

- Directory access for addressing message recipients. With Modular Messaging—MSS, the Voice Form also provides directory access for addressing messages to PDLs.

   With Modular Messaging—MSS, the Voice Form provides access to the MSS directory. The MSS directory includes the Modular Messaging Global Address List, the Modular Messaging Personal Distribution List, and Personal Contacts.

   With Modular Messaging—Microsoft Exchange, the Voice Form provides access to the Global Address List and Personal Contacts.

- User preferences

   Using the Voice Form, subscribers can set such user preferences as:

   — automatic playback of voice messages

   — request for notification of voice messages that are delivered and opened (Modular Messaging—Microsoft Exchange version only)

   — request for read receipt of all new voice messages sent (Modular Messaging—Microsoft Exchange version only)

- Message sensitivity and importance

   The Voice Form enables subscribers to set sensitivity and importance on a per-message basis.

- Message comment (Modular Messaging—Microsoft Exchange only)

   Using the Voice Form, subscribers can attach text comments to a voice message (new or opened). Modular Messaging—MSS does not support this feature. Subscribers can use message comments as search criteria, thus making it easier to locate specific messages.

- Message subject

   The Voice Form permits subscribers to add a text subject when creating a new message or when replying to or forwarding a message. This makes it easier for recipients to refer to messages when using a GUI client, or scanning via the TUI. With Modular Messaging—Microsoft Exchange, the Voice Form also enables subscribers to edit text subjects of messages they have received.

   Subscribers can use message subjects as search criteria, thus making it easier to locate specific messages.

- Message privacy

  The Voice Form permits subscribers to create private messages. Depending on the system Privacy Enforcement Level (PEL) setting and the Restrict Client Access COS value, the Voice Form also enables subscribers to access private messages. However, the Voice Form does not restrict the forwarding or saving of private messages, or replying to private messages with the original message attached.

Voice Recorder

Subscribers can use the Voice Recorder to record and send voicemail and voice-annotated items, without having to start up the Microsoft Outlook e-mail application. This tool works independently from the Voice Form.

Note: When sending messages, the Voice Recorder relies on certain capabilities of Microsoft Outlook, hence subscribers must have Microsoft Outlook installed and configured as their default e-mail client.

Service Providers (Modular Messaging—Avaya MSS)

Avaya MSS

With Modular Messaging—Avaya MSS, subscribers must configure the Modular Messaging Service Providers for their Microsoft Outlook profiles, before they use Client Add-in for Microsoft Outlook.

The Service Providers act as an interface between Microsoft Outlook and the Modular Messaging servers.

Configuring the Service Providers enables the Microsoft Outlook e-mail client to access the Modular Messaging directory as an address book, and to send and retrieve messages to and from the Modular Messaging system

For more information on the Client Add-in for Microsoft Outlook application, see *Avaya Modular Messaging Client Add-in for Microsoft Outlook User Guide*, 11-300241 available on the Modular Messaging documentation CD-ROM.

Installation of Client Add-in for Microsoft Outlook components

Two factors that decide whether all or some of the components of the Client Add-in for Microsoft Outlook are installed are:

- The Modular Messaging version (MSS, Microsoft Exchange, or IBM Lotus Domino message store)

- Whether or not Microsoft Outlook is installed

During installation, the Client Add-in for Microsoft Outlook setup program prompts the user to select the appropriate message store server, the options being, Avaya MSS, Microsoft Exchange, and IBM Lotus Domino. Depending on which message store is selected and whether or not Microsoft Outlook is installed, some or all components of Client Add-in for Microsoft Outlook are installed.

Table 4-1 explains various scenarios and the components that are installed.

For information on the supported Microsoft Outlook versions, see *Avaya Modular Messaging Client Add-in for Microsoft Outlook User Guide,* 11-300241.

Table 4-1.   Components of Client Add-in for Microsoft Outlook that are installed in various scenarios

Modular Messaging configuration	Microsoft Outlook installed?	Client Add-in components installed
Modular Messaging with an Avaya MSS	Yes	Subscriber Options, Voice Form, Voice Recorder Service providers to be configured
Modular Messaging with an Avaya MSS	No	Subscriber Options
Modular Messaging—IBM Lotus Domino version	Yes or no	Subscriber Options[1]
Modular Messaging—Microsoft Exchange version	Yes	Subscriber Options, Voice Form, Voice Recorder
Modular Messaging—Microsoft Exchange version	No	Subscriber Options

1.   When installed as a part of Client Add-in for Microsoft Outlook, Subscriber Options works as a standalone application for Modular messaging—IBM Lotus Domino systems, and does not integrate with the IBM Lotus Notes e-mail client.

Possible Microsoft Outlook profiles

Table 4-2 describes the possible configurations that might use the Microsoft Outlook e-mail client.

Table 4-2.   Possible Microsoft Outlook profiles

Modular Messaging configuration	E-mail server
Modular Messaging—Avaya MSS	Microsoft Exchange; used only for corporate e-mails
Modular Messaging—Avaya MSS	Any other vendor or no e-mail server

Table 4-2. Possible Microsoft Outlook profiles

Modular Messaging configuration	E-mail server
Modular Messaging—Microsoft Exchange version	Microsoft Exchange

Subscriber Options

Subscribers can use the Subscriber Options application to modify their mailbox settings from a desktop PC.

With Modular Messaging—MSS and Modular Messaging—Microsoft Exchange, Subscriber Options integrates with the Microsoft Outlook e-mail client. Subscriber Options also works as a standalone application for subscribers that do not use the Microsoft Outlook e-mail client.

With Modular Messaging—IBM Lotus Domino, Subscriber Options can be installed either by installing the DUC application or by installing the Client Add-in for Microsoft Outlook application.

When Client Add-in for Microsoft Outlook installs the Subscriber Options component, it attaches an additional property page to the e-mail options pages. Subscribers can use the **Voice Mail** tab to access Subscriber Options from Microsoft Outlook. Subscriber Options also appears as an option in the Programs submenu in Windows.

Subscribers Options is a component that Modular Messaging subscribers can use to modify their mailbox settings from a desktop PC. Subscribers can modify all or some of their mailbox settings, depending on how the mailbox is configured by the administrator.

With Subscriber Options, subscribers can compose greetings and set up preferences for using the telephone user interfaces (TUIs) and the GUI clients.

Subscribers can use Subscriber Options for the following:

- Configuring Call Handling

    Screen calls from the Automated Attendant, override call handling, and choose greetings for an extension that is busy or unanswered.

- Managing greetings

    Record spoken name, personal greeting, Please Hold prompt, optional greetings, and Extended Absence Greeting (EAG)

- Configuring settings for the TUIs

  Sort messages in the Inbox by priority or by order in which they were received, specify fax number for printing faxes, prompt language for mailbox, rules for new message alerts

- Setting rules for special features:

  — Find Me to schedule the redirection of unanswered calls to one or more telephone numbers

  — Call Me to schedule calls to subscribers at one or more designated telephone numbers when messages that meet certain criteria arrive in the mailbox

  — Notify Me to notify subscribers of new Call Answer messages in the mailbox and of missed incoming calls, if requested by the caller

  — Message Waiting Indicator to alert subscribers when messages meeting specified criteria arrive in their mailbox

- Creating and managing Personal Distribution Lists (applicable only to Modular Messaging—MSS)

  Modular Messaging—MSS subscriber can create new Personal Distribution Lists (PDLs) and modify or delete existing PDLs. For more information, see Working with PDLs on page 5-36.

For more information, see *Avaya Modular Messaging Subscriber Options*, 585-310-789 (Issue 2), available on the Modular Messaging documentation CD-ROM.

Desktop deployment of Client Add-in for Microsoft Outlook and Subscriber Options

To facilitate desktop deployment of Client Add-in for Microsoft Outlook and Subscriber Options, organizations can:

- Place the software on a server, to make it available to subscribers for download.

- Push software to subscribers by means of Microsoft Systems Management Server (SMS). SMS allows the distribution of software over a network to client computers with little to no intervention from the computer user.

- Use the Software Installation component of the Active Directory Group Policy Editor to centrally manage a push of software to desktops.

Avaya Modular Messaging Web Client

Avaya MSS

Avaya Modular Messaging Web Client enables subscribers to use a Web browser for visual access to their Modular Messaging messages and to corporate e-mail messages.

Modular Messaging Web Client does *not* support access to Avaya legacy messaging servers, such as Octel or the Intuity AUDIX servers.

Modular Messaging Web Client provides a visual interface that subscribers can use to create, send, receive, reply to, forward, and organize their messages from the Modular Messaging mailbox. Subscribers can listen to voice messages and view fax messages and text messages from a PC.

Modular Messaging Web Client provides subscribers the option to download the Avaya Voice Player application for playing and recording voice messages.

From Modular Messaging Web Client, subscribers can also send messages to the Personal Distribution Lists (PDLs) they own. For information on addressing messages to PDLs, see Addressing from GUI clients on page 5-39.

The Modular Messaging Web Client inbox presents visual indicators, known as message flags, that help subscribers to easily identify broadcast messages, priority messages, private messages, and delivery failures.

Note: Avaya strongly recommends that a virus protection software with the latest updates are installed on the Web server.

Modular Messaging Web Client provides the following:

- An integrated view of voice, fax, and text messages in the Modular Messaging mailboxes of subscribers.

- Message organizational capabilities, such as:

  — Sorting messages by type, sender, subject, folder, or receipt time

  — Searching for a particular message

  — Moving messages within the Inbox from one folder to another. Subscribers can move New messages to the Deleted or Saved folders, saved messages to the Deleted folder, and deleted messages to the Saved folder.

■ Directory Browsing

Provides access to the Modular Messaging voice server directory, so that from the directory, subscribers can search for other users and address messages to them.

■ Choice of language to view the interface

Provides subscribers a choice of languages such as US English, French, International Spanish, Italian, German, or Brazilian Portuguese, to view the interface.

■ Support SSL for secured access

Modular Messaging Web Client supports Secure Sockets Layer (SSL) Web connections. However, customers must configure SSL on the Web server (as per the configuration supported by IIS) prior to installing the Web Client.

Note: Whether Web browsers connect using SSL is dependent only on the Web server configuration, and not on any settings in the Modular Messaging Web Client application.

■ Access to e-mails on a corporate e-mail server

Using the IMAP4 protocol, Modular Messaging Web Client provides subscribers access to e-mail messages stored on a separate, corporate e-mail server. Subscribers can view, reply to, forward, create, send, save, and delete e-mail messages. Subscribers can also access the corporate LDAP directory to address e-mail messages.

■ Maximum message privacy enforcement

When subscribers access messages that are marked 'private', Modular Messaging Web Client provides an appropriate indication to subscribers. Irrespective of the system Privacy Enforcement Level (PEL) setting for the voice mail domain, Modular Messaging Web Client always enforces maximum message privacy—subscribers cannot forward private messages. For more information on the PEL settings, see

Administrators can configure Modular Messaging Web Client to support only dual-connect (telephone-playback only) mode. This prevents voice messages from being played locally on the PC, downloading of voice messages, and caching of voice messaging on the PC.

- Text subject creation

  Subscribers using Modular Messaging Web Client can create a text subject when composing a new message. A text subject makes it easier for recipients to refer to the message when using a GUI client or scanning via the TUI. Subscribers can create a subject text when creating a message; subscribers cannot change subject texts once messages have been sent or received.

Notes:

- For information on using Web Client, see the online Help system provided with the application.

- For information on the system requirements for Modular Messaging Web Client, see Modular Messaging Web Client requirements on page B-15.

Standards-based clients with Modular Messaging—MSS

Avaya MSS

With the appropriate privacy settings, Modular Messaging subscribers can use standards-based e-mail clients to receive, send, and manage messages from a desktop PC.

Subscribers can access and deal with messages using a wide variety of clients that support either of the IMAP4 or POP3 e-mail standards. Such clients include Microsoft Outlook, Microsoft Outlook Express, and IBM Lotus Notes.

Although most clients support both IMAP4 and POP3, some, such as some versions of Microsoft Outlook, only support the older POP3 protocol. When using a standards-based client with Modular Messaging, Avaya strongly recommends use of IMAP4. POP3 clients copy messages from the subscriber's mailbox and act on the local copy without informing the server of status changes, for example whether a message has been read or deleted.

Likewise, the local copy has no awareness of the message status on the original message store. Thus, if a POP3 user pulls copies of their voice messages into their e-mail client, and later uses the TUI to delete a message from the message store, the local copy of the message in the e-mail client will remain.

In contrast, IMAP4 clients act on the message stored on the server so message status is synchronized with the actions of other clients such as the TUI.

For more information, see *Avaya Modular Messaging Client Access to a Subscriber Mailbox*, 585-310-790 (Issue 2), available on the Modular Messaging documentation CD-ROM.

Avaya support policy for third-party clients

Avaya Modular Messaging is standards-based, which includes IMAP4 access to messages from user client software packages (for example, Microsoft Outlook and IBM Lotus Notes). Avaya has conducted successful interoperability testing with Microsoft Outlook 2002, Microsoft Outlook 2000, Microsoft Outlook Express 5.0, IBM Lotus Notes R6, and IBM Lotus Notes R5. Furthermore, Avaya acknowledges that customers have reported successful integration of GroupWise with Avaya Modular Messaging and acknowledges that our customers may integrate other IMAP4 user client software packages with Avaya Modular Messaging. Avaya, however, makes no representations, warranties, or guarantees regarding specific capabilities with specific IMAP4 clients or successful integration or interoperability thereof. Avaya's product support is limited to IMAP4 as it is implemented on Avaya Modular Messaging and does not include support for specific e-mail clients.

IBM Lotus Notes with IBM Lotus DUC

IBM Lotus Domino

From the IBM Lotus Notes proprietary client on a Windows PC, subscribers can use the following IBM Lotus Domino Unified Communications (DUC) services:

- Integrated voice mailbox

  A specialized IBM Lotus Notes mail file provides a combined Inbox for all messages, as well as a Voice Inbox tailored for voice message display and management.

- Voice Message Form with Player/Recorder

  The Voice Message Form, while maintaining the look and feel familiar to both Notes and iNotes Web Access clients, includes an integrated player/recorder that subscribers use to create and play voice messages, from either a telephone or a multimedia PC. The player/recorder provides familiar audio controls, such as, pause, stop, skip ahead, and skip back.

- Subscriber Options

  Using Subscriber Options, subscribers can modify their mailbox settings at any time from the Notes client and Domino Administrator client. For more information, see Subscriber Options on page 4-21.

Unified Communication Center Speech Access

Unified Communication Center Speech Access (UCC Speech Access) is a complementary Avaya product providing a speech user interface that supports all versions of Modular Messaging.

Using speech recognition and text-to-speech technology, UCC Speech Access communicates with callers in spoken English, enabling mobile professionals to access business computer resources from any telephone. UCC Speech Access also provides access to voicemail messages, Call Answering, and follow-me/hold-my-calls filtering.

Further, with the use of Avaya Unified Communication Center, subscribers can launch phone calls, be they single-party or multi-party conference calls, all from a single session.

UCC Speech Access also provides e-mail reading capabilities. Modular Messaging—MSS subscribers do not have access to corporate e-mails from the Modular Messaging TUIs. However, they can use UCC Speech Access for text-to-speech conversion of corporate e-mail messages.

With all versions of Modular Messaging, UCC Speech Access can provide, among other things, speech access and voice control of voice and corporate e-mail messages.

UCC Speech Access enables subscribers to create and to access private messages. For more information, see Message Privacy on page 5-42.

For more information, see the UCC Speech Access client product documentation (Site Preparation Guide, Installation Guide, and Wallet Card) available at http://support.avaya.com.

Administrative and management interfaces

Modular Messaging provides administrators with different interfaces or tools for the administration of the Message Storage Server (MSS), messaging application server (MAS) units, and caller applications. In addition, Modular Messaging also provides a reporting tool for monitoring voicemail system usage.

Note: For information on the Caller Application Editor, used to create, deploy, and modify Caller Applications, see Caller Applications Editor on page 3-4.

Message Storage Server administration

Avaya MSS

The Web-based administrative interface of the MSS provides administration, diagnostics, and reporting capabilities, using a standard web browser from anywhere in the enterprise. Organization-wide administrative utilities can also be used, as specified in Ease of administration on page 1-6.

In addition to this Web-based administrative interface, Modular Messaging also supports the Mailbox Manager application or Avaya Integrated Management with Avaya Site Administration or Avaya Multi-Site Administration for MSS mailbox administration.

Mailbox Manager

Modular Messaging—MSS administrators can use the Mailbox Manager application for administration of subscriber data for Modular Messaging—MSS and for other Avaya voicemail products in an enterprise.

The Mailbox Manager application for Modular Messaging is a Windows interface for doing moves, adds, and changes on the MSS. The software maintains an offline database of subscriber and class-of-service data. Using this Windows interface, administrators can make changes to these records and send them to the MSS. The Mailbox Manager application for the Avaya MSS can be implemented in the following configurations:

- single administrator/single-site

- single administrator/multi-site

- multi-administrator/single-site

- multi-administrator/multi-site

A single Mailbox Manager client and database can be used to manage mailbox moves, adds, and changes across a heterogeneous mix of systems, such as:

- Modular Messaging with S3400 Message Storage Server

- Intuity AUDIX LX

- Intuity AUDIX MAP5/40/100

- Octel 250/350 (Aria)

- Octel 200/300 (Serenade)

This enables administrators to have a common look and feel to managing moves, adds, and changes for all their systems, and to centralize the administration of all mailboxes on these systems.

The Mailbox Manager application is typically installed on a desktop or laptop PC used by the system administrator. However, if the corporate network has a dynamic host configuration protocol (DHCP) environment, the Mailbox Manager application must be installed on the MAS.

For more information on the minimum system requirements for a single user implementation of the Mailbox Manager application, see Mailbox Manager Minimum Requirements for Single User Implementation on page B-20.

For more information on the Mailbox Manager application, see the related documentation on the Mailbox Manager™ Software CD or visit http://support.avaya.com.

Avaya Integrated Management

Modular Messaging can be administered with Avaya Integrated Management. Avaya Site Administration (Release 2.0 or later) or Avaya Multi-Site Administration (Release 2.1 or later) can be used to perform subscriber Move, Add, Change, and Remove activity, and to define classes-of-service (COS) for Modular Messaging in conjunction with an associated user station extension on the Communication Manager Media Server. This tool also provides import and export support of subscriber data for Modular Messaging.

Messaging application server administration

A messaging application server (MAS) provides administration tools such as the Voice Mail System Configuration tool and Visual Voice Editor.

For more information on using these tools see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

Reporting capabilities

Modular Messaging provides a Reporting Tool that administrators can use to generate predefined reports for monitoring voicemail system usage, planning capacity, and tracking system security.

Report information is taken from the transaction database and generated for the voice mail domain. Some reports can also generate MAS-specific or subscriber-specific information.

MAS reports

Using the Reporting Tool, administrators can generate the following MAS reports:

- Hourly Statistics

  This report records information about the number of incoming and outgoing calls for each hour in a specified time period. This information is useful for monitoring call activity across the voice mail domain. The Hourly Statistics report assists in capacity planning.

- Login Failures

  This report records information about unsuccessful mailbox logins due to an incorrect password or invalid mailbox number being entered. This information is useful for monitoring system security for the voice mail domain.

- Port Statistics

  This report records incoming and outgoing call information for each port configured in the voice mail domain. This information is useful for monitoring port usage.

- System Usage

  This report records call and messaging statistics for the voice mail domain. This information is useful for monitoring the usage of the system.

- User Mailbox Statistics

  This report records information about telephone calls and messages received by each subscriber in the voice mail domain. This information is useful for monitoring mailbox usage.

- Basic Metrics

  This report records statistics on messaging activity in the voice mail domain. It includes general information on TUI usage and statistical information on subscriber TUI logins. The contents of the Basic Metrics report are the core Key Performance Indicators

for the voicemail system, hence this report also provides a general performance overview.

Administrators can export a report to save the report information or work with it using alternative tools. The export facility supports a number of popular spreadsheet, word processor, and data interchange formats. Administrators can also attach an exported report file to a message sent using a MAPI-enabled e-mail system, or can print a report displayed on the screen.

MSS reports

Avaya MSS

The MSS collects information about system settings and attributes and information that depicts how the system is used, including data about features, subscribers, communities, data port loads, and remote messaging traffic. This information is displayed in real-time dynamic report pages, and in messaging traffic reports.

- Community Daily or Hourly Traffic Report

  These reports show the total number of messages sent and received by each community. They also show the number of messages that were not sent or received by each community due to restrictions on sending during any day in the last 32-day period or any hour in the last seven days.

- Feature Daily or Hourly Traffic Report

  These reports show traffic information on a feature-by-feature basis. Features are divided into call answer features and messaging features.

- Load Daily or Hourly Traffic Report

  These reports show daily load traffic information for 1 to 32 days or hourly traffic information for the last 7 days. Traffic load refers to the message traffic and storage relative to established mailbox thresholds.

- Network Load Daily or Hourly Traffic Report

  These reports show network channel traffic one day at a time for up to 32 days or one hour at a time for any hours within the last 7 days. These reports can show any nodes that are exceeding specified threshold limits, the number of calls that went unanswered, the number of calls on each channel, and other channel traffic information.

- Remote Message Daily or Monthly Traffic Report

  These reports show information about traffic loads between a local messaging machine and a specified remote messaging machine.

- Subscriber Daily or Monthly Traffic Report

    These reports show traffic information about a specific subscriber for any day within the most recent eight day period or any month within the last 13 months. These reports can help you track a particular subscriber's mail-usage patterns.

- System Evaluation Report

    The System Evaluation Report is a read-only, web-based administration page that provides a summary of various MSS settings and attributes.

Voice mail domain

A voice mail domain is a group of messaging application server (MAS) units with a common set of properties, that use one or more message stores. One can think of a voice mail domain as being a single complete voice messaging system.

The MAS units in a voice mail domain can be seen as a single "virtual" server for that domain. This allows the system to be highly scalable, in that multiple servers can be configured as part of the voice mail domain to address large capacity requirements. Modular Messaging—MSS supports a maximum of five MAS units in a voice mail domain, while Modular Messaging with Microsoft Exchange or IBM Lotus Domino supports a maximum of ten MAS units in a voice mail domain.

An incoming call can land on any port on any card on any messaging application server to have access to Call Answering, greetings, messaging, fax receipt, auto attendant, caller applications, and the full directory.

Likewise, outbound services such as fax (MSS only), Call Me, and Message Waiting Indication can also share the communication facilities across all the servers. This virtual server allows any Avaya Modular Messaging subscriber in the domain to use the telephone user interface (TUI) to call in, access their mailboxes, and retrieve their messages. Also, the virtual server can call the telephone of any subscriber who runs PC client applications to play back voice messages.

Any changes made to the properties of a voice mail domain are automatically updated and replicated to all MAS units in the domain. Voice mail domains provide the ability to store and retrieve properties that belong to a set of MAS units working together to provide integrated Call Answering.

An organization can create multiple voice mail domains, for example, one in each major geographical site.

It is important that all users within the voice mail domain share a common dialing plan. For additional information on designing voice mail domains see

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Note: An Avaya Message Storage Server (MSS) can be a host to only one voice mail domain.

Avaya Modular Messaging Concepts and
Planning Guide

5

Modular Messaging features

This chapter discusses the key features of Avaya Modular Messaging. It includes the following topics:

- Key features and capabilities on page 5-2

- Text-to-speech conversion capability on page 5-9

- SNMP with Modular Messaging on page 5-11

- Logs and notifications on page 5-12

- Licensing on page 5-17

- Audio encoding formats on page 5-18

- Offline messaging on page 5-21

- N+1 server configuration on page 5-27

- Communities and sending restrictions on page 5-29

- System lists on page 5-31

- Personal Distribution Lists on page 5-34

- Message Privacy on page 5-42

- Subscriber data migrations and system upgrades on page 5-51

Key features and capabilities

Table 5-1 discusses the key features of Avaya Modular Messaging. These features are common to all versions of Modular Messaging.

Table 5-1. Key features and capabilities

Feature and capability	Description and benefits
Modular Messaging supports many Octel Aria-type, single-digit menus in the form of caller applications.	These are separate applications, such as complex automated attendants, listen-only mailboxes, and bulletin boards that can be designed using a Microsoft Windows graphical-user-interface (GUI)-based editor tool that is deployed across voice mail domains. Caller applications can be used to accomplish most of the same functions as automated attendants, (including nested automated attendants) in Intuity AUDIX.
Telephone user interface (TUI) for accessing messages	
Reply to sender or all recipients	When replying to messages, subscribers can reply only to the sender or to all recipients that Modular Messaging is aware of. When replying to messages that are received through a Message Networking system, subscribers can reply only to the sender. Messages coming via a Message Networking server will not contain a complete list of recipients because, the Message Networking server cannot be sure that it received a complete list of recipients from the originating node. Modular Messaging respects the use of BCC when used with a GUI client.
Priority of messages	Subscribers can assign a priority to messages.
Print fax messages	Subscribers can print fax messages with TIFF attachments.
Cross-media response	Subscribers can reply to messages in one medium (for example, fax) with another medium (for example, voice).
Graphical user interface clients for accessing messages	
Receive, respond to, and send messages	Subscribers can use a standards-based e-mail client or a supported GUI client to receive, reply to, forward, and send messages. For more information, see Graphical user interfaces on page 4-14.
Manage and respond to all messages	Subscribers can store, organize, delete, or respond to all types of messages.

Table 5-1. Key features and capabilities

Feature and capability	Description and benefits
Reply to messages	Subscribers can reply to only the sender, or to all recipients, or to an edited list of recipients.
Cross-media response	Subscribers can reply to messages in one medium (for example, voice) with another medium (for example, text).
Mailbox personalization	
Mailbox personalization using the TUI	Subscribers can: ■ Record and activate greetings and spoken names ■ Enable or disable Find Me, Call Me, and Notify Me ■ Set up call handling ■ Configure a fax number for printing ■ Record announcements for use in Caller Applications ■ Change passwords **Note:** Modular Messaging AUDIX TUI subscribers cannot perform certain kinds of personal configuration, such as enabling or disabling Notify Me and Find Me. Modular Messaging AUDIX TUI subscribers cannot record Caller Application announcements.
Mailbox personalization using the PC	Using Subscriber Options, subscribers can: ■ Record and activate greetings and spoken names ■ Personalize call handling ■ Set up rules for MWI, Find Me, Call Me, and Notify Me ■ Change password ■ Configure desktop PC and TUI preferences and options ■ Change the display language for Modular Messaging client applications
Message notification[1]	
Call Me	This feature alerts subscribers of new messages in their inbox by calling them at one or more designated numbers. Call Me also provides support to pagers.
Find Me	This feature redirects unanswered calls to another location, allowing callers to reach Modular Messaging subscribers live. Find Me is not supported for analog integrations.

Table 5-1. Key features and capabilities

Feature and capability	Description and benefits
Notify Me	This feature provides: ■ Automatic notification capabilities: Notifies subscribers of new Call Answer messages that meet certain subscriber-specified criteria. ■ Caller-requested notification capabilities: Notifies subscribers of missed incoming calls, provided the caller requests that the subscriber be notified. The notification is sent as an e-mail message that can be directed to any e-mail address, which might not be a conventional mailbox. For example, via a suitable gateway, the address could identify a pager, or an SMS cell phone, or any other e-mail-enabled notification mechanism.
Message Waiting Indicator (MWI)	This feature alerts subscribers that new messages are waiting by using a lamp indicator or a stutter dial tone.

1. Some of these features may not be available with all switch integrations

Modular Messaging—MSS

Avaya MSS

In addition to the features described in Table 5-1 on page 5-2, there are some features and capabilities that are specific to Modular Messaging—Message Storage Server (MSS). Table 5-2 discusses these features.

Table 5-2.   Features and capabilities of Modular Messaging—MSS

Feature and capability	Description and benefits
Voice and fax messaging	
Combined voice and fax messaging capabilities	The MSS stores voice, fax, and text messages, and messages with binary attachments.
Telephone user interface (TUI) for accessing, sending, and composing messages	
Choice of TUIs	Modular Messaging provides two TUIs—the Aria TUI for Modular Messaging and the AUDIX TUI for Modular Messaging. TUIs are assigned to subscribers on a class-of-service (COS) basis.
Receive, respond to, and send messages	Subscribers can receive, reply to, forward, and send voice and fax messages over the telephone.
Future delivery	Subscribers schedule messages for future delivery. The message is kept in the sender's mailbox and not delivered until scheduled.
Printing fax messages	From the TUI, subscribers can print fax messages to a default fax destination or to a new fax destination. When calling from a fax machine, subscribers can print the current fax message in the same call, thus terminating the subscriber log-in session. For more information, see Printing fax messages on page 7-11.
System lists and sending restrictions	
Enhanced-list application (ELA)	An ELA is a Modular Messaging—MSS system list that enables subscribers to deliver messages to a large number of recipients. Subscribers can address messages to these lists from the TUI and from a PC, or by calling the extension associated with an ELA list.

Table 5-2. Features and capabilities of Modular Messaging—MSS

Feature and capability	Description and benefits
Broadcast messages via broadcast ELA lists	Modular Messaging—MSS administrators can designate any Enhanced-List Application (ELA) system list to be a local broadcast list. A broadcast message is sent to all local subscribers and to all list members. The Modular Messaging TUIs identify broadcast messages and present new broadcast messages before other messages. The TUIs also announce the number of broadcast messages. Modular Messaging Web Client and Client Add-in for Microsoft Outlook provide visual indicators for identification of broadcast messages.
Enterprise-wide class of restrictions and sending restrictions	Modular Messaging administrators can prevent the delivery of messages from certain originators to specific groups of mailboxes residing within the Modular Messaging system. Thus, administrators can prevent unwanted enhanced-list usage and unauthorized broadcast message creation. Administrators can also isolate mailboxes that should not receive inbound traffic.
Personal distribution lists (PDLs)	
Creating and managing PDLs	Subscribers can create new PDLs and modify or delete existing PDLs from the Modular Messaging TUIs and from Subscriber Options.
Addressing messages to PDLs	Subscribers can address messages to PDLs from the Modular Messaging TUIs, Client Add-in for Microsoft Outlook, Modular Messaging Web Client, and any standards-based e-mail client.
Message privacy	
Mark Call Answer messages as private	Administrators can configure the system to enable callers to mark Call Answer messages as private. For more information, see Creating private Call Answer messages on page 5-44.

Table 5-2.   Features and capabilities of Modular Messaging—MSS

Feature and capability	Description and benefits
Marking of and access to private messages	Subscribers can use the Modular Messaging TUIs, Modular Messaging Web Client, and UCC Speech Access to mark messages as private and to access private messages. With the appropriate privacy settings, subscribers can also use Client Add-in for Microsoft Outlook and standards-based clients to mark messages as private and to access private messages. For more information, see Creating private messages on page 5-42 and Accessing private messages on page 5-43. Modular Messaging Web Client provides an administrative configuration to support only dual-connect (telephone-playback only) mode. This prevents voice messages from being played locally on the PC, downloading of voice messages, and caching of voice messaging on the PC.
Privacy Enforcement Level (PEL) settings	Administrators can use these system-wide privacy parameters to determine which clients support access to messages and the level of privacy these clients enforce. For more information, see The Privacy Enforcement Level privacy parameter on page 5-45.
Restrict client access	Administrators can use this class-of-service (COS) setting to determine if clients are permitted access to messages. For more information, see The Restrict Client Access COS on page 5-48.

Modular Messaging—Exchange and Modular Messaging—Domino

Microsoft Exchange

IBM Lotus Domino

In addition to the features described in Table 5-1 on page 5-2, there are some features and capabilities that are specific to the Microsoft Exchange and IBM Lotus Domino message stores. Table 5-3 discusses these features.

Table 5-3. Key features and capabilities of Modular Messaging—Exchange and Modular Messaging—Domino

Feature and capability	Description and benefits
Voice, fax, and e-mail messages in a single platform of choice - Microsoft Exchange or IBM Lotus Domino	
Allows voice, fax, and e-mail messages to be stored in the platform of choice – Microsoft Exchange, or IBM Lotus Domino.	Provides a single interface for accessing voicemail and corporate e-mail messages.
Telephone user interface (TUI) for accessing, sending, and composing messages	
Receive, respond to, and send messages	Subscribers can receive, reply to, forward, and send voice, fax, text, and corporate e-mail messages over the telephone. Avaya Modular Messaging reads corporate e-mail messages and subject headers using e-mail readers for text-to-speech conversion.
Print messages	Subscribers can print e-mail or fax messages with TIFF attachments.
Read receipt and delivery receipt	Modular Messaging—Exchange supports request for read receipt from the TUI.
Future delivery	Subscribers schedule messages for future delivery. The TUI marks the message with a deferred delivery time before sending it out of the sender's mailbox. The Exchange message transport holds the message internally until the scheduled delivery time. At the scheduled delivery time, Exchange delivers the message in the mailbox of the intended recipient. (Not available with Avaya Modular Messaging—IBM Lotus Domino version).

Text-to-speech conversion capability

Modular Messaging provides a licensed speech synthesis software so that subscribers can hear the envelope and subject information of messages and text names over the telephone using a computer-generated spoken voice.

Modular Messaging makes use of e-mail readers for text-to-speech (TTS) conversion. TTS is also used for name confirmation when a recorded name is not available.

Multilingual text-to-speech

Subscribers of Modular Messaging—Exchange and Modular Messaging—Domino can also hear the contents of their corporate e-mail messages over the telephone, by virtue of TTS conversion.

Organizations that receive e-mail in more than one language can enable multilingual TTS. Multilingual TTS identifies the language of e-mail messages and reads them in that language. For more information, see Table 1-1 on page 1-5.

Modular Messaging supports the following TTS engines:

- ScanSoft RealSpeak Telephony 3.5 for all languages that Modular Messaging supports.

  Modular Messaging provides ScanSoft RealSpeak Telephony 3.5 as the default TTS engine. All new installation of Modular Messaging will provide support only to the ScanSoft RealSpeak Telephony 3.5 engine.

- Fonix DECTalk for English conversions and ScanSoft RealSpeak TTS3000 for all non-English conversions

  Modular Messaging continues to support Fonix DECTalk and ScanSoft RealSpeak TTS3000 for customers that are upgrading from Unified Messenger 5.0. However, Avaya recommends ScanSoft RealSpeak Telephony 3.5 for high quality TTS conversion.

- Microsoft TTS, for English conversions only.

  Microsoft TTS is a simple TTS software used only to test the system configuration

Notes:

- Modular Messaging does not permit ScanSoft RealSpeak Telephony 3.5 to be mixed with any other TTS engine in a voice mail domain.

- TTS services are licensed. The license data applies to the entire voice mail domain, and specifies the maximum number of concurrent TTS conversions permitted.

- Some customers may implement extra security in their Microsoft Exchange or IBM Lotus Domino environment and encrypt each e-mail message. The TTS conversion capability is not capable of reading encrypted e-mail messages.

SNMP with Modular Messaging

Simple Network Management Protocol (SNMP) is a protocol used for the management and monitoring of network elements. There are two kinds of SNMP software - a manager, which makes configuration requests and receives notifications, and an agent, which acts on behalf of the managed or monitored element to respond to configuration requests and generate notifications. An SNMP manager is often referred to as a Network Management Station (NMS).

In the Modular Messaging context, the messaging application server (MAS) and the Avaya Message Storage Server (MSS) are the managed systems that interact with NMSs by means of SNMP.

SNMP can be used with Modular Messaging to perform the following tasks:

- An NMS can perform queries to retrieve information from an MSS. SNMP is read-only in the Modular Messaging system, meaning that an NMS can query an MSS for information, but cannot change that information.

- Modular Messaging (the MAS and MSS) can send alarm information to specified NMSs, using notifications or traps. For more information, see SNMP alarm notification on page 5-15.

The Avaya MSS supports SNMP versions 1, 2c, and 3, whereas the MAS supports SNMP versions 1 and 2c.

SNMP system queries

Avaya MSS

The Avaya MSS provides support to SNMP queries from Network Management Stations (NMSs). When a suitably administered NMS queries an MSS, by means of SNMP GET requests, the NMS retrieves read-only information defined by Management Information Base - II (MIB-II).

SNMP GET requests are restricted to specifically administered Network Monitoring Stations.

Note: With this release of Modular Messaging, the MAS does not provide support for SNMP GET requests Neither the MAS nor the MSS provide support for SNMP SET requests.

Logs and notifications

Since a messaging application server (MAS) runs on a standard Microsoft Windows operating system, a variety of Microsoft Windows tools can be used for monitoring the MAS services. These tools include:

- The Windows Performance Monitor to generate statistics and performance information.

- The Windows Event Log to record and trace significant events or alarms.

The MAS and the Avaya Message Storage Server (MSS) generate system alarm and error logs that can be accessed using a command line interface tool. This command line interface tool is called displog on the MAS.

Notifications that alarms generate can be sent to any one of the following:

- Avaya Services

- A network management station (NMS)

- A Business Partner. Business Partners need access to the Modular Messaging system to receive these notifications

- Avaya Fault and Performance Manager with use of either Secure Services Gateway (SSG) or Avaya Proxy Agent

Systems can be configured such that these alarm notifications are sent to a service organization either using a dial-up modem to the Avaya Initialization and Administration System (INADS) or by means of Simple Network Management Protocol (SNMP) traps. The MSS can also use the SNMP protocol to send these notifications to a customer NMS. For details of SNMP traps, see SNMP alarm notification on page 5-15.

If the system is configured for INADS alarms, MAS uses its built-in dial-up modem, whereas the MSS uses the Remote Maintenance Board (RMB) to send notifications to INADS.

MAS alarms and logs

Using the command line interface tools supplied with each MAS, administrators can view the following logs:

- The event log, which contains events and errors generally of interest to only technical services and development personnel.

    Note: The event log is not the same as the Windows Event Log.

- The administrator log, which contains events and errors that are of interest to system administrators.

- The active alarms log, which contains information about alarms that are currently active on the system. This log provides a primary tool when problems occur.

- The resolved alarms log, which contains a history of and information about alarms that have been raised and then resolved on the system. This log can be useful in analyzing problems and trends in the system.

For information on configuring serviceability and on displaying event, error, and alarm logs, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

MSS alarms and logs

The Message Storage Server (MSS) has an application-level maintenance infrastructure that provides automatic error recovery from many software failures. The MSS raises alarms for hardware or software failures for which automatic recovery actions are unsuccessful and a notification of the alarm condition is sent to Avaya Services. The MSS also monitors each MAS on a regular basis and raises an alarm if an MAS becomes unresponsive for an extended period of time. This extended period of time, known as the time-out value can be configured, and can even be set to 0 to disable the time-out.

The MSS hardware platform includes a Remote Maintenance Board (RMB) that autonomously raises an INADS alarm in the event that an MSS processor fails or in response to various environmental problems.

The Avaya MSS uses a series of logs that provide a view of activities, errors, and alarms. Reviewing the logs allows a system administrator to reach a quick understanding of overall system status. MSS logs are available from Web-based administration pages.

Logs record events that are useful for preventive maintenance, for diagnosing problems and troubleshooting the server, and for spotting trends or estimating future needs.

Log information is organized as follows:

- The Administrator's log, which contains events and errors that are of interest to system administrators. Administrative events can include problems that directly affect message processing, such as full subscriber mailboxes and undeliverable messages.

- The Alarm log, which contains descriptions of all significant problems detected by the system. The alarm log contains active alarms and resolved alarms.

- The Maintenance log, which contains descriptions of all reported maintenance events.

- The Administration History log, which identifies administrative events that occur on the system. These events include information about any changes to your system, such as logins, command line entries, reports that were run, or changes to software.

- The Backup and Restore log. The Backup log informs administrators that a partial unattended backup was successfully completed. When an unattended backup does not successfully occur, the system backs up the System data and as much of the Names and Greetings and messages data types as possible. This is called a partial unattended backup. The Restore log contains a list of all the files that were restored and information about any errors that occurred during the restore. If the restore was not successful, the log contains an explanation of why the restore process failed.

- The VM Start-up log. When the system reboots, or when the Messaging software or Voice Module restarts, the system regenerates the VM Start-up Log. The VM Start-up Log provides information about the Messaging software for the following situations:

  — During a restart, the log shows the progress of the restart and information on the state of the Messaging software.

  — During a system update from one software release to the next, the log shows the progress of the data update.

  — During normal system operation, the log provides the last start date of the Messaging software. Note that the Messaging software restart date is not necessarily the same as a system reboot.

- Internet Messaging logs. Most of the Internet Messaging logs contain information about occurrences at each stage in the messaging process.

- Enhanced-List Delivery Failure Log. This log provides information on failed ELA deliveries, and contains information such as the delivery failure date, time, the mailbox number of the originator of each failed message, the Enhanced-List to which the originator sent the message, the last Enhanced-List visited in a nested Enhanced-List hierarchy before the message failed, the name of the intended recipient of each failed message, the mailbox number of the intended recipient of each failed message, and the detailed reason for each delivery failure.

■ The Installation and Removal logs. These logs contain information about the installation, update, and removal of software packages.

SNMP alarm notification

Customers can extend their existing Simple Network Management Protocol (SNMP) alarm notification functionality to messaging application server (MAS) units and to the Message Storage Server (MSS).

Important: Avaya does not supply NMS units. Customers or Business Partners that choose to use SNMP alarm notification with their MAS units and MSS must ensure that:

— The NMS is installed, set up, and tested prior to technicians arriving onsite for the Avaya Modular Messaging installation or upgrade

— The MAS and the MSS communicate with the SNMP NMS

When an MAS or the MSS enters an alarm state, it can notify service personnel of its alarm state by sending SNMP alarm traps to a pre-defined NMS. In some SNMP versions, traps are also called notifications or informs.

Modular Messaging can send alarm notifications of major alarms, minor alarms, and warnings:

■ To send alarm notifications of major alarms or of major and minor alarms, Modular Messaging sends SNMP traps to Avaya service personnel or Business Partners. These SNMP traps are defined in the Avaya SNMP MIB, and conveys the following information in its payload:

— A notification object inadssnmpAlarm, as defined in the Avaya SNMP MIB.

— inadssnmpAlarm contains two objects in its payload, inadssnmpAlarm Message and inadssnmpAlarmTime. Both inadssnmpAlarm Message and inadssnmpAlarmTime are defined in the Avaya SNMP MIB.

■ In addition to sending major and minor alarms via SNMP traps, the MSS can be configured to send traps indicting warnings, major alarms, and minor alarms to one or more additional customer NMSs. These traps are defined in the Avaya OAM MIB. These additional customer NMSs cannot acknowledge the receipt of traps.

How an NMS acknowledges the receipt of an SNMP trap

An NMS can acknowledge the receipt of an SNMP alarm trap defined in an Avaya SNMP MIB with a return trap. With this acknowledgement method, the NMS acknowledges the receipt of an alarm trap by returning an SNMP acknowledgment trap. Customers that opt for this acknowledgment method must configure the NMS to generate such return traps.

The objects that the SNMP alarm acknowledgment trap contains are defined in the Avaya SNMP MIB. The SNMP alarm acknowledgement trap conveys the following information in its payload:

- A notification object inadssnmpAck, as defined in the Avaya SNMP MIB. inadssnmpAlarmAck describes whether the manager has successfully received the SNMP alarm trap.

- inadssnmpAck contains two objects in its payload, inadssnmpAlarmAck and inadssnmpAlarmTime. Both inadssnmpAlarmAck and inadssnmpAlarmTime are defined in the Avaya SNMP MIB.

  — The value of inadssnmpAlarmTime must be the same as that passed in the SNMP alarm trap.

  — inadssnmpAlarmAck returns a value of either "so 2 " to indicate that it has successfully received the alarm trap, or "so 3 " to indicate that it has not received the alarm trap.

The MAS and the MSS can also be configured to consider an SNMP trap acknowledged using a ping surround method. With this acknowledgment method, the MAS and the MSS generate a ping command to the NMS, prior to sending an alarm trap. If the MAS and MSS receive a ping response, they send the trap. If they do not receive a ping response, they keep trying at 5-minute intervals until they receive a response from the NMS, and then send the trap.

After sending the trap, the MAS and MSS send another ping request. If they receive another ping response from the NMS, the system assumes that the trap was received on the NMS. If the MAS and MSS do not receive another ping response from the NMS, the system assumes that the trap was not sent successfully. In this case, the trap is rescheduled to be sent at 5-minute intervals until it is successfully sent.

Note: Avaya encourages customers to use return traps to acknowledge the receipt of SNMP traps, as the ping surround acknowledgment method does not actually guarantee that the trap was received.

Licensing

Avaya controls the use and access of some of Avaya Modular Messaging features by use of licences, which the customer must purchase. The features that Avaya controls using licensing include:

- The platform the customer wants to use for the message store (Avaya MSS, Microsoft Exchange, or IBM Lotus Domino)

- The number of seats (mailboxes enabled for Modular Messaging) the customer wants to use

- The maximum number of concurrent text-to-speech (TTS) sessions the customer wants to use

Customers can view the licensing for their system using the Licensing utility in the Voice Mail System Configuration application.

The license for the number of seats the customer wants to use counts the number of Modular-Messaging-enabled mailboxes in the voice mail domain.

With Microsoft Exchange or IBM Lotus Domino message stores, after administrators have created mailboxes for subscribers, they must enable Modular Messaging. A subscriber whose mailbox is not enabled for Modular Messaging cannot make use of Modular Messaging features, but can still receive voicemail from other voicemail-enabled subscribers.

For Microsoft Exchange or IBM Lotus Domino message stores, the number of e-mail mailboxes may be less than, equal to, or greater than the number of purchased seats. For example, a customer that intends to enable all mailboxes for voicemail and is planning to add subscribers, may require fewer e-mail mailboxes than seats. Another example is of a customer that needs only some of the e-mail mailboxes to be voicemail-enabled. In this case, the number of e-mail mailboxes is greater than the number of seats.

In a Modular Messaging—MSS system, the number of mailboxes can be less than or equal to the number of licensed seats.

For more information on viewing license information, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

Audio encoding formats

Avaya Modular Messaging supports the following audio encoding formats:

- Global System for Mobile Communications (GSM) 6.10

- G.711 (A-law and µ-law)

Audio compression manager codecs for GSM and G.711 are available on most Windows desktops. Voice messages recorded by using Modular Messaging and sent to non-Modular Messaging users can be played back by using Microsoft Sound Recorder or Media Player on a multimedia PC without requiring any additional software.

GSM 6.10

This audio encoding format has a coding rate of approximately 13 kilobits per second (kbps) or approximately 1.6 Kilobytes per second (KBps). A message that is one minute long would require approximately 95.2 KB storage space when encoded using the GSM format. One hour of GSM requires 5.6 MB of space. GSM-encoded messages occupy less space, approximately 20% of the space used by G.711.

The GSM format produces cell phone quality speech. GSM is the default encoding format in Avaya Modular Messaging.

GSM does not support Telecommunication Device for the Deaf (TDD).

G.711

This audio encoding format has a coding rate of approximately 64 kbps or approximately 8 KBps. A message that is one minute long would require approximately 468.8 KB storage space when encoded using the G.711 format. One hour of G.711 requires 27.5 MB of space. G.711-encoded messages occupy more space, approximately five times as much space as GSM.

G.711 is an international standard telephony encoding format on a 64 kbps channel. G.711 uses the Pulse Code Modulation (PCM) encoding scheme. This is an 8-bit format that is used primarily for telephone quality speech. G.711 has two variants: A-law and µ-law. Typically, A-law is for Europe and µ-law for United States.

G.711 encoding produces high-quality recording, which is essential for Teletypewriter (TTY)/TDD. Customer systems that use TTY/TDD with Baudot tones must use G.711 audio encoding.

G.711 encoding produces higher quality sound. If customers that use GSM encoding find that sound quality is inferior, they may consider changing to G.711 encoding for improved sound quality.

Notes:

1. If customers have upgraded from a version of Avaya Unified Messenger Solution that used Rhetorex ADPCM, they can continue to use the Rhetorex ADPCM format. However, customers cannot create new voice mail domains that use Rhetorex ADPCM. ADPCM is not available with Dialogic telephony.

2. An MAS can play and record the GSM, G.711 A-law, and G.711 μ-law audio encoding formats. The single format specified by the voice mail domain setting refers to the format used to record voice messages, recorded names, and greetings by the TUI and GUI clients. The G.711 format is used to record system and Caller Application prompts.

3. A message store may contain some messages encoded with GSM and some with G.711. This could happen if the encoding is changed, or if networked-messages use a different encoder than used in the MAS of its voice mail domain. For example, an MSS may receive G.711-encoded messages from the MAS and GSM-encoded messages from remote subscribers.

Binary size and MIME transfer size

Avaya MSS

Modular Messaging—MSS stores voice messages in their native binary GSM or G.711 format, but uses the base64 encoding scheme to encode audio data when transferring binary messages using Multipurpose Internet Message Extensions (MIME). A binary message that is base64-encoded, occupies about 37% more space than the original binary message. For example, a message that originally occupies 300 KB will occupy about 411 KB after base64 encoding.

When Modular Messaging—MSS subscribers use a standards-based e-mail client to listen a message, the size of the message displayed by the e-mail client is the MIME transfer size of the message, after base64 encoding. This size includes a 37% increase in size as compared to the original size of the message, irrespective of the encoding format used (GSM or G.711).

How message size impacts message transfer by GUI clients

When subscribers use a graphical user interface (GUI) client to retrieve a voice message, the entire message may be downloaded to the client.

The size of an encoded message (GSM or G.711 format) and the MIME transfer size of a message affect the time GUI clients take to retrieve and play these messages locally. However, in a corporate setting, retrieval of messages takes place on a high-speed LAN, with a speed of 10 Mbps or more. Hence, the size difference between the two encoding formats does not noticeably affect message download time.

When subscribers connect to the network remotely, using a 56 Kbps dial-up line, they may have an effective connection speed of 32 Kbps or less. The transfer rate of a GSM or G.711-encoded message over such a connection is at the most 4 KBps. Therefore, subscribers actually transfer the binary content of voice messages at a rate of at most 2.9 KBps over such a connection.

Thus, a GSM-encoded message is retrieved in about 0.55 times the length of the message and a G.711-encoded message is retrieved in about 2.75 times the length of the message. For example, a GSM message that is one minute long will take 33 seconds to download and a G.711 message of the same length will take about 2.75 minutes to download.

Offline messaging

Modular Messaging supports offline messaging in the following scenarios:

- Offline Call Answer

    If a message store (Avaya MSS, Microsoft Exchange, or IBM Lotus Domino) cannot be accessed, Modular Messaging continues to provide basic Call Answering services. Some features operate in a degraded fashion. For example, some features, such as Call Me, Notify Me, MWI, and certain Caller Applications are either not available at all or are delayed. Subscribers' greetings are not available and are replaced by a system prompt with the spoken or TTS name of the subscriber. For more information, see Offline Call Answer on page 5-22.

- Offline access to Call Answer messages

    Modular Messaging Aria telephone user interface (TUI) subscribers can use a telephone to access their new Call Answer messages. For more information, see Offline access to Call Answer messages on page 5-23.

- Offline Microsoft Exchange peer server

    When a Microsoft Exchange peer server goes offline, the messaging application server (MAS) selects another Exchange server to act as the peer server. Thus, the MAS continues to support messaging, even when its primary peer server is offline. For more information, see When a Microsoft Exchange message store goes offline on page 5-24.

- Offline IBM Lotus Domino message store

    For more information, see When an IBM Lotus Domino message store goes offline on page 5-25.

- Offline MAS units

    If an MAS unit goes offline and if an N+1 server configuration has been implemented, voice port redundancy is achieved, although certain services may be affected. For more information, see N+1 server configuration on page 5-27. In any event, while one or more MAS units are unavailable, subscribers may use Unified Communication Center (UCC) Speech Access or graphical user interfaces to send messages or to retrieve messages stored up to the point of lost contact. If no MAS units are available, messages must be played or recorded by graphical clients using the local PC multimedia capabilities.

- Messaging with e-mail clients in offline mode

  Modular Messaging—Exchange and Modular Messaging—Domino support offline messaging with the e-mail clients in offline mode. Modular Messaging—MSS with Client Add-in for Microsoft Outlook support offline messaging sessions. For more information, see Messaging with e-mail clients in offline mode on page 5-25.

- Messages copied to local or network folder

  Any messages copied to a local or network folder (personal or public) are available for replay in offline mode.

Offline Call Answer

In the event that a message store server is not reachable, Modular Messaging continues to provide basic Call Answering functions to callers. Callers can continue to leave voice messages or fax messages for subscribers. With Modular Messaging—Exchange and Modular Messaging—Domino, if the message store is offline, the MAS continues to transfer fax calls to the third-party fax server. If the third-party fax server is offline, the MAS will hang up the call if the fax server does not answer.

From the caller's point of view, operation is close to normal, with a significant difference being that subscribers' greetings are not available and are replaced by a pre-recorded phrase "Please leave a message for..." followed by the recorded name of the subscriber. If subscribers do not have a recorded name, the system plays a text-to-speech rendition of the subscriber's display name.

Under these circumstances, some features such as Call Me, Notify Me, MWI, and certain Caller Applications are not available or may be delayed until the message is actually delivered.

When operating in an offline mode, the MAS queues any new Call Answer messages in a local store until the message store server is online. The MAS also queues Notify Me messages for delivery.

Once the MAS re-establishes connection with the message store server, Modular Messaging delivers accumulated Call Answer messages and Notify Me messages to the message store server. Call Me and MWI are activated for queued messages after the delivery of the accumulated messages.

Offline access to Call Answer messages

The Modular Messaging Offline Access (OLA) feature provides subscribers increased availability to Call Answer messages, by providing emergency access to Call Answer messages recently queued for delivery, even when the message store cannot be accessed.

In the event that a message store server is not reachable, the MAS continues to queue any new Call Answer messages in a local store until the message store server comes up or online. During this period, subscribers can use the Modular Messaging Aria telephone user interface (TUI) to access their Call Answer messages.

Note: Modular Messaging AUDIX TUI subscribers cannot access new Call Answer messages while the message store is offline.

With Modular Messaging—MSS, subscribers also have offline TUI access to recently received fax messages. Although fax messages cannot be printed during offline access, header information is available, including the page count and ANI information from the sender's fax machine. In addition, subscribers can also review any attached voice message.

The TUI available to subscribers during offline access is a limited, defeatured TUI, providing options only to retrieve and listen to new Call Answer messages. Subscribers will not have complete control of their mailbox. Subscribers cannot use this TUI to access other sources of messages such as from local or networked subscribers, broadcast, ELA, Enterprise Lists, Delivery Status Notifications, and so on, or to change message state, delete, forward, or reply to messages. The system informs subscribers that the TUI offers limited services.

In a multi-MAS voice mail domain, each MAS migrates copies of Call Answer messages in its local store to a common repository known as the Offline Call Answer Store.

The Offline Call Answer store acts as a single repository for Call Answer messages taken for all subscribers in the voice mail domain, in the last 'x' number of hours. The value of 'x' is 24 by default, but can be changed to any value from 1 to 99, subject to disk capacity.

If the message store is continuously offline for more than 'x' hours, the messages are retained until the message store comes back online and they can be delivered.

Queued messages remain in the Offline Call Answer Store until they roll off the MAS. Thus, when subscribers use the TUI to access Call Answer messages in offline conditions, they may hear messages that they had deleted earlier, when the message store was online.

Subscribers will not be able to log in to their mailboxes if the MAS is not able to reach the Offline Call Answer Store.

Note: Offline Call Answer and Aria TUI Access to Offline Call Answer Messages are capabilities intended to provide partial service in rare instances of failures, and not to compensate for an unreliable infrastructure.

When a Microsoft Exchange message store goes offline

A peer messaging server is the back-end server that the MAS units communicate with when sending messages.

When a Microsoft Exchange e-mail server is offline, Call Answer and subscriber access to Call Answer messages take place as described in Offline Call Answer on page 5-22 and Offline access to Call Answer messages on page 5-23.

In Modular Messaging—Microsoft Exchange system, when an MAS detects that the current peer Exchange server (primary peer) is not accessible, the MAS attempts to establish communication with another Exchange serve to act as the peer. This feature is known as Peer Failover and can be enabled using the Voice Mail System Configuration application. The initial peer Exchange server is known as the primary peer Exchange server, to differentiate it from the failover peer.

When Avaya Modular Messaging—Microsoft Exchange version is initially installed, an MAS is configured to have a single Microsoft Exchange server handle message storage and processing for subscribers. This Exchange server is known as the primary peer server. Each MAS in the system configuration has an assigned primary peer server, though all MAS units may share the same primary peer server.

System administrators can identify and configure additional peer servers within the voice mail domain that can handle messaging on behalf of subscribers if the primary peer server fails. Thus, if the primary peer server for an MAS fails, the MAS can search for another peer server to allow messaging to continue. Each MAS in the system is assigned its own list of non-primary peer servers for backup. Servers that are candidates to become the peer server in the event that the primary peer server becomes unavailable are known as failover peer servers.

For information on configuring the system to continue messaging when the Microsoft Exchange server goes offline, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

When an IBM Lotus Domino message store goes offline

IBM Lotus Domino

When an IBM Lotus Domino message store is offline, Call Answer and subscriber access to Call Answer messages take place as described in Offline Call Answer on page 5-22 and Offline access to Call Answer messages on page 5-23.

However, creation and sending of new messages and other aspects of messaging are not available when an IBM Lotus Domino message store is offline. When an MAS fails repeated attempts to access an IBM Lotus Domino message store because it is offline, the Modular Messaging telephone user interface (TUI) terminates the session.

Customers can achieve a high level of redundancy by homing subscribers on Domino clusters.

A Domino cluster comprises two or more Domino servers that mirror each other's data. If one of the servers in the cluster fails, Domino clients (including the messaging subsystem used by the TUI) are seamlessly switched to another server in the cluster. This allows the Domino message store to run at a higher level of overall availability, since nodes in the cluster can be taken down without significantly affecting clients. In practice, this is all transparent to the TUI.

In a Avaya Modular Messaging—IBM Lotus Domino environment, mailboxes and directories are stored in IBM Lotus Domino databases. Within a Domino cluster, replicas of mailboxes and directory databases are continuously synchronized. If a primary database is not available, the MAS units fail over to a replica within the cluster.

Messaging with e-mail clients in offline mode

Modular Messaging—MSS (with Client Add-in for Microsoft Outlook) and Modular Messaging with Exchange and Domino, support offline messaging sessions.

With offline messaging, subscribers can have messages from their message store synchronized with a local file on their PC so they have access to those messages when they are not connected to the network or message store. Subscribers can listen to, reply, forward, and compose new voice messages from their multi-media PC. New messages will remain in the outbox until the next time subscribers are connected to the message store.

With Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino, all messages (new and opened) are included in the offline message file. Whereas Client Add-in for Microsoft Outlook for Modular Messaging—MSS caches copies of messages on the local PC after a message has been opened.

Thus, only messages that have been opened at least once using Client Add-in for Microsoft Outlook will be available for off line messaging with Modular Messaging—MSS. The MSS directory is available only when connected to the MSS. Offline subscribers can address messages by entering the full address, copying from messages in their inbox or folders, or selecting from personal contacts where subscribers have recorded the MSS address of recipients.

N+1 server configuration

Modular Messaging offers redundancy of voice ports by way of an N+1 server configuration.

N+1 server configuration is the implementation of more than the minimum number of messaging application servers recommended, to increase availability and reliability. An N+1 server configuration can be implemented only if certain established maximum limits are not exceeded. These limits are:

- A 144-port limit and a five MAS limit for Modular Messaging—Avaya MSS version.

- A 10 MAS limit for Modular Messaging—Microsoft Exchange version and Modular Messaging—IBM Lotus Domino version

If the Tracing Server and the Offline Access Store are installed on machines other than an MAS, those machines do not count toward the MAS limit.

Important: N+1 server configuration is currently available only with Avaya Communication Manager or DEFINITY G3 switches.

Added redundancy with N+1 server configuration

An N+1 server configuration provides redundancy for:

- Inbound services

  Call Answer, subscriber access, dual-connect for GUI access, Automated Attendant, caller applications, fax answer and transfer (Microsoft Exchange and IBM Lotus Domino message stores), and inbound fax receipt (MSS only)

- Outbound services

  Find Me (DSE integrations) and Automated Attendant transfers

Some Modular Messaging services are MAS-dependent and could be affected if they are on the MAS that goes out of service. These services include:

- The Tracing Server (if the Tracing Server resides on an MAS)

- The Offline Call Answer Store server. An MAS will not offer offline access if it is unable to communicate with the Offline Call Answer Store server. This condition does not arise unless both the

message store and the Offline Call Answer Store server are
unavailable.

- Call Me and MWI are installed on a single MAS. If that MAS
goes down, neither of these services will work.

- Find Me will not work for H.323 and QSIG integrations, if:

— the ports on the MAS that received the call do not support
outcalling applications

— the ports on the remaining in-service MAS units do not
support outcalling applications

Note: In such circumstances, Modular Messaging prompts
the caller to leave a Call Answer message.

- Outbound fax (Modular Messaging—Avaya MSS only)

Note: It is possible to install the Fax Sender Server on more
than one MAS in a voice mail domain. In such a
case, it becomes easier to reconfigure the system to
use a different MAS for fax sending before a planned
outage.

Distributing ports in an N+1 server configuration

In an N+1 server configuration, ports can be distributed in any of the
following methods:

- Additional capacity (recommended)

In this method, more ports than are required for day-to-day use
are deployed. Additional ports may be added to the N+1 MAS
until the system limits on ports and MAS units is reached. The
additional ports are used for normal operation and ensure that
even when an MAS is down, customers still have the number of
ports they need to provide desired service levels.

- Spread

In this method, the port capacity of the voice mail domain
remains unchanged even after implementing an additional MAS
(N+1). The required number of ports are spread across all MAS
units, including the N+1 MAS. If a server goes down, the system
will have less capacity than normal, but is still able to provide
service.

Communities and sending restrictions

Avaya MSS

Modular Messaging—Avaya Message Storage Server (MSS) has a feature called Sending Restrictions. With appropriate administration, this feature prevents the delivery of messages from certain originators to specific groups of mailboxes residing within the Modular Messaging system. Thus, administrators can prevent unwanted enhanced-list usage, unauthorized broadcast message creation, and undesired messaging, such as delivery from line employees to senior executives, while also isolating mailboxes that should not receive inbound traffic (such as the ELA shadow mailbox).

Use of the sending restrictions feature begins with the planning necessary to organize the messaging network's mailboxes into communities. Modular Messaging provides up to 15 communities. It may also be helpful to think of the communities as classes-of-restriction. Although these assignments can be changed, Modular Messaging, by default, employs communities 10 and 11 for enhanced-list mailboxes and the ELA shadow mailbox, respectively.

The communities must be defined equivalently everywhere within the messaging network as messaging systems include each mailbox's community assignment when exchanging directory updates. For networked messaging systems that do not possess facilities to assign communities to its subscribers, Modular Messaging has an administration field, configurable on a per-networked system basis, to allocate a community number to all of the remote system's mailboxes. Likewise, an administrator can uniformly assign a community number to all Internet originators who send e-mail to the Modular Messaging system's mailboxes.

Once the communities are defined, the administrator should identify unwanted message transmission paths and configure each Modular Messaging system with the same sending restrictions matrix. Message transmission between any two communities may be freely open, restricted in one direction or the other, or restricted in both directions. Modular Messaging systems arrive pre-configured to restrict all traffic into the community in which the ELA shadow mailbox resides.

Community numbers are given to Modular Messaging local subscribers on a per-subscriber basis. They are independent of class-of-service assignments. It may be necessary to change the community assignments for some subscribers or networked systems that have already been administered to achieve the desired results. Administrators should assign appropriate community numbers to subscribers or networked machines that are added in the future. Modular Messaging allows definition of a default community number. The default community is assigned to a new local subscriber unless the administrator selects a different value during the subscriber addition.

The Modular Messaging Server enforces community-based sending restrictions at delivery time. Feedback will not be given when addressing a message to a destination that the system does not allow the originator to reach. However, for each unreachable destination, the originator will receive a delivery failure notice stating that messaging to the intended recipient was not permitted. This behavior produces uniformity between the telephone user interfaces and the graphical clients.

Sending restrictions do not affect directory lookup services available to subscribers. When addressing or performing lookups based on name or number, results will include entries to which sending may be restricted. Community-based sending restrictions may not be suitable to partition a Modular Messaging system for multi-tenant applications, as entries for other tenants will appear in a given tenant's addressing and lookup results.

A common configuration for community-based sending restrictions is to allow only selected individuals to use very large enhanced lists or broadcast lists. To do so, the administrator would assign the privileged persons into their own community and then modify the restrictions matrix to prevent all other communities from sending into the community housing the list mailboxes.

System lists

This topic provides information on the system lists that Modular Messaging supports.

Modular Messaging—MSS Enhanced-List Application

Avaya MSS

Enhanced-List Application (ELA) is a messaging tool that greatly expands the capability of the Modular Messaging—MSS system to deliver messages to a large number of recipients. ELA associates one mailbox to a list of members, so that when subscribers want to send a message to the whole list, they can send a message to the list mailbox instead.

When a new message is delivered into the list mailbox, known as the shadow mailbox, the ELA software distributes the message to the members of the list. ELA members can be local or remote subscribers or arbitrary e-mail addresses, thus providing extreme flexibility. For example, administrators can set up an ELA list for a suggestion box such that, messages addressed to this list are distributed to the Modular Messaging mailboxes of a set of subscribers and to one or more e-mail addresses, for archiving or any other purpose.

Ordinarily, recipients receive the message as if it were sent by the message originator. Recipients can reply to the person who originally sent the message and to all recipients of the original message. However, administrators can configure lists to block recipients from replying to ELA senders or recipient lists. In such a case, the shadow mailbox must belong to a community that cannot receive messages, but can send messages to all other communities. For more information on sending restrictions and communities, see Communities and sending restrictions on page 5-29.

An ELA mailbox is just like any other mailbox, allowing such operations as recording a name for the list, a greeting for the list, and allowing Call Answer messages to be distributed via ELA. Like any other mailbox, an ELA mailbox has a mailbox number, a numeric address, and a Modular Messaging e-mail address. The actual addressing format used to send the message to the list mailbox can be any addressing format that the relevant interface (TUI or PC interface) supports.

Administrators of Modular Messaging—MSS can also administer a remote mailbox with the e-mail address of a list, thus making Microsoft Exchange and IBM Lotus Domino lists available via Modular Messaging—MSS configurations.

A Modular Messaging—MSS system supports a maximum of 1,000 ELA lists; each ELA list can have a maximum of 1,500 members. ELA lists can be nested to create larger lists.

Modular Messaging—MSS Broadcast

Avaya MSS

The Modular Messaging—MSS Broadcast feature enables an administrator to designate any Enhanced-List Application (ELA) to be a local broadcast list. When a message is received into an appropriately configured enhanced-list mailbox, the message is sent to all local subscribers and to all list members.

Modular Messaging—MSS administrators can also set up system-wide or enterprise-wide broadcast lists. For example, administrators can create a broadcast list on each Modular Messaging system, and then create a broadcast list on one of the Modular Messaging systems that has as its members the broadcast lists on all the systems.

The MSS uses the broadcast mailbox and Community ID settings to control sending privileges of users who address messages to ELA broadcast mailing lists. For more information on communities and sending privileges, see

The actual addressing format used to send a broadcast message can be any addressing format that the relevant interface (telephone user interface or PC interface) supports.

While a new broadcast message does not activate MWI, Find Me, and Notify Me, it activates Call Me, provided the broadcast message meets subscriber-specified criteria. If customers require MWI activation, system administrators can create an ELA list with entries for each local subscriber. Messages sent to an ELA list activate MWI.

The Modular Messaging telephone user interfaces (TUIs) announce broadcast messages as such. The TUIs present new broadcast messages before other messages and provide a summary count of broadcast messages after logging in. AUDIX TUI subscribers hear all broadcast messages of all message types (voice, fax, and text) before gaining access to other messages. Aria TUI subscribers hear all voice broadcast messages before accessing other voice messages, but have to select the text message option to be able to listen to broadcast text messages. Hence, if broadcast messages are sent as text, Aria TUI users will not hear the message unless they access text messages.

Modular Messaging Web Client and Client Add-in for Microsoft Outlook provide visual indications for identifying broadcast messages.

Standards-based clients do not provide any special visual indicators for broadcast messages. Recipients can recognize broadcast messages from the address of the broadcast ELA, unless the broadcast message has been sent via BCC.

Modular Messaging—Exchange and Modular Messaging—Domino system lists

Microsoft Exchange

IBM Lotus Domino

Microsoft Exchange and IBM Lotus Domino systems support system lists, known as global distribution lists and mailing list groups, respectively.

A global distribution list is a group of e-mail addresses that are typically grouped under a single e-mail address. A distribution list provides an easy way to send messages to a group of people. A message sent to a distribution list goes to all recipients listed in the distribution list.

Microsoft Exchange supports global distribution lists that are visible in the Global Address List, and which are available to everyone who uses that network.

IBM Lotus Domino supports mailing list groups that are visible in the IBM Lotus Notes Address Book and are available to everyone on that Domino Domain.

Personal Distribution Lists

Avaya MSS

A personal distribution list (PDL) is a labelled collection of addresses that subscribers create and save for use later. Messages that are addressed to the list are sent to all the multiple addresses (list members) within the list. Subscribers that frequently send messages to the same group of people, can create a PDL for the group. For example, if a subscriber frequently sends messages to ten members of the Sales team, the subscriber can create a PDL labelled 'Sales' that has the addresses of the ten members of the Sales team. When the subscriber sends a message to the Sales PDL, the message is sent to all ten members of the Sales team.

Unlike system lists, such as an Enhanced-List Application (ELA), a PDL is created and managed by a subscriber rather than a system administrator. Unlike an ELA, a PDL is personal, meaning that only the owner of the list can view and use the list. A PDL is not available for other subscribers to use.

Modular Messaging supports up to 500 PDLs per subscriber, subject to system capacity, though no hard limit has been established in the product.

Note: Lists are not subscribers and do not count towards any purchasable limits.

PDL members

The entries that a PDL contains are known as PDL members. A PDL can contain one or more of the following as list members:

- Addresses of local or remote subscribers. Subscribers can also create a PDL with no addresses and add addresses later. The format for adding addresses to a PDL depends on the client or interface subscribers use. For more information, see

- Fax machine telephone number

- ELA lists on local or remote systems

- Enterprise Lists on a Message Networking server

- Other PDLs owned by the same subscriber

- Any arbitrary e-mail address

A PDL must not contain the MSS broadcast mailbox, the internal fax delivery mailbox, and the ELA shadow mailbox.

Avaya supports up to 999 members (list entries) per PDL, subject to system capacity, though no hard limit has been established in the product.

PDL labels and identifiers

A PDL has one or more of the following labels or identifiers:

- Name

- Identifier

- List number (List ID)

- Recorded list name

Name

A Name, also known as the PDL display name, is a Unicode textual name that subscribers can assign a PDL. A PDL Name can contain a maximum of 255 characters.

Subscribers can use the PDL Name when addressing messages from the Modular Messaging telephone user interfaces (TUIs). When managing PDLs from Subscriber Options, subscribers can use the PDL Name to quickly navigate through the PDLs they own.

A PDL Name cannot contain only numerics. A PDL Name need not be unique.

When creating PDLs from Subscriber Options, subscribers must assign PDL Names. When creating PDLs from the Modular Messaging TUIs, subscribers cannot assign PDLs a Name. However, subscribers can use Subscriber Options to modify the PDL and assign it a Name.

Identifier

An Identifier is an ASCII name that subscribers can assign to PDLs they own. The Identifier is used in the PDL e-mail address syntax #[Identifier]@hostdomain.com, when subscribers address messages to a PDL from a graphical user interface (GUI) client.

An Identifier can contain only ASCII characters (0 to 9, a to z, A to Z, _ and -) and must be unique across all the PDLs a subscriber owns. If subscribers do not provide an Identifier, the system automatically generates an Identifier. A system-generated Identifier is the PDL Name without any spaces or restricted characters. For example, the Identifier of a PDL named 'Sales Team (3)' would be 'SalesTeam3'.

List number (List ID)

A List number, also known as the list ID, is a numeric list identifier that subscribers must assign to PDLs they own. A List number must be unique among all PDLs that the subscriber owns.

A List number can contain from 1 to 32 digits, and can start with '0'. Hence, if a PDL contains a single list member, the 7-digit telephone number of that list member can be used as the List number. The List number is used in the PDL e-mail address syntax #[List number]@hostdomain.com, when subscribers address messages to a PDL from a graphical user interface (GUI) client. A PDL that exists must have a List number.

Recorded list name

A recorded list name is an optional identifier that subscribers can record when creating lists from either the Modular Messaging TUIs or from Subscriber Options.

Working with PDLs

Subscribers can create and manage PDLs from the following interfaces or clients. Managing a Personal Distribution List (PDL) includes modifying or deleting a PDL.

- The Modular Messaging telephone user interfaces (TUIs)

  — Aria TUI for Modular Messaging

  — AUDIX TUI for Modular Messaging

- Subscriber Options

Personal Distribution Lists (PDLs) that subscribers create using one client or interface are usable from any other client or interface. For example, PDLs that subscribers create using the Aria TUI for Modular Messaging are usable from the AUDIX TUI for Modular Messaging and from Graphical User Interface (GUI) clients.

Creating PDLs from the TUIs

From the Modular Messaging TUIs, a subscriber can create new PDLs with one or more of the following members:

- Local subscribers. Local subscribers can be added by mailbox number, Numeric Address, or name.

- Remote subscribers. Remote subscribers can be added by Numeric Address, network address, or name.

- Fax device telephone numbers

> **Note:** The Modular Messaging Aria TUI does not support adding a fax device telephone number to a PDL.

- Enhanced-List Application (ELA) lists

- List numbers (List IDs) of other PDLs that the same subscriber owns

Note: Subscribers can also create a PDL with no members, with the intention of adding entries later.

When subscribers create a PDL from the TUIs, the PDL has no text Name. Subscribers can provide a Name later from Subscriber Options, after the PDL is created. When subscribers create a PDL from the TUIs, they can also provide a recorded name.

Creating PDLs from Subscriber Options

From the Subscriber Options application, a subscriber can create new PDLs with one or more of the following members:

- The mailbox numbers or Numeric Addresses of subscribers from the Global Contacts.

- The extension numbers of local subscribers from the Global Contacts.

- The names of subscribers from the Global Contacts. When subscribers enter the name or partial name of subscribers from the Global Contacts, Subscriber Options presents a list of matches, if any. Subscriber Options presents up to nine matches for the specified name.

- Fax device telephone numbers in the format fax=nnnn@host.domain, where host.domain is the address of the subscriber's MSS.

- Arbitrary e-mail addresses.

- Text Names of other PDLs that the same subscriber owns.

Note: Subscribers can also create a PDL with no members, with the intention of adding entries later.

When subscribers create a PDL from Subscriber Options, subscribers assign the PDL a text Name, an Identifier, and a List number. Subscribers can also provide an optional recorded name.

Managing PDLs from the TUIs

Managing a PDL from the Modular Messaging TUIs includes:

- Adding and removing list members by specifying their mailbox number, Numeric Address, network address, or display name

- Modifying the List number of the PDL

- Adding or modifying the recorded name of the PDL

- Deleting a PDL

To manage a PDL, subscribers can select the PDL by specifying its List number or its Name. If the PDL Name contains only non-ASCII characters, the only way to select a PDL is by its List number.

Managing PDLs from Subscriber Options

Managing a PDL from Subscriber Options includes:

- Adding and removing list members by specifying their mailbox number, Numeric Address, extension number, or e-mail address

- Modifying the List number of the PDL

- Adding or modifying the recorded name of the PDL

- Deleting a PDL

To manage a PDL, subscribers can select the PDL by specifying its List number or its Unicode Name. The PDL Name enables subscribers to quickly navigate through the PDLs they own. From Subscriber Options, subscribers can sort PDLs by Name or by List Number.

An administrator can invoke Subscriber Options on behalf of a subscriber, enabling the administrator to access lists that the subscriber owns.

Addressing messages to PDLs

Subscribers can address messages to Personal Distribution Lists (PDLs) from any of the following interfaces, applications, or clients:

- The Modular Messaging telephone user interfaces (TUIs)

  — Aria TUI for Modular Messaging

  — AUDIX TUI for Modular Messaging

- Client Add-in for Microsoft Outlook

- Modular Messaging Web Client

- A standards-based e-mail client

If subscribers address a message to a PDL that contains a deleted subscriber or a deleted PDL, the system generates a delivery failure notification message. The message is delivered to all other valid

recipients. The system also informs the originator of the message of the last known name and e-mail address of the deleted subscriber or PDL. The TUIs voice the e-mail address using text-to-speech (TTS) conversion. For more information, see PDLs and deleted subscribers on page 5-41.

Addressing from the Modular Messaging Aria TUI

To address messages to a PDL from the Modular Messaging Aria TUI, subscribers can address to the List number (List ID) or to the list Name, if one exists.

With the Modular Messaging Aria TUI, PDLs belonging to a subscriber are mixed in with addresses of other subscribers. When subscribers address a message to the List number of a PDL, the system matches the number against all PDLs belonging to the subscriber, as well as mailbox numbers, Numeric Addresses, and network addresses of other subscribers. When subscribers address a message by name, the system matches the name against the names of PDLs belonging to the subscribers, as well as display names of subscribers.

The system prompts the subscribers to select the targeted recipient, which in this case is a PDL.

Addressing from the Modular Messaging AUDIX TUI

The Modular Messaging AUDIX TUI enables subscribers to include a PDL in the addressee list when addressing messages.

Subscribers can address to a PDL either by Name, if one exists, or by List number (List ID). The TUI provides subscribers an opportunity to select the PDL from a list of matches. The Modular Messaging AUDIX TUI provides subscribers a unique key press when addressing messages to PDLs. This key press identifies the PDL address type, thus keeping PDL addresses separate from addresses of other subscribers.

Addressing from GUI clients

Subscribers can address messages to a PDL from any of the following Graphical User Interface (GUI) clients:

- Microsoft Outlook, with Client Add-in for Microsoft Outlook

- Modular Messaging Web Client

- UCC Speech Access

- a standards-based e-mail client

From all these GUI clients, subscribers can address messages either to the List number or to the PDL Identifier.

When subscribers address messages to a PDL from Client Add-in for Microsoft Outlook, the Voice Form component provides directory assistance. Subscribers can select a PDL recipient from the MSS directory and conveniently send a message to the list. All PDLs that a subscriber owns are grouped under Modular Messaging Personal Distribution Lists, in the MSS directory.

Modular Messaging Web Client does not provide a facility for subscribers to look up PDL addresses, hence, subscribers must know the address of a PDL.

Client Add-in for Microsoft Outlook and Modular Messaging Web Client support the following PDL addressing formats:

- #nnnn, where nnnn is the List number of the PDL. Client Add-in for Microsoft Outlook resolves this address to a PDL from the list of PDLs belonging to the subscriber. Modular Messaging Web Client expands this address to mailboxnumber#nnnn@host.

- #asciichars, where asciichars is the Identifier of the PDL. Client Add-in for Microsoft Outlook resolves this address to a PDL from the list of PDLs belonging to the subscriber. Modular Messaging Web Client expands this address to mailboxnumber#asciichars@host.

In addition to these addressing formats, Client Add-in for Microsoft Outlook and Modular Messaging Web Client support the same addressing formats as an IMAP4 standard-based e-mail client. These addressing formats are:

- mailboxnumber#nnnn@host, where mailboxnumber is the local mailbox number of the subscriber and nnnn is the List number of the PDL.

- handle#nnnn@host, where handle is the part to the left of the @ symbol in the subscriber's e-mail address and nnnn is the List number of the PDL.

- mailboxnumber#asciichars@host, where mailboxnumber is the local mailbox number of the subscriber and asciichars is the Identifier of the PDL.

- handle#asciichars@host, where handle is the handle (part to the left hand side of @) of the subscriber's e-mail address and asciichars is the Identifier of the PDL.

Note: When using the list Identifier, the match against the PDLs belonging to the subscriber is not case-sensitive.

When addressing messages to a PDL from the UCC Speech Access client, subscribers can, through speech, request a PDL List number. The List number can have a maximum length of four digits. Alternatively, subscribers can add the e-mail address of the PDL to their personal Contacts.

Other concepts related to PDL addressing

Other concepts related to PDL addressing are:

Circular PDLs   A circular PDL is a PDL that directly or indirectly includes itself. A message addressed to a circular PDL is delivered to the union of all individual members, other than PDLs on each of the PDLs. Each recipient receives the message only once.

Consider the example of a subscriber who owns two PDLs—PDL1 and PDL2. PDL1 has subscriber A, subscriber B, and PDL2 as its members and PDL2 has subscriber B, subscriber C, and PDL1 as its members. A message addressed to either PDL1 or PDL2 is delivered to subscriber A, subscriber B, and subscriber C, and all three subscribers receive the message only once.

A circular PDL can have unlimited levels of nesting.

PDLs and deleted subscribers   If a subscriber addresses a message to a PDL that has deleted subscribers or deleted PDLs among its members, the system delivers a delivery status notification (DSN) to the subscriber. This DSN informs the subscriber of a problem with list expansion. The message is delivered to all other valid recipients.

The DSN informs the subscriber of the list that has deleted members and also includes the last known text name and e-mail address of the deleted members. The TUIs voice the e-mail address using text-to-speech (TTS) conversion.

Regardless of the number of deleted subscribers in the targeted PDL, the subscribers receives only one DSN that informs them of a problem in the targeted PDL. However, a subscriber receives as many DSNs as the number of PDLs with deleted subscribers. For example, if a subscriber sends a message to a PDL that has other PDLs—PDL A and PDL B, each containing deleted subscribers, the originating subscriber receives 2 DSNs: a DSN informing of problems with PDL A and another DSN informing of problems with PDL B.

PDL address not visible to recipients   When subscribers send a message to a PDL from the Modular Messaging TUIs, Microsoft Outlook with Client Add-in for Microsoft Outlook, or Modular Messaging Web Client, recipients cannot see the address of the PDL.

The message that the recipient receives shows only the addresses of individual subscribers within the PDL, and not the address of the PDL itself. Even when a PDL contains other PDLs, recipients see only the addresses of individual subscribers.

If a PDL is copied on a message using Blind Carbon Copy (BCC), provided BCC is available to the sending client, the recipient sees neither the PDL itself nor any of the PDL members.

Message Privacy

Avaya MSS

Modular Messaging uses a two-pronged approach to achieve message privacy:

- Flexible support for message privacy

  This includes the ability to create, send, and access private messages from the Modular Messaging telephone user interfaces and from Avaya graphical user interface (GUI) clients. It also includes the restrictions that these clients and interfaces impose on the recipients of private messages. The support that Client Add-in for Microsoft Outlook and standards-based e-mail clients provide is subject to the enforced privacy parameters.

- Enforcement of message privacy

  This includes privacy parameters that administrators can configure using the Voice Mail System Configuration (VMSC) tool on a messaging application server (MAS) and on the Avaya Message Storage Server (MSS).

System administrators can set the levels of privacy support and privacy enforcement. These administered levels also determine the behavior of user interfaces and clients, with respect to privacy.

Note: Modular Messaging does not restrict recipients of private messages from playing the messages on a speakerphone or recording the message with a tape recorder. Likewise, Modular Messaging does not restrict recipients of private fax messages or private messages with attachments from printing and then circulating the fax or attachments. Modular Messaging cannot restrict the operation of programs that subscribers may use to view private message attachments.

Creating private messages

When creating new messages, Modular Messaging subscribers can mark messages as private, from the following interfaces, clients, or applications:

- The Modular Messaging telephone user interfaces (TUIs)

  — Aria TUI for Modular Messaging

  — AUDIX TUI for Modular Messaging

- Modular Messaging Web Client

- Unified Communication Center (UCC) Speech Access

- Microsoft Outlook with Client Add-in for Microsoft Outlook

- Standards-based e-mail clients

  Standards-based e-mail clients support creating private messages only if the client uses the standard RFC822 privacy or sensitivity message header. Modular Messaging treats 'private', 'confidential', or 'personal' messages originating from a standard-based e-mail client as private messages.

Callers can create private messages when using the Avaya Common Caller Interface (CCI) to leave Call Answer messages, provided administrators have configured the system to allow private Call Answer messages. For more information, see Creating private Call Answer messages on page 5-44.

Accessing private messages

Modular Messaging supports subscriber access to private messages as follows:

- When subscribers access a private message from any of the Modular Messaging TUIs, the TUI announces that the message is private, before playing the message. Depending on the Privacy Enforcement Level (PEL) setting, the TUIs may restrict subscribers from forwarding private messages or from replying to private messages with the original message attached. For more information, see The Privacy Enforcement Level privacy parameter on page 5-45.

- When subscribers access a private message from the Modular Messaging Web Client application, the application provides a visual indicator for private messages. Irrespective of the administered PEL setting, Modular Messaging Web Client restricts subscribers from forwarding private messages or replying to the sender of a private message, with the original message attached.

  Note: When subscribers play a voice message locally on the PC, they have the option to save the voice file on the PC. In addition, Windows Media Player also caches the voice file on the PC. Hence, to enforce maximum privacy, administrators can configure Modular Messaging Web Client to support only dual-connect mode. This prevents voice messages from being played locally on the PC, downloading of voice messages, and caching of voice messaging on the PC.

- When subscribers access a private message from the Unified Communication Center (UCC) Speech Access client, the client announces that the message is private. The UCC Speech Access client restricts subscribers from forwarding private messages or from replying to private messages with the original message attached.

- Client Add-in for Microsoft Outlook and IMAP4 standard-based e-mail clients can be used to access mailboxes only if:

  — The privacy enforcement level (PEL) parameters are *not* set to Full.

  — The Restrict Client Access COS is set to No.

  Note: These clients do not enforce privacy restrictions. Hence, if voicemail privacy operation is desired, administrators can prevent specific subscribers or all subscribers from using these clients, using the Restrict Client Access COS and the PEL setting, respectively.

When subscribers access a private message from Client Add-in for Microsoft Outlook, the application provides a visual indicator for private messages. However, the application does not enforce privacy, hence, subscribers are allowed to forward the message or reply to the message with the original attached. Subscribers can also save the message using the 'Save As' feature.

Standard IMAP4 clients may provide a visual indicator for private messages, provided the client recognizes the standard RFC822 privacy or sensitivity message header. Typically, these clients may not enforce privacy, that is, they may not restrict subscribers from replying to private messages with the original message attached, forwarding, or saving messages.

Creating private Call Answer messages

The Voice Mail System Configuration (VMSC) tool on the MAS provides an administrative setting that determines whether a caller can leave private Call Answer messages. If this setting (Allow Private Call Answer Messages) is enabled, callers that reach the Avaya Common Caller Interface (CCI) can mark Call Answer messages private.

This administrative setting is independent of the Privacy Enforcement Level parameters

If this setting is disabled, callers will not be able to leave private messages. However, subscribers will still be able to create new private

messages when composing messages from the telephone user interface (TUI), graphical user interfaces (GUIs), or Unified Communication Center (UCC) Speech Access.

The Privacy Enforcement Level privacy parameter

Administrators can control the level of privacy the system enforces by administering the Privacy Enforcement Level (PEL) parameter. The PEL privacy parameter setting determines which clients or interfaces have access to Modular Messaging mailboxes. Depending on the PEL parameter setting, clients and interfaces may or may not restrict subscriber attempts to forward private messages or reply to private messages with the original message attached.

PEL is a system-wide parameter with values Full, Partial, and Notification Only, where Full is the default value. The value of this privacy parameter determines the level of privacy the system enforces.

The PEL parameter does not affect the Allow Private Call Answer Messages parameter.

Full privacy enforcement

This is the default setting for new Modular Messaging—MSS installations.

If the value of the PEL system parameter is set to Full, the Modular Messaging system enforces privacy to the fullest extent possible.

With this setting, subscribers can access their mailboxes using only the following interfaces or clients:

- Modular Messaging telephone user interfaces (TUIs)

- Modular Messaging Web Client

- Unified Communication Center (UCC) Speech Access

When the PEL parameter is set to Full, these interfaces and clients also enforce privacy to the maximum extent possible; subscribers cannot forward private messages, or reply to private messages with the original message attached.

In addition, with this setting, the system prevents subscribers from sending private messages to arbitrary e-mail addresses.

When Modular Messaging subscribers send private messages to users of remote messaging systems connected to a Message Networking server, the following occurs:

- Private messages sent to Intuity AUDIX, Octel 250/350, Octel 200/300 are delivered as private.

- The Message Networking server provides an option to either allow or block the sending of private messages to an AMIS end node. If this option is set to block private messages from being sent to an AMIS end node, private messages will be rejected. If this option is set to allow private messages to be sent to an AMIS end node, the message is sent to the AMIS recipient with a earcon indicating "Private" appended to the start of the message. AMIS remote subscribers cannot send private messages.

- VPIM support of privacy is optional. Private messages sent via a Message Networking server to a VPIM end node will be sent as private. However, the ability of the receiving node to identify the message as private and offer any restrictions is a function of the capabilities of that end node. Likewise, if a VPIM subscriber sends a private message, and if it is delivered to Message Networking marked as private, the Modular Messaging recipient will receive it marked as private, subject to the Modular Messaging privacy restrictions.

Note: When the PEL parameter is set to Full, subscribers cannot access their mailboxes using either standards-based clients or Client Add-in for Microsoft Outlook. The Full privacy enforcement setting overrides the Restrict Client Access COS setting.

Partial privacy enforcement

If the value of the PEL system parameter is set to Partial, subscribers can access their mailboxes using the following interfaces or clients:

- Modular Messaging telephone user interfaces (TUIs)

- Modular Messaging Web Client

- UCC Speech Access

- Client Add-in for Microsoft Outlook. This access is determined by the Restrict Client Access COS setting.

- Standards-based clients. This access is determined by the Restrict Client Access COS setting.

With this setting, the TUIs, Modular Messaging Web Client, and UCC Speech Access enforce privacy; subscribers cannot forward private messages, or reply to private messages with the original message attached. However standards-based clients and Client Add-in for Microsoft Outlook may not restrict subscriber attempts to forward private messages or reply to private messages with the original message attached.

Notification Only privacy enforcement

This is the default setting for upgrades from previous releases of Modular Messaging—MSS.

If the value of the PEL system parameter is set to Notification Only, subscribers can access their mailboxes using the following interfaces or clients:

- Modular Messaging telephone user interfaces (TUIs)

- Modular Messaging Web Client

- UCC Speech Access

- Client Add-in for Microsoft Outlook. This access is determined by the Restrict Client Access COS setting.

- Standards-based clients. This access is determined by the Restrict Client Access COS setting.

With this setting, although the TUIs allow subscribers to mark messages as private, they do not enforce privacy of messages. The TUIs announce messages as being private, but do not enforce restrictions on forwarding of private messages and on replying to a private message with the original message attached.

Modular Messaging Web Client and the UCC Speech Access client always enforce privacy, regardless of the PEL setting; subscribers cannot forward private messages or reply to private messages with the original message attached.

TUI privacy announcement

The announcements that the Modular Messaging TUIs play when subscribers access private messages depend on the PEL setting:

- If the PEL setting is Full or Partial, the TUIs play an announcement, indicating that the message is private. Subscribers cannot dial through this announcement.

- If the PEL setting is Notification Only, the TUIs play a non-dial-through privacy announcement, followed by a dial-through announcement indicating that the sender has requested that the message be treated as private.

Restricting client access to mailboxes

Modular Messaging provides administrative settings to control subscriber access to mailboxes from clients that use IMAP4 or POP3 standards.

Enabling or disabling POP3 and IMAP4 services

The Avaya Message Storage Server (MSS) provides administrators the facility to enable or disable IMAP4 and POP3 services.

When the IMAP4 service is disabled, subscribers cannot use any IMAP4 clients to access the Modular Messaging system. This includes Modular Messaging Web Client, UCC Speech Access, the Client Add-in for

Microsoft Outlook application, or any IMAP4 standard-based e-mail clients.

When the POP3 service is disabled, subscribers cannot use POP3 standard-based e-mail clients to access their Modular Messaging mailboxes.

When the IMAP4 and POP3 services are enabled, IMAP4 and POP3 standards-based clients can access Modular Messaging, subject to the Restrict Client Access COS and the PEL setting. For more information, see The Privacy Enforcement Level privacy parameter on page 5-45.

The Restrict Client Access COS

Administrators can use a class-of-service (COS) privacy parameter to enable or restrict client access to Modular Messaging mailboxes. This COS, known as the 'Restrict Client Access' COS determines whether subscribers using that COS can use an IMAP4 or POP3 standards-based client to access their Modular Messaging mailboxes.

This Restrict Client Access COS has values of Yes and No.

Subscribers can access their mailboxes from standards-based e-mail clients and from Client Add-in for Microsoft Outlook only when the Restrict Client Access COS parameter is set to No.

The Restrict Client Access COS does not affect the behavior of the Modular Messaging telephone user interfaces (TUIs) and Modular Messaging Web Client; these clients will continue to have access to the Modular Messaging mailboxes, even when the COS is set to Yes.

For new installations of Modular Messaging, the COS value is set to Yes by default. For upgrades from existing systems, the COS value is set to No by default.

Note: The Restrict Client Access to Mailbox COS is not relevant when the Privacy Enforcement Levels (PEL) parameter is set to Full. When the PEL parameter is set to Full, the system operates as if all COS have the Restrict Client Access setting of Yes.

Standard RFC822 Privacy Header

Modular Messaging supports the standard RFC822 sensitivity header for privacy. This allows subscribers using standards-based clients to mark outgoing messages as private. Depending on the capabilities of the client, incoming messages may also be identified as 'private'. Typically, these clients do not prominently display the privacy indicator. These clients may not enforce any privacy restrictions with respect to forwarding private messages.

Summary of the privacy parameters

Table 5-4 summarizes the roles and interdependencies of the different parameters that enforce and support message privacy:

Table 5-4.   Interdependencies of the privacy parameters

Privacy Enforcement Level (PEL)	Restrict client access to mailbox (COS) setting	Access via TUI, Web Client, and UCC Speech Access	Access via IMAP4 and POP3 clients and Client Add-in for Microsoft Outlook
Full	Yes or No; PEL overrides COS	Permitted. Subscribers cannot forward private messages or reply to private messages with the original message attached.	Restricted.
Partial	No	Permitted. Subscribers cannot forward private messages or reply to private messages with the original message attached.	Permitted. Subscribers may be able to forward private messages or reply to private messages with the original message attached.
Partial	Yes	Permitted. Subscribers cannot forward private messages or reply to private messages with the original message attached.	Restricted.
Notification Only	Yes	Permitted. From TUIs and UCC Speech Access, subscribers can forward private messages or reply to private messages with the original message attached. From Web Client, Subscribers cannot forward private messages or reply to private messages with the original message attached.	Restricted.

Table 5-4. Interdependencies of the privacy parameters

Privacy Enforcement Level (PEL)	Restrict client access to mailbox (COS) setting	Access via TUI, Web Client, and UCC Speech Access	Access via IMAP4 and POP3 clients and Client Add-in for Microsoft Outlook
Notification Only	No	Permitted. From TUIs and UCC Speech Access, subscribers can forward private messages or reply to private messages with the original message attached. From Web Client, Subscribers cannot forward private messages or reply to private messages with the original message attached.	Permitted. Subscribers may be able to forward private messages or reply to private messages with the original message attached.

Subscriber data migrations and system upgrades

Avaya MSS

Modular Messaging supports the migration of the following systems to Modular Messaging—MSS Release 2.

- Intuity AUDIX R4.4, R5.0, R5.1, and Intuity AUDIX HiCap

- Aria 2.0x and Aria 3.0x, 3.1x

Note:

- Subscriber data migrations are a value-added service that Avaya Global Services and trained Channel Partners provide to Modular Messaging—MSS Release 2. Customers are advised to contact the appropriate organization to facilitate this service.

- For migration of networking subscriber information to a new or existing Message Networking Server, see the document 'Network management for subscriber migrations to Modular Messaging', available at http://support.avaya.com.

For subscriber data migrations from Intuity AUDIX systems, the telephone user interface (TUI) type for each assigned class-of-service (COS) defaults to Modular Messaging AUDIX.

For subscriber data migrations from Aria systems, the TUI type for each assigned COS defaults to Modular Messaging Aria.

For subscriber data migrations, the following are included:

- Any applicable system data. Most system values are set as part of the installation, and not via migration.

- Any applicable COS data.

- Any applicable subscriber mailbox data.

- Distribution lists on Aria systems are migrated to Modular Messaging Enhanced List Application (ELA) lists. Migration of Intuity AUDIX ELA lists to Modular Messaging are not supported.

For subscriber data migrations, the following are not included:

- Messages

- Greetings

- Names

- Customer-modified system prompts and announcements

- Automated Attendant mailboxes and applications

Modular Messaging supports upgrading the following systems to Modular Messaging—MSS Release 2:

- Modular Messaging Release 1.0

- Modular Messaging—MSS, Release 1.1

For upgrades from these systems, the TUI type for each assigned class-of-service (COS) defaults to Modular Messaging Aria.

Notes:

- Systems that are initially configured with all Modular Messaging Aria TUI mailboxes that later deploy the Modular Messaging AUDIX TUI must be engineered at that time to meet the capacities noted in Table 11-5 on page 11-7.

- Upgrades are done by service personnel, not the customer.

Modular Messaging also supports upgrading the following systems to Modular Messaging Release 1.1:

- Unified Messenger for Microsoft Exchange, Release 5.0 to Modular Messaging—Microsoft Exchange, Release 1.1

- Unified Messenger for IBM Lotus Domino, Release 5.0 to Modular Messaging—IBM Lotus Domino, Release 1.1

Note: Earlier releases of Unified Messenger must be upgraded to Unified Messenger Release 5.0, prior to upgrading to Modular Messaging, Release 1.1.

6

Addressing and networking

This chapter introduces the interoperability of Modular Messaging with other voicemail systems and the different forms of addressing that Modular Messaging supports.

This chapter includes the following topics:

- [Addressing](#) on page 6-2

- [Multiple mailboxes and alias extensions](#) on page 6-12

- [Networking](#) on page 6-14

Addressing

Every Modular Messaging mailbox is assigned the following addresses that can be used to address messages from the Modular Messaging telephone user interface (TUI) and from a desktop PC:

- Primary mailbox address

- Local mailbox number

- Numeric Address

Notes:

- For information on addressing messages to Personal Distribution Lists (PDLs), see

- For addressing from UCC Speech Access, refer to the UCC Speech Access documentation available at: http://support.avaya.com.

Primary mailbox address

Modular Messaging uses the mailbox number and a standard e-mail address as the primary addresses for subscriber mailboxes.

In most voicemail systems, the primary mailbox address is the mailbox number. Modular Messaging also associates an e-mail address with each mailbox:

- In a Modular Messaging—MSS system, the e-mail address is of the form firstname.lastname@msshost.company.com, where msshost.company.com is the DNS name of the MSS, and can be replaced with an e-mail host alias name. For more information, see

  Note: This e-mail address cannot be the same as the subscriber's corporate e-mail address, as this is the address of the subscriber's MSS mailbox, and not of the subscriber's corporate e-mail mailbox.

- In Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino systems, the e-mail address is the subscriber's corporate e-mail address. Typically, this address is of the form firstname.lastname@company.com.

The different interfaces of Modular Messaging, such as the telephone user interface (TUI) and the graphical user interfaces (GUIs) support different forms of addressing. All these addressing forms are effectively aliases of either the mailbox number or the e-mail address. Internally, Modular Messaging always delivers messages to an e-mail address and always identifies the sender with an e-mail address.

When Modular Messaging sends messages, such as those sent via SMTP/MIME networking or those sent by the Notify Me feature, the sender's name and the e-mail address of the sender's Modular Messaging mailbox appear in the 'from' field of the message. With Modular Messaging—Exchange and Modular Messaging—Domino, this name and address are the sender's corporate e-mail identity. With Modular Messaging—MSS, these are the name and e-mail address for the sender's Modular Messaging mailbox and, although the name might be the same as the sender's name for corporate e-mail, the address must be different. Although Outlook typically displays only names, the address is what is used when sending replies.

When sending messages to networked systems, and when sending notification e-mail messages, Modular Messaging uses the customer's e-mail infrastructure. With Modular Messaging—Exchange and Modular Messaging—Domino, these messages are sent as e-mails from the subscriber's e-mail mailbox. With Modular Messaging—MSS, these messages are sent as standard e-mail SMTP messages from the Modular Messaging system using the customer's TCP/IP network, but not necessarily using the customer's e-mail servers.

Other networking considerations for Modular Messaging—MSS

Avaya MSS

Other networking considerations for Modular Messaging—MSS systems are:

- The e-mail address for a Modular Messaging subscriber mailbox by default includes the (internal) DNS name of the MSS server. This name can be replaced with an e-mail domain alias. For example, a default e-mail address of john.smith@mss.internaldomain.company.com can be replaced by john.smith@voicemail.company.com, where 'voicemail.company.com' is an e-mail domain alias. Two or more Modular Messaging—MSS systems cannot currently be configured to share the same e-mail domain alias.

- Two Modular Messaging—MSS systems or a Modular Messaging—MSS and a Message Networking server network using SMTP and LDAP connections over the customer's TCP/IP network. The domain names for the e-mail addresses for the remote subscribers must either be resolvable by DNS or be administered in the hosts file of each system (/etc/hosts).

- Messages sent external to Modular Messaging—MSS, such as those sent via SMTP/MIME networking or those sent by the Notify Me feature, may be dynamically routed by:

  — standard SMTP e-mail DNS mail exchanger (MX) lookup, with preference to local /etc/hosts entries or

  — by configuring a single outgoing e-mail gateway

- When messages are sent outside the customer's network, for example Notify Me messages sent to e-mail-accessible paging systems, consideration should be given to:

  — exposing the internal DNS host name of the MSS server

  — whether the customer's inbound e-mail gateways will allow incoming e-mail (from the Internet) to be delivered into the subscriber's Modular Messaging mailbox.

Avaya neither recommends nor discourages allowing Internet e-mail delivery into Modular Messaging mailboxes. However if Internet e-mail can be delivered into a Modular Messaging— MSS system, Avaya strongly recommends any such e-mail be filtered through the customer's normal spam and virus checking mechanisms before delivery.

Local mailbox numbers

Subscribers can use local mailbox numbers to address any Avaya Modular Messaging subscriber within a voice mail domain. Traditional voicemail systems typically use this form of addressing. From the PC user interface, Modular Messaging—MSS subscribers can address messages to local mailbox numbers in the format nnnn@domain.com, where nnnn is the mailbox number and domain.com is the e-mail domain name used for the e-mail addresses of Modular Messaging mailboxes.

Within a voice mail domain, all local mailbox numbers must have the same number of digits, and each local mailbox number must be unique. Unlike many voicemail system, Modular Messaging does not require the mailbox number of subscribers to be the same as their telephone extension numbers

The number of digits that a local mailbox number can have is:

- Modular Messaging—MSS: At least two digits and a maximum of ten digits

- Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino: At least two digits and a maximum of ten digits

> **Note:** Only local subscribers, that is subscribers within a voice mail domain, can use local mailbox numbers for addressing.

Numeric Address

A Numeric Address, also known as a variable length address, enables subscribers to address messages to any local or remote recipient in an organization.

For Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino, the recipient can be anyone in the global directory with a Numeric Address. For Modular Messaging—MSS, the recipient can be any local or remote subscriber in the directory. Remote subscribers that do not have an administered Numeric Address, are assigned Numeric Addresses equal to their network addresses. For details, see Network address on page 6-7.

Every Avaya Modular Messaging subscriber must be assigned a Numeric Address. The Numeric Address allows a subscriber to send a message to any recipient from the TUI without having to know the geographic location of the recipient. The directory makes all Numeric Addresses available to all locations within the organization.

US Organizations might choose to use 10-digit telephone numbers (with the area code) for Numeric Addresses. Other possible schemes include:

- A geographic location code associated with a local mailbox number

- Mailbox numbers

- Employee numbers

- Short Numeric Addresses, for example "55" for a Help Desk, or "1" for the office of the CEO

A Numeric Address can have a variable length of between one and 32 digits.

In Modular Messaging—MSS and Modular Messaging—Microsoft Exchange[1] systems (other than Microsoft Exchange 5.5[2]), Numeric Addresses can be the same length as mailbox numbers.

With Modular Messaging—IBM Lotus Domino, a Numeric Address cannot be the same length as the mailbox number.

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1. Modular Messaging—Exchange 2000 and Exchange 2003 systems support same length Numeric Address and mailbox numbers, as of Modular Messaging Release 1.1, Service Pack 3.
2. New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

All local and remote subscribers can use Numeric Addressing.

Additional forms of addressing from the TUI

In addition to local mailbox numbers and Numeric Addresses, Modular Messaging supports two custom forms of addressing messages from the Modular Messaging telephone user interfaces (TUIs). These forms are needed because the TUIs do not provide a facility to enter alphabetic characters easily. The two forms of addressing are:

- Dial-by-Name

- Network address

When subscribers address messages from the TUIs, the system confirms the correct entry of each recipient's address, by playing the name of each recipient. If the subscriber has a recorded name, the recorded name is played. For example, if there are multiple subscribers with the name Jim Smith, subscribers hear Jim Smith speaking his own name. If no recorded name is available, the system uses text-to-speech (TTS) to play the name of the recipient. Modular Messaging—MSS systems support 250,000 names, each of which can have a spoken name.

Dial-by-Name
Dial-by-Name is a method of addressing messages by spelling the name of the recipient using the keys on the telephone keypad.

Note: With Dial-by-Name, if a remote subscriber's spoken name is not available, the TUI speaks their display names using text-to-speech technology. Consider this when setting up a format for display names.

Administrators can configure the properties of the Dial-by-Name mode of addressing, so that when matching names, Dial-by-Name uses either of the following:

- The name of the recipient

- The e-mail address of the recipient.

Avaya recommends matching by e-mail addresses only if the names of recipients are not easily mapped to a telephone keypad. This mode of addressing (matching by e-mail address) is useful when the name of the recipient includes characters (such as Chinese) that are not part of the Latin character set.

The Voice Mail System Configuration (VMSC) tool on the MAS enables administrators to configure Dial-by-Name properties and to select matching by name or by e-mail address.

Avaya MSS

Modular Messaging—MSS

Modular Messaging—MSS forces the administration of a US-ASCII name for all subscribers, in addition to the display name, which may contain non-ASCII characters. Dial-by-Name, when configured to match the names of recipients, uses this US-ASCII name.

Microsoft Exchange

IBM Lotus Domino

Modular Messaging—Exchange and Modular Messaging—Domino

With Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino, subscribers have only one name. This name may contain non-ASCII characters. European accented characters are mapped to the unaccented character for Dial-by-Name using the name of the recipient. Alternatively, Dial-by-Name can be configured to use the e-mail address of the recipient.

All local and remote subscribers can be addressed using Dial-by-Name addressing.

When callers use Dial-by-Name to address messages or to reach an extension or mailbox, callers must enter enough characters to allow the system to reduce the possible matches to be 9 or fewer. The system then prompts the caller to select the desired entry. For example, the system plays such prompts as "For John A Smith, press 1. For John B Smith, press 2, and so on" If there are more than 9 matches, the system will prompt the caller to enter more characters.

For information on configuring Dial-by-Name, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

Network address

Modular Messaging—MSS subscribers can directly communicate with other Modular Messaging—MSS subscribers or with non-Modular Messaging subscribers, by means of a Message Networking server.

Modular Messaging—MSS subscribers can address messages using the following address forms in addition to the remote subscriber's Numeric Address:

- Prefix + Remote Number Range set up when administering a remote Modular Messaging—MSS system on a local Modular Messaging—MSS system.

  — When multiple Modular Messaging—MSS systems use a Message Networking server as a gateway for LDAP updates, the Remote Number Range is the Network Address. This Network Address is the fixed-length (typically seven or ten digit) number assigned on the Message Networking server.

  — When a Modular Messaging—MSS system is directly administered as a remote machine on a local Modular

Messaging—MSS system, the Remote Number Range is the mailbox number range of the remote system. The mailbox number range is the length of the mailbox numbers on the remote Modular Messaging—MSS system.

■ Prefix + Message Networking Network Address when addressing to other systems through a Message Networking server.

Message Networking Network Address

The Message Networking server assigns each Avaya Modular Messaging subscriber a unique network address that is specific to a voicemail system. A network address is typically a machine prefix followed by the subscriber mailbox number. The machine prefix is common to all subscribers of a particular voice mail system.

A Message Networking server is not assigned a prefix by either the Modular Messaging system or the remote system.

Consider the following example (Table 6-1) of a subscriber on a Modular Messaging—MSS system communicating with a networked subscriber, through a Message Networking server.

Table 6-1. Modular Messaging—MSS and Message Networking server addressing

System	Mailbox number	Network address	E-mail/SMTP address
Modular Messaging—MSS	70000	732-817-0000	name@sys. company.com
Traditional system connected to the Message Networking server	1234	408-555-1234	4085551234@mn. avaya.com

To address a message to a remote subscriber reached via the Message Networking server:

1. The Modular Messaging subscriber uses mailbox number 70000 to log in to the telephone user interface (TUI)

2. The subscriber addresses a message to the network address of the recipient on the Message Networking server (408-555-1234)

3. Modular Messaging sends the message via SMTP to 4085551234@mn.avaya.com

4. The Message Networking server converts the e-mail address (4085551234@mn.avaya.com), which contains the network address network address (408-555-1234) to the mailbox number

(1234). The Message Networking server then sends the message to the remote traditional system, via a protocol that the traditional system supports.

To address a message to a Modular Messaging subscriber:

1. The networked subscriber uses mailbox number 1234 to log in to the subscriber mailbox

2. The subscriber addresses a message to the Modular Messaging recipient, using the network address (732-817-0000) of the recipient

3. The remote traditional system sends the message to the Message Networking server.

4. The Message Networking server converts the network address (732-817-0000) to the e-mail address of the Modular Messaging subscriber (name@sys.company.com). The Message Networking server then sends the message via SMTP to the Modular Messaging system.

Note: Modular Messaging subscribers can use the Message Networking e-mail address when addressing from a graphical user interface (GUI) client. For example, to address a message to a networked subscriber whose network address is 408-555-1234, Modular Messaging subscribers can use 4085551234@mn.avaya.com. The Message Networking e-mail addresses of remote users are in the LDAP directory, so GUI client users can use this directory to resolve names to these e-mail addresses.

Implementing networking without using prefixes

It is possible for an organization with multiple Modular Messaging— MSS systems to implement networking between the systems, without assigning any prefixes.

Avaya MSS

In such a case, the network address of the remote subscribers will be the same as their local mailbox number. Such an implementation is appropriate for an organization with more subscribers at one location than a single Modular Messaging—MSS system supports. For example, an organization with 40,000 subscribers, all using 5-digit dialing.

With multiple Modular Messaging—MSS systems, some features that are voice mail domain-specific will not work between the systems. For example, features like reply to Call Answer messages, call sender of Call Answer messages, call sender of voicemail messages, and transfers will not work between the systems.

When two networked Modular Messaging—MSS systems are located in different cities, their respective prefixes might be a city-specific switch

access code. For example both sites may be using 4-digit dialing within the system, but they could use the switch access code as a prefix when dialing employees at the other site. The network address does not have to match the (assigned) Numeric Address, so in this case the remote users might be addressable in multiple ways.

When Modular Messaging—MSS subscribers use a network address to address messages, Modular Messaging translates the address to an e-mail address, and the message is sent using e-mail protocols.

Additional forms of addressing from the PC user interface

Depending on the Graphical User Interface (GUI) client subscribers use to send messages, Modular Messaging supports the following address formats:

Modular Messaging with e-mail servers

Microsoft Exchange

IBM Lotus Domino

When addressing messages from a PC user interface, Modular Messaging—Exchange and Modular Messaging—Domino subscribers can use the respective global directories. An address is always unique within the directory. An address entered at any location is automatically available at all locations within the organization. E-mail servers support an enterprise-wide directory, which uses unique identifiers valid from anywhere in the enterprise.

When Modular Messaging—Microsoft Exchange subscribers use the Client Add-in for Microsoft Outlook application to send messages, they can use the Global Address List for directory assistance.

When Modular Messaging—IBM Lotus Domino subscribers integrate DUC software from IBM to run with their IBM Lotus Notes client, they can use the IBM Lotus Notes Address Book for directory assistance.

Subscribers can additionally address messages by the local mailbox number and Numeric Address of the recipient.

The Global Address List and IBM Lotus Notes Address Book are also available to subscribers using supported standards-based e-mail clients.

Modular Messaging—MSS

Avaya MSS

When using Modular Messaging Web Client, subscribers can address messages to recipients using their names, e-mail addresses, or mailbox numbers. The Web Client provides access to the MSS directory and the e-mail directory. From the directory, subscribers can search for other users and address messages to them. The Web Client supports only Modular Messaging—Avaya MSS version.

When Modular Messaging—MSS subscribers use Client Add-in for Microsoft Outlook or a standards-based e-mail client, they can address messages using the LDAP Address Book that the MSS provides. Subscribers can also address messages by name, primary mailbox

address, or Message Networking server e-mail address. For information on the Message Networking address, see <u>Network address</u> on page 6-7.

Subscribers using Client Add-in for Microsoft Outlook can also address messages to local mailbox numbers and Numeric Addresses of recipients.

Subscribers using any standards-based e-mail client will not be able to use address forms such as local mailbox number and Numeric Address, unless the LDAP query string can be modified.

With Modular Messaging—MSS, if a separate e-mail directory exists for corporate e-mails, subscribers must be careful when using directory assistance. Addresses of local subscribers appear in the Modular Messaging directory. If, by mistake, subscribers address a voice message to contacts in the corporate directory, recipients receive an e-mail message with a .WAV attachment, in their corporate e-mail mailbox.

Note: When Modular Messaging—MSS subscribers using a standards-based e-mail client reply to a message, care should be taken to ensure that the reply is sent from the sender's Modular Messaging address directly to the MSS rather than from the subscriber's corporate e-mail address. Depending on the client used, this operation may be controlled based on from where the message was retrieved or may require a manual selection when sending the message.

Multiple mailboxes and alias extensions

Modular Messaging enables administrators to configure schemes that support:

- Multiple extensions per mailbox

- Multiple mailboxes per extension

Multiple extensions per mailbox

Modular Messaging systems enable a mailbox to have more than one extension number.

A mailbox can have one primary extension number and one or more secondary extension numbers. A secondary extension number is an alternate number that callers can dial to interact with a subscriber.

A secondary extension number provides subscribers a separate number for direct reception of fax messages and enables callers to use an existing Caller Application. A secondary extension can also be used if each line appearance on the telephone set has a different telephone number. Secondary extensions can also be used by individuals who have multiple offices with separate extensions, or by small teams where members have their own extensions but need to share a mailbox.

With Modular Messaging—MSS Release 1.1, administrators could configure a mailbox to have a maximum of ten secondary extensions.

With Modular Messaging—MSS Release 2, Modular Messaging— Exchange, and Modular Messaging—Domino, administrators can configure a mailbox to have as many secondary extensions as required. The number of secondary extensions is limited only by the amount of storage space available.

Notes:

- Modular Messaging—Exchange with Microsoft Exchange Server 5.5[3] does not support the multiple extension feature.

- Modular Messaging—Domino does not support Caller Applications on secondary extensions.

Call Answer support
By default, the Call Answer behavior for the secondary extension numbers is the same as it is for the primary extension. Thus, callers would get to hear the same greetings and prompts, irrespective of which

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3. New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

extension number they dial. The automated attendant transfers calls to the primary extension. However, with Modular Messaging—MSS and Modular Messaging—Exchange (except Exchange 5.5 server), Caller Applications can be used to customize the Call Answering behavior for each extension. For more information, see <u>Caller Application support</u> on page 6-13.

When a subscriber with multiple extensions sends a voice message to another subscriber, and if the recipient wished to call the sender, the call will be made to the primary extension of the sender.

As with the primary extension, secondary extension numbers are unique.

Outcall feature support

Secondary extensions do not have an impact on the working of the Call Me server and the MWI server. The MWI server will only control the lamp state for the primary extension. All outcalls are made using the primary extension.

Caller Application support

With Modular Messaging—MSS and Modular Messaging—Exchange (except Exchange 5.5 server), each secondary extension number may be associated with a different front-door Caller Application.

If a Caller Application is associated with a called extension and the call is then redirected to the telephone user interface (TUI), the Caller Application is executed instead of any default call handling.

If no Caller Application is associated with an extension, TUI uses the default call handling for the mailbox.

Multiple mailboxes per extension

Using Caller Applications, it is possible to achieve coverage for multiple mailboxes from a single number. A single-level Caller Application can transfer the caller to up to 9 mailboxes.

Call Answer callers hear "To leave a message for subscriber A, press 1. To leave a message for subscriber B, press 2, and so on." They then hear an announcement from the relevant subscriber's mailbox, and can leave a message.

To complete the configuration, administrators must create an association that ties the deployed Caller App to a specified extension. This is the extension that is dialed to reach multiple mailboxes.

Even when multiple mailboxes are set up for an extension, subscribers are still capable of having their own extension number.

Note: An Enhanced-List Application (ELA) can be configured such that calls can be made to the extension number of the ELA

list, and the message is delivered to all of the ELA list members.

Networking

The term 'networking' is used to describe how subscribers of a Modular Messaging system can exchange messages with subscribers of other Modular Messaging systems, or, in some cases, with users of other voicemail systems.

Modular Messaging interoperates with other Modular Messaging systems in the following manner:

- Modular Messaging—MSS. Provides native support to SMTP/MIME networking, using which, subscribers can exchange messages with:

  — Subscribers of other Modular Messaging—MSS systems

  — Subscribers of systems connected to an Avaya Message Networking Server. The Message Networking Server performs the conversion between SMTP/MIME and both proprietary voicemail networking protocols (such as Octel Analog, AUDIX TCP/IP, Aria TCP/IP, and Serenade TCP/IP) and standard protocols (such as AMIS and VPIM).

  Note: With Modular Messaging—MSS, networking is a chargeable option, and facilitates networking between a Modular Messaging—MSS system and a Message Networking server. For simplified administration, directory management, and performance, customers are advised to consider using a Message Networking server among multiple Modular Messaging—Avaya MSS systems. For more information, see Modular Messaging—MSS and the Message Networking Server on page 6-15.

- Using native networking, Modular Messaging—Exchange subscribers can exchange messages with subscribers of other Modular Messaging—Exchange systems and Modular Messaging—IBM Lotus Domino subscribers can exchange messages with subscribers of other Modular Messaging—IBM Lotus Domino systems

- Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino systems also interoperate with systems connected to an Avaya Message Networking Server. However, networking between heterogeneous systems requires

careful consideration. Customers and planners are advised to review Appendix C, <u>Considerations with Message Networking server</u>, and should consult the engineering paper Message Networking Implementation Notes. This engineering paper is available upon request.

Modular Messaging—MSS and the Message Networking Server

Avaya MSS

It is important to plan for the Mailbox ID length, Numeric Address length, and Network Address length when designing a network that involves Modular Messaging—MSS and Message Networking. For example, in some cases, depending on the Network Address length of the Message Networking application (which is fixed in length), it may be desirable for two Modular Messaging systems to send their subscriber directories directly to each other rather than get routed through a Message Networking application. This is so that the Network Address value for a remote Modular Messaging subscriber on a local Modular Messaging system is not fixed in length as would be required with a Message Networking solution.

When a Modular Messaging—MSS system uses a Message Networking server for communicating with other voicemail systems, certain features are affected in the following manner:

No partial updates when addressing from the telephone user interface (TUI)

Modular Messaging—MSS does not support partial updates when addressing to remote subscribers from the TUI. When Modular Messaging subscribers address messages to remote subscribers, from the telephone user interface (TUI), recipients must be pre-administered on the Modular Messaging—MSS as remote subscribers. This means that all remote subscribers in the network must be added via an automatic networking directory update or manually pre-administered on the Modular Messaging—MSS system, to be able to receive messages addressed from the Modular Messaging TUI.

Reply-all

Messages coming via a Message Networking server will not contain a complete list of recipients because, the Message Networking server cannot be sure that it received a complete list of recipients from the originating node. Hence when using reply-all to messages coming via a Message Networking server, the reply-all feature sends the reply only to the originator of the message.

Message Networking server among multiple Modular Messaging—MSS systems

Avaya MSS

Modular Messaging—MSS systems can establish direct connectivity with each other, using SMTP/MIME networking. However, for simplified administration, directory management, and performance, customers are advised to consider using a Message Networking server among multiple Modular Messaging—Avaya MSS systems.

Message Networking server for administration: Modular Messaging requires that each remote machine be administered on the Modular Messaging system.

With the implementation of a Message Networking server, remote machines are administered on the Message Networking server. Hence, each Modular Messaging system only needs to administer the Message Networking server system, rather than each remote machine, thus simplifying administration.

Message Networking server for performance: Large directory updates between Modular Messaging systems can significantly impact system performance.

A Message Networking server eliminates the possibility of multiple directory updates occurring at the same time, thus improving the performance of directory updates.

When the number of subscribers of a Modular Messaging system is large, customers are advised to consider using the high-availability configuration of the MSS (MSS-H). MSS-H improves performance of directory updates by providing higher throughput than the standard-availability MSS configuration (MSS-S).

Table 6-2 defines when a Message Networking Server is recommended and when it is optional in an environment that contains multiple Modular Messaging—Avaya MSS systems.

Table 6-2. Message Networking Server in a multiple Modular Messaging— MSS environment

Average number of subscribers per Modular Messaging— MSS system	3 to 5 Modular Messaging— MSS systems	5 to 10 Modular Messaging— MSS systems	More than 10 Modular Messaging— MSS systems
Less than 2,000	Optional	Optional	Recommended for administration and performance
2,000 to 5,000	Optional	Recommended for performance	Recommended for administration and performance
5,000 to 10,000 **Note:** Customers are advised to use MSS—H	Recommended for performance	Recommended for performance	Strongly recommended for administration and performance
More than 10,000 **Note:** Customers are strongly advised to use MSS—H	Strongly recommended for performance	Strongly recommended for performance	Strongly recommended for administration and performance

7

Modular Messaging and fax servers

Modular Messaging—Avaya Message Storage Server (MSS) is a fax-capable messaging solution that includes native fax resources to provide fax capability.

Avaya Modular Messaging—Microsoft Exchange version and Avaya Modular Messaging—IBM Lotus Domino version require a third-party fax server for fax messaging.

Note: Avaya does not sell, service, or maintain third-party fax server hardware or software. Customers that do not currently have a fax solution deployed can purchase a third-party fax solution from a choice of fax vendors and their authorized distribution channels, some of which are also authorized for the Avaya Modular Messaging solution.

This chapter provides information on the fax server setup with all versions of Modular Messaging. This chapter contains the following topics:

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Modular Messaging—MSS native fax server

Avaya MSS

Avaya Modular Messaging—Avaya Message Storage Server (MSS) makes use of a native fax server to support the following fax features:

- Subscribers can receive, review, send, and print fax messages. When sending faxes, the feature attaches a cover page to the fax message.

- Subscribers can forward a copy of their inbox listing to a fax device through the Modular Messaging Aria telephone user interface (TUI).

- Subscribers can forward a fax message with a voice annotation.

- Fax senders can leave fax-only messages or voice-and-fax messages for subscribers.

- Subscribers using Client Add-in for Microsoft Outlook can print multilingual text messages to a fax device, by addressing the text messages to MM:fax=nnnn@host.domain. Similarly, when subscribers use a standards-based e-mail client to address fax messages, they must ensure that the message is sent directly to the MSS, using their Modular Messaging identity (MM identity).

- Subscribers can print text messages received into the Modular Messaging mailbox

Incoming faxes

Receipt of incoming faxes can take place in several ways, depending on how the system is set up with Direct Inward Dialing (DID):

- On systems with DID, callers call into a subscriber mailbox and press Start on the fax device.

- On systems without DID, callers call the automated attendant from the fax machine, select the extension of the subscriber either by using Dial-by-Name or by entering the extension of the subscriber, and press Start on the fax device.

The native fax server provides fax messaging capabilities via the voice ports on a messaging application server (MAS). An MAS receives fax messages using the drivers provided by Dialogic. When an MAS receives a call, the TUI calls the relevant function and the fax data is acquired and stored in the message.

Outgoing fax

Outgoing fax messages include:

- Fax messages that subscribers create and manually address to fax=nnnn@host.domain, where nnnn is the number of the destination fax machine or the recipient.

- Fax messages that subscribers print to a fax device from the TUI. A messaging application server (MAS) takes responsibility of the fax message and sends it to the Message Store Server (MSS).

Fax Sender Server

On receiving a fax message, the Fax Sender Server converts the text message to TIFF format, adds a cover page, includes any TIFF file that the subscriber may have attached, places an outgoing call to the fax machine, sends the fax, and sends a message to the subscriber indicating whether the fax was successfully transmitted.

If the fax is not delivered in spite of the maximum number of retries, the fax is deemed undeliverable, the message is deleted from the fax mailbox and a non-delivery-report is sent to the subscriber who sent the message.

Modular Messaging enables administrators to configure fax properties, including defining company identification that appears on the outgoing fax cover pages.

The Fax Sender Server can be installed on every MAS in a voice mail domain. However, only one MAS can be designated as the active fax sender for the voice mail domain. The Fax Sender Server installed on this MAS requests and utilizes fax resources available on any of the MAS units in the voice mail domain to receive or transmit fax messages. The maximum number of concurrent incoming or outgoing faxes that a system supports is equal to the sum of the fax resources on all the MAS units in the voice mail domain.

Table 7-1 contains the maximum number of fax resources that different port boards support. Fax resources are shared amongst all voice ports on this board.

Table 7-1. Maximum fax resources on a port board

Port board	Number of fax resources
T1 port board	15 (Dual span card)
E1 port board	16 (Dual span card)
8-port DSE port board	2
12-port analog port board	4
4-port analog port board	4

Notes:

— Avaya-provided T1 and E1 cards are dual span.

— H.323-based IP integration currently does not support fax messaging.

— The Windows 2000 Fax Service has no connection with Modular Messaging. Starting or stopping this service will have no effect on the fax capabilities of Modular Messaging.

Providing interoperability with third-party fax servers

Avaya Modular Messaging—Microsoft Exchange version and Avaya Modular Messaging—IBM Lotus Domino version require a third-party fax server for fax messaging.

This section describes how third-party fax servers interoperate with Avaya Modular Messaging.

Note: The hardware and software required for the third party fax server must be provided by the customer. For information on the fax server hardware and software recommended for a particular switch integration type, see the configuration notes available at http://support.avaya.com. These configuration notes also provide information on where the fax server can be installed.

An overview of third-party fax servers

Avaya Modular Messaging, in conjunction with a compatible, customer-provided, third-party fax server, offers the following fax features:

- A subscriber mailbox can receive and store fax messages.

- Subscribers can forward fax messages and e-mail messages to fax devices for printing.

- Subscribers can forward a copy of their inbox listing to a fax device through the telephone user interface (TUI).

- Subscribers can forward a fax message with a voice annotation.

- Fax senders can leave fax-only messages for subscribers.

- Subscribers can print e-mail messages that have attachments (for example, a document in Microsoft Word or Microsoft Excel format), to a fax device. The fax server converts such attachments to fax format. The types of attachments that can be printed to a fax device depend on the capabilities of the fax server.

Incoming faxes   Receipt of incoming faxes can take place in several ways, depending on how the system is set up with Direct Inward Dialing (DID):

- On systems with DID, callers call into a subscriber mailbox and press Start on the fax device.

■ On systems without DID, callers call the automated attendant from the fax machine, select the extension of the subscriber either by using Dial-by-Name or by entering the extension of the subscriber, and press Start on the fax device.

When an MAS receives a call and detects the fax tone, it transfers the call to the third-party fax server. When the fax server answers the call, the MAS plays the fax routing information inband to the fax server. Based on the fax routing information, the fax server then delivers the fax message to the mailbox of the recipient.

Note: The fax server must support dual tone multifrequency (DTMF) routing.

Requirements for fax server interoperability with Avaya Modular Messaging

Avaya recommends that the third-party fax server resides on a separate server. The fax hardware is connected to a fax hunt group on the switch.

The following are the requirements for third-party fax server interoperability with Avaya Modular Messaging:

■ The fax server must be integrated with the mail system as an e-mail connector or an e-mail gateway for fax.

■ The fax server must use addressing that is specific to Avaya Modular Messaging:

— With Microsoft Exchange, use a FAX addressing type specific to Avaya Modular Messaging.

— With IBM Lotus Domino, use a specified foreign domain name for the right-hand part of an address. For example, nnnnn@FAX, where FAX is the foreign domain name.

This addressing is necessary to deliver messages to the fax server for transmission and to create one-off or ad-hoc addresses.

■ The fax server must support dual tone multifrequency (DTMF) detection and collection.

■ The fax server must match the DTMF fax routing number supplied by Avaya Modular Messaging with the fax routing address of a subscriber.

■ The fax server must create faxes as e-mail messages with TIFF attachments and send them to the intended recipient.

■ Depending on the messaging environment, the fax messages placed in the inbox of a subscriber should be identified by one of the following:

— A unique message class (IPM.NOTE.FAX), so that they can be detected as faxes by Avaya Modular Messaging—Microsoft Exchange version.

— A unique message type (FAX), so that they can be detected as faxes by Avaya Modular Messaging—IBM Lotus Domino version.

Note: If a fax server does not support the message class or message type, Modular Messaging does not classify messages as faxes. Instead, depending on the fax server, the message is classified as a normal e-mail message with TIFF attachments.

Enabling subscribers for fax

Subscribers with fax-enabled mailboxes can use the telephone user interface (TUI) to access fax messages in their mailbox. From the TUI, fax-enabled subscribers can route fax or e-mail messages (with or without attachments) to any fax device for printing. Subscribers can also listen to the number of fax messages, review fax messages in a separate queue, print contents of the mailbox, and forward fax messages with voice annotations.

Microsoft Exchange

Enabling fax for subscribers (Modular Messaging—Microsoft Exchange version)

Subscribers are fax-enabled when a system administrator adds a fax routing address (FAXROUTE:) as an e-mail address type for the subscriber. The contents of the fax are passed to the fax server with the inbound call.

When a subscriber requests the printing of a fax or e-mail message, Avaya Modular Messaging requests that Microsoft Exchange forward a copy of the message to the default fax destination or to a one-off address of the form [FAX:nnnnnnn], where FAX is the address type for the fax server and nnnnnnn is the telephone number of the fax device.

IBM Lotus Domino

Enabling fax for subscribers (Modular Messaging—IBM Lotus Domino version)

Subscribers are fax-enabled when a system administrator adds a fax routing address as an e-mail address type for the subscriber. The contents of the fax are passed to the fax server with the inbound call.

When a subscriber requests the printing of a fax or e-mail message, Avaya Modular Messaging requests that IBM Lotus Domino forward a copy of the message to the default fax destination or to a one-off address of the form nnnnnnn@FAX, where FAX is the address type for the fax server and nnnnnnn is the telephone number of the fax device.

Routing inbound fax calls to the third-party fax server

Microsoft Exchange

IBM Lotus Domino

Like voice calls, fax calls placed to the extension of a subscriber are redirected to the messaging application server (MAS) when these calls encounter a ring-no-answer or busy condition. Whenever the MAS receives a call and detects that it is a fax, it places the call on hold and initiates a call transfer to the fax server hunt group.

After a fixed time delay (5-second default), Avaya Modular Messaging sends fax routing information as DTMF codes to the fax server and then transfers the fax call. The fax routing information that Avaya Modular Messaging sends is determined by retrieving the fax routing address for the subscriber, based on the called extension number or entered mailbox number.

After the fax server receives the fax, it completes the following steps:

1. Determines the address of a subscriber by finding the subscriber with a matching fax routing address

2. Creates an e-mail message with a TIFF attachment (TIFF group 3 fax format)

3. Does one of the following:

   ■ In Microsoft Exchange, sets the message class to IPM.NOTE.FAX

   ■ In IBM Lotus Domino, sets the message type to FAX

4. Sends the message to the subscriber mailbox

Note: If the subscriber has Call Me enabled for fax messages, Modular Messaging makes an outcall to the subscriber, and provides a notification of the new fax message.

Working with fax messages

This section contains information on the fax messaging capabilities Modular Messaging supports, from the telephone user interface (TUI) and from the PC user interfaces.

Note: H.323-based IP integration currently does not support fax messaging.

Fax messaging from the TUI

The Modular Messaging TUI provides the following fax capabilities to subscribers and callers:

- Callers can leave fax messages for subscribers.

- Subscribers can review fax messages

- Subscribers can respond to fax messages

- Subscribers can print fax messages to a default fax destination or to a new fax destination

- Subscribers can configure a fax destination

Note: Modular Messaging—Exchange and Modular Messaging—Domino provide these capabilities in conjunction with a third-party fax server. Some features are dependent on the specific fax server and may not be available.

Fax Call Answer The TUI enables callers calling from a fax machine to leave fax messages for subscribers. A Modular Messaging—MSS system also supports voice-and-fax Call Answer messages.

Modular Messaging—MSS subscribers can have a secondary fax extension associated with their mailbox. This enables subscribers to give callers a fax number that is different from the primary extension number.

Modular Messaging—Exchange and Modular Messaging—Domino subscribers can also have a separate number for fax, in which case, incoming fax calls are sent directly to the third-party fax server.

Call Answer fax mailbox features

Modular Messaging—MSS enables customers to configure single or dual Direct Inward Dialing (DID) fax delivery mechanisms, using the multiple

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extensions per mailbox feature. For more information, see

Single extension per mailbox (single DID fax delivery). This method uses a single number to reach a subscriber mailbox for both voice and fax calls. The call comes through the switch and is forwarded to the subscriber mailbox on such conditions as:

- The extension is busy

- The extension rings but there is no answer

- The system has been configured to forward all calls

However, if the subscriber answers the call before it is forwarded to the mailbox, they must manually transfer the call back to their mailbox on the server, in order to receive the fax.

Multiple extensions per mailbox (dual DID fax delivery). This method uses two different numbers to reach a subscriber mailbox—one for voice messages, the other for fax or voice-and-fax[1] messages. Both calls come through the switch and are integrated into a single mailbox. This method requires no intervention by the fax recipient.

Fax Call Answer with Modular Messaging—MSS

The MAS receives the fax and delivers it to the MSS.

Fax Call Answer with Modular Messaging—Exchange and Modular Messaging—Domino

The MAS detects the fax tone, identifies the mailbox information, and transfers the call to a customer-provided third-party fax server along with the necessary mailbox information. The third-party fax server then receives the fax and puts it into the mailbox.

Reviewing fax messages

When subscribers log in to their mailboxes from the Modular Messaging TUI, they are informed of how many new messages they have, including new fax messages. When subscribers choose to review fax messages, the system plays the message header information. Header information includes the types of message (fax), the name or number of the sender, if available, the date and time of receipt of the messages, and the number of pages the fax contains.

Subscribers can use the TUI options to respond to a fax message, in much the same way as they can to voice or e-mail messages.

Subscribers can:

- Forward a message with or without a voice annotation.

1. Only the Modular Messaging—MSS version supports voice-and-fax Call Answer messages.

- Reply to the sender of the messages, provided the fax originates from a PBX extension that is the primary or a secondary extension of a subscriber in the same voice mail domain.

- Call the sender of the message, provided the caller is within the dialing plan of the voice mail domain.

- Print the fax message to a fax device.

Printing fax messages

Subscribers can print fax messages to a fax device before or after reviewing them. When printing fax messages, subscribers can print to the default fax destination or they can provide a new, alternate fax destination. Subscribers configure the default destination for the mailbox using the TUI options and the Subscriber Options component.

When calling from a fax machine, Modular Messaging—MSS subscribers can print the current fax message in the same call, thus terminating the subscriber log-in session.

Subscribers can use any one of the following formats to enter the fax destination number:

- Simple number format. This format includes the complete telephone number of the fax device including the trunk access and area codes, as a single string of digits. For example, 902088674100, where 9 is the trunk access code, 020 is the area access code, and 88674100 is the fax number.

  Note: PBX account or authorization codes may be added to the fax dialing string, where appropriate. This entire digit string is sent to the PBX. Modular Messaging—MSS attaches a cover page to the fax, and this cover page includes the entire digit string, thus making the account or authorization code visible to the fax recipient.

- Canonical format. This format specifies the full fax telephone number for the voice mail domain, for use by the telephone user interface. When a subscriber wants to send a fax, the system will prompt for these outgoing numbers or allow alternative entries as an aid to addressing. The canonical address includes the country code and area code:

  +CountryCode (AreaCode) SubscriberNumber

  For example:

  +1 (408) 3458000

  If a Modular Messaging—MSS system is configured to use canonical addressing, access codes for the fax address must be configured. Subscribers can use canonical addressing if the fax

servers support canonical addressing and if canonical addressing has been enabled using the Voice Mail System Configuration tool. The canonical address also allows the system to prevent unnecessary toll calls if the receiver of the fax uses the same country code or area code as the sender.

If subscribers use dialing prefixes, such as 9 or 1, these prefixes must be included in the address format.

When printing a fax message, Modular Messaging—MSS adds a cover page to the fax. The details of the cover page are added when administering the messaging application server (MAS).

Notes:

■ Modular Messaging—MSS subscribers can also print text messages or messages with TIFF attachments to fax devices.

■ Modular Messaging—Exchange and Modular Messaging—Domino subscribers can print text and corporate e-mail messages, messages with TIFF attachments, and Microsoft Office file attachments (including Word documents, Powerpoint presentations, and so on) to a fax device. In addition, subscribers can also print any specific attachments that are supported by the third-party fax server.

Creating fax messages

Subscribers cannot use the TUI subscriber interface to create new fax messages. To create a fax message from the TUI, subscribers must use the Call Answer feature to send a fax message to their own mailboxes. Subscribers can then log in to their respective mailboxes and forward the message to the intended recipients. The recipients can be local or remote, networked subscribers.

With Modular Messaging—MSS, subscribers can leave voice-and-fax messages during Call Answer. These messages are treated as fax messages.

Fax messaging from the PC user interfaces

PC user interfaces treat fax messages like e-mail messages. From a PC user interface, subscribers can:

■ Print faxes received into their mailbox to a fax machine, or local or networked-attached printer

■ Print text messages received into their mailbox to a fax machine

Note: When Modular Messaging—MSS subscribers use a standards-based e-mail client to print text messages

to a fax device, they must address the messages to
fax=nnnnn@address.

In conjunction with a third-party fax server, subscribers of Modular
Messaging with Microsoft Exchange or IBM Lotus Domino can also print
corporate e-mail messages to a fax machine.

**Modular
Messaging—MSS**

Avaya MSS

Modular Messaging—MSS subscribers can view and forward fax
messages from Modular Messaging Web Client. Modular Messaging Web
Client does not support creating fax messages. However, subscribers can
send fax messages in one of the following ways:

- Depending on the system configuration, subscribers may be able
  to send a fax from a fax machine to their Modular Messaging
  mailbox. Once the fax is in the mailbox, subscribers can forward
  the message with the fax attachment.

- Subscribers can create a .tif file with fax software or a graphics
  program and scanner, and attach the .tif file to a message.

Modular Messaging—MSS subscribers can create and send fax messages
from a standards-based e-mail client. Subscribers can create a fax
message using Windows 2000 features and send it to the intended
recipient's fax device, by using the address format
fax=nnnn@host.domain, where nnnn is the number of the destination fax
machine or the recipient. The use of this form of address is restricted to
SMTP sessions originating from authenticated (local) subscribers.

When the Message Storage Server (MSS) receives a message with such
an address format, it delivers it to the fax mailbox. The Fax Sender Server
converts the text message to a TIFF format, adds a cover page, includes
TIFF files (if any) that the subscriber attached to the message, and notifies
the MAS of the fax message. The MAS places an outgoing call to the
destination number, and sends the TIFF data to the remote fax machine.

Modular Messaging notifies subscribers of the delivery status by sending
a fax delivery status notification message to the mailbox of the subscriber.

Notes:

- The Fax Sender Server can only transmit image files that conform
  to the TIFF/F format. TIFF/F stands for 'F Profile of TIFF for
  Facsimile'. An arbitrary TIFF file that does not meet all the
  requirements for TIFF/F is not guaranteed to be acceptable for
  transmission as a fax.

- When subscribers send fax messages or print text messages to a
  fax device, using Client Add-in for Microsoft Outlook, they
  address messages to fax=nnnn@host.domain. Subscribers must
  resolve the address (CTRL+K) and specify that the custom e-mail
  type is 'MM', to ensure that the message is sent via Modular

Messaging. Alternatively, subscribers can also address messages to MM:fax=nnnn@host.domain.

For more information, see *Avaya Modular Messaging Client Add-in for Microsoft Outlook User Guide*, 11-300241.

Similarly, when subscribers use a standards-based e-mail client to address fax messages, they must ensure that the message is sent directly to the MSS, using their Modular Messaging identity (MM identity).

Modular Messaging—Exchange

Microsoft Exchange

With Modular Messaging—Microsoft Exchange, subscribers using the Client Add-in for Microsoft Outlook application can forward fax messages addressed to 'fax:nnnnnn', where 'nnnnnn' is either the simple or canonical number, depending on the configuration of the fax server and the fax properties for the voice mail domain.

8

Telephony concepts

This chapter describes how Avaya Modular Messaging communicates with various telephony environments to provide call-processing features.

This chapter includes the following topics:

- Voice ports on page 8-2

- Switch integration on page 8-3

- Telephony protocols on page 8-8

- Signaling on page 8-10

- Hunt groups on page 8-11

For switch integration documentation, see the configuration notes available from the Avaya Modular Messaging support representative or from the Avaya Support Center at http://support.avaya.com.

Configuration notes provide integration information for several types of switch and fax devices. Configuration notes provide information on the common features of switch integrations, the procedures for configuring switch integration, and the considerations for each type of integration. Configuration notes are updated frequently to reflect best practices and current knowledge. Customers are advised to verify that they are referring to the latest version of a configuration note.

Voice ports

Messaging application server (MAS) units provide a critical link between the telephone call switching equipment and the message store. MAS units communicate with the switch by means of a number of telephone end-points known as voice ports. Voice ports receive inbound calls and place outbound calls in the same way as any other extension on the switch.

Avaya Modular Messaging supports a range of voice cards, offering various port densities, from 4-port cards upwards.

Note: H.323-based IP integration does not use voice ports. All further references to voice ports are equivalent to voice channels for H.323-based IP integration.

Voice ports or channels can be configured into port groups that are associated with the following Avaya Modular Messaging components:

- Telephone user interface (TUI)

- PC client

- Call Me Server

- Message Waiting Indicator (MWI)

- Fax

Voice cards provide telephony signaling to the Avaya Modular Messaging software. The way in which this signaling is implemented depends on the telephony protocol. For example, with inband analog telephony, the signaling is implemented in the voice path. With other types of telephony protocol, for example, Q-Signaling (QSIG), a separate signaling channel is used.

For more information on telephony protocols, see Telephony protocols on page 8-8.

Switch integration

Switch integration is the means by which the switch and the Modular Messaging system exchange 'control' information relevant to calls, message waiting indicator (MWI) status, and so on. This control information may be passed inband along with the voice data, or out-of-band separate from the voice data.

Switch integration is achieved when a call is presented to a voice port and information about the call is supplied to the messaging application server (MAS) software. This information includes the nature of the call (for example, a direct call or a call deflected on busy detection), called party information (for example, the number of the busy extension for a deflected call), and the calling party number, if known. Switch integration includes MWI status information, where MWI activity pertains to messages, not calls. An MWI request can be sent as the result of a message arriving from some remote system, without any telephone calls on the local system.

Switch integration options

Switch information is provided by one of the following mechanisms, depending on the switch type:

- H.323-based IP integration

- QSIG D Channel

    — T1 QSIG

    — E1 QSIG

- Digital Set Emulation

- Analog:

    — RS-232 serial integration

    — Inband Dual Tone Multifrequency (DTMF) integration

H.323-based IP integration

Modular Messaging provides H.323-based IP integration with Avaya Communication Manager (release 1.1 or later) and Avaya DEFINITY (release 10 or later).

With H.323-based IP integration, the switch and the MAS are connected to the LAN. All exchange of information, such as call information, signaling information, and voice data happens by means of voice channels via the LAN. In this release of Modular Messaging, each MAS supports a maximum of 20 voice channels. H.323 connectivity between the MAS and Avaya Communication Manager is accomplished by means

of H.323 trunk groups configured as tie trunks supporting Q-Signaling (QSIG) features. QSIG is a standards-based, private networking protocol, based on Q.931 standards (ISDN). Signaling information and MWI information are transmitted using QSIG messages embedded in an H.323 packet.

Note: H.323-based IP integration currently does not support fax capabilities.

QSIG D Channel

ISDN protocols, such as QSIG, carry signaling information in the D channel for calls where voice data is carried in separate but associated bearer channels. This is referred to as Common Channel Signaling (CCS). The data in this channel can be used for integration.

For QSIG integration, Modular Messaging supports 23-port T1 port boards and 30-port E1 port boards.

The Avaya switches that Modular Messaging supports with T1 and E1 QSIG integration are Avaya Communication Manager (release 1.1 or later) and Avaya DEFINITY (release 10 or later).

Digital Set Emulation

Many switch vendors use proprietary digital protocols to connect their own hand sets to the switch. These protocols provide call control and integration information. Examples of such switches include Nortel Meridian and Siemens.

Inband DTMF integration

With inband integration, the switch sends DTMF tone strings to the MAS port when the call is first placed to the port. These DTMF tone strings are sent within the voice channel, and not on a separate data channel, thus the name 'inband' integration. MAS units are configured to recognize the format of these tone strings and interpret the information.

RS-232 serial integration

With RS-232 serial integration, a separate RS-232 serial communications interface is used to send control information between the switch and the MAS. Avaya Modular Messaging supports a number of RS-232 serial integration protocols to send data to the MAS. The most widely used protocol is the standard Simplified Message Desk Interface (SMDI) protocol. In other cases, the RS-232 interface is proprietary to a particular switch.

Note: Some switches can support only a single serial interface for one hunt group. MAS units, when used in a multiserver voice mail domain, can operate with a single serial interface. This is known as remote integration.

Integration features

Configuration notes provide integration information for several types of switches. These configuration notes also provide information on the integration features that a particular switch integration supports.

Integration features include:

- System Forward to Personal Greeting: The switch controls the call transfer conditions when the following occur:

    — All Calls: All calls are directly transferred to the voice messaging system, regardless of the status of the subscriber extension. This feature can be configured on the switch.

    — Ring No Answer: The subscriber extension rings, but no one answers the call. The switch transfers the call to the voice messaging system after a certain number of rings. The number of rings is four by default, but can be configured on the switch.

    — Busy: The subscriber extension is busy. The switch transfers the call to the voice messaging system on detecting the busy signal.

    — Busy/No Answer: Certain switches have multiple appearances of the same telephone number on a single telephone set. Each appearance of the number can function as a separate "line", meaning each appearance can carry a separate conversation. With such switches, Busy/No Answer features means that the switch transfers the call to the voice messaging system on detecting a busy signal. The telephone rings on the second or third line appearance, but because the switch detected a busy signal during the first line appearance, the call is treated as busy.

- Station Forward to Personal Greeting: The subscriber controls the call transfer conditions when the following occur:

    — All Calls

    — Ring No Answer

    — Busy

    — Busy/No Answer

    Note: These features work in a similar manner as when the switch controls the forwarding conditions, except that these features can be configured by subscribers on their telephone sets.

- Auto Attendant: This is an optional feature provided by Modular Messaging, and which allows initial call handling.

- Direct Call: Permits automatic login. When subscribers dial the hunt group, they need to enter only their password for mailbox access.

- External Call ID (ANI): The switches passes on the identification of external callers to the Modular Messaging system.

- Internal Call ID: The switches passes on the identification of internal callers to the Modular Messaging system.

- Message Waiting: The ability of the switch support Message Waiting Indicator (MWI), by controlling the light (on/off) and stutter dial tone on telephone sets.

- Multiple Call Forward: Multiple Call Forward or Double Call Forward supports transferring calls to two or more recipients, while providing the system greeting of the original recipient. This feature works only when all extensions have coverage to voicemail. For example, if A calls B, and the call is automatically diverted to C, if C does not answer the call, the call is transferred to the voicemail system. The integration retains the Call ID of B, the original target of the call, and plays the target that B has activated. The benefit of this feature is that a call may be transferred more than once, without losing the original Call ID (as long as the call continues to forward to voicemail), and callers would still hear the greeting of the original target.

- Multiple Greetings: Enables subscribers to have multiple greetings, depending on the call condition. For example, subscribers can activate a greeting for when the extension is busy, and another greeting for when there is no response. This feature can only be used when supported by the switch.

- Outcalling: The ability of the switch to support outcalling features, such as Find Me, Call Me, and so on.

- Return to Operator: Enables callers to dial 0 (zero) during Call Answer, to transfer the call to an operator. If the operator does not answer the call, callers hear the greeting activated for the subscriber mailbox.

- Transfer to Messaging: The Avaya Communication Manager software provides a feature to transfer to messaging, known also as Transfer to AUDIX. This feature allows an associate, such as an administrative assistant who receives a call either because they are the first coverage path, or because the caller pressed zero from a mailbox, to transfer the caller directly to the mailbox associated with the originally dialed number. The transferring party does not have to re-enter the originally called number, nor

does that telephone ring again. This is supported with Modular Messaging using a QSIG integration. For other integrations, or other PBXs, Modular Messaging can use a caller application to transfer a caller directly into a mailbox.

Telephony protocols

Avaya Modular Messaging supports the following telephony protocols for connecting the MAS to the switch:

- H.323-based IP interface

- T1 digital trunks with QSIG signaling

- E1 digital trunks with QSIG signaling

- Digital Set Emulation

- Analog telephony interface

This section provides an overview of each of these telephony protocols and describes the characteristics and deployment options associated with Avaya Modular Messaging.

For more information on voice card options and the port boards that Avaya Modular Messaging supports, see *Modular Messaging Release 2 Installation*, 11-300122.

H.323-based IP interface
H.323 is a call signalling protocol that relies on packet-based networks, such as an IP network, for transmission of voice. In H.323-based IP integration, call information and MWI updates are passed using QSIG protocol messages on an H.323 packet between the Avaya Communication Manager (Avaya CM) and the MAS. Call information, MWI updates, and voice data are passed over an IP network.

T1 digital trunks
A T1 connection is a digital transmission link with a capacity of 1.544 MBps. T1 trunks carry 24 concurrent telephone connections multiplexed into time slots. Each time slot carries sound digitized at 64 KBps, which can be used to convey voice or signaling information.

T1 is a standard for digital transmission in North America. It is widely used by telecommunications service providers to connect to remote locations and to connect switches to public networks. T1 digital trunks can connect MAS units to the switch. This enables the use of simplified wiring, with one wire for 24 time slots: 23 bearer channels (voice) and one signaling channel (data).

Customers that use T1 between their switch and service provider have the option of using E1 between the switch and the MA to obtain the benefit of higher port density per card. Typically though, customers choose to use T1 to match the interface used for external and internal communication and establish a consistent model for switch provisioning.

E1 digital trunks
Outside North America, the standard for primary rate connections is an E1 digital trunk. An E1 digital trunk is a digital transmission link with a with a capacity of 2.048 MBps. This link is divided into 32 time slots: 30

bearer channels (voice), one signaling channel (data), and one framing channel. Each time slot carries 64 KBps of data.

Digital Set Emulation

Digital Set Emulation is a digital protocol developed by switch manufacturers to connect digital telephones to their switches. Using Digital Set Emulation, Avaya Modular Messaging can emulate digital telephone sets. These telephone sets can provide all the features that a voicemail system requires to integrate with a switch. For example, they can support the receipt of calling and called party identity and can have message waiting indicators and programmable keys.

Analog telephony interface

With analog signaling, sound is represented by varying current rather than digital signals. Telephony signaling, such as on-hook or off-hook, is conveyed by completing and disconnecting the circuit. The MAS dials outbound calls using DTMF tones. All other call progress states, such as dialtone, ring-back, and busy, are conveyed using standard tones.

To initiate a three-way call, Avaya Modular Messaging issues a flash-hook (also known as a "switch hook flash"). On receipt of the flash-hook, the switch normally gives a second dialtone, allowing Avaya Modular Messaging to place an enquiry call. The MAS can then dial another number and transfer the call (by hanging up). Depending on the switch type, the switch reconnects Avaya Modular Messaging to the caller if the inquiry call clears or fails.

Analog with DTMF call-progress signaling

Using standard tones, such as ring-back and busy, to convey call progress can be imprecise and slow. For example, when an MAS dials an outbound call and detects when the call is answered, it must to go off-hook, wait for a dialtone, and then dial the number. At this point, it detects one of the following standard tones: ring-back, busy, speech, or silence. It can take some time to detect the standard tone, particularly if detection is inferred by the absence of other tones. However, when using DTMF tones the MAS can quickly and accurately detect call progress.

Signaling

Signaling is required to set up, clear, and supervise telephone connections. With analog telephone lines, digital currents (DC) perform signaling by using protocols such as E&M, loopstart, and wink start.

Digital trunks must convey signaling information in a digital format. To do this, they can use an analog protocol or a protocol developed specifically for digital networks, such as QSIG. Avaya Modular Messaging supports the QSIG protocol with T1 and E1 trunks.

Modular Messaging supports the Common Channel Signaling (CCS) digital signaling protocol.

Common Channel Signaling (CCS)

CCS signaling uses one or more channels to transmit signaling information for the remaining channels in the trunk. Non-signaling channels are known as bearer channels, and signaling channels are known as data channels. Therefore, for T1 there are 23 bearer channels and one data channel known as 23B+D. For E1 there are 30 bearer channels and one data channel known as 30B+D. Various signaling protocols can be conveyed in the D channel.

With QSIG, Avaya Modular Messaging uses QSIG supplementary services (ISO compatible) to convey integration information and to support Message Waiting Indicator (MWI) and transfers.

Hunt groups

A hunt group is a pre-programmed collection of extensions that is configured on the switch. A single pilot number presents a call to one of the available ports within the hunt group. Hunt groups can be designated for specific purposes, for example, incoming only or outgoing only. The simplest hunt groups are linear (available ports are hunted in sequential order).

When planning for Avaya Modular Messaging, use hunt groups to balance the load on voice ports. This is important because multiple MAS units can be installed with multiple telephony cards. For more information, see Hunt algorithm on page 13-12.

Types of hunt groups

Some common types of hunt groups are:

- Linear call distribution

  Calls start at the first port. When the first port is busy with the first call, the next call goes to the second port. If the first port becomes free, the next call goes to the first port, and so on.

- Uniform call distribution (UCD)

  Calls start at the first port. Subsequent calls go sequentially to the second, third, and fourth ports, and so on, regardless of whether earlier ports become available. The first port does not receive another call until all ports have taken a call.

- Automatic call distribution (ACD)

  Calls go to the port that has been idle the longest. For example, if the first port has been idle for 30 seconds, the second for 50 seconds, and the third for 40 seconds, the first call goes to the second port.

  Note: Avaya recommends ACD only with Digital Set Emulation integration using Nortel switches, and when support for more than 18 ports is required. Avaya does not recommend ACD with any other integration.

- Circular call distribution

  In circular call distribution, the switch has the ability to remember the last busy port. When a call comes it goes to the last busy port. Subsequent calls go to the first port in the group and then sequentially go to the second, third, fourth ports, and so on.

9

Support for message and call notification

This chapter describes the message notification mechanisms that Avaya Modular Messaging provides to subscribers.

This chapter includes the following topics:

- [Message notification](#) on page 9-2

- [Call notification](#) on page 9-9

Message notification

Message notification includes:

■ Call Me

■ Notify Me - Automatic

■ Message Waiting Indicator

Call Me

With Call Me enabled, Modular Messaging calls subscribers at a designated telephone number or telephone list, when subscribers receive a message that meets specified criteria. The criteria for requesting Call Me are set by subscribers using rules. For example, subscribers can choose to be informed of all urgent messages that arrive in their mailbox during their morning commute.

Once a message has activated Call Me, subsequent messages will not activate Call Me again until the subscriber logs into the mailbox. Once the subscriber has logged in to the mailbox, the next message that meets the specified criteria will trigger Call Me again.

Note: Modular Messaging—MSS subscribers cannot activate Call Me for corporate e-mail messages that are received in a separate mailbox on the corporate e-mail server.

Subscribers can designate a list of telephone numbers for Call Me. If there is no answer at the first number in the list, a call is directed to the next number in the list and so on, until the subscriber answers. To answer a Call Me call, the subscriber logs in to Avaya Modular Messaging and reviews the message or messages. Call Me also provides support to pagers.

The Call Me Server includes a Call Me service and a Mailbox Monitoring service for monitoring subscriber mailboxes. The Mailbox Monitoring service periodically checks subscriber mailboxes for new messages that meet the criteria set for Call Me.

When the Mailbox Monitoring service detects a message that meets subscriber-specified criteria, the Call Me Server dials the numbers in the telephone list of the subscriber.

With Modular Messaging—MSS, broadcast messages may activate Call Me.

⚠ **SECURITY ALERT:**
The Call Me feature can be misused to commit toll fraud. When a message triggers Call Me, the MAS generates an outgoing call to a list of telephone numbers that subscribers provide, hence making the system vulnerable to toll fraud. The Call Me feature is enabled by means of a class-of-service (COS) setting. Administrators are advised to enable Call Me, by the relevant COS, for only those subscribers that truly require this method of notification. Administrators can also take additional security measures such as assigning a restrictive PBX COS to the PBX ports used to make the outcall, or requiring account codes or authorization codes. For more information on toll fraud, see 'Modular Messaging and Security' on CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121.

Notes:

- The Call Me Server and MWI Server must be installed on the same MAS and must be set up to share the same Mailbox Monitoring service.

- The Call Me Server, MAS units, and e-mail server (Microsoft Exchange and IBM Lotus Domino message stores), must have their system clocks synchronized using a time service.

Using Call Me

Subscribers set up a rule for using Call Me on the Assistant page in Subscriber Options. A Call Me rule is created by selecting values in the following rule description:

"When [*schedule*] is active, if [*message type*] with [*importance*], from [*sender*] have arrived, call telephone numbers in [*phone list*] within [*minutes*] and then every [*interval*]."

An example rule might be:

"When schedule [*commute time*] is active, if [*new voice messages*] with [*high importance*], from [*John Smith*] have arrived, call phone numbers in [*my personal list*] within [*15 minutes*], and then every [*20 minutes*]."

Call Me rules are created using Subscriber Options. The rules can be enabled or disabled using Subscriber Option or from the Modular Messaging telephone user interfaces (TUIs).

When answering a Call Me call, subscribers are presented with a common Call Me interface. This interface provides options for receiving the call, blocking the call, and logging in to their mailboxes. The options of the Call Me interface are the same for all subscribers, regardless of the TUI assigned to them.

Call Me in Offline Mode

Outcalls from the Call Me feature are not made while either the message store or the MAS on which the Call Me server resides is not accessible. These calls may be made when both are operational again.

For more information on using Call Me, see *Avaya Modular Messaging Subscriber Options,* 585-310-789 (Issue 2).

Configuring Call Me   Administrators can use the voice mail system configuration (VMSC) tool on the MAS to enable Call Me at the system level. Once Call Me is enabled for the system, administrators can edit the Call Me class-of-service (COS) parameter on the MSS, to control the number of subscribers enabled for Call Me.

Call Me-enabled subscribers can set up rules for Call Me from Subscriber Options. The rules can be enabled or disabled using Subscriber Options or from the Modular Messaging TUIs.

Notify Me - Automatic

Notify Me provides enhanced notification specifically for Call Answer messages over and above that provided by Call Me.

Using the Avaya Modular Messaging Notify Me - Automatic feature, subscribers can be notified of new Call Answer messages in their inbox. Modular Messaging—MSS subscribers can also be notified of new fax answer messages. Subscribers can choose to be notified of all new Call Answer messages or only of new Call Answer messages marked as urgent.

When a caller leaves a message in a subscriber mailbox, Modular Messaging sends a text message to the e-mail address specified by the subscriber for notification. This may result in a page or short message service (SMS) message due to capabilities provided by the pager or the SMS system.

Notify Me capabilities   Notify Me includes the following capabilities:

- Administration by subscribers through the Aria telephone user interface (TUI) and PC interface

  Avaya Modular Messaging subscribers can configure Notify Me from a desktop PC and enable or disable Notify Me from either the desktop PC or from the TUI Personal Configuration menu in the Aria TUI for Modular Messaging.

- E-mail gateway support

  Avaya Modular Messaging can send notification messages to e-mail gateways, including third-party SMS gateways and pager gateways.

- Internet support

  Notification messages can be sent to any Internet e-mail address configured in the notification address field.

- Notify Me support for pagers

  The Notify Me feature supports notification via pagers that have an e-mail address.

- Notify Me in offline mode

  — Modular Messaging—Microsoft Exchange. When an MAS is unable to contact the primary peer Exchange server, it establishes communication with another nominated Exchange Server that now acts as the peer server. Notification messages are sent to this peer server until the primary peer server is online again.

  — Modular Messaging—IBM Lotus Domino and Modular Messaging—MSS. When an MAS is unable to contact the message store, the Notify-Me feature generates notification e-mail messages as configured by the subscriber. The MAS queues these notification e-mails, until the message store is operational again. Hence, if a subscriber has set up the feature to send a page, and the message store goes offline, the subscriber does not receive the notification e-mail until the message store is online.

The 'From' field of a Notify Me notification e-mail contains the e-mail address of the Modular Messaging subscriber.

With Modular Messaging—MSS, this e-mail address is of the form firstname.lastname@msshost.company.com, where msshost.company.com is the DNS name of the MSS, and can be replaced with an e-mail host alias name. This notification e-mail is sent from the MSS server to either a single specified e-mail gateway or using MX routing, provided by the customer's DNS infrastructure.

With Modular Messaging—Exchange and Modular Messaging—Domino, this e-mail address is the subscriber's corporate e-mail address. Typically, this address is of the form firstname.lastname@company.com.

For more information, see Primary mailbox address on page 6-2.

Using Automatic Notify Me

Subscribers can set up rules for using Notify Me on the Assistant page in Subscriber Options. Notify Me rules are created by selecting values in rule descriptions for automatic call notification.

Automatic call notification

Subscribers set up automatic notification rules by selecting values in the following rule description.

"When anyone calls and leaves a [*message*], send a notification message with this [*message body*] and with this [*subject*] to [*e-mail address*]."

An example rule might be:

"When anyone calls and leaves a [*urgent voice message*], send a notification message with this [*caller's phone number*] and with this [*notification message*] to [*anon@avaya.com*]."

Once a rule is created, subscribers can enable or disable the automatic notification rule in Subscriber Options. If necessary they can enable or disable automatic notification using the Aria TUI for Modular Messaging.

For more information on using Notify Me, see *Avaya Modular Messaging Subscriber Options,* 585-310-789 (Issue 2).

Configuring automatic Notify Me

Administrators can use the Notify Me class-of-service (COS) parameter on the MSS, to determine which subscribers are enabled for Notify Me.

Notify Me-enabled subscribers can set up rules for automatic Notify Me from Subscriber Options. The rules can be enabled or disabled using Subscriber Options or from the Modular Messaging Aria TUI.

Overview of Message Waiting Indicator (MWI)

MWI is a method of alerting subscribers when messages that meet specified criteria arrive in their mailbox. Subscribers are alerted by either a lamp indicator on the telephone or an audible tone (stutter dialtone) when they pick up the receiver. The indicator is cleared when a subscriber accesses the message and the message moves out of the New message category. Subscribers can set up rules for using MWI in Subscriber Options. For example, they can choose to be notified only when they receive urgent voice messages.

With Modular Messaging—MSS, broadcast messages do not activate MWI.

An MWI Server provides message waiting indication for the voice mail domain. The MWI Server communicates with the MAS and the Mailbox Monitoring service. The Mailbox Monitoring service receives notifications from the message store when the subscriber mailbox changes. The MWI Server then determines when the indicator on the telephone of a subscriber needs to be turned on or off.

Note: The Call Me Server and MWI Server must be installed on the same MAS and must be set up to share the same Mailbox Monitoring service.

MWI capacities

Modular Messaging—MSS supports up to a maximum of 20,000 subscribers in a voicemail domain. All of these subscribers can be MWI-enabled.

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino support up to a maximum of 100,000 subscribers in a voicemail domain. Of these, 7,000 subscribers can be MWI-enabled.

Subscribers can be MWI-enabled through system administration. Administrators can use a class-of-service attribute to disable MWI for subscribers that cannot receive MWI notification.

Using MWI

Subscribers set up rules for using MWI on the Assistant page in Subscriber Options. MWI rules are created by selecting values in the following rule description:

"If [*message type*] messages, with [*importance*], have arrived, set my message waiting indicator."

An example rule might be:

"If [*voice*] messages, with [*high importance*], have arrived, set my message waiting indicator."

Subscribers can enable or disable MWI rules in Subscriber Options. When messages meet an MWI rule, subscribers are alerted by either a lamp indicator on their telephone, or an audible tone (stutter dialtone) when they pick up the receiver. The indicator is reset when they open the message in the e-mail client or save or delete the message by using the TUIs.

Subscribers that use the Avaya IP Softphone application to access Modular Messaging messages can use the 'Picture of Phone' tab to view MWI.

MWI in offline mode

New messages, including Call Answer messages will not activate MWI, if those messages are received when either the message store or the MAS on which the MWI server resides is not accessible. These messages activate MWI only when both are operational again

For more information on using MWI, see *Avaya Modular Messaging Subscriber Options,* 585-310-789 (Issue 2).

Configuring MWI

Administrators can use the voice mail system configuration (VMSC) tool on the MAS to enable MWI at the system level. Once MWI is enabled for the system, administrators can edit the MWI class-of-service (COS) parameter on the MSS, to control the number of subscribers enabled for MWI.

MWI-enabled subscribers can set up rules for MWI from Subscriber Options. The rules can be enabled or disabled using Subscriber Options.

Resetting MWI manually

Modular Messaging provides customers the ability to manually reset MWI (by restarting the MWI service), to ensure that:

■ The MWI always reflects the correct status of new messages

- The state of the MWIs on the switch synchronizes with that of the Modular Messaging MWIs

Manual resetting of MWI is available with Modular Messaging systems that use the QSIG or H.323-based IP switch integrations.

When any discrepancy in the MWI state is noticed, administrators can restart the MWI service and refresh the MWI states. Restarting the MWI service resets each MWI to its correct state.

Important: Manually resetting the MWI significantly impacts performances of the Modular Messaging system and the switch. Customers are advised to use this feature only when absolutely necessary, such as, after a PBX reboot.

Call notification

Call notification includes:

- Caller-requested Notify Me

- Find Me

- Intercom paging

- Call screening from Automated Attendant

- Single number access

Caller-requested Notify Me

Using the Caller-requested Notify Me feature, subscribers can be notified of missed incoming calls, if requested by the caller.

With Caller-requested Notify Me, subscribers can enable a service that prompts callers to request that the subscriber is notified of their call, by sending a message to the subscriber. The caller does not have to leave a message for this notification to happen. When caller requested notification is enabled, callers hear the following prompt:

"To have <name of subscriber> notified, press **[9]** now"

The notification message can contain the telephone number of the caller as well as additional information. When a caller requests that the subscriber be notified of a missed call, Avaya Modular Messaging sends a text message to the e-mail address specified by the subscriber for notification. This may result in a page or SMS message due to capabilities provided by the pager or the SMS system.

With the caller-requested notification option, subscribers can be notified of calls even if the automatic notification option is disabled or if the caller does not leave a message.

A caller-requested notification message may also be sent to the inbox of a subscriber. This notification message can be used in the following ways:

- Third-party notification applications can monitor the inbox of a subscriber and send a notification message when a notification message is detected. For example, Microsoft Outlook provides a way of editing Exchange server rules that execute even when Microsoft Outlook is not in use or connected to the Exchange server. Such rules can be made to forward an incoming message, or send a notification, to a specified e-mail address, such as a gateway to an SMS network. (Applicable only to Modular Messaging—Microsoft Exchange)

■ Subscribers can access their inbox from a desktop PC or telephone and review their notification messages.

■ Subscribers can keep a record of Notify Me requests that may include caller information, such as the telephone number of the caller and the time the call arrives.

For information on the capabilities of Notify Me, see [Notify Me capabilities](#) on page 9-4.

Using caller-requested Notify Me

Subscribers can set up rules for using Notify Me on the Assistant page in Subscriber Options. Notify Me rules are created by selecting values in rule descriptions for caller-requested notification.

Caller requested notification

Subscribers set up caller-requested notification rules by selecting values in the following rule description.

"When anyone calls and requests I am notified, send a notification message with this [*message body*] and with this [*subject*] to [*e-mail address*] and [*don't save a copy*] in my Inbox."

An example rule might be:

"When anyone calls and requests I am notified, send a notification message with this [*caller's name*] and with this [*notification message*] to [*anon@avaya.com*]."

Once a rule is created, subscribers can enable or disable the caller-requested notification rule in Subscriber Options. If necessary they can enable or disable caller-requested notification using the Aria TUI for Modular Messaging.

Caller-requested notification can take place even without the caller leaving a message.

For more information on using Notify Me, see *Avaya Modular Messaging Subscriber Options,* 585-310-789 (Issue 2).

Configuring caller-requested Notify Me

Administrators can use the Notify Me class-of-service (COS) parameter on the MSS, to determine which subscribers are enabled for Notify Me.

Notify Me-enabled subscribers can set up rules for caller-requested Notify Me from Subscriber Options. The rules can be enabled or disabled using Subscriber Options or from the Modular Messaging Aria TUI.

Find Me

Find Me is a feature that redirects unanswered calls to a list of telephone numbers specified by the subscriber. With Find Me, subscribers can set up

schedules (times for rules) with an associated list of telephone numbers for forwarding unanswered calls. Find Me is implemented only for calls that are not answered because the extension rings, but there is no answer, and not for calls that are not answered because the extension is busy.

When unanswered calls are directed to Modular Messaging, the system checks to see if Find Me is enabled, and if so, whether the call has arrived within an active schedule. If the call has arrived within an active schedule, Modular Messaging asks callers if they want to leave a message or have the system try to locate the subscriber, in which case, the system prompts callers to record their name and then plays the 'Please Hold' prompt.

Depending on the type of integration used, callers will hear a tone or music or silence when on hold. In the meantime, the system dials the first Find Me number in the telephone list associated with the schedule. This process is referred to as making an enquiry call. If the call is answered, Modular Messaging responds with the name of the calling party and provides the recipient with an opportunity to accept or reject the call. If the recipient answers the call, the system completes the transfer. If the call is unanswered, Avaya Modular Messaging calls the next number in the Find Me list. If it reaches the end of the list and all the calls are either unanswered or rejected, Avaya Modular Messaging allows the caller to leave a message.

Note: Find Me is not supported for analog integrations.

Depending on the integration type, Find Me uses one or two ports:

- On systems that use Digital Set Emulation integrations, Find Me uses only one port. The same port that handles the incoming call is also used to complete the transfer.

- On systems that use QSIG and H.323-based IP integration, Find Me uses two ports.

  On systems that use QSIG integration, one port is used for the incoming call and the other port is used to dial the called subscriber and to attempt transfer. The two ports are used for the duration of the transfer attempt. If the transfer is unsuccessful, the second port acquired for the enquiry call is dropped. If the transfer attempt is successful then the transfer will be completed and path replacement will ensure that both MAS ports are dropped.

Note: Certain switch configurations cause path replacement to fail; both ports on the MAS stay busy for the duration of the successfully transferred call. To avoid such switch-specific failure scenarios, it is important to make sure that the switch configuration is implemented as described in the relevant

configuration note. Configuration notes are available from the Avaya Modular Messaging support representative or from the Avaya Support Center at http://support.avaya.com.

⚠ **SECURITY ALERT:**

The Find Me feature can be misused to commit toll fraud. When a call triggers Find Me, the MAS generates an outgoing call to a list of telephone numbers that subscribers provide, hence making the system vulnerable to toll fraud. The Find Me feature is enabled by means of a class-of-service (COS) setting. Administrators are advised to enable Find Me, by the relevant COS, for only those subscribers that truly require this method of notification. Administrators can also take additional security measures such as assigning a restrictive PBX COS to the PBX ports used to make the outcall, or requiring account codes or authorization codes. For more information on toll fraud, see 'Modular Messaging and Security' on CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121.

Using Find Me

Subscribers set up rules for using Find Me on the Assistant page in Subscriber Options. Find Me rules are created by selecting values in the following rule description:

"When anyone phones me when schedule [*schedule name*] is active call phone numbers in [*phone list*]."

An example rule might be:

"When anyone phones me when schedule [*weekend schedule*] is active call phone numbers in [*personal list*]."

Find Me rules are created using Subscriber Options. They can be enabled or disabled using Subscriber Options or from the Modular Messaging Aria TUI.

Find Me in offline mode

Find Me information (such as Find Me rules, schedules, and telephone lists) uses the message store to keep the master copy, and is cached on each MAS.

When a call comes in that requires Find Me, the MAS checks to see if the cache is up to date. If not, the MAS reads the updated information from the message store, updates the cache and then applies the rule.

When a subscriber changes a Find Me rule, the cache on an MAS is not updated until the MAS handles a call for the subscriber. If the message store cannot be accessed when that call arrives, the MAS cannot reach the message store, and hence cannot check to see if it has the most recent Find Me information. In such a case, the MAS will use the last available information that is cached on the MAS, to control Find Me.

For more information on using Find Me, see *Avaya Modular Messaging Subscriber Options,* 585-310-789 (Issue 2).

Configuring Find Me   Administrators can use the Notify Me class-of-service (COS) parameter on the MSS, to determine which subscribers are enabled for Find Me.

Find Me-enabled subscribers can set up rules for Find Me from Subscriber Options. The rules can be enabled or disabled using Subscriber Options or from the Modular Messaging Aria TUI.

Intercom paging

Subscribers can set Modular Messaging to contact them through intercom paging when they are not at their desks. Once subscribers are paged, they must return to their extensions to pick up the call. If subscribers do not respond to the page, the system transfers the callers to their mailbox. Thus, as is the case with Find Me, Intercom Paging increases the probability of establishing a live connection on the first attempt.

Where Find Me is typically used when a subscriber is out of the office, Intercom Paging is used when the subscriber is in the office but is not available to answer a call.

Note: Modular Messaging supports station-level paging. For Modular Messaging to be able to support trunk-level paging, customers are required to provide additional hardware between Modular Messaging, the switch, and the paging system.

Configuring Intercom Paging   Administrators can use the voice mail system configuration (VMSC) tool on the MAS to enable Intercom Paging at the system level. Once Intercom Paging is enabled for the system, administrators can edit the Page via PBX class-of-service (COS) parameter on the MSS, to control the number of subscribers enabled for Intercom Paging. Further, administrators can use the Web-based administration pages of the MSS to edit subscribers and to configure Intercom Paging (Off, Manual, or Automatic).

Intercom Paging-enabled subscribers can configure Intercom Paging options (On, Off, or Automatic) from the Modular Messaging Aria TUI and from Subscriber Options.

Call screening from the Automated Attendant

Subscribers can configure their mailboxes to support screening of calls from the Automated Attendant. Call screening is a Modular Messaging Call Answering option that requires callers to announce themselves

before subscribers answer their calls. Subscribers can then decide whether to take the call. Call screening screens only those calls that come through the Automated Attendant, and is not applicable to direct inward dialing (DID) calls.

If subscribers have chosen to screen calls but are not available to answer screened calls, callers have the choice of leaving a message, being diverted to a different extension, or transferring to the operator.

Subscribers can use the Subscriber Options application to enable call screening.

Note: Screening calls from the Automated Attendant has no relation to the Find Me call screening capability.

Configuring call screening

Administrators can use the Call Screening class-of-service (COS) parameter on the MSS, to determine which subscribers are enabled for call screening.

Subscribers can enable or disable call screening from the Modular Messaging Aria TUI and from Subscriber Options.

Note: For Call screening from the Automated Attendant to be available, the Automated Attendant must be enabled at the system level. Administrators can use the VMSC tool on the MAS to enable the Automated Attendant. For more information, see *Avaya Modular Messaging Release 2 Messaging Application Server Administration Guide for Avaya Modular Messaging with the Avaya MAS and MSS*, 11-300243.

Combining features

Modular Messaging enables subscribers to combine notification features.

Single number access

By combining features, it is possible for subscribers to offer their callers a single number where they can be reached for all purposes.

The use of multimedia messaging allows subscribers to have a single number for voice and fax calls. The use of Find Me means that callers to the business line can still reach the subscribers on their cell phone, remote or virtual office from that single number.

When subscribers offer their callers the option of Caller-initiated Notify Me, it means that callers can trigger a notification during the same session as their Call Answer session, and they need not go through a second step

of locating additional contact information and issuing a notification request.

Multiple notifications

A subscriber receives multiple notifications if a caller requests a notification and leaves a message. This is because Modular Messaging notification mechanisms are independent of each other. For example, consider that a subscriber has provided a cell number to be reached at when Find Me is activated. When a caller calls this subscriber, and this subscriber is away, the cell phone rings. If the subscriber chooses not to answer, the caller is given the option to leave a message and page a notification. Once the caller disconnects, the MWI on the desktop set is lit, the subscriber receives two notification messages—one for the Call Answer message and one for the caller-requested message to the pager. Call Me makes an outcall to the cell telephone based on the arrival of the new urgent message. While the subscriber is away, the subscriber's e-mail client indicates that a new message has arrived.

Section 3

Planning

Avaya Modular Messaging Concepts and
Planning Guide

10

Designing voice mail domains

This chapter discusses the main points to consider when designing voice mail domains.

This chapter includes the following topics:

- **General rules for voice mail domains** on page 10-2

- **Rules for MSS messaging environments** on page 10-5

- **Rules for Microsoft Exchange messaging environments** on page 10-6

- **Rules for IBM Lotus Domino messaging environments** on page 10-7

General rules for voice mail domains

Some general rules that apply to voice mail domains of all versions of Modular Messaging are:

Messaging application server (MAS)

1. Each messaging application server (MAS) can belong to only one voice mail domain.

2. A voice mail domain can contain multiple MAS units.

Subscriber

3. Each voice mail subscriber can belong to only one voice mail domain.

Tracing Server

4. In a voice mail domain, there can be only one Tracing Server.

5. A Tracing Server can provide services to only one voice mail domain.

Message waiting indicator Server

6. In a voice mail domain, there can be only one message waiting indicator (MWI) Server.

7. An MWI Server can interface to only one switch.

8. An MWI Server can provide services to only one voice mail domain.

9. An MWI Server uses the Mailbox Monitor Server from the same voice mail domain.

Call Me Server

10. In a voice mail domain, there can be only one Call Me Server.

11. A Call Me Server can provide services to only one voice mail domain.

12. A Call Me Server uses the Mailbox Monitor Server from the same voice mail domain.

Mailbox Monitor Server

13. In a voice mail domain, there can be only one Mailbox Monitor Server.

14. A Mailbox Monitor can provide services to only the MWI Server and Call Me Server that belong to its own voice mail domain.

Directory server

15. Each MAS must have a single directory server.

16. Each directory server can be a server of more than one MAS.

Offline Call Answer store

17. A voice mail domain can contain only one Offline Call Answer store.

18. An Offline Call Answer store can provide services to only one voice mail domain.

Multiple switches

19. A voice mail domain can serve multiple switches, provided all the switches share a common dial plan.

20. A voice mail domain can serve a network of switches, provided the administrator ensures that the network uses a single switch as a gateway to the voice mail domain, and that the switches are networked using a supported switch networking protocol.

21. The MWI Server connects to a single switch. That switch must be able to light the MWI of any other switches associated with the voice mail domain.

22. A single switch can support multiple voice mail domains.

Integration

23. A voice mail domain can support only a single integration type.

Multiple voice mail domains networking

24. A voice mail domain can be connected to only one Avaya Message Networking server.

25. An Avaya Message Networking server can be connected to multiple voice mail domains.

Message encoding

26. An MAS supports only one encoding format for recording messages, either the G.711 or the GSM. The encoding format that the MAS supports determines the encoding format that the voice mail domain supports.

27. A message store can support both the formats (GSM and G.711) for message encoding. For example, an MSS may receive G.711-encoded messages from the MAS and GSM-encoded messages from remote subscribers.

License

28. A voice mail domain has a single license key. This license key can be used only with the voice mail domain it is intended for.

H.323-based IP integration

29. For H.323-based IP integration, an MAS must be on the same LAN segment as the Avaya Communications Manager.

Rules for MSS messaging environments

Avaya MSS

MSS

30. An Avaya Message Storage Server (MSS) can be a host to only one voice mail domain.

31. A voice mail domain can contain only one MSS.

Fax Sender Server

32. In a voice mail domain, there can be only one Fax Sender Server (running the Fax Sender service).

33. A Fax Sender Server can provide services to only one voice mail domain.

Capacity

34. A voice mail domain supports a maximum of five MAS units. If a dedicated server is used to host the Tracing Server, or Offline Call Answer store, or both, this dedicated server does not count toward the maximum MAS units supported.

Mailbox Manager

35. A voice mail domain can use only one Mailbox Manager database.

36. A Mailbox Manager database can provide services to multiple voice mail domains.

Modular Messaging Web Client

37. A Web Server for a Modular Messaging Web Client can support multiple Modular Messaging systems.

38. A voice mail domain can use multiple Web Servers.

39. A Web Server for a Modular Messaging Web Client is used exclusively for Modular Messaging. This Web Server does not support other voice messaging systems.

Rules for Microsoft Exchange messaging environments

Microsoft Exchange

Topology

40. All MAS units must be on same LAN segment as the Microsoft Exchange server.

Peer Exchange server

41. Each MAS has a single primary peer Exchange server. The administrator can configure the MAS to establish communication with another Exchange server to act as a peer when the current primary peer Exchange server goes offline.

42. Different MAS units in a voice mail domain can have different peer Exchange servers.

Directory server

43. Different MAS units in a voice mail domain can have different directory servers that are replicants of each other.

44. Each directory server can be a server of more than one voice mail domain.

Capacity

45. An e-mail server can be a peer server for more than one MAS.

46. An e-mail server can be a host to more than one voice mail domain.

47. A voice mail domain can have multiple e-mail servers.

48. A voice mail domain can contain a maximum of ten MAS units. If a dedicated server is used to host the Tracing Server, or Offline Call Answer store, or both, this dedicated server does not count toward the maximum MAS units supported.

Rules for Exchange 2003 messaging environments

49. Each MAS can have only one directory server. The directory server must be an Active Directory Domain controller configured as a global catalog.

50. An Exchange 2003 domain can contain more than one voice mail domain.

51. A voice mail domain can contain subscribers in different Exchange 2003 domains, provided subscribers are in the same forest.

Rules for Exchange 2000 messaging environments	52. Each MAS can have only one directory server. The directory server must be an Active Directory Domain controller configured as a global catalog.
	53. An Exchange 2000 domain can contain more than one voice mail domain.
	54. A voice mail domain can contain subscribers in different Exchange 2000 domains, provided subscribers are in the same forest.
Rules for Exchange 5.5 messaging environments	55. Each MAS can have only one directory server. The directory server can be any Exchange 5.5 server.
	56. An Exchange 5.5 site can contain more than one voice mail domain.
	57. A voice mail domain cannot contain subscribers or MAS units in different Exchange 5.5 sites.

Note: New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

Rules for IBM Lotus Domino messaging environments

IBM Lotus Domino

Topology

58. An MAS must be on the same LAN segment as the IBM Lotus Domino server.

Domino domain

59. Each MAS must have one directory server or cluster per Domino domain in which voice mail-enabled subscribers exist.

60. A Domino domain may contain more than one voice mail domain.

61. A voice mail domain may contain subscribers in more than one Domino domain.

Peer server

62. When customers create a voice mail domain, the peer directory server for the first MAS in the voice mail domain becomes the primary server in the voice mail domain.

63. Different MAS units in a voice mail domain can have different peer Domino servers.

Directory server

64. Different MAS units in a voice mail domain can have different directory servers that are replicants of each other.

65. Each directory server can be a server of more than one voice mail domain.

Capacity

66. An e-mail server can be a peer server for more than one MAS.

67. An e-mail server can be a host to more than one voice mail domain.

68. A voice mail domain can have multiple e-mail servers.

69. A voice mail domain can contain a maximum of ten MAS units. If a dedicated is used to host the Tracing Server, or Offline Call Answer store, or both, this dedicated server does not count toward the maximum MAS units supported.

Considering the proximity of the switch to e-mail message stores

Microsoft Exchange

IBM Lotus Domino

When implementing a Modular Messaging—Microsoft Exchange or Modular Messaging—IBM Lotus Domino configuration, planners must consider the proximity of the e-mail message store to the switch or communication servers.

Messaging Application Server (MAS) units must be located on the same LAN as the message store. If the switch is at another location, arrangements must be made to get the traffic from the remote switch to the site with the e-mail server and MAS units. This can be accommodated by extending communication facilities or by networking traffic from the remote site(s) to a switch at the same location as the e-mail server and MAS units.

Note: In a Modular Messaging—MSS system, the MAS units and the MSS are on the same private LAN, and are at the same location as the switch.

11

System capacities

This chapter provides information on the capacities of a voice mail domain, an Avaya Message Storage Server (MSS), and a messaging application server (MAS).

This chapter contains the following topics:

- [Voice mail domain capacities](#) on page 11-2

- [Avaya Message Storage Server capacities](#) on page 11-4

- [Messaging application server capacities](#) on page 11-5

- [MAS port capacities (Modular Messaging—MSS)](#) on page 11-6

- [MAS port capacities (Exchange and Domino)](#) on page 11-8

Voice mail domain capacities

Table 11-1 provides information on the capacities of a voice mail domain for Modular Messaging—MSS, Modular Messaging—Microsoft Exchange, and Modular Messaging—IBM Lotus Domino versions.

Note: Table 11-1 provides information on the maximum number of subscriber mailboxes that can be administered on a Modular Messaging system. Customers can purchase additional mailboxes, for example, in increments of one, provided system resources are capable of supporting additional mailboxes.

Table 11-1. Voice mail domain capacities

Feature	MSS—S & MSS—H	Microsoft Exchange	IBM Lotus Domino
Maximum number of MAS units in a voice mail domain (VMD)[1]	5	10	10
Maximum number of message stores per VMD	1	No limit	No limit
Total number of MAS voice ports supported per VMD (Aria TUI)	144	690	690
Total number of MAS voice ports supported per VMD (AUDIX TUI)	144	—	—
Subscriber mailboxes per VMD ■ Maximum local subscribers ■ Maximum networked subscribers ■ Message waiting indicator (MWI)	 20,000 250,000 20,000	 100,000 250,000 7,000	 100,000 250,000 7,000
Class-of-service	512	25	25
IMAP4 Simultaneous Connections	1,000	—	—
Enhanced-list application (ELA) lists	1,000 **Note:** Each ELA list can have a maximum of 1,500 members. ELA lists can be nested to create larger lists.	—	—

Table 11-1. Voice mail domain capacities

Feature	MSS—S & MSS—H	Microsoft Exchange	IBM Lotus Domino
Personal Distribution Lists (PDLs) per subscriber	500 **Note:** No hard limit established in the product.	—	—
List members per PDL	999 **Note:** No hard limit established in the product.	—	—
Maximum voice message length	45.78 MB	45.78 MB	45.78 MB
Maximum Call Answer message length	45.78 MB	45.78 MB	45.78 MB
Maximum mailbox size	64 MB	Unlimited[2]	Unlimited[2]
Storage for offline Call Answer	1 to 99 hours (default 24)	1 to 99 hours (default 24)	1 to 99 hours (default 24)
Communities	15	—	—
Secondary extensions per mailbox	Unlimited	Unlimited	Unlimited

1. If a dedicated server is used to host the Tracing Server, or Offline Call Answer store, or both, this dedicated server does not count toward the maximum MAS units supported.
2. Subject to storage limits.

Avaya Message Storage Server capacities

Avaya MSS

Table 11-2 provides information on the capacities of an Avaya Message Storage Server (MSS), the high-availability configuration (MSS—H) and the standard-availability configuration (MSS—S).

> **Note:** Capacities for single Microsoft Exchange and IBM Lotus Domino servers are not controlled by Avaya and must be determined from Microsoft and IBM.

Table 11-2. MSS capacities

Feature	MSS—S	MSS—H
Disk storage (number of disks @ size)	2 @ 80 GB[1]	3 @ 72 GB[2]
Hours of storage[3]		
▪ Using GSM encoding	7,500	15,000
▪ Using G.711 encoding	1,500	3,000
Subscriber mailboxes		
▪ Maximum local subscribers	20,000	20,000
▪ Maximum remote networked subscribers (includes spoken names)	250,000	250,000
IMAP4 client sessions These capacities exclude MAS IMAP4 usage and include Client Add-in for Microsoft Outlook IMAP4 usage.	1,000	1,000
POP3 client sessions		
▪ Maximum number of clients (clients poll every 10 minutes)	5000	5000
▪ Maximum number of active client sessions	24	24
SMTP messages per hour. This includes MAS-initiated deliveries.	15,000	15,000

1. With software mirroring, two disks provide the actual storage capacity of only one disk.
2. With RAID Level 5, three disks provide the actual storage capacity of only two disks.
3. The MSS calculations account for the need to have at least 20% free space available for the system to run. Thus system free space is built into these calculations for the MSS.

Messaging application server capacities

Table 11-3 provides information on the capacities of a messaging application server (MAS).

Table 11-3. MAS capacities

Feature	MAS Capacity
Hours of storage[1]	
■ Maximum for GSM storage	5,000 hours
■ Maximum for G.711 storage	1,000 hours
Text-to-Speech (TTS) Sessions	
■ English (using DECtalk)	12
■ Other languages (using RealSpeak TTS3000)	12
■ All languages (using RealSpeak Telephony 3.5)	12
Note: The maximum number of TTS resources in a Modular Messaging—MSS voice mail domain is 2 x number of MAS units. Additional TTS resources cannot be purchased.	
Switch Link - High bandwidth (QSIG)	
■ Maximum calls	15,000/hour
■ Message Waiting Indicator (MWI) updates	15,000/hour

1. Hours of storage for Call Answer messages are available only when the message store is not available. These values are estimated maximum values and are not guaranteed.

MAS port capacities (Modular Messaging—MSS)

Avaya MSS

Table 11-4 provides information on the messaging application server (MAS) port capacities of a Modular Messaging—Avaya Message Storage Server (MSS) system with all mailboxes enabled for the Modular Messaging Aria telephone user interface (TUI).

Systems that are initially configured with all Modular Messaging Aria TUI mailboxes that later deploy the Modular Messaging AUDIX TUI must be engineered at that time to meet the capacities noted in Table 11-5 on page 11-7.

Table 11-4. Modular Messaging—MSS capacities with the Modular Messaging Aria TUI

Integration			Cards and MAS			Voice		Fax		TTS[1]	
Method	Voice ports / Card	Fax Resources / Card	Cards / MAS	MAS / VMD[2]	Cards / VMD	Voice / MAS	Voice / VMD	Fax / MAS	Fax / VMD	Provided / Max TTS / MAS	TTS / VMD
H.323-based IP[3]	20	—	1	5	5	20	100	—	—	2/2	10
T1[4] QSIG	23	15	3	4	7	69	144[5]	45	105	2/2	8
E1[4] QSIG	30	16	2	4	5	60	144[5]	32	80	2/2	8
Digital Set Emulation	8	2	4[6]	5	18	32	144	8	36	2/2	10
Analog[7] 12-port	12	4	4	4	12	48	144	16	48	2/2	8
Analog[7] 4-port[8]	4	4	4[6]	5	20	16	80	16	80	2/2	10

1. E-mail readers are purchased/included with the system, and statically assigned to a specific MAS
2. Includes N+1 or spreading cards beyond the minimum number of required servers. When the Tracing Server, the Offline Call Answer store, or both are implemented on a dedicated server; they don't count towards the MAS maximums.
3. The IP port represents the card interfacing to the PBX and supporting other IP functions.
4. Avaya provides Dual Span T1/E1 cards for incremental fax resources, the 2nd span is not used for voice
5. Not all ports are used on the last card
6. Hardware configurations deployed prior to November 1, 2004, with five DSE cards or five 4-port analog cards within a single MAS continue to be supported.
7. Find-Me is not supported for analog integrations
8. Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after market are supported to capacity.

Table 11-5 provides information on the messaging application server (MAS) port capacities of a Modular Messaging—Avaya Message Storage Server (MSS) system with mailboxes enabled for the Modular Messaging

AUDIX telephone user interface (TUI) or both the Modular Messaging TUIS (Aria and AUDIX).

Systems that are initially configured with all Modular Messaging Aria TUI mailboxes that later deploy the Modular Messaging AUDIX TUI must be engineered at that time to meet the capacities noted in Table 11-5 on page 11-7.

Table 11-5. Modular Messaging—MSS capacities with the Modular Messaging AUDIX TUI or Aria and AUDIX TUIs

Integration			Cards and MAS			Voice		Fax		TTS[1]	
Method	Voice ports / Card	Fax Resources / Card	Cards / MAS	MAS / VMD[2]	Cards / VMD	Voice / MAS	Voice / VMD	Fax / MAS	Fax / VMD	Provided / Max TTS / MAS	TTS / VMD
H.323-based IP	20	—	1[3]	5	5	20	100	—	—	2/2	10
T1[4] QSIG	23	15	1	5	5	23	115	15	75	2/2	10
E1[4] QSIG	30	16	1	5	5	30	144[5]	16	80	2/2	10
Digital Set Emulation	8	2	3	5	15	24	120	6	30	2/2	10
Analog[6] 12-port	12	4	2	5	10	24	120	8	40	2/2	10
Analog[7] 4-port[7]	4	4	4[8]	5	20	16	80	16	80	2/2	10

1. E-mail readers are purchased/included with the system, and statically assigned to a specific MAS
2. Includes N+1 or spreading cards beyond the minimum number of required servers. When the Tracing Server, the Offline Call Answer store, or both are implemented on a dedicated server; they don't count towards the MAS maximums.
3. The IP port represents the card interfacing to the PBX and supporting other IP functions
4. Avaya provides Dual Span T1/E1 cards for incremental fax resources, the 2nd span is not used for voice
5. Not all ports are used on the last card
6. Find-Me is not supported for analog integrations
7. Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after market are supported to capacity.
8. Hardware configurations deployed prior to November 1, 2004, with five 4-port analog cards continue to be supported.

Overriding maximums for Modular Messaging—MSS

■ Maximum of five MAS units per voice mail domain

■ Maximum of 144 ports per voice mail domain

MAS port capacities (Exchange and Domino)

Microsoft Exchange

IBM Lotus Domino

Table 11-6 provides information on the messaging application server (MAS) port capacities of a Modular Messaging—Microsoft Exchange and a Modular Messaging—IBM Lotus Domino system.

Table 11-6. Modular Messaging—Exchange and Modular Messaging—Domino capacities

Integration Method	Voice ports / Card	Fax Resources / Card	Cards / MAS	MAS / VMD[2]	Cards / VMD	Voice / MAS	Voice / VMD	Fax / MAS	Fax / VMD	Provided / Max TTS / MAS	TTS / VMD
H.323-based IP	20	—	1	10	10	20	200	Subject to third-party fax server[3]	Subject to third-party fax server[3]	2/12	120
T1[4] QSIG	23	15	3	10	30	69	690			2/12	120
E1[4] QSIG	30	16	2	10	20	60	600			2/12	120
Digital Set Emulation	8	2	4[5]	10	40	32	320			2/12	120
Analog[6] 12-port	12	4	4	10	40	48	480			2/12	120
Analog[7] 4-port[7]	4	4	4[5]	10	40	16	160			2/12	120

1. E-mail readers are purchased/included with the system, and statically assigned to a specific MAS
2. Includes N+1 or spreading cards beyond the minimum number of required servers. When the Tracing Server, the Offline Call Answer store, or both are implemented on a dedicated server; they don't count towards the MAS maximums.
3. All integrations with the exception of IP, support fax answer and transfer to 3rd-party fax server
4. Avaya provides Dual Span T1/E1 cards for incremental fax resources, the 2nd span is not used for voice
5. Hardware configurations deployed prior to November 1, 2004, with five or six DSE cards or five 4-port analog cards within a single MAS continue to be supported.
6. Analog integrations do not support Find Me
7. Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after market are supported to capacity.

Overriding maximums for Modular Messaging with Exchange or Domino

- Maximum of ten MAS units per voice mail domain

- Maximum of 690 ports per voice mail domain

12

Port Sizing

Based on the results of a detailed system study, Avaya has designed offers that are intended to assist a planner in the port sizing exercise. This chapter explains how a planner can make use of the Modular Messaging offers when planning the system.

This chapter also provides an information on port sizing without referring to the Modular Messaging offers.

This chapter contains the following sections:

- Port sizing using Modular Messaging offers on page 12-2

- Port sizing without using Modular Messaging offers on page 12-21

Note: To validate planning assumptions, customers and planners can use Modular Messaging reports, such as Hourly Statistics, Port Statistics, System Usage, User Mailbox Statistics, Basic Metrics, Feature Daily or Hourly Traffic Report, Load Daily or Hourly Traffic Report, Network Load Daily or Hourly Traffic Report, Remote Message Daily or Monthly Traffic Report, and Subscriber Daily or Monthly Traffic Report. For more information on reports, see Reporting capabilities on page 4-30.

Port sizing using Modular Messaging offers

When sizing port requirements, planners need to be able to estimate the following:

- The number of subscribers in a voice mail domain

- The number of ports required to support the estimated number of subscribers

- The number of messaging application server (MAS) units required to provide those many ports

- The number of e-mail readers required to provide text-to-speech capabilities for the estimated number of subscribers

To simplify the planning process, Avaya has designed offers that have pre-calculated estimations of the number of ports and messaging application servers required for a given number of subscribers of each Modular Messaging version. In addition, the offers also provide an estimate of additional e-mail readers.

For Modular Messaging—MSS, the offers are based on the telephone user interface (TUI) assigned to subscribers.

Important: The Modular Messaging offers eliminate the need for calculation of port requirements, the number of messaging application servers required, or the number of port boards required.
Planners that wish to perform a more detailed study of the port requirements and the number of MAS units required can refer to Port sizing without using Modular Messaging offers on page 12-21. However, those instructions are only meant for planners with sufficient prior experience in implementing a messaging system.

Port usage patterns

When planning a system, it is important to be able to make an accurate estimate of the number of ports that would be required to provide services to a given number of subscribers.

The Modular Messaging offers provide pre-calculated estimates of the required number of ports. However, it is beneficial to a planner to understand how the port usage patterns of subscribers affect the estimation of port capacity.

Modular Messaging—MSS

Modular Messaging—MSS subscribers typically use the system for voice and fax messaging. A separate, customer-provided system is used for e-mail messages.

Subscribers use the system primarily for retrieval of voice and fax messages by means of a telephone, hence port usage is high. Subscribers that wish to have corporate e-mails read to them over the telephone would use the UCC Speech Access client. When subscribers access their voice and e-mail messages via UCC Speech Access, they are not using Modular Messaging ports, hence port usage decreases on the Modular Messaging system.

The Modular Messaging—MSS system is intended for traditional port usage, with six minutes of voice messaging per day per subscriber.

Port usage consists primarily of Call Answer sessions and message retrieval using the TUIs. There is also a small amount of port usage for such features as Call Me, Find Me, Message Waiting Indicator (MWI) Automated Attendants, Caller Applications, and the Fax Sender Server.

Modular Messaging— Exchange and Modular Messaging— Domino

Subscribers of Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino use the system for voice, fax[1], and e-mail messaging.

Typically, subscribers use graphical user interface (GUI) clients for messaging, hence, port usage is lower, with 4.5 minutes of messaging per day per subscriber (including text-to-speech conversion of e-mail messages).

Port usage consists primarily of Call Answer sessions. A significant portion of retrieval time using the voice ports is for text-to-speech of e-mail messages.

Modular Messaging—MSS offers

Avaya MSS

Take into consideration the following items before referring to the offers:

- The Modular Messaging—MSS system is intended for traditional port usage, with six minutes of voice messaging per day per subscriber.

- These tables indicate the maximum number of subscribers supported by the given port configuration. When provisioning a new system, it is recommended to allow for growth. If the initial number of subscribers is within 5 to 15% of the maximum, the next size system is recommended.

- These tables provide for traffic patterns of 14% busy hour traffic.

1. Fax capabilities are provided by means of a customer-provided third-party fax server.

- These tables are applicable to switch integrations that support queuing and to switches that do not support queuing. Switch integrations that support queuing allow calls to be queued on the switch until a port is available on the Modular Messaging system. Switch integrations that do not support queuing cause callers to hear a busy signal when no ports are available on the Modular Messaging system. The tables reflect both non-queuing (using Erlang B and P.02 Grade of Service) and queuing (using Erlang C model and P.05 Grade of Service) sizing recommendations. Currently, most Modular Messaging switch integrations do not support switch queuing. For example, the Avaya Communication Manager QSIG integration implementation does not support queuing.

- These calculations are based on the assumption that the system is used primarily for voice and fax messaging. This version does not support telephone user interface (TUI) access to corporate e-mail messages stored on a separate e-mail server.

- These calculations are based on the assumption that 10% of the subscribers are regular users of fax messaging, with 0.75 3-page faxes per day per subscriber.

- The tables do not take into account the number of MAS units in an N+1 server configuration.

- Number of subscriber mailboxes are rounded to the nearest hundred.

Based on the TUI assigned to subscribers, the Modular Messaging—MSS offers are:

- Modular Messaging Aria TUI offers

    — H.323-based IP integration

    — T1 QSIG integration

    — E1 QSIG integration

    — Digital Set Emulation (DSE) integration

    — Analog telephony (4-port board)

    — Analog telephony (12-port board)

- Modular Messaging AUDIX TUI offers

    — H.323-based IP integration

    — T1 QSIG integration

    — E1 QSIG integration

— Digital Set Emulation (DSE) integration

— Analog telephony (4-port board)

— Analog telephony (12-port board)

Modular Messaging Aria TUI offers

The Modular Messaging Aria TUI offers provide port sizing calculations for systems with all subscriber mailboxes enabled for only the Modular Messaging Aria TUI.

H.323-based IP integration

Table 12-1 provides information on the H.323-based IP integration offer for Modular Messaging—MSS (Aria TUI only).

Table 12-1. The H.323-based IP integration Aria TUI offer

Subscriber mailboxes	Voice ports	Number of MAS units
900	20	1
2000	40	2
3300	60	3
Larger systems require separate Tracing Server		
4500	80	4
5800	100	5

T1QSIG integration

Table 12-2 provides information on the T1 QSIG integration offer for Modular Messaging—MSS (Aria TUI only).

Table 12-2. T1 QSIG integration Aria TUI offer

Subscriber mailboxes	Voice ports	23-port T1 boards	Number of MAS units
1000	23	1	1
2400	46	2	1
3800	69	3	1
Larger systems require separate Tracing Server			
5300	92	4	2
6700	115	5	2
8200	138	6	2
8600	144	7	3

E1 QSIG integration   Table 12-3 provides information on the E1 QSIG integration offer for Modular Messaging—MSS (Aria TUI only).

Table 12-3.   The E1 QSIG integration Aria TUI offer

Subscriber mailboxes	Voice ports	30-port E1 boards	Number of MAS units
1400	30	1	1
3300	60	2	1
Larger systems require separate Tracing Server			
5100	90	3	2
7100	120	4	2
8600	144	5	3

Digital Set Emulation integration   Table 12-4 provides information on the Digital Set Emulation integration offer for Modular Messaging—MSS (Aria TUI only).

Table 12-4.   The Digital Set Emulation integration Aria TUI offer

Subscriber mailboxes	Voice ports	8-port DSE boards	Number of MAS units
200	8	1	1
600	16	2	1
1100	24	3	1
1600	32	4	1
2000	40	5	2
2500	48	6	2
3000	56	7	2
3500	64	8	2
4000	72	9	3
4500	80	10	3
5000	88	11	3
5500	96	12	3
6000	104	13	4
6500	112	14	4
7100	120	15	4
7600	128	16	4

8100	136	17	5
8600	144	18	5

Analog telephony (12-port board)

Table 12-5 provides information on the Analog telephony (12-port board) offer for Modular Messaging—MSS (Aria TUI only).

Table 12-5. The Analog telephony (12-port board) Aria TUI offer

Subscriber mailboxes	Voice ports	12-port analog boards	Number of MAS units
400	12	1	1
1100	24	2	1
1800	36	3	1
2500	48	4	1
3300	60	5	2
4000	72	6	2
4800	84	7	2
5500	96	8	2
6300	108	9	3
7100	120	10	3
7800	132	11	3
8600	144	12	3

Analog telephony (4-port board)

Table 12-6 provides information on the Analog telephony (4-port board) offer for Modular Messaging—MSS (Aria TUI only).

Table 12-6. The Analog telephony (4-port analog port board) Aria TUI offer

Subscriber mailboxes	Voice ports	4-port analog boards	Number of MAS units
70	4	1	1
200	8	2	1

Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after market are supported to capacity. For larger systems, configurations with 12-port analog cards should be used.

Modular Messaging AUDIX TUI offers

The Modular Messaging AUDIX TUI offers provide port sizing calculations for systems with subscriber mailboxes enabled for either the Modular Messaging AUDIX TUI or a combination of both the Modular Messaging TUIs.

H.323-based IP integration

Table 12-7 provides information on the H.323-based IP integration offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-7. The H.323-based IP integration AUDIX TUI offer

Subscriber mailboxes	Voice ports	Number of MAS units
900	20	1
2000	40	2
3300	60	3
Larger systems require separate Tracing Server		
4500	80	4
5800	100	5

T1QSIG integration

Table 12-8 provides information on the T1 QSIG integration offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-8. T1 QSIG integration AUDIX TUI offer

Subscriber mailboxes	Voice ports	23-port T1 boards	Number of MAS units
1000	23	1	1
2400	46	2	2
3800	69	3	3
Larger systems require separate Tracing Server			
5300	92	4	4
6700	115	5	5

E1 QSIG integration

Table 12-9 provides information on the E1 QSIG integration offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-9. The E1 QSIG integration AUDIX TUI offer

Subscriber mailboxes	Voice ports	30-port E1 boards	Number of MAS units
1400	30	1	1

3300	60	2	2
5100	90	3	3
Larger systems require separate Tracing Server			
7100	120	4	4
8600	144	5	5

Digital Set Emulation integration

Table 12-10 provides information on the Digital Set Emulation integration offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-10.   The Digital Set Emulation integration AUDIX TUI offer

Subscriber mailboxes	Voice ports	8-port DSE boards	Number of MAS units
200	8	1	1
600	16	2	1
1100	24	3	1
1600	32	4	2
2000	40	5	2
2500	48	6	2
3000	56	7	3
3500	64	8	3
4000	72	9	3
Larger systems require separate Tracing Server			
4500	80	10	4
5000	88	11	4
5500	96	12	4
6000	104	13	5
6500	112	14	5
7100	120	15	5

Analog telephony (12-port board)

Table 12-11 provides information on the Analog telephony (12-port board) offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-11.   The Analog telephony (12-port board) AUDIX TUI offer

Subscriber mailboxes	Voice ports	12-port analog boards	Number of MAS units

400	12	1	1
1100	24	2	1
1800	36	3	2
2500	48	4	2
3300	60	5	3
4000	72	6	3
Larger systems require separate Tracing Server			
4800	84	7	4
5500	96	8	4
6300	108	9	5
7100	120	10	5

Analog telephony (4-port board)

Table 12-12 provides information on the Analog telephony (4-port board) offer for Modular Messaging—MSS (AUDIX TUI).

Table 12-12. The Analog telephony (4-port analog port board) AUDIX TUI offer

Subscriber mailboxes	Voice ports	4-port analog boards	Number of MAS units
70	4	1	1
200	8	2	1

Note: Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after market are supported to capacity. For larger systems, configurations with 12- port analog cards should be used.

Offers for Modular Messaging with Exchange and Domino message stores

Microsoft Exchange

IBM Lotus Domino

Take into consideration the following items before referring to the offers:

- Typically, subscribers use graphical user interface (GUI) clients for messaging, hence, port usage is lower, with 4.5 minutes of messaging per day per subscriber (including text-to-speech conversion of corporate e-mail messages).

- These tables provide for traffic patterns of 14% busy hour traffic.

- These tables are applicable to switch integrations that support queuing and to switches that do not support queuing. Switch integrations that support queuing allow calls to be queued on the switch until a port is available on the Modular Messaging system. Switch integrations that do not support queuing cause callers to hear a busy signal when no ports are available on the Modular Messaging system. The tables reflect both non-queuing (using Erlang B and P.02 Grade of Service) and queuing (using Erlang C model and P.05 Grade of Service) sizing recommendations. Currently, most Modular Messaging switch integrations do not support switch queuing. For example, the Avaya Communication Manager QSIG integration implementation does not support queuing.

- These tables are based on Erlang B with P.02 Grade of Service (GOS) and Erlang C with P.05 GOS.

  The Erlang B model represents a scenario in which incoming calls are not queued on the switch. The Erlang C model represents a scenario in which incoming calls are queued on the switch.

- Calculations are based on the assumption that the system is used for all messaging types, including voice, fax, and e-mail.

- The tables do not take into account the number of MAS units in an N+1 server configuration.

- Number of subscriber mailboxes are rounded to the nearest hundred.

The offers for Modular Messaging with Exchange and Domino message stores are:

- H.323-based IP integration

- T1 QSIG integration

- E1 QSIG integration

- Digital Set Emulation (DSE) integration

- Analog telephony (12-port board)

- Analog telephony (4-port board)

H.323-based IP integration

Table 12-13 provides information on the H.323-based IP integration offer for Modular Messaging with Exchange and Domino message stores.

Table 12-13.   The H.323-based IP integration offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	Number of MAS units
1200	20	3 (2)	1
2700	40	6 (4)	2
4300	60	9 (6)	3
Larger systems require separate Tracing Server			
6000	80	12 (8)	4
7700	100	15 (10)	5
9400	120	18 (12)	6
11100	140	21 (14)	7
12800	160	24 (16)	8
14500	180	27 (18)	9
16200	200	30 (20)	10

T1 QSIG integration   Table 12-14 provides information on the T1 QSIG integration offer for Modular Messaging with Exchange and Domino message stores.

Table 12-14.   The T1 QSIG integration offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	23-port T1 boards	Number of MAS units
1400	23	3 (2)	1	1
3200	46	5 (2)	2	1
5100	69	6 (2)	3	1
Larger systems require separate Tracing Server				
7000	92	10 (4)	4	2
9000	115	11 (4)	5	2
11000	138	12 (4)	6	2
11500	144	15 (6)	7	3
12900	161	16 (6)	7	3
14900	184	17 (6)	8	3
16800	207	18 (6)	9	3

18800	230	22 (8)	10	4
20800	253	23 (8)	11	4
22800	276	24 (8)	12	4
24700	299	27 (10)	13	5
26700	322	29 (10)	14	5
28700	345	30 (10)	15	5
30700	368	34 (12)	16	6
32700	391	35 (12)	17	6
34800	414	36 (12)	18	6
36800	437	40 (14)	19	7
38800	460	41 (14)	20	7
40800	483	42 (14)	21	7
42700	506	46 (16)	22	8
44700	529	47 (16)	23	8
46600	552	48 (16)	24	8
48600	575	52 (18)	25	9
50500	598	53 (18)	26	9
52400	621	54 (18)	27	9
54400	644	58 (20)	28	10
56300	667	59 (20)	29	10
58300	690	60 (20)	30	10

E1 QSIG integration   Table 12-15 provides information on the E1 QSIG integration offer for Modular Messaging with Exchange and Domino message stores.

Table 12-15.   The E1 QSIG integration offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	30-port E1 boards	Number of MAS units
1900	30	4 (2)	1	1
4300	60	5 (2)	2	1
Larger systems require separate Tracing Server				
6900	90	9 (4)	3	2

9400	120	10 (4)	4	2
11500	144	14 (6)	5	3
12000	150	14 (6)	5	3
14500	180	15 (6)	6	3
17100	210	19 (8)	7	4
19700	240	20 (8)	8	4
22300	270	24 (10)	9	5
24800	300	25 (10)	10	5
27400	330	29 (12)	11	6
30000	360	30 (12)	12	6
32700	390	34 (14)	13	7
35300	420	35 (14)	14	7
38000	450	39 (16)	15	8
40500	480	40 (16)	16	8
43100	510	44 (18)	17	9
45600	540	45 (18)	18	9
48100	570	49 (20)	19	10
50700	600	50 (20)	20	10

Digital Set Emulation integration

Table 12-16 provides information on the Digital Set Emulation (DSE) integration offer for Modular Messaging with Exchange and Domino message stores.

Table 12-16.   The DSE integration offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	8-port DSE boards	Number of MAS units
300	8	2 (2)	1	1
900	16	3 (2)	2	1
1500	24	3 (2)	3	1
2100	32	4 (2)	4	1
2700	40	4 (2)	5	2
3400	48	6 (4)	6	2

4000	56	7 (4)	7	2
4700	64	8 (4)	8	2
5300	72	8 (4)	9	3
6000	80	8 (4)	10	3
6700	88	11 (6)	11	3
7400	96	12 (6)	12	3
8000	104	12 (6)	13	4
8700	112	12 (6)	14	4
9400	120	12 (6)	15	4
10100	128	16 (8)	16	4
10800	136	16 (8)	17	5
11500	144	16 (8)	18	5
Larger systems require separate Tracing Server				
12100	152	16 (8)	19	5
12800	160	16 (8)	20	5
13500	168	20 (10)	21	6
14200	176	20 (10)	22	6
14900	184	20 (10)	23	6
15600	192	20 (10)	24	6
16200	200	20 (10)	25	7
16900	208	24 (12)	26	7
17600	216	24 (12)	27	7
18300	224	24 (12)	28	7
19000	232	24 (12)	29	8
19700	240	24 (12)	30	8
20400	248	28 (14)	31	8
21100	256	28 (14)	32	8
21800	264	28 (14)	33	9
22400	272	28 (14)	34	9
23100	280	28 (14)	35	9

23800	288	32 (16)	36	9
24500	296	32 (16)	37	10
25200	304	32 (16)	38	10
25900	312	32 (16)	39	10
26600	320	32 (16)	40	10

Analog telephony (12-port board)

Table 12-17 provides information on the Analog telephony (12-port board) offer for Modular Messaging with Exchange and Domino message stores.

Table 12-17.   The Analog telephony (12-port board) offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	12-port analog boards	Number of MAS units
600	12	3 (2)	1	1
1500	24	3 (2)	2	1
2400	36	4 (2)	3	1
3400	48	5 (2)	4	1
4300	60	7 (4)	5	2
5300	72	8 (4)	6	2
6400	84	9 (4)	7	2
7400	96	10 (4)	8	2
8400	108	12 (6)	9	3
9400	120	13 (6)	10	3
10400	132	14 (6)	11	3
11500	144	15 (6)	12	3
Larger systems require separate Tracing Server				
12500	156	17 (8)	13	4
13500	168	18 (8)	14	4
14500	180	19 (8)	15	4
15600	192	20 (8)	16	4
16600	204	22 (10)	17	5
17600	216	23 (10)	18	5
18700	228	24 (10)	19	5

19700	240	25 (10)	20	5
20700	252	27 (12)	21	6
21800	264	28 (12)	22	6
22800	276	29 (12)	23	6
23800	288	30 (12)	24	6
24800	300	32 (14)	25	7
25900	312	33 (14)	26	7
26900	324	34 (14)	27	7
27900	336	35 (14)	28	7
29000	348	37 (16)	29	8
30000	360	38 (16)	30	8
31100	372	39 (16)	31	8
32100	384	40 (16)	32	8
33200	396	42 (18)	33	9
34200	408	43 (18)	34	9
35300	420	44 (18)	35	9
36400	432	45 (18)	36	9
37400	444	47 (20)	37	10
38500	456	48 (20)	38	10
39500	468	49 (20)	39	10
40500	480	50 (20)	40	10

Analog telephony (4-port board)

Table 12-18 provides information on the Analog telephony (4-port board) offer for Modular Messaging with Exchange and Domino message stores.

Table 12-18.   The Analog telephony (4-port board) offer

Subscriber mailboxes	Voice ports	E-mail readers recommended (Included)	4-port analog boards	Number of MAS units
95	4	2 (2)	1	1
300	8	2 (2)	2	1

Note: Analog systems with 4-port cards can be purchased as a new system in 4 and 8 port configurations only. Expansions after

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> market are supported to capacity. For larger systems, configurations with 12- port analog cards should be used.

Identifying which Modular Messaging offer a customer needs

The Modular Messaging offers make it simpler for planners to estimate the number of voice ports the system would require for a given number of subscribers. In addition, the offers also provide information on the number of messaging application server (MAS) units and e-mail readers a system needs for a given combination of voice ports and subscribers.

To identify which Modular Messaging offer a customer needs, planners must know:

- The approximate number of subscribers

- The telephony protocol that the system will use

An Example

Consider the example of an organization implementing a Modular Messaging—Microsoft Exchange system to provide services to approximately 4,000 subscribers.

Further specifications include:

- The customer has purchased a software-only configuration (Avaya-provided software and customer-provided hardware)

- The Modular Messaging system connects to the telephone system using H.323-based IP integration.

For such an implementation, a planner could consider the Modular Messaging H.323-based IP integration offer for Modular Messaging—Microsoft Exchange. See Table 12-13 on page 12-12.

The Modular Messaging H.323-based IP integration offer provides support for 60 voice ports that service 4,300 subscribers of Modular Messaging—Microsoft Exchange.

The system requires three messaging application server (MAS) units to support 60 ports.

Estimating the additional e-mail readers required

When Modular Messaging subscribers use the telephone user interface (TUI) to retrieve e-mail messages, Modular Messaging renders the messages in a computer-generated spoken voice. This computer-generated voice reads out the envelope information of messages and contents of e-mail messages.

The conversion of text-to-speech (TTS) is achieved by licensed speech synthesis software, known as e-mail readers. TTS conversion is also used to convert the text names of mailboxes when subscribers have not recorded their spoken names, and to read envelope information.

Modular Messaging includes two e-mail readers bundled with each messaging application server (MAS). These two e-mail readers enable two concurrent text to speech conversions per MAS. If subscribers are likely to make extensive use of the TUIs to retrieve e-mail and fax messages, customers may need to purchase additional e-mail readers.

Modular Messaging—MSS

Subscribers of Modular Messaging—MSS can use the TUI to access voice and fax messages. As subscribers cannot use the TUI to access corporate e-mail messages, usage of e-mail readers is primarily for TTS conversion of fax message subjects and spoken names of subscribers. For such usage, the default number of e-mail readers should suffice. With Modular Messaging—MSS, the e-mail reader capacity for a voice mail domain is 2 x number of MAS units. Additional e-mail readers cannot be purchased.

Modular Messaging with e-mail servers

Subscribers of Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino can use the TUI to access voice, fax, and corporate e-mail messages. The Modular Messaging offers indicate the number of e-mail readers recommended.

The calculations in these tables assume that when using the TUI to retrieve messages, subscribers are likely to spend 60% of the message retrieval time for TTS conversion of e-mail messages. When a message is played using TTS conversion, it is assumed that an e-mail reader is required for 10% of the actual message play time.

With Modular Messaging—Exchange and Modular Messaging—Domino, an MAS supports a maximum of 12 e-mail readers, enabling 12 concurrent text to speech conversions on an MAS.

To calculate the number of additional e-mail readers required, see the **E-mail readers recommended for e-mail (Included)** column of the Modular Messaging offers. Each MAS application license includes two TTS resources.

The calculation for additional e-mail readers is:

(Number of e-mail readers recommended) - (Number of e-mail readers included).

The number of e-mail readers purchased is for the entire voice mail domain. Customers are responsible for allocating e-mail readers among the MAS units in the voice mail domain. Customers are advised to allocate e-mail readers in proportion to the number of ports on each MAS.

> **Note:** E-mail readers once allocated to specific MAS units are dynamically available for all ports on that MAS and are not available for ports on other MAS units. Customers may reallocate e-mail readers to MAS units at anytime, using the voice mail system configuration (VMSC) tool on the MAS.

Port sizing without using Modular Messaging offers

Planners that have sufficient prior experience in planning and implementing messaging systems may prefer to carry out the port sizing exercise without referring to the Modular Messaging offers.

This section provides guidelines and calculations that planners can use to make estimations such as traffic generated during the busy hour, port usage, storage capacity, additional text-to-speech resources, and so on.

Concepts a planner must know

Before a planner estimates port requirements, a planner must be familiar with the following concepts:

Busy hour

Busy hour is the one-hour period of the day when traffic intensity is the highest.

Suppose that during the busiest day of a business week, a total of 3,500 calls are received. The hour between 9:00 a.m. and 10:00 a.m experiences the heaviest traffic, with 490 incoming calls. This makes 9:00 a.m. to 10:00 a.m. the busy hour.

Another way of expressing busy hour traffic is as a percentage of total daily traffic. In the example above, 490 busy hour calls is 14% of the 3,500 calls received for the day.

Determining the busy hour

Most switches can generate traffic reports that provide statistics on a weekly, daily, or hourly basis. Usually these reports break up the traffic statistics by type of call, for example, incoming calls, outgoing calls, and calls to specific hunt groups. These reports can be used to determine what the specific traffic patterns are and when the busy hour occurs. If traffic statistics are not available, an educated guess at busy hour traffic is required. The default planning assumption is 14%.

When calculating the busy hour, planners must realize that the busy hour for different divisions or user groups may vary. For example, in an organization that has 1,000 employees in the sales division and 2,000 employees in the technical support division, the busy hour for the sales division may be different from that of the technical support division. It is important to calculate the busy hour for the entire organization.

Units of measurement for busy hour traffic

Busy hour traffic is normally expressed in minutes, Erlangs, or Centum Call Seconds (CCS), using the formula:

Busy hour traffic in Erlangs = [Calls during busy hour x Average duration of each call] /3600

For example:

- Number of calls generated during busy hour = 120

- Average duration of each call = 30 seconds

- Busy hour traffic = (120 x 30) / 3600 = 1 Erlang

- 1 Erlang of busy hour traffic = 3,600 call seconds, or 60 call minutes, or 36 CCS of busy hour traffic.

Note: 1 CCS = 100 call seconds. There are 3,600 seconds in 1 hour. 3,600 call seconds(/60) = 60 call minutes(/60) = 1 call hour or Erlang = 36 CCS.

Busy hour offered traffic

Busy hour offered traffic is the total traffic offered to a group of ports during the busy hour, including calls that are delayed or blocked. Offered traffic is usually expressed in minutes, Erlangs, or CCS.

Grade of service

Grade of service (GOS) is the probability that an incoming call is significantly delayed or blocked because all ports are in use.

With switches that support queueing, calls are queued up on the switch and the caller hears multiple rings because all ports are in use. The call is eventually answered if the caller does not hang up.

With switches that do not support queuing, calls are blocked when all ports are in use and the callers hear a busy tone.

GOS is expressed as a percentage of callers who call during the busy hour. For example, if the number of ports is sized so that no more than 2 of 100 calls are likely to be delayed or blocked during the busy hour, the system is said to provide a P.02 GOS. If no more than 5 of 100 calls are likely to be delayed or blocked, the system provides a P.05 GOS. P.01 is a better GOS than P.05 and, therefore, requires more ports.

Common industry GOS for messaging servers is P.01, P.02, P.03, and P.05.

There is a trade-off between cost and GOS. The choice is a business decision based on a number of factors, including an assessment of how critical the application is to the business, and an assessment of the cost of ports required to provide the required GOS.

The tables in Appendix A, Grade of service, show the maximum amount of busy hour traffic supported by a number of ports for each GOS.

Estimating port requirements

Planners must make an accurate estimate of ports needed to provide an acceptable level of service to subscribers.

Ports are utilized when incoming calls are made to the system or outgoing calls are made by the system. Planners must estimate the traffic generated by calls made by subscribers and external callers during the busiest hour of the day, and outcalls made by the system to support outcalling features.

Calculating the busy hour offered traffic

Most newer switches provide traffic statistic reports that provide an accurate picture of traffic patterns on the switch. When preparing the implementation of a messaging system, the planner needs to study a minimum of traffic data from one week to determine daily and hourly call volumes.

Standard traffic-engineering tables are used to determine the proper number of ports based on busy hour offered traffic.

To calculate the busy hour offered traffic, planners must know or estimate:

- The average number of incoming and outgoing calls generated during the busy hour.

- The average duration of a call, also known as the average hold time (AHT), usually expressed in seconds or minutes. The hold time must include call setup and tear-down time. Setup time starts from the moment a port is seized, that is, when ringing starts. Tear-down time is the time it takes for the port to be available to process another call after a caller hangs up or is disconnected by the server.

Busy hour offered traffic = (Average number of incoming and outgoing calls during the busy hour) x (AHT in seconds) / 3600 erlangs

Table 12-19 is an example of busy hour calculation:

Table 12-19.   Example of busy hour traffic calculation

Calls generated during busy hour	1500
AHT of a call	45 seconds
Total busy hour traffic	1,500 calls x 45 seconds = 67,500 call seconds OR 67,500/60 = 1,125 call minutes OR 67,500/3600 = 18.75 Erlangs OR 67,500/100 = 675 CCS

To predict busy hour traffic accurately, planners must collect reliable traffic data that reflects the calling patterns specific to an installation or application. If busy hour calls are underestimated, the number of ports might not be sufficient to provide users with an acceptable level of

service. If busy hour calls are overestimated, the additional number of ports increases the cost of providing the service needlessly.

Estimating traffic generated by incoming and outgoing calls

Traffic generated by incoming and outgoing calls include traffic generated by:

- Incoming calls

  — Call Answer messages, including fax

  — Automated Attendant and Caller Applications

  — Incoming fax messages (Applicable only to Modular Messaging—MSS)

  — Find Me (Caller)

  — Subscribers using the TUI

  — Record (for example, conference calls)

- Outgoing calls

  — Outgoing fax messages (Applicable only to Modular Messaging—MSS)

  — Call Me

  — MWI (Integration-dependent)

  — Find Me (Subscriber being called)

  — Client Access via dual connect

Guidelines

Some guidelines that will help planners to estimate the traffic generated by incoming and outgoing calls:

- To place an outgoing call, the MAS makes use of a port. The traffic generated by these features can significantly affect the GOS if this traffic is not included in the estimate of busy hour offered traffic. If outcall delivery traffic is managed so that the majority of it occurs outside the busy hour, the impact on busy hour GOS is minimized. If a large amount of outgoing call traffic is expected during the busy hour, it might be preferable to size a separate group of outgoing ports and dedicate them to outcalling applications only.

- With some switch integrations, such as QSIG and H.323-based IP integration, a Find Me call uses two ports. Each time a Find Me call is made, one voice port is used for the incoming call and one voice port is used for the outgoing call to the subscriber. Therefore, if subscribers regularly use Find Me, the number of

ports required will be higher. Planners must take this point into account when estimating the number of ports required.

- With some switch integrations, such as QSIG and H.323-based IP integration, each time the Automated Attendant or a Caller Application transfers an answered call, two ports are utilized. Therefore, when used often, these interfaces increase port usage.

- Calculation of port usage for MWI varies depending on the switch integration that the Modular Messaging system and the switch support. For IP H.323 integration, QSIG, or digital set emulation switch integrations, administrators are required to configure port groups for MWI.

- Port usage varies depending on the medium used to access messages.

  — When subscribers use the TUI to retrieve messages, port usage is high.

  — When subscribers access messages from a desktop PC, and play or record messages using the multimedia capabilities of the PC, port usage is low.

  — When using Client Add-in for Microsoft Outlook to access messages, if clients play or record messages using a telephone, port usage is high.

  — When using Client Add-in for Microsoft Outlook to access messages, if clients play or record messages on the PC, port usage is low.

  — When subscribers use the Modular Messaging Web Client or the UCC Speech Access client for accessing messages, Modular Messaging port usage is lowered.

- When subscriber use the TUI to retrieve e-mail messages, TTS resources are in use and the average duration of a call, also known as the average hold time (AHT) increases. With an increase in AHT, ports are busy for a longer time.

Total estimated port requirements

For sizing port requirements:

1. Calculate the total estimated traffic generated by incoming and outgoing calls

2. Refer to the tables in Appendix A, Grade of service, for the number of ports required for a given grade of service.

   — If the telephone system does not support queuing of calls, see the calculations based on the Erlang B model.

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— If the telephone system supports queuing of calls, see the calculations based on the Erlang C model.

A system planner needs to allow for a safety or growth factor of 5% to 15% when sizing the initial implementation.

Calculating the number of messaging application servers required

The number of ports that a messaging application server (MAS) supports is restricted by the number of slots available and the number of cards supported.

For information on the maximum number of cards that an MAS supports, see Table 11-4 on page 11-6 and Table 11-5 on page 11-7.

> **Note:** Modular Messaging—Avaya MSS supports a maximum of five MAS units per voice mail domain.
> Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino support a maximum of ten MAS units per voice mail domain.

To determine the correct (not the minimum) number of servers needed, it is necessary to consider the effects of the following factors:

- The voice mail domain design. For more information, see General rules for voice mail domains on page 10-2.

- Switch configuration and integration. For more information, see Switch integration on page 8-3.

- The number of PCI slots available and the number of ports on the voice card. For more information, see the MAS port capacities tables in Chapter 11, System capacities.

- Port usage patterns. For more information, see Estimating traffic generated by incoming and outgoing calls on page 12-24.

- MAS load balancing. For more information, see Messaging application server load balancing on page 13-5.

Examples
The examples in this section show the number of MAS units required, depending on the telephony type and number of voice ports.

For more information on telephony types, see Telephony protocols on page 8-8.

Modular Messaging—MSS (Aria TUI) using analog telephony

In this example, an organization has 5600 subscribers, requiring a total of 96 voice ports.

- Maximum number of cards supported per MAS = 4

- Number of voice cards = 8

- Number of ports per voice card = 12

- Number of MAS units required = 2

In this example, four voice cards will be required on each MAS. However, to allow for future expansion, administrators might want to distribute the ports across three MAS units.

Modular Messaging—MSS (Aria TUI) using T1 QSIG telephony

In this example, an organization has 5300 subscribers, requiring a total of 92 voice ports.

- Maximum number of cards supported per MAS = 3

- Number of voice cards = 4

- Number of ports per voice card = 23

- Number of MAS units = 2

In this example, three voice cards will be required on each MAS.

QSIG telephony with Find Me (Modular Messaging—MSS; Aria TUI)

In this example, an organization has 5300 subscribers requiring a total of 150 ports. This is based on the assumption that two-thirds of calls result in a Find Me call.

- Maximum number of cards supported per MAS = 3

- Number of voice cards = 7

- Number of ports per voice card = 23

- Number of MAS units = 3

Evaluating the additional load on the network and e-mail servers

Implementing Avaya Modular Messaging results in the flow of voice data over the organization's data network. This section provides the information required to calculate the additional network traffic generated by an Avaya Modular Messaging system.

In Modular Messaging—Avaya MSS, the MSS and the messaging application server (MAS) units are connected by a private LAN. Though this system provides subscribers unified access to voice and fax messages, the use of graphical user interface clients for messaging is not expected to cause a significant load to the network traffic.

This section provides guidelines for evaluating the additional network traffic when the message store is Microsoft Exchange or IBM Lotus Domino.

Note: Customers must keep their systems within performance operating ranges prescribed by Microsoft and IBM Lotus. In order to support the extra load for voice messaging, Avaya requires that the CPU utilization be no more than 50%.

The calculation for additional network traffic is based on several factors, including:

- The number of MAS units in the voice mail domain (S)

- The number of ports on each MAS (P)

- The usage characteristics

- The voice encoding rate (13 kilobits per second for GSM, 64 kilobits per second for G.711)

Worst-case network load

To calculate the worst-case network load contributed by a voice mail domain, substitute the number of MAS units in the voice mail domain for S and the number of ports on each MAS for P in the following formula:

Worst-case network bandwidth =
S x P x 13 kilobits per second (GSM encoding)

S x P x 64 kilobits per second (G.711 PCM encoding)

For example, for a site with a voice mail domain containing five MAS units, each with 24 ports, the worst-case network bandwidth is:

For GSM encoding, 5 x 24 x 13 = 1,560 kilobits per second

For G.711 PCM encoding, 5 x 24 x 64 = 7,680 kilobits per second

In addition, it is necessary to apply a factor of 10% to allow for the overhead that is applicable to the network protocols and options that are in operation.

This calculation is based on the worst-case assumption that all ports are recording or playing voice data at the same time. It provides a calculation of the total network traffic potentially added, but no indication of how

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many ports are receiving incoming calls and how many ports are making outgoing calls.

Note: The worst-case network load calculation does not include burst rates caused by bursty message deliveries or bursty message playback.

13

Other planning considerations

This chapter contains the following additional planning considerations:

Planning for redundancy

When planning a Modular Messaging implementation, Avaya recommends that planners include redundancy.

Planning for redundancy includes planning for:

- Messaging application server redundancy

- Message Store Server redundancy

In addition, power redundancy must be considered. Avaya requires that all servers are connected to a UPS for power backup.

Messaging application server redundancy

Messaging application server (MAS) redundancy means that when one of the MAS units in a multi-MAS voice mail domain goes out of service, the system can continue to send and receive messages.

Use the following guidelines when planning for MAS redundancy:

- Ensure that the voice ports are distributed evenly across MAS units in the voice mail domain. To do this, install a balanced number of voice cards on each MAS. This ensures that if one or more MAS units are out of service, an adequate number of voice ports are still available.

  For more information on voice ports, see Voice ports on page 8-2.

- With Digital Set Emulation or QSIG telephony, ensure that incoming port groups for all MAS units are in the same hunt group. If incoming port groups are in different hunt groups, calls presented to a port group on an MAS that is out of service may not be routed to another voice port on an available MAS.

  For more information on hunt groups, see Telephony protocols on page 8-8.

- When using an integration device, such as PBXLink, one can plan for redundancy by using a separate integration device for each MAS in the voice mail domain. This ensures that if an MAS goes out of service, all remaining MAS units are still connected to the switch.

- When using analog telephony, use wiring to enable two MAS units to be serviced by a single extension on the switch. This ensures that if one MAS is not available, calls from the switch extension can go to the other MAS.

> **Note:** When using wiring to enable two MAS units to be serviced by a single extension on the switch, one must ensure that only one MAS unit is allowed to make outcalls.

■ For greater reliability, ensure that extension numbers for the port boards on the MAS are distributed over a number of switch boards.

N+1 server configuration for MAS redundancy

Modular Messaging offers redundancy of voice ports by way of an N+1 server configuration.

With an N+1 server configuration, customers can purchase more MAS units than are required in a standard configuration, and can set up ports on this additional MAS. For more information, see N+1 server configuration on page 5-27.

Message Store Server redundancy

In the event that a message store becomes unavailable to MAS units, Modular Messaging continues to provide Call Answer services and emergency retrieval of new Call Answer messages from the Modular Messaging TUI. For more information, see Offline messaging on page 5-21.

Avaya MSS

Customers that require Avaya Message Storage Server redundancy are advised to consider implementing the high-availability configuration of the MSS (MSS—H).

The MSS—H offers:

■ 2 redundant, hot swappable chassis fans and 2 redundant, hot swappable power supplies

■ 3 hot swappable SCSI RAID drives with hardware RAID Level 5 data redundancy

■ Remote Maintenance Board (connects to analog line for alarm reporting and servicing; international versions require an external modem)

> **Note:** For non-domestic sites, an external modem is required in addition to the RMB

■ The MSS—H uses a Digital Versatile Disc (DVD) Random Access Memory (RAM) drive to back up data. One DVD-RAM medium holds approximately 4.7-GB of data. In the event of a system failure, the data stored on the media is used to restore the system back to an operational state. For more information, see CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121

Note: When a Microsoft Exchange server or when an IBM Lotus Domino server is offline, Modular Messaging continues to provide offline messaging. For more information, see When a Microsoft Exchange message store goes offline on page 5-24 and When an IBM Lotus Domino message store goes offline on page 5-25.

Messaging application server load balancing

Modular Messaging server components such as the Tracing Server, Call Me Server, MWI Server, Mailbox Monitor Server, Fax Sender Server (MSS only), and Offline Call Answer store are installed on a messaging application server (MAS), unless otherwise recommended.

In a voice mail domain that contains a single MAS unit, all such server components are installed on this MAS. In a multi-MAS voice mail domain, these components are distributed across MAS units. For better efficiency, it is important that the load across MAS units in a voice mail domain is well-balanced.

Distribution of server components

In a multi-MAS voice mail domain, server components such as the Tracing Server, Call Me Server, and MWI server may be installed on the same machine. However, for better efficiency, Avaya recommends the following rules:

- Install the Tracing Server on the MAS with the smallest number of ports or on the MAS that handles the least number of calls. The Tracing Server may also be installed on its own machine if possible. In systems of large configurations, the Tracing Server may need to be installed on a separate system, other than an MAS. For more information, see Recommendations for the Tracing Server on page 13-7.

- Install the Call Me Server software and MWI Server software on the same MAS. These services must be co-resident with the Mailbox Monitor Server, and must be installed on the MAS with the smallest number of ports possible, or on the MAS with the second smallest number of ports if the Tracing Server is installed.

Table 13-1 provides information on the recommended placement of server components for Modular Messaging—MSS.

> **Note:** The Call Me server and MWI server are co-resident with the Mailbox Monitor server.

Table 13-1.   Recommended placement of MAS components with Modular Messaging—MSS

MAS#1	MAS#2	MAS#3	MAS#4	MAS#5	Supplementary server
Voice mail domain with one MAS unit. **Switch integrations: All. TUI: Aria, AUDIX**					
Tracing Server Call Me + MWI Server Fax Sender Server **Note:** No Offline Call Answer store is needed	—	—	—	—	—
Voice mail domain with two MAS units. **Switch integrations: T1 and E1 QSIG integration. TUI: Aria**					
Fax Sender Server	Call Me + MWI Server[1]	—	—	—	Tracing Server Offline Call Answer Store Admin Clients
Voice mail domain with two MAS units. **Switch integrations: T1 and E1 QSIG integration. TUI: AUDIX**					
Call Me + MWI Server Fax Sender Server	Tracing Server Offline Call Answer Store[1]	—	—	—	—
Voice mail domain with two MAS units. **Switch integrations: H.323-based IP and DSE integration. TUI: Aria, AUDIX**					
Call Me + MWI Server Fax Sender Server	Tracing Server Offline Call Answer Store[1]	—	—	—	—
Voice mail domain with three MAS units. **Switch integrations: T1 and E1 QSIG integration. TUI: Aria**					

Table 13-1.   Recommended placement of MAS components with Modular Messaging—MSS

MAS#1	MAS#2	MAS#3	MAS#4	MAS#5	Supplementary server
—	Fax Sender Server	Call Me + MWI Server[1]	—	—	Tracing Server Offline Call Answer Store Admin Clients
Voice mail domain with three MAS units. **Switch integrations: T1 and E1 QSIG integration. TUI: AUDIX**					
Fax Sender Server	Call Me + MWI Server	Tracing Server Offline Call Answer Store[1]	—	—	—
Voice mail domain with three MAS units. **Switch integrations: H.323-based IP, Inband, DSE integration. TUI: Aria, AUDIX**					
Fax Sender Server	Call Me + MWI Server	Tracing Server Offline Call Answer Store[1]	—	—	—
Voice mail domain with four MAS units. **Switch integrations: All. TUI: Aria, AUDIX**					
—	—	Fax Sender Server	Call Me + MWI Server[1]	—	Tracing Server Offline Call Answer Store Admin Clients
Voice mail domain with five MAS units. **Switch integrations: All. TUI: Aria, AUDIX**					
—	—	—	Fax Sender Server	Call Me + MWI Server[1]	Tracing Server Offline Call Answer Store Admin Clients

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1.   MAS with smallest number of ports

Recommendations for the Tracing Server

For systems that have very large configurations and port capacities, Avaya recommends that the Tracing Server is installed on a separate machine other than an MAS.

Table 13-2 provides information on the capacity limits for hosting the Tracing Server on an MAS. For systems that are larger than the limits mentioned in Table 13-2, a separate machine is required to host the Tracing Server.

The separate system for hosting the Tracing Server can be either an Avaya-provided S3400 system that customers must purchase or a customer-provided machine that meets the specifications described in Tracing Server or Offline Call Answer store requirements in Appendix B, Customer environment..

If customers purchase an additional S3400 system for the Tracing Server, Avaya recommends hosting the Offline Call Answer store and Administration Clients also on this same system.

Table 13-2. Capacity limit for hosting the Tracing Server on an MAS

Telephone integration	Voice ports	Number of port boards	Number of MAS units
Modular Messaging Aria TUI only			
H.323-based IP	60	—	3
T1 QSIG	69	3 (23-port T1 boards)	1
E1 QSIG	60	2 (30-port E1 boards)	1
DSE	144	18 (8-port DSE boards)	5
Analog	144	12 (12-port analog boards)	3
Modular Messaging AUDIX TUI or combination of Aria and AUDIX TUIs for Modular Messaging **Note:** Applicable only to Modular Messaging—MSS			
H.323-based IP	60	—	3
T1 QSIG	69	3 (23-port T1 boards)	3
E1 QSIG	90	3 (30-port E1 boards)	3
DSE	72	9 (8-port DSE boards)	3
Analog	72	6 (12-port analog boards)	3

Recommendations for the Offline Call Answer Store

The Modular Messaging telephone user interfaces (TUIs) provide Call Answer services to callers that cannot reach subscribers. These Call Answer services allow callers to leave voice or fax messages for subscribers.

Modular Messaging continues to provide Call Answer services to callers, even when a message store is cannot be accessed. This feature is referred to as offline Call Answer. For more information, see Offline Call Answer on page 5-22.

Further, Modular Messaging provides subscribers emergency access to these offline Call Answer messages, from the Modular Messaging Aria TUI.

The messaging application server (MAS) caches all Call Answer messages that it receives in a local message store. In a multi-MAS voice mail domain, each MAS migrates copies of Call Answer messages in its local offline message store to a common repository known as the Offline Call Answer Store. Hence, the Offline Call Answer Store contains copies of messages from all MAS units in a voice mail domain.

The Offline Call Answer store acts as a single repository for Call Answer messages taken for all subscribers in the voice mail domain, in the last 'x' number of hours. The value of 'x' is 24 by default, but can be changed to any value from 1 to 99.

The Offline Call Answer Store can reside on any one of the following:

- An MAS

  The Offline Call Answer Store can reside on an MAS that has the capacity to store up to 5,000 hours of GSM-encoded messages (1,000 hours of G.711-encoded messages). This storage space is utilized by Call Answer messages in the local store and Call Answer messages in the Offline Call Answer Store.

  Note: In a voice mail domain that has only two MAS units, the Offline Call Answer store can reside on the same MAS as the Tracing Server.

- A separate S3400 system that customers can purchase from Avaya

  An S3400 system on which the Modular Messaging software has not been installed provides up to 10,000 hours of GSM-encoded messages (2,000 hours of G.711-encoded messages). This capacity is sufficient to store one copy of Call Answer messages from every MAS in the voice mail domain. The additional S3400 system must be on the customer's LAN with Modular Messaging—Microsoft Exchange and Modular Messaging—

IBM Lotus Domino. With Modular Messaging—MSS, this system must be on the private LAN that connects the MAS units and the MSS.

Note: If customers purchase an additional S3400 system for the Offline Call Answer store, Avaya recommends installing the Tracing Server also on this system. Avaya also recommends that the Modular Messaging Administration Client be run from this system, due to their intensive resource requirements.

- A customer-provided machine that meets the requirements described in Tracing Server or Offline Call Answer store requirements in Appendix B, Customer environment..

Note: This release of Modular Messaging does not support configurations with the Offline Call Answer Store on a MAN or WAN.

Calculating the number of hours for message storage

To calculate the number of hours required for the Offline Call Answer store to store messages, planners must have these details:

- The total number of mailboxes on the system (M)

- The total number of Call Answer (voice and fax) messages received daily per subscriber. The default is 5. (nCA)

- The average length of Call Answer (voice and fax) messages, in seconds. The default is 30. (L)

- The number of messaging application server (MAS) units in the voice mail domain. (nMAS)

- The retention time in hours, for offline Call Answer messages. The default is 24, but can be changed to any value from 1 to 99. (HRS)

- Message encoding format: GSM or G.711

The rules for calculating the hours of storage are:

- Hours required per 24-hour period (24HRS): (M x nCA x L) / 3600

- Hours required for "n" hour periods (nHRS): 24HRS x nHRS/24

The calculation for evaluating whether the Offline Call Answer store must be located on an MAS or on a separate S3400 system are:

■ If an MAS is used to host the Offline Call Answer store, the MAS must meet the criteria:

nHRS + (nHRS / nMAS) $\leq$ 5,000 (GSM) or 1,000 (G.711)

■ If a separate S3400 system is used to host the Offline Call Answer store, the S3400 system must meet the criteria:

nHRS $\leq$ 10,000 (GSM) or 2,000 (G.711)

Note: The maximum number of hours available on an MAS is 5,000 (GSM) or 1,000 (G.711). The maximum number of hours available on a separate S3400 system not configured as an MAS is 10,000 (GSM) or 2,000 (G.711).

An example   Table 13-3 provides an example for calculating the requirements for storing offline Call Answer messages.

Table 13-3.   Server capacities and requirements for Offline Call Answer message storage

Input	Values
Number of seats or mailboxes (M)	5,000
Average number of incoming Call Answer messages per seat in a 24-hour period (nCA)	5
Average length of messages, in seconds (L)	30
Number of MAS units in configuration (nMAS)	2
Number of hours of storage required (HRS)	24
Message encoding format	GSM
Hours of storage	
Hours of storage required per 24-hour period (24HRS)	(M x nCA x L) / 3600 = 208
Total hours of storage for "n" hour periods (nHRS)	24HRS x HRS/24 = 208
On-board evaluation (located on one of the MAS units)	
Total on-board hours (copy for all MAS units plus local MAS copy)	nHRS + (nHRS/nMAS) = 313
On-board MAS is OK or not OK **Note:** Maximum 5,000 GSM / 1,000 G.711	Is OK
Off-board evaluation (On separate server - Avaya S3400 Server)	
Total off-board hours (copy of all MAS units)	nHRS = 208

Table 13-3. Server capacities and requirements for Offline Call Answer message storage

Off board S3400, assuming 60 GB available, is OK or not OK **Note:** Maximum 10,000 GSM / 2,000 G.711 hours	Is OK

Hunt algorithm

While planning load balancing across MAS units, take into consideration the hunt algorithm that the telephone system uses.

Since the hunt group consists of ports spread across multiple MAS units, calls should be distributed as equally as possible among all the MAS units. Hunt algorithms that distribute calls evenly across all ports are the most desirable. Algorithms that hunt from either the top or bottom of the hunt group should be avoided because they tend to load the MAS units unevenly.

If the telephone system does not offer a desirable algorithm, one alternative is to set up the hunt group so that ports alternate between the MAS units.

Note: The hunt group also be configured to provide even distribution of traffic to cards within servers.

Calculating the message storage capacity

Modular Messaging supports the GSM and G.711 encoding formats.

Table 13-4 shows the storage spaces required to encode voice using the GSM and G.711 formats.

Table 13-4. Encoding rates and storage space

Encoding rate	GSM	G.711
Voice messages		
Bytes per second (Bps)	1,625	8,000
Kilobytes per second (KBps)	1.58	7.81
Kilobytes per minute (KB/min)	95.2	468.8
Megabytes per hour (MB/hour)	5.6	27.5
Fax messages		
Kilobytes per page (subject to coverage, quality, file format)	80	80

Note: These calculations use the following definitions:
1024 bytes = 1 KB
1024 KB = 1 MB

Storage space available on the MAS

The maximum hours available on the MAS for storage of Call Answer messages are :

- Maximum for GSM storage: 5,000[1] hours

- Maximum for G.711 storage: 1,000[1] hours

The hours of storage for offline Call Answer message storage are used when the message store is not available.

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1. These values are estimated maximum values and are not guaranteed. The storage capacity may be reduced by the use of other files, such as log files.

Storage space available on the MSS

Avaya MSS

Modular Messaging supports the GSM, G.711 A-law, and G.711 μ-law encoding formats.

An MAS can play and record the GSM, G.711 A-law, and G.711 μ-law audio encoding formats. The single format specified by the voice mail domain setting refers to the format used to record voice messages, recorded names, and greetings by the TUI and GUI clients.

The Message Storage Server (MSS) is capable of supporting both encoding formats simultaneously, as the MSS may receive messages from remote subscribers in any supported format.

The G.711 encoding format consumes approximately five times as much storage space as the GSM format. However, the G.711 provides better sound quality and also provides support for TTY/TDD.

The maximum hours of storage[2] available on an MSS are:

- GSM

  — MSS—S: 7,500

  — MSS—H: 15,000

- G.711

  — MSS—S: 1,500

  — MSS—H: 3,000

All available storage on the MSS is made available to the customer. Hence, there is no need to purchase additional storage.

Calculating the storage space on e-mail servers

Microsoft Exchange

IBM Lotus Domino

Administrators of the e-mail environment typically define a maximum amount of space that each subscriber is entitled to have on the corporate e-mail system. If voice and fax messages are going to be added to the e-mail message store, this needs to be accounted for.

Subscribers need to be able to operate within existing allocations or be granted incremental space as required.

The amount of additional storage space required for voice and fax messaging on Microsoft Exchange or IBM Lotus Domino e-mail servers depends on several factors, including:

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2. These calculations include the 20% free space that must be available on the MSS for the system to run.

- The average number of Call Answer messages sent and received received per day

- The average duration of Call Answer messages

- The average number of voice messages sent and received received per day

- The average duration of voice messages

- The average number of fax messages sent and received per day

- The average length and size of fax messages

- The average retention period for storage of messages

- The number of subscribers in the organization

- Average retention period for storage of messages

An example of e-mail server storage capacity calculation

To calculate the impact that voice messages will have on the current e-mail store based on which encoding algorithm is being used, consider the example shown in Table 13-5.

Table 13-5. Storage capacity calculation example

Assumptions per subscriber	GSM encoding	G.711 encoding
Voice and Call Answer messages		
Total number of voice and Call Answer messages sent and received per day	6	—	—
Average length, in seconds	40	—	—
Size in Kilobytes per second (KBps)	—	1.58	7.81
Space required for storage of new messages (MB)	—	0.370	1.830
Fax messages		
Total number of fax messages sent and received per day	0.075	—	—
Average length of fax, in pages	3	—	—
Size in KB/page (subject to coverage, quality, file format)	80	—	—
Space required for storage of new fax messages (MB)	—	0.018	0.018

Table 13-5. Storage capacity calculation example

Assumptions per subscriber		GSM encoding	G.711 encoding
Total storage requirements			
Total daily storage (MB)	—	0.388	1.848
Average retention period (days)	10	—	—
Total message store requirement (MB)	—	3.88	18.48
E-mail storage allocation			
Current e-mail storage allocation per subscriber (MB)	50	—	—
Percentage of current e-mail allocation for voice-mail	—	7.76%	36.96%

Storage planning

Table 13-6 provides a calculator for storage planning.

Table 13-6. Storage planning

	Assumptions	GSM	G.711
Assumptions per subscriber			
Subscribers	5,000		
Call Answer messages per day	4		
Average duration of Call Answer messages	30 seconds	47 KB	234 KB
Fax messages per day	0.05		
A length of fax messages	3 pages	240 KB	240 KB
Local messages sent	1		
Network messages sent	0.04		
Local messages received	1		
Network messages received	0.06		
Average message length	60	95 KB	469 KB
Average retention period	2 days		
Message Store (1=MSS, 0 = E-mail)	1		

Table 13-6. Storage planning

Subscriber summary			
Total voice or Call Answer messages per day (sent or received)	6.1		
Weighted average length of messages	40.3 seconds		
MAS requirements			
MAS requirement	167 hours		
Fax	750 pages		
MAS requirement		1,035 MB	4,800 MB
Number of MAS units		needs to be calculated	
Offline access requirements			
Retention period	48 hours		
Offline Call Answer store **Note:** Assumes equal distribution of messages over period		1,987 MB	9,167 MB
Message Store requirements			
Message Store requirement **Note:** Assumes each recipient is charged with space	683.3 hours		
Fax	750 pages		
Message Store requirement		3,887 MB	18,792 MB
Planning for Unified Message store			
Total MB/user for voice/fax messaging		0.777	3.758
Current e-mail storage allocation / user	50 MB		
% of current allocation for voicemail		1.55%	7.5%

Fax port and storage planning

Planners can use the calculator provided in Table 13-7, for fax port and storage planning.

Table 13-7. Fax port and storage planning

Planning assumptions			
Number of subscribers	500		

Table 13-7. Fax port and storage planning

		Standard	Fine	Average
Average length of fax messages	3 pages			
Page coverage	80%			
Storage format	.tif			
Fax / day / heavy user	0.75 faxes			
% heavy users	10%			
Fax / day / user	0.075 faxes			
Retention time	2 days			
% busy hour	14%			
		Standard	**Fine**	**Average**
Mix		50%	50%	100%
Storage per page		40.0 KB	80.0	60.0
Port utilization per page		40.0 seconds	70.0	55.0
Storage				
Per fax		120.0 KB	240.0	180.0
Per user / day		9.0 KB	18.0	13.5
Per user base / day		4.5 MB	9.0	6.8
Retention		9.0 MB	18.0	13.5
Port utilization				
Per fax		120.0 seconds	210	165.0
Per user / day		9.0 seconds	15.8	12.4
Per user base / day		4,500.0 seconds	7,875.0	6,187.5
Per user base / busy hour		630.0 seconds	1,102.5	866.3
Per user base / busy hour		6.3 ccs	11.0	8.7
Per user base / busy hour		0.2 erlangs	0.3	0.2

Message retention estimate

To calculate the message retention estimate, planners need the following information:

- Percentage of daily messages retained (A)

- Maximum retention limit (B)

- Average retention time relative to retention limit (C)

The calculations for message retention estimate are:

- Average retention time for retained messages (D): [B x C]

- Average retention for all messages; includes 1 day cycle time for daily messages not retained: [1 x A + D x (1-A)]

Table 13-8 provides an example for calculating the message retention estimate.

Table 13-8. Message retention estimate calculation

Planning inputs	Value
Percentage of daily messages retained	0.55 %
Maximum retention limit	20 days
Average retention time relative to retention limit	0.4 days
Calculation	
Average retention time for retained messages	[20 x 0.4] 8 days
Average retention for all messages (includes 1 day cycle time for daily messages not retained)	[1 x 0.55 + 8 x (1-0.55)] 4.15 days

Calculating the number of desktop users per voice mail domain

A Modular Messaging—Exchange or Modular Messaging—IBM Lotus Domino configuration supports up to a maximum of 100,000 local subscribers in a voice mail domain. The customer implementation of the e-mail environment determines the number of desktop users.

The Modular Messaging Message Waiting Indicator (MWI) feature is limited to 7,000 subscribers for Modular Messaging—Exchange and Modular Messaging—Domino, within a voice mail domain.

Subscribers that are not enabled for MWI alerts can rely on the notification mechanisms provided by the Graphical User Interface (GUI) clients for being notified of new voice messages.

Modular Messaging—Message Storage Server (MSS) supports two types of standards-based e-mail clients:

- E-mail clients based on Internet Message Access Protocol 4 standards (IMAP4 clients).

- E-mail clients based on Post Office Protocol 3 standards (POP3 clients)

The Modular Messaging offers show the number of ports that are required to provide service to a given number of subscriber mailboxes. The number of mailboxes is based on port calculations alone. The number of IMAP4 and POP3 clients that Modular Messaging supports is limited by factors such as CPU occupancy and the maximum number of IMAP4 sessions supported.

IMAP4 client limits

Avaya MSS

With a Modular Messaging—MSS system, all active IMAP4 clients require an IMAP4 session on the Avaya MSS. Currently, Modular Messaging—MSS supports up to 1,000 simultaneous IMAP4 connections to an MSS. The Client Add-in for Microsoft Outlook application, Modular Messaging Web Client, and the Unified Communication Center (UCC) Speech Access client count towards this limit. Subscribers may also be using UCC Speech Access and an IMAP4 e-mail client simultaneously.

Use the following rule for calculating IMAP4 client limits:

(User population x [% given IMAP4 access] x [% logged in at one time]) $\leq$ 1,000

To determine the IMAP4 requirement for a single MSS voice mail domain, planners must calculate the estimated simultaneous IMAP4 users. For example:

- If the total user population = 1,750

- Percentage of users with IMAP4 access[3] = 50%

- Total number of IMAP4 users = 875

- Percentage of IMAP4 users simultaneously logged in[3] = 80%

- Estimated simultaneous IMAP4 requirement = 700

Inactive IMAP4 clients are timed out by the server after 30 minutes. However, clients that check for new messages at a periodic interval of less than approximately 30 minutes are never timed out.

POP3 client limits

Avaya MSS

POP3 clients perform background polling to check for new messages every few minutes. This polling is CPU-intensive and limits the number of POP3 clients that can be configured on a Modular Messaging—MSS system.

For this reason, it is important to calculate the number of POP3 clients that can be supported for large configurations requiring 80 ports or approximately 5,000 mailboxes.

Use the following rule for calculating POP3 client limits:

(POP3_CLIENTS x 0.007) + (PORTS x 0.4) <= 70, where

- POP3_CLIENTS = Number of POP3 clients

- PORTS = Number of voice ports sold

This calculation ensures that CPU occupancy will be less than 70% and must be satisfied for the configuration to be valid.

Modular Messaging—MSS supports up to a maximum of 20,000 local subscribers in a voice mail domain, all of which can be enabled for MWI.

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3. Customer deployment and usage patterns may vary

Port requirement planning

Avaya MSS

The calculator in Table 13-9 provides information for planning port requirement for a Modular Messaging—MSS system.

Table 13-9. Modular Messaging—MSS port requirements planning

Feature using ports	AHT	% capable	frequency/day/ user	% busy hour	Seconds /Day	Erlangs	CCS
Per Subscriber							
Call Answer	35	100%	2.000	14.0	70.00	0.02	0.70
Fax Answer	5	100%	0.050	14.0	0.25	0.00	0.00
Fax Inbound	120	100%	0.050	14.0	6.00	0.00	0.06
Fax Outbound	120	100%	0.025	14.0	3.00	0.00	0.03
Automated Attendant	20	100%	3.000	14.0	60.00	0.02	0.60
Caller App 1	60	100%	0.250	10.0	15.00	0.00	0.15
Caller App 2	30	100%	2.000	14.0	60.00	0.02	0.60
Caller App 3	120	100%	0.100	10.0	12.00	0.00	0.12
Call Me	180	20%	2.000	5.0	72.00	0.02	0.72
Find Me - Calling Party	120	10%	6.000	5.0	72.00	0.02	0.72
Find Me - Called Party	300	10%	3.000	5.0	90.00	0.03	0.90
TUI Access	180	100%	3.000	14.0	540.00	0.15	5.40
Client Access/Dual Connect	60	30%	3.000	14.0	54.00	0.02	0.54
Record (e.g. conference calls)	2,700	100%	0.001	10.0	2.70	0.00	0.03
Total / Day					1,056.95	0.29	10.57
Total / Busy Hour				11.9	125.73	0.03	1.26
Per System (5,000 subscribers)							
Total / Day					5,284,750	1,467.99	52,847.50

Table 13-9. Modular Messaging—MSS port requirements planning

					628,625	174.62	6,286.25
Total / Day Busy Hour					628,625	174.62	6,286.25

Microsoft Exchange

IBM Lotus Domino

The calculator in Table 13-10 provides information for planning port requirement for a Modular Messaging—Microsoft Exchange or a Modular Messaging—IBM Lotus Domino system.

Table 13-10. Modular Messaging (Exchange or Domino) port requirements planning

Feature using ports	AHT	% capable	frequency/ day/user	% busy hour	Seconds /Day	Erlangs	CCS
Per Subscriber							
Call Answer	35	100%	2.000	14.0%	70.00	0.02	0.70
Fax Answer	5	100%	0.050	14.0%	0.25	0.00	0.00
Fax Inbound	0	100%	0.000	14.0%	0.00	0.00	0.00
Fax Outbound	0	100%	0.000	14.0%	0.00	0.00	0.00
Automated Attendant	20	100%	3.000	14.0%	60.00	0.02	0.60
Caller App 1	60	100%	0.250	10.0%	15.00	0.00	0.15
Caller App 2	30	100%	2.000	14.0%	60.00	0.02	0.60
Caller App 3	120	100%	0.100	10.0%	12.00	0.00	0.12
Call Me	180	20%	3.000	5.0%	108.00	0.03	1.08
Find Me - Calling Party	120	10%	6.000	5.0%	72.00	0.02	0.72
Find Me - Called Party	300	10%	3.000	5.0%	90.00	0.03	0.90
TUI Access	360	100%	2.000	14.0%	720.00	0.20	7.20
Client Access/Dual Connect	60	60%	3.000	14.0%	108.00	0.03	1.08
Record (e.g. conference calls)	2,700	100%	0.001	10.0%	2.70	0.00	0.03

Table 13-10. Modular Messaging (Exchange or Domino) port requirements planning

Total / Day					1,317.95	0.37	13.18
Total / Busy Hour				12.1%	159.03	0.04	1.59
Per System (5,000 subscribers)							
Total / Day					6,589,750.00	1,830.49	65,897.50
Total / Day Busy Hour					795,125.00	220.87	7,951.25

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Grade of service

The tables in this appendix show the maximum busy hour traffic supported by a given number of ports for each grade of service (GOS), and the average number of ports in use during the busy hour.

Table A-1 uses the Erlang B and Erlang C models to provide information on the port capacity in Erlangs, for each grade of service.

Note: Erlangs, CCS, and minutes are three different measures of traffic. 60 minutes = 1 Erlang = 36 CCS.

The Erlang B model. The Erlang B model represents a scenario in which incoming calls are not queued on the switch. If a caller calls when all ports are busy, the caller hears a busy tone and the call is blocked.

GOS with Erlang B = probability of being blocked and thus busy tone

The Erlang C model. The Erlang C model represents a scenario in which incoming calls are queued on the switch. The caller hears multiple rings if all ports are in use, and the call is significantly delayed. The call is eventually answered if the caller does not hang up.

GOS with Erlang C = probability of encountering a delay and thus ring back. If there is a delay, the probability of delay will be more than 10% of the average hold time (AHT).

Avaya Communication Manager with Q-Signaling (QSIG) integration does not support queuing of calls when all ports are busy.

Table A-1. Average number of ports in use during the busy hour

Ports	P.01	P.02	P.03	P.04	P.05	P.01	P.02	P.03	P.04	P.05
—	Erlang B Model					Erlang C Model				
4	0.87	1.09	1.26	1.40	1.52	0.89	1.09	1.23	1.34	1.43
8	3.13	3.63	3.99	4.28	4.54	3.13	3.53	3.80	4.01	4.18
12	5.88	6.61	7.14	7.57	7.95	5.84	6.40	6.77	7.05	7.28
16	8.88	9.83	10.51	11.06	11.54	8.79	9.49	9.94	10.29	10.56
20	12.03	13.18	14.00	14.66	15.25	11.91	12.72	13.25	13.64	13.96
23	14.47	15.76	16.68	17.42	18.08	14.32	15.21	15.78	16.21	16.56
24	15.30	16.63	17.58	18.35	19.03	15.14	16.05	16.64	17.08	17.44
30	20.34	21.93	23.06	23.99	24.80	20.12	21.18	21.85	22.35	22.76
32	22.05	23.73	24.92	25.89	26.75	21.82	22.92	23.61	24.13	24.55
36	25.51	27.34	28.65	29.72	30.66	25.25	26.42	27.17	27.72	28.17
40	29.01	31.00	32.41	33.58	34.60	28.72	29.97	30.76	31.34	31.82
46	34.32	36.53	38.11	39.40	40.54	33.99	35.35	36.20	36.83	37.33
48	36.11	38.39	40.02	41.36	42.54	35.77	37.16	38.02	38.67	39.19
56	43.31	45.87	47.70	49.21	50.54	42.93	44.44	45.38	46.08	46.64
60	46.95	49.65	51.57	53.16	54.57	46.54	48.11	49.09	49.81	50.38
64	50.60	53.43	55.45	57.12	58.60	50.18	51.79	52.80	53.55	54.14
69	55.19	58.18	60.31	62.09	63.65	54.75	56.43	57.48	58.25	58.86
72	57.96	61.03	63.24	65.08	66.69	57.50	59.22	60.29	61.07	61.70
80	65.36	68.69	71.08	73.06	74.82	64.88	66.69	67.81	68.64	69.30
84	69.08	72.53	75.00	77.07	78.89	68.59	70.44	71.59	72.44	73.11
88	72.81	76.38	78.94	81.08	82.97	72.30	74.20	75.38	76.24	76.93
90	74.68	78.31	80.92	83.09	85.01	74.17	76.09	77.27	78.14	78.84
92	76.56	80.23	82.89	85.10	87.06	76.03	77.97	79.17	80.05	80.75
96	80.31	84.10	86.84	89.12	91.15	79.77	81.75	82.97	83.87	84.58
100	84.07	87.97	90.79	93.15	95.24	83.52	85.54	86.78	87.70	88.42
104	87.83	91.85	94.75	97.18	99.34	87.28	89.33	90.60	91.53	92.27
108	91.60	95.74	98.72	101.22	103.44	91.04	93.13	94.42	95.37	96.12
112	95.39	99.62	102.69	105.26	107.55	94.81	96.94	98.25	99.21	99.97
115	98.22	102.54	105.68	108.29	110.63	97.65	99.80	101.12	102.09	102.86
120	102.96	107.42	110.65	113.35	115.77	102.37	104.57	105.92	106.91	107.69

128	110.57	115.23	118.62	121.46	124.00	109.96	112.22	113.61	114.62	115.43
132	114.38	119.15	122.62	125.53	128.13	113.76	116.06	117.46	118.48	119.31
136	118.19	123.06	126.61	129.59	132.25	117.58	119.89	121.32	122.36	123.18
138	120.10	125.02	128.61	131.62	134.32	119.48	121.82	123.25	124.29	125.12
140	122.01	126.98	130.60	133.66	136.38	121.38	123.73	125.18	126.23	127.06
144	125.83	130.91	134.61	137.72	140.51	125.20	127.59	129.04	130.10	130.94
150	131.58	136.80	140.62	143.82	146.71	130.94	133.36	134.84	135.92	136.78
152	133.50	138.77	142.63	145.86	148.78	132.86	135.29	136.78	137.87	138.73
156	137.32	142.70	146.64	149.94	152.91	136.69	139.14	140.65	141.75	142.62
160	141.17	146.65	150.64	154.02	157.05	140.52	143.00	144.53	145.64	146.51
161	142.13	147.63	151.65	155.04	158.08	141.48	143.98	145.50	146.61	147.48
168	148.86	154.52	158.67	162.18	165.33	148.20	150.74	152.29	153.41	154.31
176	156.56	162.42	166.71	170.34	173.61	155.90	158.48	160.06	161.21	162.12
180	160.42	166.37	170.74	174.44	177.75	159.75	162.36	163.94	165.11	166.02
184	164.27	170.33	174.76	178.53	181.91	163.60	166.24	167.84	169.01	169.93
192	172.00	178.24	182.82	186.71	190.20	171.32	173.99	175.63	176.82	177.76
200	179.74	186.16	190.89	194.89	198.50	179.05	181.77	183.43	184.64	185.59
204	183.61	190.12	194.92	198.99	202.66	182.91	185.67	187.33	188.54	189.50
207	186.51	193.10	197.95	202.07	205.78	185.82	188.59	190.27	191.48	192.44
208	187.49	194.09	198.95	203.08	206.81	186.79	189.56	191.24	192.45	193.42
210	189.42	196.07	200.97	205.14	208.89	188.73	191.50	193.19	194.42	195.38
216	195.24	202.02	207.03	211.29	215.12	194.54	197.35	199.05	200.29	201.27
224	203.01	209.97	215.12	219.50	223.45	202.30	205.14	206.88	208.12	209.12
228	206.90	213.94	219.16	223.60	227.60	206.17	209.04	210.78	212.05	213.05
230	208.84	215.93	221.18	225.64	229.68	208.12	211.00	212.74	214.00	215.00
232	210.78	217.92	223.20	227.70	231.77	210.06	212.95	214.70	215.96	216.97
240	218.56	225.87	231.29	235.91	240.10	217.84	220.76	222.53	223.82	224.83
248	226.35	233.84	239.39	244.12	248.42	225.62	228.57	230.37	231.68	232.69
252	230.24	237.81	243.44	248.24	252.58	229.51	232.49	234.29	235.60	236.63
253	231.22	238.82	244.45	249.26	253.63	230.49	233.46	235.26	236.58	237.61
256	234.15	241.80	247.49	252.35	256.74	233.41	236.40	238.21	239.52	240.55
264	241.95	249.78	255.60	260.56	265.09	241.21	244.22	246.06	247.40	248.44
270	247.79	255.75	261.67	266.75	271.33	247.05	250.10	251.95	253.28	254.34
272	249.75	257.75	263.71	268.79	273.42	249.00	252.07	253.91	255.26	256.30

276	253.65	261.74	267.75	272.91	277.59	252.91	255.98	257.85	259.20	260.26
280	257.57	265.74	271.82	277.02	281.75	256.82	259.89	261.77	263.12	264.18
288	265.39	273.72	279.94	285.25	290.10	264.63	267.74	269.64	270.99	272.08
296	273.21	281.72	288.06	293.50	298.45	272.43	275.59	277.49	278.88	279.97
299	276.14	284.70	291.11	296.58	301.56	275.38	278.53	280.45	281.84	282.91
300	277.12	285.71	292.12	297.61	302.61	276.35	279.52	281.42	282.82	283.91
304	281.04	289.70	296.18	301.73	306.79	280.26	283.45	285.36	286.75	287.85
312	288.87	297.71	304.30	309.97	315.13	288.09	291.31	293.23	294.64	295.75
320	296.71	305.71	312.43	318.21	323.49	295.93	299.17	301.12	302.53	303.64
322	298.68	307.70	314.46	320.28	325.57	297.88	301.12	303.08	304.50	305.62
324	300.64	309.71	316.50	322.33	327.67	299.84	303.09	305.05	306.47	307.60
328	304.57	313.72	320.56	326.47	331.83	303.77	307.03	308.99	310.41	311.53
330	306.52	315.71	322.60	328.52	333.94	305.72	308.98	310.96	312.39	313.51
336	312.41	321.72	328.71	334.70	340.19	311.61	314.89	316.88	318.31	319.44
344	320.26	329.73	336.83	342.96	348.55	319.45	322.76	324.76	326.21	327.34
345	321.24	330.73	337.85	343.98	349.60	320.42	323.74	325.74	327.20	328.33
348	324.18	333.74	340.92	347.08	352.73	323.37	326.71	328.70	330.15	331.29
352	328.12	337.75	344.99	351.22	356.91	327.28	330.63	332.65	334.11	335.25
360	335.97	345.75	353.11	359.46	365.26	335.14	338.52	340.54	342.02	343.16
368	343.84	353.77	361.27	367.72	373.63	342.99	346.38	348.43	349.91	351.08
372	347.79	357.80	365.34	371.85	377.80	346.92	350.33	352.37	353.87	355.03
376	351.71	361.81	369.40	375.97	382.00	350.86	354.28	356.32	357.81	358.98
384	359.59	369.83	377.57	384.22	390.36	358.72	362.17	364.23	365.73	366.90
390	365.49	375.85	383.68	390.44	396.63	364.61	368.06	370.16	371.66	372.83
391	366.48	376.86	384.69	391.47	397.67	365.60	369.06	371.13	372.64	373.83
392	367.46	377.85	385.70	392.49	398.71	366.58	370.05	372.13	373.64	374.81
396	371.38	381.87	389.78	396.62	402.90	370.51	373.99	376.07	377.59	378.78
400	375.33	385.88	393.86	400.74	407.09	374.45	377.94	380.04	381.56	382.73
408	383.21	393.92	402.01	409.01	415.46	382.31	385.82	387.94	389.46	390.66
414	389.12	399.94	408.13	415.23	421.72	388.24	391.75	393.87	395.39	396.60
416	391.10	401.95	410.17	417.28	423.83	390.19	393.72	395.85	397.38	398.57
420	395.04	405.96	414.24	421.42	428.01	394.12	397.66	399.79	401.33	402.53
424	398.99	409.99	418.32	425.54	432.19	398.08	401.63	403.75	405.30	406.49
432	406.89	418.04	426.48	433.81	440.56	405.94	409.52	411.66	413.21	414.43

437	411.81	423.06	431.60	438.99	445.79	410.87	414.45	416.61	418.16	419.38
440	414.77	426.08	434.64	442.08	448.93	413.83	417.43	419.58	421.13	422.34
444	418.70	430.08	438.73	446.24	453.12	417.78	421.36	423.53	425.10	426.32
448	422.67	434.12	442.82	450.37	457.31	421.71	425.32	427.48	429.06	430.27
450	424.64	436.12	444.85	452.43	459.41	423.67	427.30	429.47	431.03	432.27
456	430.55	442.15	450.98	458.63	465.67	429.60	433.22	435.42	436.98	438.20
460	434.52	446.17	455.04	462.77	469.87	433.54	437.19	439.38	440.95	442.19
464	438.47	450.19	459.14	466.90	474.07	437.48	441.13	443.31	444.90	446.14
468	442.42	454.22	463.22	471.04	478.24	441.42	445.08	447.28	448.88	450.10
472	446.37	458.24	467.32	475.18	482.44	445.37	449.05	451.24	452.83	454.07
480	454.26	466.30	475.47	483.44	490.80	453.27	456.96	459.16	460.77	462.00
483	457.22	469.34	478.53	486.55	493.95	456.22	459.93	462.14	463.73	464.97
506	479.98	492.49	502.03	510.34	518.03	478.93	482.67	484.92	486.53	487.79
510	483.93	496.51	506.12	514.50	522.22	482.87	486.64	488.88	490.50	491.77
529	502.73	515.65	525.53	534.15	542.12	501.64	505.45	507.71	509.35	510.61
540	513.62	526.73	536.79	545.55	553.66	512.53	516.32	518.63	520.24	521.56
552	525.50	538.84	549.05	557.98	566.23	524.39	528.20	530.52	532.17	533.45
570	543.33	556.97	567.44	576.59	585.12	542.19	546.05	548.38	550.01	551.34
575	548.27	562.03	572.56	581.79	590.35	547.12	551.01	553.33	554.98	556.31
598	571.08	585.21	596.08	605.61	614.44	569.88	573.78	576.16	577.83	579.15
600	573.07	587.24	598.15	607.67	616.53	571.86	575.78	578.12	579.80	581.12
621	593.92	608.44	619.62	629.43	638.57	592.63	596.61	598.96	600.67	601.99
644	616.74	631.64	643.15	653.30	662.69	615.40	619.41	621.81	623.54	624.88
667	639.58	654.89	666.69	677.12	686.81	638.20	642.23	644.63	646.38	647.72
690	662.44	678.10	690.27	700.97	710.95	660.96	665.05	667.49	669.26	670.61

B

Customer environment

This appendix lists the minimum hardware requirements and supported software configurations for Avaya Modular Messaging.

This appendix contains the following topics:

Important: Customers are responsible for obtaining and installing anti-virus software on any Microsoft Windows machine that is used to run Avaya Modular Messaging software, in accordance with their local policy. In addition, Microsoft Windows security patches must be installed and routinely updated to protect the operating system from known security weaknesses. Consult http://support.avaya.com for recommended Microsoft Service Packs and Security updates. For more information on security, see 'System security' on

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the CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121.

Avaya support policy for third-party clients

Avaya Modular Messaging is standards-based, which includes IMAP4 access to messages from user client software packages (for example, Microsoft Outlook and IBM Lotus Notes). Avaya has conducted successful interoperability testing with Microsoft Outlook 2002, Microsoft Outlook 2000, Microsoft Outlook Express 5.0, IBM Lotus Notes R6, and IBM Lotus Notes R5. Furthermore, Avaya acknowledges that customers have reported successful integration of GroupWise with Avaya Modular Messaging and acknowledges that our customers may integrate other IMAP4 user client software packages with Avaya Modular Messaging. Avaya, however, makes no representations, warranties, or guarantees regarding specific capabilities with specific IMAP4 clients or successful integration or interoperability thereof. Avaya's product support is limited to IMAP4 as it is implemented on Avaya Modular Messaging and does not include support for specific e-mail clients.

Site requirements for Avaya servers

This section describes the physical requirements for the installation site, including environmental, weight, space, and power considerations for an Avaya Messaging Application Server (Avaya MAS) and the Avaya Message Storage Server (MSS—S, standard availability and MSS—H, high-availability).

Environmental requirements

Table B-1 lists the environmental conditions that must be maintained in the area where the Avaya servers are installed and maintained.

Table B-1. Environmental requirements

Operating state	Temperature	Maximum heat output	Humidity (noncondensing)
Operating	+10 to +35ºC (+50 to +95ºF)	MAS: 730 BTU/hour MSS-S: 352 BTU/hour MSS-H: 682 BTU/hour	20% to 80% RH
Non-operating (in storage or being shipped)	-20 to +50ºC (-4 to+122ºF)	N/A	20% to 90% RH

Weight and space considerations

Table B-2 lists the weight, height, width, and depth of each MAS and the MSS.

Table B-2. Avaya MAS weight and space considerations

Server	Weight (full)	Height	Width	Depth
Avaya MAS	40 lb. (18.1 kg) (without port boards)	6.8 in. (17 cm)	16.9 in. (43 cm)	18.9 in. (48 cm)
Avaya MSS-S	41 lb. (18.6 kg)	6.8 in. (17 cm)	16.9 in. (43 cm)	18.9 in. (48 cm)
Avaya MSS-H	52 lb. (23.6 kg)	6.8 in. (17 cm)	16.9 in. (43 cm)	18.9 in. (48 cm)

For safety considerations, at least two technicians should be on site and available to mount the units.

Customer-provided cabinet requirements

If the Avaya MAS and MSS are to be installed in a rack-mount configuration, the customer-provided cabinet must meet the following requirements:

- The cabinet must contain a 4-post rack to support the weight of the server.

- The cabinet must be secured to the floor before attempting to mount any units.

- The sliding rails and extender brackets provided with each server are designed for mounting in cabinets 22.5 to 32 inches in depth.

- The cabinet height must accommodate the number of units to be mounted. It may also need to hold the MAS modems, UPS, and optional equipment such as the KVM switch.

Power requirements

Table B-3 lists the power requirements for the S3400-family servers. The AC power supply source must be a single phase 3-conductor (line, neutral, and ground), with a 15 A circuit breaker for 100-127 Vac installations or a 10 A circuit breaker for 200-240 Vac installations.

Table B-3.   Server power requirements

Server	# of power supply units	Volts AC	Hertz	Amperes 120V/240V
Avaya MAS	1	100-240 +/- 10%	50/60 +/- 3 Hz	10/5
Avaya MSS—S	1	100-240 +/- 10%	50/60 +/- 3 Hz	10/5
Avaya MSS—H	2	100-240 +/- 10%	50/60 +/- 3 Hz	6/3 for each supply

Consider the server connection to a branch circuit with regard to overload or overcurrent protection. Verify the system ratings to ensure that, together with other equipment connected to the same branch circuit, an overcurrent or overload condition does not exist.

Note: For more information on the site requirements, see *Modular Messaging Release 2 Installation*, 11-300122 available on the CD-ROM *Avaya Modular Messaging Release 2 Documentation*, 11-300121.

Modular Messaging and the Microsoft Windows domain infrastructure

Different versions of Modular Messaging relate differently to the Microsoft Windows domain infrastructure at the customer site.

The relationship that a Modular Messaging system shares with the Windows domain affects subscriber and administrator authentication, and the relationship of MAS units to the Windows domain.

Modular Messaging and the Windows domain

Modular Messaging—MSS system.

When installing a Modular Messaging—MSS system, technicians create a Windows domain that does not require any interaction with a Windows domain that the customer network may already have. In fact, the Modular Messaging—MSS system does not require that the customer even have an existing Windows network. Messaging application server (MAS) units are added to the Windows domain that has been created for Modular Messaging. MAS administrators use logins that are configured in this Windows domain. The Modular Messaging Windows domain can be configured to 'trust' one or more customer Windows domains, allowing MAS administrators to use their normal Windows desktop login when administering the MAS.

Modular Messaging—Exchange and Modular Messaging—Domino.

Modular Messaging—Exchange and Modular Messaging—Domino systems join an existing customer Windows domain. MAS units function as members of the Windows domain set up by the customer.

Subscriber and administrator authentication

Modular Messaging—MSS system.

Subscribers using Graphical User Interface (GUI) clients or Subscriber Options have to provide their mailbox numbers and passwords for authentication. This authentication is not related to any Windows login mechanisms. User credentials of MAS administrators are authenticated against the Windows login in the domain created during the Modular Messaging installation.

Modular Messaging—Exchange and Modular Messaging—Domino.

Modular Messaging—Exchange and Modular Messaging—Domino systems: Subscribers and administrators authenticate against the existing

Windows domain; such authentication is based on the security standards established by the customer for the existing Windows domain.

Considerations when implementing Modular Messaging—MSS

Avaya MSS

Modular Messaging—Avaya Message Storage Server (MSS) uses a dedicated server and private network to isolate critical components from reliance on the customer's IT and e-mail infrastructure. Basic voicemail features including Call Answer and telephone retrieval of messages operate completely independently of this infrastructure. However, certain features rely on and interoperate with aspects of the customer's infrastructure.

IT and e-mail infrastructure considerations when implementing Modular Messaging—MSS are:

■ The MSS and messaging application server (MAS) hosts need to be added to the customer's DNS servers for any desktop client usage (including Client Add-in for Microsoft Outlook and Subscriber Options), as well as for sending networked messages and directory updates between multiple (separate) Modular Messaging systems or between Modular Messaging and Message Networking systems in the customer network. Networking between Modular Messaging or Modular Messaging and Message Networking systems can also be done by adding these systems to each other's /etc/hosts files without relying on DNS.

■ The Modular Messaging—MSS system delivers all messages sent outside of its Voice Mail Domain, that is, networked messages and Notify Me messages, with the standard SMTP/MIME e-mail protocols using the customer's IT and e-mail infrastructure. Depending on the MSS configuration options, these messages are sent either using DNS MX (mail exchanger) lookups of the recipient's host.domain or using an administered e-mail gateway which then relays the message to its recipient. Although a configuration where networked messages are sent directly to the destination Modular Messaging (or Message Networking) machine and all Notify Me messages are sent to a gateway is not explicitly supported, this behavior can be achieved using DNS MX routing. To do this, the customer must provide a DNS server that responds to MX queries for all hosts with the host name of the gateway and either administer networked machines via /etc/hosts or have the DNS server return the actual IP address for networked Modular Messaging hosts.

■ Messages sent outside a voice mail domain using SMTP/MIME carry an e-mail "from:" address identifying the sender's Modular Messaging mailbox, typically in the form first.last@mmsystem.domain.company.com. If these messages are sent through an e-mail gateway in the customer's network that modifies outbound "from:" addresses, for example replacing the

host.domain portion with a fixed string like "company.com", then replies to these messages will be redirected to an incorrect address. Many companies use "first.last@company.com" as the e-mail address for a user's Exchange or IBM Lotus Notes mailbox. These addresses have the same "first.last@" part, so if the host.domain portion of a message sent from a user's Modular Message mailbox is replaced any replies will end up in the user's regular e-mail mailbox. Customers need to make sure messages sent between Modular Messaging systems are not sent through such e-mail gateways, or that the gateway's processing rules allow messages sent between Modular Messaging systems to retain their original (unmodified) "from:" address.

- The Notify Me feature allows notification messages to be sent to any e-mail address, including addresses outside of the customer's network. Such messages must generally be sent via an outbound e-mail gateway in the customer's network, and consideration should be given to what the "from:" address indicates in this case. The "from:" address when sent by the Modular Messaging system identifies the subscriber's Modular Messaging mailbox. Many companies' outbound e-mail gateways are configured to replace the host.domain portion of "from:" addresses with a fixed string like "company.com". This runs into the same issue of confusing users' Modular Messaging and regular e-mail addresses as described above, although if the Modular Messaging and e-mail addresses are coordinated this may be precisely what is desired. Another option is to change the gateway processing rules to modify "from:" addresses for messages sent from Modular Messaging systems into a non-replyable form, such as "do_not_reply@company.com". With this approach, users would not receive indication of problems with their notification messages. Yet another option is to change the gateway to modify "from:" addresses for messages sent from Modular Messaging systems into an administrative mailbox, for example "postmaster@company.com". With this approach, failures related to notification messages would be delivered to the company's e-mail postmaster.

- When deploying a Modular Messaging—MSS system, the customer needs to choose whether the e-mail address for subscribers' mailboxes (used for networking and when sending messages using desktop clients) specifies the actual host.domain of the MSS or is an "e-mail host alias". The default is to use the actual host.domain name of the MSS. If an e-mail host alias is used, this name must be added to the customer's DNS servers or remote systems' /etc/hosts files for messages to be able to be delivered between systems or from users' desktop clients. Multiple Modular Messaging systems within a single customer's network cannot share identical e-mail host aliases.

■ Customers must choose whether to allow incoming internet e-mail to be delivered to users' Modular Messaging mailboxes. This includes "bounce" messages generated by Notify Me messages sent to incorrectly specified notification addresses and possibly replies to such messages. If choosing to allow such messages to be delivered, the customer's external e-mail infrastructure needs to be able to associate an incoming address to the user's Modular Messaging mailbox. One way to do this is to use an "e-mail host alias" such as "mm.company.com" and register this domain with the customer's external DNS servers. Another is to use Modular Messaging e-mail addresses with "left hand sides" (the portion before the "@") distinct from those used for regular e-mail addresses. For example, a user's e-mail address might be "first.last@company.com" while their Modular Messaging mailbox might be "first.last.mm@company.com". If allowing Internet e-mail into users' Modular Messaging mailboxes Avaya strongly suggests all such e-mail be filtered for spam and viruses before being delivered to the Modular Messaging system.

Considerations when implementing Modular Messaging with e-mail servers

Microsoft Exchange

IBM Lotus Domino

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino systems fit within the existing IT infrastructure at the customer site. Hence, these systems are more sensitive to the customer environment than a Modular Messaging—MSS system, where a dedicated server and private network are used to isolate critical operations.

Some additional considerations when implementing Modular Messaging with e-mail servers are:

- To confirm that the Microsoft Exchange and IBM Lotus Domino e-mail systems have been deployed and are being operated in accordance with Microsoft and IBM specifications, respectively.

- To assess the impact the Modular Messaging solution will have on the existing e-mail environment. The messaging requirements of a unified message store increase the utilization of the e-mail server, mailboxes, and system administration. Thus, the CPU utilization and memory requirements of the e-mail servers need to be able to support the additional processing requirements for the voice mail application.

    Note: Customers must keep their systems within performance operating ranges prescribed by Microsoft and IBM Lotus. In order to support the extra load for voice messaging, Avaya requires that the CPU utilization be no more than 50%.

- To evaluate the customer's LAN environment to ensure that it can support the application. In Modular Messaging with e-mail servers, all of the communications for the application run on the customer's network. Thus, the occupancy of the customer's IP network needs to be assessed to determine if it can support the additional load, and to provide the responsiveness for the real-time aspects of the solution.

    Note: The customer's estimated busy hour LAN occupancy, including the incremental traffic due to voice messaging must be less than 25%.

- To ensure that certain factors are in harmony and meet the specifications for the solution in order to perform reliably. These factors include the release level of e-mail, how it is configured, operating systems, what is being used for directory authentication, and other hardware, software, and operating

system elements that will be involved in the overall architecture and its topology.

The assessment of the customer environment may determine that it meets the operational specifications for a Modular Messaging system with e-mail servers. However, customers must maintain the reliability of their environment, and to ensure that the e-mail environment and data network are not in a constant state of flux.

Minimum hardware requirements and supported software (MSS version)

Avaya MSS

This section provides information on the minimum hardware requirements and supported software for Modular Messaging—MSS.

MAS specifications with Modular Messaging—MSS

A Modular Messaging—MSS system uses Avaya-provided messaging application server (MAS) units for which, Avaya provides the Modular Messaging software and the S3400 hardware.

Hardware specifications

Table B-4 provides information on the hardware specifications of an Avaya-provided MAS.

Table B-4.   S3400 MAS hardware specifications

Clock speed	RAM
2.00 GHz processor Intel Pentium IV	512 MB

Table B-5 lists the supported voice cards.

Table B-5.   Supported voice cards for an S3400 MAS with Modular Messaging—MSS

Protocol	Voice cards	Maximum cards per MAS		Maximum ports[1] per MAS	
—	—	Aria TUI	AUDIX TUI	Aria TUI	AUDIX TUI
H.323-based IP integration	—	—	—	20	20
T1 QSIG	Dialogic D/480JCT-2T1	3	1	69	23
E1 QSIG	Dialogic D/600JCT-2E1-120	2	1	60	30
Digital Set Emulation	Dialogic D/82JCT-U (5v card) Dialogic D82JCTPCIUNIV (3.3v and 5v universal card)	4	3	32	24
Analog	12-port Dialogic D/120JCT	4	2	48	24
	4-port Dialogic D/41JCT-LS	4	4	16	16

1.   The number of ports that an MAS can support is restricted by the number of PCI slots available and the number of cards supported.

Note: For upgrades from Modular Messaging Release 1.0 the only Dialogic voice card supported is Dialogic D/82JCT/U.

The following are also required:

- A DVD-ROM drive to install the software.

- LAN connectivity of speed 100 Mbps

- 80 GB of free disk space

- Dialogic drivers: SR5.1.1 FP1 Service Update 15

Software specifications

Table B-6 provides the software specifications of an S3400 MAS.

Table B-6. Software specifications of an S3400 MAS

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with service pack (SP) 4[1]
Internet browser	Microsoft Internet Explorer 5 or later

---

1. Internet Information Services (IIS) 5.0 is required and is included with Microsoft Windows 2000 Server.

Note:

- Avaya-provided S3400 hardware is installed from an image, which installs Microsoft Windows 2000 Server and the latest service packs and hotfixes.

- Customer-provided virus protection is recommended for all Microsoft Windows servers.

Client Add-in for Microsoft Outlook requirements

Avaya MSS

This section provides information on the system requirements for installing the Client Add-in for Microsoft Outlook with Modular Messaging—MSS.

The minimum hardware requirements are:

- Processor speed: As per standard Microsoft recommendations

- 256 MB of RAM

■ 50 MB of free disk space (minimum)

The supported software are:

■ Microsoft Windows 2000 Professional with service pack (SP) 4 with either of the following Microsoft Outlook e-mail clients:

— Microsoft Outlook 2000 with SR1

— Microsoft Outlook 2002 with SP2

■ Microsoft Windows XP with SP1 with either of the following Microsoft Outlook e-mail clients:

— Microsoft Outlook 2000 with SR1

— Microsoft Outlook 2002 with SP2

— Microsoft Outlook 2003

■ Microsoft Internet Explorer 5 or later

Note: Microsoft Outlook must already be installed for the Voice Form component of Client Add-in for Microsoft Outlook to be installed.

Subscriber Options requirements

Avaya MSS

With Modular Messaging—MSS, if the subscriber PC has Microsoft Outlook, the Subscriber Options application is installed as part of the Client Add-in for Microsoft Outlook installation.

For information on the Client Add-in for Microsoft Outlook requirements, see Client Add-in for Microsoft Outlook requirements on page B-13.

Modular Messaging subscribers that do not use Microsoft Outlook as an e-mail client can install Subscriber Options as a standalone component.

Table B-7 lists the supported software for installing Subscriber Options

Table B-7.   Supported software for Subscriber Options

Required software	Supported versions
Microsoft Windows version	Microsoft Windows Millennium Edition Microsoft Windows 2000 Professional with SP4 Microsoft Windows XP Professional

Modular Messaging Web Client requirements

Avaya MSS

Avaya support policy for Modular Messaging Web Client: Avaya Modular Messaging Web Client is standards-based, which includes IMAP4 access to messages stored on the Avaya Message Storage Server (MSS). Modular Messaging Web Client can also be used to access messages stored on an IMAP4 compatible e-mail system. Avaya has conducted successful interoperability testing with Microsoft Exchange. Customers may integrate other IMAP4 e-mail systems with Modular Messaging Web client. Avaya however, makes no representations, warranties, or guarantees regarding specific capabilities with specific IMAP4 e-mail systems or successful integration or interoperability thereof. Avaya's product support is limited to IMAP4 as it is implement on Avaya Modular Messaging and Avaya Modular Messaging Web Client and does not include support for specific e-mail systems.

Web Client requirements

Microsoft recommendations for the operating system and the Microsoft Outlook e-mail client apply.

Table B-8 lists the supported software for installing Modular Messaging Web Client

Table B-8. Supported software for Modular Messaging Web Client

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Professional with SP4 Microsoft Windows XP Professional with SP1
Internet browser	Internet Explorer 5.5 or 6.0 Netscape 7.0 or 7.1

Web Server requirements for Modular Messaging Web Client

Table B-9 lists the minimum recommended hardware requirements for installing the Web Server.

Table B-9. Minimum hardware requirements for the Web Server

Clock speed	RAM
2.00 GHz processor Intel Pentium IV	1 GB

The following are also required:

- A DVD-ROM drive to install the software

- LAN connectivity

- 40 GB of free disk space

Table B-10 lists the supported software for installing the Web Server.

Table B-10. Supported software for the Web Server

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4[1]
Internet browser	Internet Explorer 6.0 with SP1

1. Internet Information Services (IIS) 5.0 is required and is included with Microsoft Windows 2000 Server.

Note:

- If remote access is required, PC Anywhere must be installed.

- Customer-provided virus protection is recommended for all Microsoft Windows servers.

Tracing Server requirements

Avaya MSS

In a voice mail domain that has more than one messaging application server (MAS), Avaya recommends installing the Tracing Server software component on the MAS with the smallest number of ports, or on the MAS that handles the least number of calls.

In systems of large configurations, the Tracing Server may need to be installed on a separate system, other than an MAS. For more information, see Table B-13 on page B-18.

Table B-11 lists the minimum recommended hardware requirements for installing the Tracing Server software component on a messaging application server (MAS).

Table B-11. Minimum hardware requirements for the Tracing Server on an MAS

Clock speed	RAM
2 GHz processor Intel Pentium IV	512 MB

The following are also required:

- A DVD-ROM drive to install the software.

- 80 GB of free disk space

- LAN connectivity

Table B-12 lists the supported software for installing the Tracing Server on an MAS.

Table B-12. Supported software for the Tracing Server

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4
Internet browser	Microsoft Internet Explorer 5 or later

Note: Customer-provided virus protection is recommended for all Microsoft Windows servers.

Tracing Server or Offline Call Answer store requirements

Avaya MSS

For systems of large configurations, Avaya recommends that the Tracing Server be installed on a separate system. The separate system for hosting the Tracing Server can be either an Avaya-provided S3400 system that customers must purchase or a customer-provided machine that meets the specifications described in Table B-22.

If the Tracing Server is installed on a separate system, Avaya recommends that the Offline Call Answer store and Modular Messaging Administration Clients also be located on that same system.

The additional system that is used to host the Tracing Server, or the Offline Call Answer store, or both, must not have any port cards or the messaging application service (MAS) service installed on it.

Table B-13 lists the minimum recommended hardware requirements for installing either the Tracing Server, or the Offline Call Answer store, or both, on a separate machine.

Table B-13.   Minimum hardware requirements for the Tracing Server and Offline Call Answer store

Clock speed	RAM
2 GHz processor Intel Pentium IV	512 MB

The following are also required:

- A DVD-ROM drive.

- 80 GB of free disk space. The available disk space requirements may vary depending on the expected size of the Tracing Server database.

- LAN connectivity

Table B-14 lists the supported software for installing the Tracing Server.

Table B-14.   Supported software for the Tracing Server

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4
Internet browser	Microsoft Internet Explorer 5 or later

Note:

- Available disk space requirements will vary depending on the expected size of the Tracing Server databases and the Offline Access Remote store.

- The Tracing Server and Offline Call Answer store must be running on the same operating system as the MAS units in the VMD.

- The Tracing Server and Offline Call Answer store must be in the same Windows domain as all MAS units.

- The Tracing Server and Offline Call Answer store must be on the private LAN that connects the MAS units and the MSS.

- Customer-provided virus protection is recommended for all Microsoft Windows servers.

Mailbox Manager Minimum Requirements for Single User Implementation

Avaya MSS

This section provides information on the minimum requirements for a single user implementation of the Mailbox Manager application.

Hardware requirements

The minimum hardware requirements for a single user implementation of the Mailbox Manager application are:

- At least a Pentium 233 MHz, a Pentium II class with 366 MHz or higher is recommended, Intel-based PC

- 64 MB RAM minimum, 128 MB or greater recommended

- Minimum SVGA resolution graphics (800 x 600)

- Monitor with 256 colors and 800 x 600 resolution

- 200 MB of disk space for the Mailbox Manager application

- Additional data storage of 4 MB per 1000 mailboxes

- CD-ROM drive

- External backup capability

- LAN access to the Avaya Message Storage Server. For access to other Avaya messaging systems: one or more modems, RS-232 communication connections, or TCP/IP (telnet) connections to send changes to systems being managed.

Supported software

The software supported for a single user implementation of the Mailbox Manager application are:

- Operating System

    — Microsoft Windows 2000

    — Microsoft Windows 2000 Professional

    — Microsoft Windows XP

    — Microsoft Windows XP Professional

    — Microsoft Windows Millennium Edition (ME)

    — Microsoft Windows 98

    — Microsoft Windows NT Workstation

- Microsoft Internet Explorer 5 or later

Other For client/server implementations supporting multiple administrators, remote, or WAN access to the message store, request specifications from Unimax at (612) 341-0946 or sales@unimax.com.

Administration Client requirements

Avaya MSS Administration Clients includes the Voice Mail Configurator, Voice Editor, Port Monitor, Reporting Tool, Operation History Viewer, and Caller Applications Editor.

Table B-15 lists the software requirements for installing Modular Messaging Administration Clients. Minimum hardware requirements are as per the Microsoft recommendations for the operating system.

Table B-15.   Supported software for Modular Messaging Administration Clients

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4 or Microsoft Windows XP Professional
Internet browser	Microsoft Internet Explorer 5 or later

Note: If customers purchase an additional S3400 system for the Tracing Server and Offline Call Answer store, Avaya recommends that Modular Messaging Administration Clients be run from this system, due to their intensive resource requirements. For more information, see Table B-13 on page B-18.

Browser requirements for the MSS administration interface

Avaya MSS The Web browser requirements for the Web-based administration interface of the MSS are:

■ Netscape 4.7 or later

■ Microsoft Internet Explorer 5 or later

Compatibility with Avaya Integrated Management

- Avaya Site Administration Release 2.0 or later

- Avaya Multi-Site Administration Release 2.1 or later

- Avaya Fault and Performance Manager Release 2.0 or later with use of either Secure Services Gateway (SSG) or Avaya Proxy Agent

Minimum hardware requirements and supported software (Exchange and Domino)

This section provides information on the minimum hardware requirements and supported software for Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino.

Messaging application server requirements

In Avaya Modular Messaging with Microsoft Exchange or IBM Lotus Domino as the message store, the customer can purchase software and S3400 servers from Avaya, or can choose to provide a machine that will serve as the MAS. In such cases, Avaya provides the Modular Messaging software that must be installed on such customer-provided MAS units.

A customer-provided machine must meet certain minimum hardware and software requirements for successful installation of the Modular Messaging software.

Minimum hardware requirements

Table B-16 lists the minimum recommended hardware requirements for installing the MAS software.

Table B-16.   Minimum system requirements for the MAS

Ports	Clock speed	RAM
Up to 12 ports	400 MHz single or dual processor Intel Pentium II	128 MB
13 to 24 ports	400 MHz single or dual processor Intel Pentium III	256 MB
25 to 48 ports	500 MHz single or dual processor Intel Pentium III	512 MB
49 to 69 ports	800 MHz dual processor Intel Pentium III	512 MB

Table B-17 lists the recommended voice cards.

Table B-17.   Recommended voice cards for customer-provided MAS units

Protocol	Voice cards	Max. cards per MAS	Max. ports[1] per MAS
H.323-based IP integration	—	—	20
T1 QSIG	Dialogic D/240JCT-T1	3	69

Table B-17.   Recommended voice cards for customer-provided MAS units

Protocol	Voice cards	Max. cards per MAS	Max. ports[1] per MAS
E1 QSIG	Dialogic D/300JCT-E1-120	2	60
Digital Set Emulation	Dialogic D/82JCT-U (5v card) Dialogic D82JCTPCIUNIV (3.3v and 5v universal card)	4	32
Analog	12-port Dialogic D/120JCT	4	48
	4-port Dialogic D/41JCT-LS	4	16

---

1. The number of ports that an MAS can support is restricted by the number of PCI slots available and the number of cards supported.

The following are also required:

- A DVD-ROM drive to install the software.

- LAN connectivity of speed 100 Mbps

    Note: With Modular Messaging—Exchange and Modular Messaging—Domino, an MAS must be located on the same LAN as the e-mail server.

- 30 GB of free disk space

- Dialogic drivers: V5.1.1 FP1

Modular Messaging supports only Dialogic analog cards for new installations. However, Modular Messaging also provides support to Brooktrout analog cards for customers that are upgrading from existing Unified Messenger systems using Brooktrout analog cards.

Table B-18 lists the supported Brooktrout analog voice cards.

Table B-18.   Supported Brooktrout analog voice cards

Protocol	Ports[1]	Voice cards
Analog	—	*4-port Brooktrout cards*

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Table B-18. Supported Brooktrout analog voice cards

Protocol	Ports[1]	Voice cards
	4	Brooktrout VPS4 (US and Canada only)
	4	Brooktrout VPS4i (International)
	—	*8-port Brooktrout cards*
	8	Brooktrout PCI (US and Canada only)
	8	Brooktrout PCI International (EMEA region)
	8	Brooktrout PCI APAC (APAC region only)
	24	24-port Brooktrout VRS24/ATSI combo (US and Canada only)

1. The number of ports that an MAS can support is restricted by the number of PCI slots available and the number of cards supported.

Note:

- Also required are Brooktrout drivers: V2.38

- New installations of Modular Messaging do not support Brooktrout cards. Brooktrout cards are no longer available for sale.

Messaging application server software requirements

Table B-19 lists the software requirements for installing the MAS.

Table B-19. Software requirements for MAS

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with service pack (SP) 4 Microsoft Windows 2000 Advanced Server with SP4
Internet browser	Microsoft Internet Explorer 5 or later

Note: Customer-provided virus protection is recommended for all Microsoft Windows servers.

Microsoft Exchange

For Modular Messaging—Microsoft Exchange versions, the following software must also be installed on the MAS:

- For Microsoft Exchange 2003

  Exchange 2003 System Management Tools

- For Microsoft Exchange 2000

  Exchange 2000 with SP3 System Management Tools

- For Microsoft Exchange 5.5[1]

  Exchange 5.5 with SP4 Administration Tools

IBM Lotus Domino

For Modular Messaging—IBM Lotus Domino versions, IBM Lotus Notes Client 6.0.1 Critical Fixpack 3 (CF3) must also be installed on the MAS.

This applies to IBM Lotus Domino 6.5, IBM Lotus Domino 6.0, and IBM Lotus Domino 5.0.10 environments.

Tracing Server requirements

Microsoft Exchange

IBM Lotus Domino

Table B-20 lists the minimum recommended hardware requirements for installing the Tracing Server.

Table B-20.   Minimum hardware requirements for the Tracing Server

Clock speed	RAM
400 MHz single or dual processor Intel Pentium II	128 MB

The following are also required:

- A DVD-ROM drive to install the software.

- 1 GB of free disk space. The available disk space requirements may vary depending on the expected size of the Tracing Server database.

- LAN connectivity

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1. New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

Note:

- The Tracing Server must be on the same LAN segment as all MAS units.

- The Tracing Server must be in the same Windows domain as all MAS units.

Table B-21 lists the supported software for installing the Tracing Server.

Table B-21.   Supported software for the Tracing Server

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
Internet browser	Microsoft Internet Explorer 5 or later

Note:

- Customer-provided virus protection is recommended for all Microsoft Windows servers.

- For systems of large configurations, the Tracing Server must be installed on a separate system. For more information, see

Tracing Server or Offline Call Answer store requirements

Microsoft Exchange

IBM Lotus Domino

For systems of large configurations, Avaya recommends that the Tracing Server be installed on a separate system. The separate system for hosting the Tracing Server can be either an Avaya-provided S3400 system that customers must purchase or a customer-provided machine that meets the specifications described in Table B-22.

If the Tracing Server is installed on a separate system, Avaya recommends that the Offline Call Answer store be also located on that same system.

The additional system that is used to host the Tracing Server, or the Offline Call Answer store, or both, must not have any port cards or the messaging application service (MAS) service installed on it.

Table B-22 lists the minimum recommended hardware requirements for installing either the Tracing Server, or the Offline Call Answer store, or both, on a separate machine.

Table B-22.   Minimum hardware requirements for the Tracing Server and Offline Call Answer store

Clock speed	RAM
400 MHz single or dual processor Intel Pentium II	128 MB

The following are also required:

- A DVD-ROM drive to install the software.

- 30 GB of free disk space. The available disk space requirements may vary depending on the expected size of the Tracing Server database.

- LAN connectivity

Table B-23 lists the supported software for installing the Tracing Server.

Table B-23.   Supported software for the Tracing Server

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
Internet browser	Microsoft Internet Explorer 5 or later

Note:

- Available disk space requirements will vary depending on the expected size of the Tracing Server databases and the Offline Access Remote store.

- The Tracing Server and Offline Call Answer store must be running on the same operating system as the MAS units in the VMD.

- The Tracing Server and Offline Call Answer store must be in the same Windows domain as all MAS units.

- The Tracing Server and Offline Call Answer store must be on the same LAN segment as all MAS units.

- Customer-provided virus protection is recommended for all Microsoft Windows servers.

Administration Client requirements

Microsoft Exchange

IBM Lotus Domino

Administration Clients includes administration tools and diagnostic tools.

Table B-24 lists the minimum recommended hardware requirements for installing the following Modular Messaging Administration Clients:

- Voice Mail Configurator

- Voice Editor

- Port Monitor

- Reporting Tool

- Operation History Viewer

Table B-24. Minimum hardware requirements for Modular Messaging Administration Clients

Clock Speed	RAM
200 MHz single or dual processor Intel Pentium	128 MB

The following are also required:

- A DVD-ROM drive to install the software.

- 1 GB of free disk space

- LAN connectivity

- RAM as per Microsoft recommendations for the operating system

Table B-25 lists the supported software for installing the Modular Messaging Administration Tools.

Table B-25. Supported software for Modular Messaging Administration Clients

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4 or Microsoft Windows XP Professional
Internet browser	Microsoft Internet Explorer 5 or later

Caller Applications Editor requirements

Hardware requirements are as per the Microsoft recommendations for the operating system.

Table B-26 lists the supported software for installing the Modular Messaging Caller Applications Editor

Table B-26. Supported software for Modular Messaging Caller Applications Editor

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4 or Microsoft Windows 2000 Professional with SP4 or Microsoft Windows XP Professional
Internet browser	Microsoft Internet Explorer 5 or later

Client Add-in for Microsoft Outlook requirements

This section provides information on the software requirements for installing the Client Add-in for Microsoft Outlook with Modular Messaging—Microsoft Exchange versions.

Minimum hardware requirements are:

- Processor speed: As per standard Microsoft recommendations

- 128 MB of RAM

- 50 MB of free disk space (minimum)

Microsoft Exchange Table B-27 lists the supported software for installing the Client Add-in for Microsoft Outlook with Modular Messaging—Microsoft Exchange.

Table B-27. Supported software for Client Add-in for Microsoft Outlook with Modular Messaging—Microsoft Exchange

Required software	Supported versions
Microsoft Windows version	Microsoft Windows Millennium Edition Microsoft Windows 2000 Professional with SP4 Microsoft Windows XP Professional

Table B-27. Supported software for Client Add-in for Microsoft Outlook with Modular Messaging—Microsoft Exchange

Required software	Supported versions
Microsoft Exchange Client	Microsoft Outlook 2000 Microsoft Outlook 2002 with SP2 Microsoft Outlook 2003 (on Windows XP Professional)
Internet browser	Microsoft Internet Explorer 5 or later

Note:

- With Microsoft Windows Millennium Edition and Microsoft Windows XP, clients must log on to a Windows domain to which the Modular Messaging system belongs.

- When running the Client Add-in for Microsoft Outlook with Microsoft Outlook 2002, the client must be Microsoft Office 2002 SP2. Alternatively, Microsoft Outlook Hotfix Q317106 must be installed on the client machine.

Subscriber Options requirements

With Modular Messaging—MSS and Modular Messaging—Microsoft Exchange, if the subscriber PC has Microsoft Outlook, the Subscriber Options application is installed as part of the Client Add-in for Microsoft Outlook installation.

For information on the Client Add-in for Microsoft Outlook requirements, see .

For Modular Messaging—IBM Lotus Domino

IBM Lotus Domino

With Modular Messaging—IBM Lotus Domino, the installation of DUC automatically installs Subscriber Options.

Minimum hardware requirements are as per the IBM Lotus recommendations for the operating system.

Table B-28 lists the supported software for installing IBM Lotus Domino Subscriber Options

Table B-28. Supported software for IBM Lotus Domino Subscriber Options

Required software	Supported versions
Microsoft Windows version	Microsoft Windows 2000 Professional with SP4 Microsoft Windows XP Professional

Note: Domino Unified Communications (DUC) 1.2.2 must be installed for Avaya Modular Messaging—IBM Lotus Domino version. DUC is supplied by IBM and is implemented according to IBM specifications. For information about DUC, see *Administrator's Guide, Domino Unified Communications for Avaya*, which is available from IBM Lotus.

For subscribers that do not use the Microsoft Outlook e-mail client

Modular Messaging subscribers that do not use Microsoft Outlook as an e-mail client can install Subscriber Options as a standalone component.

Table B-29 lists the supported software for installing Subscriber Options

Table B-29.   Supported software for Subscriber Options

Required software	Supported versions
Microsoft Windows version	Microsoft Windows Millennium Edition Microsoft Windows 2000 Professional with SP4 Microsoft Windows XP Professional

For Modular Messaging—Microsoft Exchange, minimum hardware requirements are as per the Microsoft recommendations for the operating system.

Subscriber Administration Extension requirements

Microsoft Exchange

For hardware requirements for Microsoft Exchange Subscriber Administration Extension to Exchange System Management Tools, use Microsoft recommendations for the Exchange Administrator program.

The following are also required:

- For Microsoft Exchange 2003, 50 MB of free disk space

- For Microsoft Exchange 2000, 50 MB of free disk space

- For Microsoft Exchange 5.5, 10 MB of free disk space

Note: New installations of Modular Messaging do not support Microsoft Exchange 5.5 server.

Table B-30 lists the supported software for installing the Microsoft Exchange Subscriber Administration Extension to Exchange System Management Tools.

Table B-30. Supported software for Microsoft Exchange Subscriber Administration Extension to Exchange System Management Tools

Required software	Supported versions
Modular Messaging for Microsoft Exchange 2003	
Microsoft Windows version	Microsoft Windows 2003 Standard Server or Microsoft Windows 2003 Enterprise Server
Microsoft Exchange system management tools	Exchange 2003 System Management Tools
Internet browser	Microsoft Internet Explorer 5 or later
Modular Messaging for Microsoft Exchange 2000	
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
Microsoft Exchange system management tools	Exchange 2000 with SP3 System Management Tools
Modular Messaging for Microsoft Exchange 5.5	
Microsoft Windows version	Microsoft Windows NT 4.0 with SP6a - Intel
Microsoft Exchange system management tools	Exchange 5.5 Server with SP4 Administration Tools

Note: Modular Messaging extensions to Microsoft Exchange
Administrator work only when Microsoft Exchange
Administrator is installed on Intel-based machines.

Peer Exchange Server requirements

Microsoft Exchange

For hardware requirements, use Microsoft recommendations for
Microsoft Exchange Server.

Table B-31 lists the supported software for a Microsoft Exchange Peer
Exchange Server.

Note: New installations of Modular Messaging do not support
Microsoft Exchange 5.5 server.

**Table B-31.   Supported software for Microsoft Exchange Peer Exchange
Server**

Required software	Supported versions
Modular Messaging for Microsoft Exchange 2003	
Microsoft Windows version	Microsoft Windows 2003 Standard Server or Microsoft Windows 2003 Enterprise Server
Microsoft Exchange Server	Exchange 2003 Server
Modular Messaging for Microsoft Exchange 2000	
Microsoft Windows version	Microsoft Windows 2000 Server SP4 or Microsoft Windows 2000 Advanced Server SP4
Microsoft Exchange Server	Exchange 2000 Server SP3 Exchange 2000 Enterprise Server SP3
Modular Messaging for Microsoft Exchange 5.5	
Microsoft Windows version	Microsoft Windows NT 4.0 SP6a - Intel
Microsoft Exchange Server	Exchange 5.5 Server SP4

Note: Customers must keep their systems within performance
operating ranges prescribed by Microsoft. In order to support
the extra load for voice messaging, Avaya requires that the
CPU utilization be no more than 50%.

Peer Domino Server requirements

IBM Lotus Domino

For minimum hardware requirements, use IBM Lotus recommendations for Domino Server.

Table B-32 lists the supported software for a IBM Lotus Domino Peer Domino Server.

Table B-32.   Supported software for IBM Lotus Domino Peer Domino Server

Required software	Supported versions
Modular Messaging for Domino 6.5	
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
IBM Lotus Domino Server	IBM Lotus Domino Server 6.5
Modular Messaging for Domino 6.0	
Microsoft Windows version	Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
IBM Lotus Domino Server	IBM Lotus Domino Server 6.0
Modular Messaging for Domino 5.0.10	
Microsoft Windows version	Microsoft Windows NT 4.0 with SP6a - Intel or Microsoft Windows 2000 Server with SP4 or Microsoft Windows 2000 Advanced Server with SP4
IBM Lotus Domino Server	IBM Lotus Domino Server 5.0.10

Note:

- Domino Unified Communications (DUC) 1.2.2 must be installed for Avaya Modular Messaging—IBM Lotus Domino version. DUC is supplied by IBM and is implemented according to IBM specifications. For information about DUC, see *Administrator's Guide, Domino Unified Communications for Avaya*, which is available from IBM Lotus.

- Customers must keep their systems within performance operating ranges prescribed by IBM Lotus. In order to support the extra

load for voice messaging, Avaya requires that the CPU utilization be no more than 50%.

Other considerations

Other hardware and software considerations include:

- Virus protection software

- Domino Unified Communications (DUC) software from IBM is required for Modular Messaging—IBM Lotus Domino systems. DUC is supplied by IBM and is implemented according to IBM specifications.

- Extended Battery Modules and Bypass Distribution Module for backup power management. Avaya requires that customers use a UPS regardless of the Modular Messaging version. Customers can purchase the UPS from Avaya or they can purchase it elsewhere.

- Server administration: monitors, keyboards, KVM switch, modem, rack

- Switch hardware and software to support required provisioning. For the latest switch integration information, see the configuration notes available at http://support.avaya.com.

- Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino interoperate with a customer-provided fax server. For information on the hardware and software support and telephony boards for third-party fax servers, see Modular Messaging—MSS native fax server on page 7-2.

- Client and server hardware and software required to implement the multi-administrator implementation of the Mailbox Manager application.

- Unified Communication Center Speech Access hardware and software requirements. For more information, visit http://support.avaya.com.

- Networking by means of a Message Networking server.

- Successful planning and implementation of a Modular Messaging system requires cross-functional participation from a variety of disciplines from within the customer organization. The following

disciplines may be represented by single or multiple individuals or organizations:

— telephony management

— voice mail management

— e-mail management

— desktop computing

— server management

— help desk

— IP network management

— SMTP gateway

— data network security

— user community

- In preparation for implementation, customers need to have some very specific information available related to their system implementation and data network. The necessary items are identified in System Planning forms for Avaya Modular Messaging , as provided in Appendix A of the installation guides, or available as a downloadable file from http://support.avaya.com.

- Avaya requires remote access to all servers to provide support for the Modular Messaging system. Avaya S3400 servers include a USB modem for this purpose. For configurations with the Avaya Message Storage Server (MSS), note that the Remote Monitoring Board (RMB) for US and Canada includes an on-board modem. For the Avaya MSS in international markets, an external modem needs to be connected to the RMB.

   For more information on remote access to the Modular Messaging system, see *Modular Messaging Release 2 Installation*, 11-300122 .

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Considerations with Message Networking server

Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino systems can interoperate with other messaging systems via a Message Networking server. However, such implementations may not provide full support to certain features on the networked systems. Customers and planners are advised to request for and consult the following Message Networking engineering notes. These engineering notes are available upon request.

■ Message Networking Implementation Notes

Describes important notes about the implementation of Avaya Message Networking and the differences to consider for customers moving from a point-to-point network. Many of these issues impact messaging end users and must be discussed with customers prior to implementation.

■ Message Networking Directory Considerations

Describes important notes on the implementation of Message Networking networked with Avaya Modular Messaging (using either Microsoft Exchange or IBM Lotus Domino as the message store). Addresses subscriber directory implementation required in such a configuration.

Note: The considerations discussed in this Appendix apply only to Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino. For information on the considerations for Modular Messaging—MSS, see Modular Messaging—MSS and the Message Networking Server on page 6-15.
In this Appendix, Modular Messaging refers to Modular Messaging—Microsoft Exchange and Modular Messaging—IBM Lotus Domino, unless stated otherwise.

Private messages (Modular Messaging—Exchange and Modular Messaging—Domino)

Modular Messaging does not currently support marking messages for privacy when sending a networked message or restrict forwarding of a private message received via networking. This is important to note as the recipient can forward private messages sent from the Message Networking solution to another recipient. Priority message markings are supported.

Voice Message is sent as e-mail message to Modular Messaging—Microsoft Exchange subscribers

When a voice message is sent to a Modular Messaging—Microsoft Exchange system, it is treated as an e-mail message with a .wav file binary attachment. (Not applicable to Modular Messaging—IBM Lotus Domino).

Manual directory initialization

Modular Messaging does not support automatic directory updates from a Message Networking server. Hence, the directory entries on a Modular Messaging system for remote subscribers must be populated manually.

Alternatively, Modular Messaging administrators can extract the directory from the Message Networking server and import it into the global directory for Microsoft Exchange and IBM Lotus Domino.

In addition, Modular Messaging subscriber records must also be built on the Message Networking server. Some possible ways to add subscriber records are:

- Bulk adding subscribers by file

    Use of File Transfer Protocol (FTP) to send a file to the Message Networking server. This file contains the numeric Network Addresses and e-mail addresses of Modular Messaging subscribers.

- Self-registration

    Self-registration of each Modular Messaging subscriber on the Message Networking server. To self-register, subscribers send a voice name message to a predefined self-registration mailbox on the Message Networking server.

- Subscriber administration

    Message Networking server administrators manually build the records of each Modular Messaging subscriber on the Message Networking server, using the administration screen interface.

No ongoing automatic directory updates

Modular Messaging does not support automatic directory updates from a Message Networking server. Hence, there is an ongoing need to manually synchronize the databases of Modular Messaging and Message Networking server. Each time there is a change (add, delete, change) in any subscriber information, databases of both the Message Networking server and Modular Messaging require manual updates.

No voice name

For Modular Messaging subscribers, remote subscribers on the Message Networking server have a text-to-speech name, rather than a recorded voice name. When Modular Messaging subscribers address a message to a remote subscriber from the TUI, they hear the text-to-speech name of that remote subscriber.

Double database entries on Modular Messaging

Currently, the Modular Messaging internal database stores two database entries for each subscriber—one entry is based on the subscriber telephone number and the other entry is based on the subscriber e-mail address. For example, for a certain subscriber, the two entries may be 303-555-1234 and subscriber@company.com.

When a Modular Messaging subscriber uses Dial-by-Name to address a message from the TUI, this internal database is referenced. When the subscriber spells the name of the recipient on the telephone keypad, the subscriber is given a choice between the two entries for the recipient. Modular Messaging renders the name of the recipient, using text-to-speech (TTS) conversion. However, because the TTS rendering of both the e-mail address entry and the name are the same, they appear to be duplicates.

With Modular Messaging—IBM Lotus Domino, a potential solution is to establish a secondary directory with the entries based on telephone numbers. When subscribers use the Dial-by-Name from the TUI, Modular Messaging presents this secondary directory to the subscriber. Thus, the subscriber is presented with only one the TTS rendering for the telephone number-based entry. However, this solution requires a third database that administrators must manually maintain and synchronize.

Receiving or sending fax messages via Message Networking server

When Modular Messaging subscribers receive or send fax messages via a Message Networking server, the following are not supported:

- Group 4 fax. The Message Networking server does not support Group 4 fax transcoding.

■ Multistrip fax. A multistrip fax message is a fax with one or more pages, each stored as multiple strips of image data. Depending on its product version, Modular Messaging may generate multistrip fax messages. The Message Networking server does not support multistrip faxes.

Glossary

Active Directory

The directory service for a Microsoft Windows 2000 or Windows 2003 Server. The Active Directory stores information about objects on the network and makes this information available for authorized administrators and users. It provides administrators with an intuitive hierarchical view of the network and a single point of administration for all network objects.

Automated Attendant

The system Automated Attendant that greets callers and instructs them on how to proceed. When automated attendant is enabled, callers are transferred to the extension of a subscriber. When automated attendant is disabled, callers are transferred directly to the subscriber mailbox where they can leave a message. The Automated Attendant is *not* the same as Caller Applications. Modular Messaging Caller Applications can be customized to perform functions similar to automated attendants and nested automated attendant in other systems, such as AUDIX.

Avaya Modular Messaging Voice Form

An application that provides access to voice messages. Through voice forms, subscribers can perform standard voicemail functions, such as listening to, replying to, or forwarding voice messages, or composing new voice messages using their desktop PCs or telephones.

Avaya Modular Messaging Voice Recorder

A tool for recording voicemail and voice-annotated items, such as Microsoft Word documents. It provides a way to send a quick voice message without having to start an e-mail application.

average hold time (AHT)

The sum of the lengths of all telephone calls (in minutes or seconds) during the busiest hour of the day divided by the number of calls.

blind transfer

See [unsupervised transfer](#).

broadcast

A Modular Messaging—MSS feature whereby, a message that is received into an appropriately configured enhanced-list mailbox is sent to all local subscribers and to all list members

busy hour

Used to calculate the number of ports required when sizing a system. It represents the hour of the day when the volume of calls generated by internal subscribers and external callers reaches its peak.

Call Answering

Also known as telephone answering. This is the sequence of events that enable the voicemail system to answer calls on behalf of a subscriber if the line is busy or if the subscriber does not answer.

call management

A component of the messaging application server that provides an interface between the voice cards and Avaya Modular Messaging telephony applications.

Call Me

A feature that allows subscribers to be called at a designated telephone number, or from a telephone list, each time they receive a message that meets specified criteria. The subscriber is then invited to log onto Avaya Modular Messaging to review the message. Call Me also provides support to pagers. Subscribers can set up Call Me rules in Subscriber Options.

call screening

A Call Answering option that requires callers to announce themselves before a subscriber answers the call. If a call is screened and the subscriber is not available to answer it, the caller has the choice of leaving a message or being forwarded to a different extension or to the operator.

caller applications

Extensions to the Avaya Modular Messaging telephone user interface used to customize how Avaya Modular Messaging interacts with callers.

Caller Applications Editor

An Avaya Modular Messaging tool that customizes the Microsoft Management Console (MMC) user interface to permit the creation, editing, and deployment of caller applications.

canonical addressing

A method of addressing that specifies the full location, including country code and area code, in the following order:

+CountryCode [(AreaCode)] SubscriberNumber

carried traffic

The total busy hour traffic offered to the group of ports, minus the blocked calls.

Centum Call Second

A unit of measurement for call time. The formula for a Centum Call Second is the number of calls per hour multiplied by their average duration in seconds, all multiplied by 100. A Centum Call Second is $1/36^{th}$ of an Erlang.

Class-of-Service (COS)

A category used to determine subscriber access to system options and features. The administrator assigns a class-of-service to each subscriber.

cluster

A group of two or more Domino servers that are set up to provide users with constant access to data, balance the workload among servers, improve server performance, and maintain performance when the size of an organization increases.

codec

A system of compressing uncompressed digital data so that the data uses less memory.

Community

A community is a group of subscribers to whom administrators can assign some type of calling restrictions. The administration of communities enables administrators to further define the allowed call destinations of subscribers The Modular Messaging system provides up to 15 communities.

Dial-by-Name

A method of addressing that enables a subscriber to spell the name of a recipient on the telephone keypad when using the telephone user interface. It is also a method of using directory assistance from an Automated Attendant to call an extension.

DID

See Direct Inward Dialing (DID).

Direct Inward Dialing (DID)

Using DID, a caller can dial inside an organization to reach a telephone extension directly without going through a receptionist.

Domino Administrator

Client software that administrators use to perform administration tasks, such as setting up and managing users and servers.

Domino domain

A collection of Domino servers and users that share a common Domino Directory. User domains are determined by the location of their server-based mail files. For a Domino server to communicate with a server in a different domain, create a Domain document in the Domino Directory to define the name, location, and access to the other domain.

Dual-connect

Dual-connect mode is where a Client Add-in for Microsoft Outlook subscriber uses the PC for command and control, and uses the telephone for listening to and recording a message.

Dual Tone Multifrequency (DTMF)

A combination of two tones that uniquely identify each button on a telephone keypad.

E1

A digital transmission link with a capacity of 2.048mbps. This is the standard for primary rate connections outside North America.

ELA

See Enhanced-list application.

Enhanced-list application

A feature that associates one mailbox to a list of members, so that when subscribers want to send a message to the whole list, they can send a message to the list mailbox instead. Enhanced-list applications are only supported by Modular Messaging—MSS systems.

Erlang

A unit of measurement for call time. One Erlang is equivalent to 60 call minutes or 36 Centum Call Seconds. See also Centum Call Second.

event

A significant occurrence in a voicemail system that is of interest to an administrator for diagnostic or reporting purposes.

fax routing address

An e-mail address consisting of a string of digits that uniquely identify the subscriber to the fax server.

Find Me

A feature that enables a subscriber mailbox to re-direct unanswered calls to a list of telephone numbers. Calls are directed to each telephone number in the list, unless the subscriber answers. Subscribers can set up rules for using Find Me in Subscriber Options. Find Me is not supported for analog integrations.

G.711

An audio encoding format with a coding rate of approximately 64 kbps or approximately 8 KBps.

Global System for Mobile Communications

An audio encoding format with a coding rate of approximately 13 kbps or approximately 1.6 KBps.

Grade of service (GOS)

The probability, expressed as a percentage of callers who call during the busy hour, that an incoming call is delayed (the caller hears multiple rings) because all ports are in use. When calls are queued on the switch, the call is eventually answered if the caller does not hang up. P.05 means that the caller has a five percent chance of hearing a busy signal.

GSM

See Global System for Mobile Communications.

H.323-based IP integration

With H.323-based IP integration with the Avaya Communication Manager (Avaya CM), signaling information, Message Waiting Indicator (MWI) information, and voice data are transmitted over the IP network.

hunt group

A group of telephone lines where the incoming calls are distributed according to a priority scheme.

IMAP4

See Internet Messaging Access Protocol 4.

inband signaling

A method of connecting the messaging application server to the switch as if it were a series of single-line telephones or a series of trunks in a hunt group. The term "inband" is used because all of

the call-identification information is passed from the switch to the messaging application server using DTMF signals on the same line as the voice connection.

Intercom paging

A method of automatically paging subscribers if they do not answer their telephones. Once subscribers are paged, they must return to their extensions to pick up the call. If subscribers do not respond to the page, the system transfers the callers to their mailbox. Modular Messaging supports station-level paging. For Modular Messaging to be able to support trunk-level paging, customers are required to provide additional hardware between Modular Messaging, the switch, and the paging system.

Internet Messaging Access Protocol 4

A method of accessing electronic mail or bulletin board messages that are kept on an e-mail server. Client e-mail applications can use Internet Messaging Access Protocol 4 (IMAP4) to access remote message stores as if they were local.

IP telephony

The use of networks running Internet Protocol (IP) to send and receive messages, such as voice data.

LDAP

Lightweight Directory Access Protocol (LDAP) is an Internet protocol to retrieve and manage directory information.

local mailbox number

A method of addressing messages to recipients within the voice mail domain.

MAS

See messaging application server (MAS).

Message Storage Server (MSS)

An Avaya-produced message store that is an internal part of the Modular Messaging—MSS system. The MSS software resides on the Avaya S3400 platform with a Linux operating system.

messaging application server (MAS)

The voice server that provides an interface between the message store (and directory) and the telephone system.

Message Waiting Indicator (MWI)

A method of alerting subscribers when messages meeting specified criteria arrive in their mailbox. Subscribers are alerted by either a lamp indicator on their telephone, or an audible tone (stutter dialtone) when they pick up the receiver. The indicator is cleared when the message is opened in the e-mail client, or saved or deleted using the TUI. Subscribers can set up rules for using MWI in Subscriber Options. For example, they may choose to be notified only when they receive urgent voice messages.

MIME

See Multipurpose Internet Mail Extensions.

Microsoft Exchange site

A group of Microsoft Exchange servers, where one or more servers on a high-bandwidth, permanent LAN work together to provide messaging and other services to a set of users. Within an Exchange site, users can share information and can be managed as a collection. A Microsoft

Exchange site can be mapped to the Windows domain topology that has already been established. It can also span multiple trusted Windows domains that already exist.

multimedia PC

A PC with multimedia capabilities. A PC has multimedia capabilities if it has a sound card, microphone, and speakers or headphones.

Multipurpose Internet Mail Extensions

Multipurpose Internet Mail Extensions (MIME) is a specification for formatting non-ASCII messages so that they can be sent over the Internet. Many e-mail clients now support MIME, which enables them to send and receive graphics, audio, and video files via the Internet mail system. In addition, MIME supports messages in character sets other than ASCII.

MWI

See Message Waiting Indicator (MWI).

name prompt

A personalized prompt that states the name of a subscriber when the extension of that subscriber is busy or unanswered and he or she has not recorded a personal greeting.

Notify Me

With Notify Me, subscribers can use a pager, SMS-enabled digital telephone, or other device to notify them of calls to their Avaya Modular Messaging inbox.

Notes client

Client software that provides access to Notes databases on a Domino server, and allows them to send mail and browse the Web.

Numeric Address

A string of digits that uniquely identifies a recipient across the organization. A Numeric Address is used by the telephone user interface as a means of addressing a message.

offered traffic

The total traffic offered to a group of ports during the busy hour, including calls that are blocked.

Offline Call Answer store

A repository that every MAS in a multi-MAS voice mail domain migrates offline Call Answer messages to.

operation history database

A temporary storage area for events generated by Avaya Modular Messaging. The Operation History Viewer is used for viewing events in this database.

Operation History Viewer

A diagnostic tool that displays events generated by Avaya Modular Messaging activity and logged in the Avaya Modular Messaging operation history database. By creating a "session" administrators can restrict the number of events to only those that meet their criteria. They can view live events as they are added to the operation history database or view historical events.

operator

The person to whom callers are transferred when they request to speak with an operator, exceed the maximum number of errors permitted on the system, or call from a rotary telephone. Individual

mailboxes may have an operator that is different from the designated system operator, for example, a personal assistant.

optional greeting
A personalized message for greeting callers if the extension of a subscriber is busy or unanswered, or if incoming calls are blocked.

PDL
See Personal Distribution List.

POP3
See Post Office Protocol 3 (POP3).

password
A number required by subscribers to gain access to Avaya Modular Messaging through different interfaces, such as the telephone user interface, desktop PC interfaces, and the UCC speech client. Subscribers can change their passwords using the telephone user interface or Subscriber Options.

PBX
See Private Branch Exchange (PBX).

PBX integration
A method that establishes communication between the switch and the voicemail system. The switch supplies information, such as the identity of the caller who is calling on internal calls, and the extension that the caller is trying to reach. Also known as switch integration.

PC client applications
A group of applications that enable subscribers and administrators to access Avaya Modular Messaging from their desktop PCs. PC client applications include Avaya Modular Messaging Voice Form, Avaya Modular Messaging Voice Recorder, and Subscriber Options.

PC user interface
An interface through which subscribers can access the Avaya Modular Messaging system from their PC.

PCI
See Peripheral Component Interconnect (PCI).

PEL
See Privacy Enforcement Level (PEL).

Peripheral Component Interconnect (PCI)
A standard for connecting peripherals to a personal computer. PCI is supported by most major computer manufacturers.

Personal Distribution List
A labelled collection of addresses that subscribers create and save for use later. Messages that subscribers address to the list are sent to all the multiple addresses (list members) within the list. Subscribers can manage and address messages to only those Personal Distribution Lists (PDLs) that they create and own.

personal greeting
A personalized prompt that greets callers when they are transferred to a subscriber mailbox when the extension is busy or not answered.

pilot number
> A single number that presents a call to one of the available ports within a hunt group.

Please Hold prompt
> A personalized prompt that informs callers that they are on hold while being transferred to an extension.

Port Monitor
> A diagnostic tool that provides a graphical user interface for checking and changing the status of ports on a particular messaging application server.

Post Office Protocol 3 (POP3)
> POP3 is an Internet access protocol that is used to retrieve e-mails from an e-mail server. Clients using POP3 typically connect briefly to the server, to download any new messages and store them on the subscriber PC.

Privacy Enforcement Level (PEL)
> PEL is a system-wide privacy parameter that determines the level of privacy the system enforces. The PEL setting determines which clients or interfaces have access to Modular Messaging mailboxes, and the level of restriction imposed on recipients of private messages.

Private Branch Exchange (PBX)
> A telephone exchange local to a particular organization that uses, rather than provides, telephone services. Also known as a switch.

prompt
> A spoken greeting or instruction that directs callers whose calls have come through the automated attendant.

Public Switched Telephone Network (PSTN)
> A common carrier network that provides circuit switching between public users.

QSIG
> A protocol for ISDN-based inter-switch signaling based on the European Q.931, Q.9212, and DPNSS protocols.

replication
> The process of exchanging modifications between replicas. Through replication, Domino makes all of the replicas essentially identical over time.

Reporting Tool
> A tool for generating reports for monitoring voicemail system usage, planning capacity, and tracking security. Once a report is generated, it can be viewed on screen or printed for easy reference. It can also be exported to many popular file formats or attached to a message sent via a MAPI-enabled e-mail system.

Restrict Client Access COS
> A Class of Service (COS) privacy parameter that enables or restricts client access to Modular Messaging mailboxes.

Sending Restrictions
> A Modular Messaging—MSS feature that prevents the delivery of messages from certain originators to specific groups of mailboxes residing within the Modular Messaging system.

Set Emulation

A digital protocol that is used to connect digital telephones to switches in order to emulate digital telephone sets. Also known as Digital Set Emulation (DSE).

Simple Mail Transfer Protocol

Simple Mail Transfer Protocol (SMTP) is a TCP/IP protocol used for sending and receiving e-mail. Most e-mail systems that send mail over the Internet use SMTP to send messages from one server to another, and to send messages from an e-mail client to an e-mail server.

Simplified Message Desk Interface (SMDI)

A protocol that is used for sending switch integration data. This protocol does not require a caller to re-enter the telephone number if the extension is busy or not answered.

Single-connect mode

Single-connect mode is where a Client Add-in for Microsoft Outlook subscriber plays or records messages by means of a multimedia PC.

SMTP

See Simple Mail Transfer Protocol.

subscriber

A user whose profile is enabled for voice messaging. A subscriber can use both the telephone user interface and the graphical user interface of Avaya Modular Messaging.

Subscriber Options

An application that allows subscribers to configure their mailboxes using their PCs. Subscribers can record all personal greetings and prompts, personalize their call handling options, and select whether to use multimedia or telephone for recording and playing back voice messages.

supervised transfer

A call transfer that occurs when the voicemail system monitors call progress during a transfer. The transfer is completed only if it will be successful.

switch

See Private Branch Exchange (PBX).

Tag Image File Format (TIFF)

A widely-used file format for storing image data. TIFF format is supported by several image processing applications.

Telephone answering

Also known as Call Answering. This is the sequence of events that enable the voicemail system to answer calls on behalf of a subscriber if the line is busy or if the subscriber does not answer.

telephone user interface (TUI)

An interface through which callers and subscribers can access the Avaya Modular Messaging system via the telephone. The telephone user interface is an automated attendant and voice messaging system that controls call handling. It greets incoming callers and instructs them on how to proceed.

text-to-speech (TTS)
The conversion of text into speech (speech synthesis). Using text-to-speech, Avaya Modular Messaging subscribers can listen to the envelope information of messages, text names, and e-mail messages over the telephone.

TIFF
See Tag Image File Format (TIFF).

Tracing Server
A separate Avaya Modular Messaging service that records operational information about activity in the voice mail domain.

transaction database
A storage area where voice-messaging events happening in the voice mail domain are written. It is a permanent database containing summary information that is used by the reporting tool.

TTS
See text-to-speech (TTS).

TUI
See telephone user interface (TUI).

T1
A connection with a digital transmission link of 1.544 mpbs.

unsupervised transfer
A call transfer that occurs when the voicemail system does not monitor the call progress and completes the transfer regardless of the destination of the call. Known also as a "blind transfer."

Visual Voice Editor
An administration tool that allows the recording of customized prompts used by Avaya Modular Messaging. The tool allows recording using multimedia or the telephone user interface. When modifying a prompt, the user is presented with a graphical rendering of the sound, which allows precise editing of the audio data.

voice mail domain
A group of messaging application servers that share a common set of properties, using one or more message stores. All subscribers who are provided with telephone answering by these messaging application servers are said to belong to the same voice mail domain.

Voice Mail System Configuration
An administration tool used to configure the attributes of a voice mail domain or group of messaging application servers.

voice player
A component of the Avaya Modular Messaging Voice Form used for playing back and recording voice messages.

voice port
A telephone end-point provided by installing voice cards on the messaging application server. With H.323-based IP integration, voice ports are equivalent to voice channels over the IP connection.

.WAV
A file extension used for Windows multimedia format audio data.

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