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CHAPTER

Administering Unified Messaging Servers

The new Unified Messaging server role in Exchange Server 2007 extends the functionality of your Exchange messaging infrastructure, allowing it to transmit and store more than just traditional e-mail. As more established communication solutions (voice and fax) find a new life on IP networks, a new means of storing and facilitating access to the information is required. The Unified Messaging (UM) server role provides that capability natively in your Exchange 2007 organization. From a user's perspective, Unified Messaging provides easy access to voice messages, faxes, and e-mail in way that was simply not possible before Unified Messaging. This chapter will help you understand what Unified Messaging is by describing the voice, fax, and e-mail technologies that the Unified Messaging role supports. And, to help you with your implementation of Unified Messaging, this chapter details the process of deploying the Unified Messaging server role and the steps to configure and administer the UM server and UM clients.

Understanding Unified Messaging

Before you plan for and implement Unified Messaging, you will want to become familiar with the technologies you will be working with. Voice and fax technologies are traditionally analog technologies, whereas e-mail has always been a digital technology. Because of the vast difference between the analog world and the digital world, the ability for the average organization to merge the technologies only came about circa 1997. The first environments to adopt technology to send digitally encoded voice communications were the telecom companies. This was done to improve the quality of voice communications across long distances (long-hauls) and to reduce the cost of those connections. Today a number of commercial solutions provide digitally encoded voice communications. These technologies and associated protocols are generally referred to as *Voice over Internet Protocol*, or *VoIP*. VoIP is allowing organizations to unify their communications infrastructures. Microsoft Exchange 2007 Unified Messaging does utilize VoIP. Unified Messaging is only part of an overall Unified Communications strategy. Although Unified Communications refers to the new digital forms of voice, fax, and more, a Unified Messaging solution is the storage and

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retrieval solution for the digitized voice, fax, and e-mail messages. E-mail systems such as Exchange are attractive back-end solutions for centrally storing (unifying) all types of messages that a knowledge worker uses.

A Brief History of Unified Messaging

The introduction of Unified Messaging to Exchange could not have happened at a worse time. In 1999 Microsoft laid out their first strategy for supporting Unified Messaging on the soon-to-be-released Exchange 2000 Server, code-named Platinum. Vendors such as Lucent were lining up to take advantage of Microsoft's improvements to their storage system to handle the additional load of voice and fax data. Studies from analysts such as the Radicati Group showed that companies that used Unified Messaging technologies could regain up to 30 minutes a day in individual user productivity and save 70% in administrative costs by replacing the traditional voicemail and faxing solutions with the existing messaging infrastructure.

So why has it taken so many years for Unified Messaging to really start taking off? Well, in 2000 when Unified Messaging would have flourished, IT departments had to stand back and rethink the adoption of untested technologies due the burst of the dot-com bubble. However, it is not entirely fair to blame this on the economy alone. There are other reasons as well, including the slow adoption of digital-based voice communications (VoIP) solutions due to cost and quality-of-service issues. The slow adoption of Unified Messaging has not hindered the development of communication technologies. And UM has taken on new life in 2007 with the inclusion of support for Unified Communications and Unified Messaging in Microsoft Exchange 2007 and Office Communications Server 2007. For more details on Office Communications Server 2007, see Chapter 13.

Voice Primer for Exchange Administrators

Voice and e-mail technologies not only differ in how they work, they differ in how they are administered. Perhaps the most difficult part of deploying a Unified Messaging solution is bridging the knowledge gap between the voice system administrators and the Exchange administrators. When the voice system administrators in an organization do not understand Exchange and the Exchange administrators do not understand the voice systems, it does not necessarily help to bring the two together on a Unified Messaging project. One side or the other is going to have to give in and learn the other technology so there is common ground. Because this book is written for the Exchange 2007 administrator, the following will serve as a primer for voice communication systems. This primer only covers the information and terminology that is essential to know in order to implement a Unified Messaging server role. You should supplement this information with the documentation provided by your voice system's vendor. Each vendor will likely have proprietary technology that falls outside the scope of this chapter.

Voicemail is the primary voice system that the Exchange Unified Messaging Server role replaces. Call management still requires a Private Branch Exchange (PBX). Voicemail is commonly associated with PBXs, which are premise-based (business) phone systems. Voicemail was a feature created from necessity. Voicemail was conceived and demonstrated in the 1970s, many years before it became commercially viable. The first commercial solutions did not appear until the 1980s, when a product called VMX was successfully adopted by many big name companies. It was limited in its ability to work with only internal voice messages,

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and provisioning new users and making changes were very difficult. A company called Octel really brought voicemail to the masses in the 1990s. Although legacy PBXs have the ability to forward calls to other extensions, they do not have the ability to prompt a caller to leave a voicemail or convert the caller's voice to a digital format. Prior to voicemail systems, calls had to be routed to phone extensions where dedicated operators resided. A number of companies filled this niche for many years by providing organizations with call-answering services. In fact, when voicemail systems began to rise in popularity, the telecom companies were prohibited by federal regulations from using voicemail systems in order to prevent them from putting the call-answering services out of business. When this restriction was eliminated in the mid 1980s, all the carriers began to offer voicemail solutions.

Voicemail systems were designed to mimic e-mail systems. They provide storage and retrieval mechanisms for voice messages. The voicemail solutions digitize the messages left by callers and then replay the messages back to the intended recipients. Integrating a PBX with the corporate e-mail system is a logical evolution for voicemail. For a voice messaging system to work properly, it must be able to communicate with the PBX and send and receive signals to the PBX and signals to desktop sets (phones) via the PBX. Prior to Exchange Server 2007, e-mail systems did not have native voicemail capabilities. Prior to Exchange 2007, leaders in the voice industry provided the only Unified Messaging solutions that could store voice messages on an Exchange server.

PBX/Voicemail Architecture

A PBX allows a few inbound phone lines to be used by a large number of people within an organization by managing and logging each call. The PBX is also used by the voicemail solution in the process of storing and retrieving voicemail. Many organizations, and possibly yours, will need to connect Exchange 2007 Unified Messaging to a legacy PBX. Figure 9-1 shows how the legacy PBX and legacy voicemail systems interoperate.

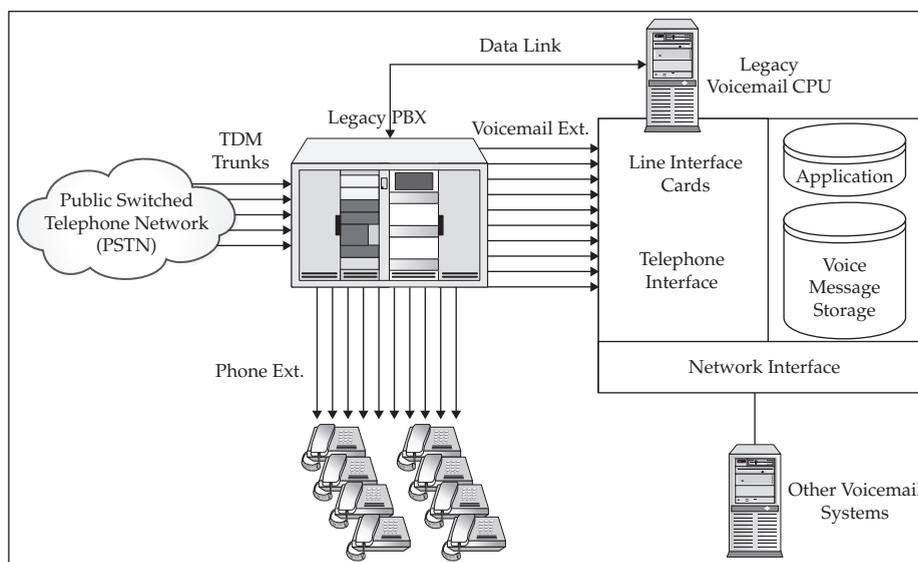


FIGURE 9-1 Legacy PBX and voicemail

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The following walkthrough of the inbound voicemail process will help you understand how the legacy PBX and voicemail systems are integrated:

1. An inbound call from the PSTN comes across a TDM trunk.
2. The PBX routes the call to the specified extension.
3. When there is no answer after an administrative-defined number of rings, the call is forwarded to a voicemail extension.
4. PBX sends a command across the data link to the voicemail CPU, to prompt the inbound call with the target's voicemail message.
5. The voicemail CPU instructs the telephone interface to answer the call.
6. The CPU application plays the voicemail prompt and the application-specific prompts.
7. The CPU application listens for any keystrokes from the caller. The voice message is digitized from the incoming analog voice stream. Then, when the caller hangs up or specifies the end of the voice message, the CPU application stores the voice message.
8. When the call is complete, the voicemail system sends a command to the PBX via the data link to turn on the Message Waiting Indicator for that phone extension.

A similar process ensues when a person checks their e-mail. The key to a sophisticated voicemail system is in the application's ease of use. Is it easy to navigate the voice prompts? Does the application provide a range of playback and storage options? The best systems do that—and then some.

Voice System Terminology

We have already used some voice system terminology that may seem like a foreign language to an Exchange administrator. Reviewing the following comprehensive list of voice system terms will help you during your deployment of Unified Messaging:

- **Public Switched Telephone Network (PSTN)** A term that represents the worldwide collection of publicly available phone networks run by private corporations and governments. One connotation of the term implies the circuit-switching (legacy) portion of the public network. However, today the PSTN is a combination of both circuit-switching and packet-switching technologies.
- **Private Branch Exchange (PBX)** Voice system that enables companies to manage incoming calls by sharing a small number of outside phone lines among many internal extensions.
- **Time-Division Multiplexing (TDM)** TDM is used to allow multiple connections to exist on the same circuit-switched network. The PSTN still contains many circuit-switched networks.
- **Trunk** A connection that consists of multiple individual TDM-based links, aggregated to increase the overall bandwidth.
- **VoIP trunking** A way of providing scalable long-haul phone connections using high-bandwidth WAN connections to interconnect PBXs in a corporation through VoIP gateways. This concept is used at the carrier level for the long hauls between PSTNs. H.323, SIP, Media Gateway Control Protocol (MGCP), and Inter-Asterisk Exchange (IAX) are some of the supported trunking protocols.

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- **Message Waiting Indicator (MWI)** PBXs that support voicemail systems that support MWI signaling requests to allow individual phone extensions to know that there is a message waiting for them on the voicemail system.
- **Interactive Voice Response (IVR)** IVR extends the functionality of a voicemail system by allowing the application to understand voice requests and dial tones (DTMF) from callers. Microsoft UM has a built-in IVR.
- **Quality of Service (QoS)** A protocol used on IP networks to set the priority of data packets used by bandwidth-sensitive applications such as VoIP.
- **Call Forward No Answer (CFNA)** A setting on a PBX designed to forward mail to a legacy voicemail system. Can be configured to forward calls to a VoIP gateway instead.
- **Voice over Internet Protocol (VoIP)** A general term used to describe various methods of digital voice communications across an IP network.
- **VoIP gateways** Network devices that connect local PSTNs that use TDM circuit-switching to an IP-based packet-switching backbone. These devices are required to connect Exchange 2007 Unified Messaging servers to legacy PBX systems.
- **Session Initiation Protocol (SIP)** SIP is used as a means for an IP phone to establish a connection to a VoIP gateway or Digital PBX (call manager). SIP is also used by the VoIP gateway to connect to the Exchange UM server.
- **Real-time Transport Protocol (RTP)** Protocol for creating and transmitting the data packets that contain audio and or video communications. RTP is used after SIP establishes a session.
- **Uniform Resource Identifier (URI)** Used by SIP to uniquely identify each client.
- **Digital Set Emulation (DSE)** A feature of some VoIP gateways that emulates digital phone sets, so the PBX views the gateway as different phone sets on the same hunt group and handles the connections and requests (transfer/receive call) as a phone set.
- **Hunt group** Also known as *hunting*, a hunt group is a method of forwarding calls from a single inbound number to a group of extensions. The three methods of hunting are circular, linear, and most-idle.
- **Pilot number** Phone number assigned to a hunt group for inbound calls.
- **T1 Channel Associated Signaling (CAS)** Used by some legacy PBXs to transmit control signaling data between the PBX and the voicemail system on the same channel as the data.
- **T1 Q Signaling (Q.SIG)** Q Signaling is an ISDN-based protocol. Used by some legacy PBXs to transmit data between the PBX and the voicemail system. Also used for PBX-to-PBX interoperability.
- **Integrated Services Digital Network (ISDN)** A dedicated WAN connection between an Internet or telecom provider and a subscriber. Can be used for voice or data.
- **Basic Rate Interface (BRI)** A method of provisioning a dedicated ISDN line for voice communications or data communications. This configuration consists of two B channels for voice or data and a D channel for signaling information. Used for small business and home users.

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- **Primary Rate Interface (PRI)** A method of provisioning a dedicated T1 or E1 for voice or data communications. T1 PRI has a maximum capacity of 23 B channels for voice or data and one D channel for signaling. E1 PRI has a max of 30 B channels on ISDN circuits, for voice or data and one D channel for signaling. Used for large enterprises.
- **B channel** Bearer channel with a data rate of 64 kilobits per second (Kbps). Each B channel could classically bear the TDM digital form of one analog voice call. For data purposes, multiple B channels may be aggregated for greater combined data rates.
- **D channel** Delta channel for signaling changes, status updates, and command initiation associated with the B channels that are provisioned along with the D channel. For BRI, the D channel is 16 Kbps whereas for PRI the D channel is 64 Kbps (like a B channel).
- **T.38** A standard for supporting fax communications. It specifies how to send an audio packet through a data network, similarly to G.711. T.38 describes the process of converting analog connections from the telephone company to the PBX into encoded voice between the PBX and VoIP gateway. Exchange UM supports T.38.
- **Simplified Message Desk Interface (SMDI)** A legacy method for a phone system to provide voice messaging systems with the information necessary to process incoming calls. Usually communicated across a dedicated data link cable.
- **Audio codec** A computer program that compresses as well as decompresses digital audio data according to a given audio file format. Voicemail systems do not require the same frequency range or quality as music audio codec.
- **Speech compression** Specialized audio codec for voice files. Early speed compression codecs include G.711 A-Law and G.711 mu-Law (μ -Law) pulse-code modulation (PCM). The most widely used speed compression method today is Code Excited Linear Prediction (CELP). This can be seen in standards such as GSM and WMA. Decisions on which codecs are used affect the quality and performance of a voice messaging system.
- **Dual-tone Multifrequency (DTMF)** A standard that defines the sound frequencies generated when each key is pressed on a phone. This is also commonly referred to as *touchtone inputs*. DTMF is used by voicemail systems to allow callers to navigate Auto Attendant menus and subscribers to retrieve messages from the system.
- **Telephone user interface (TUI)** The voicemail interface available from a standard analog, digital, or cellular telephone.
- **Voice User Interface (VUI)** A voicemail system that can interpret voice commands has a Voice User Interface that parallels the telephone user interface. The VUI depends on the Automatic Speech Recognition (ASR) service to interpret speech input from a caller.
- **Automatic Speech Recognition (ASR)** A feature of Unified Messaging that allows an Outlook Voice Access user to move through the mailbox menus by using voice commands.
- **Text to Speech (TTS)** The component of the Unified Messaging architecture that reads e-mail, voicemail, and calendar items, and plays the menu prompts for callers.

Exchange Unified Messaging Features

Exchange 2007 Unified Messaging is more than a substitute for an existing voicemail system. Besides the basic voicemail functionality that can be expected of any voicemail system, the following unique features make Exchange's UM Server attractive:

- Outlook Voice Access
- Outlook Calendar Access
- Directory and Personal Contacts Access
- Outlook and OWA Voicemail Form
- Auto Attendant

Outlook Voice Access

A phone system is recognizable to most people by the phones used to place calls. Today this includes analog phones, digital phones, cellular phones, satellite phones, and VoIP phones. The keypad interface we are familiar with using to place calls, accept calls, and check for messages is called the telephone user interface (TUI). Exchange 2007 Unified Messaging extends the phone user interface to include voice commands and voice menus. This additional interface is called the *voice user interface (VUI)*. Microsoft refers to both interfaces from the Exchange 2007 UM server as simply *Outlook Voice Access (OVA)*. It makes sense then that the primary Unified Messaging client will still be phones.

The only command that cannot be entered by voice is the subscriber's PIN. Currently OVA only supports the English language for voice commands. But it can be customized to support phonetic version of users' names that do not sound like they are spelled. A text-to-speech engine is built into the UM server to allow e-mail message to be read from a users mailbox. The text-to-speech feature is available for languages other than English, including Portuguese (Brazilian), Dutch, French, German, Italian, Japanese, Korean, Mandarin Chinese, Spanish, and Swedish. This feature is smart enough to know which one to use based on the content of an e-mail.

Outlook Voice Access allows a phone to be a Unified Messaging client. A UM-enabled user can call into their company's UM server and access the following:

- Voicemail
- E-mail
- Calendar
- Contacts
- Meeting requests
- Out-of-office messages settings
- Security settings
- Personalization settings

To secure access to voicemail, Exchange associates a personal identification number (PIN) with each subscriber. Although this is an attribute on the user object, it is not the same as the user's password. Users can change their PINs on their own without administrative assistance.

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Outlook Calendar Access

UM phone users can connect to their calendars and listen to their upcoming schedule. Appointments can be added, modified, or cancelled by phone. Responses can be made to meeting requests. In fact, it is also possible for a subscriber to notify other participants of a meeting that they are running late by sending an “I’ll be late” message from their phone. This has been one of the more popular demonstrations that Microsoft is using to bring awareness to Unified Messaging at technical conferences and sales events.

Directory and Personal Contacts Access

Because UM is integrated with Active Directory and Exchange, UM clients have additional contact lookup capabilities. The Global Address List, which contains all Exchange recipients in Active Directory, and Outlook contacts, which are stored in each user’s mailbox, are fully accessible to the UM clients. Using a keypad on a phone or a voice command, users can search for a contact. Once a contact has been found, the user can use the contact’s phone number to send a voicemail, place a call to one of their listed numbers, or just listen to their contact information, such as the business address.

Outlook and OWA Voicemail Form

Although Unified Messaging has transformed what a phone can be, it has also transformed what an e-mail client can be. In fact, the line has been so blurred between the two that it no longer matters if you use a phone or a computer for any form of messaging. It is simply a matter of preference and convenience. Unified Messaging extends the functionality of the e-mail client by adding a new form specifically for voicemail messages in a user’s mailbox. The new form provides a number of options for reviewing voicemails from Outlook and Outlook Web Access. Because voicemails contain audio, the voicemail form contains controls similar to a media player, allowing users to perform the following tasks:

- Play a voicemail on speakers/headphones
- Stop a voicemail
- Pause a voicemail
- Play voicemail on a telephone
- Add and edit notes

The voicemail form is only compatible with Outlook 2007 and Outlook Web Access 2007, as shown in Figure 9-2 from one of Microsoft’s Virtual Hard Drives (VHD). To obtain the Exchange Server 2007 SP1 VHD go to <http://www.microsoft.com/downloads/details.aspx?FamilyID=43621a8f-12fb-4e7c-bb38-lcbb6ef272c5&DisplayLang=en>. If an incompatible client receives a voicemail, it will appear as an attachment to an e-mail. The attachment can be played back with windows Media Player or another audio player.

Auto Attendant

Today’s global economy opens opportunities for businesses to serve customers around the globe. Both small and large businesses alike are dependent on having a phone system that can respond to calls on a 24/7 basis in order to maintain good customer relationships and

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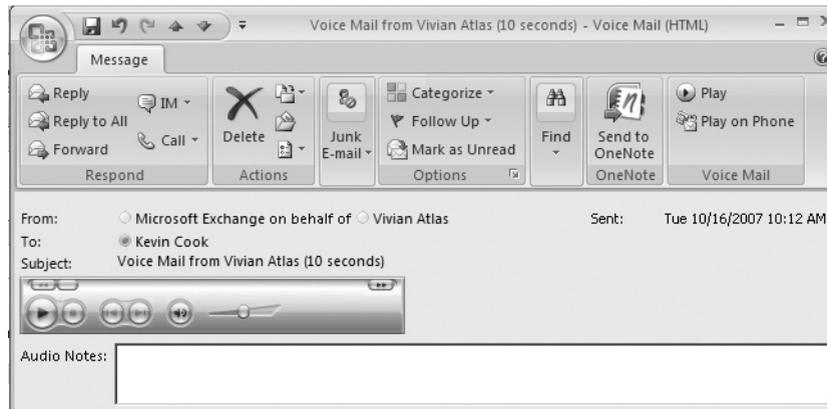


FIGURE 9-2 Outlook 2007 voicemail form

participate in the global marketplace. The Auto Attendant in the Exchange Unified Messaging Server allows an organization to do the following:

- Create customized menus
- Define custom greetings
- Add holiday schedules
- Provide help with searching the voice directory
- Provide help with connecting to a user's extension
- Provide help with searching the directory for a specific user
- Define an operator extension

Each of these are voice prompts stored as WAV files that take the place of a dedicated person answering inbound phone calls. The Auto Attendant can respond to input from a caller. The input could be in the form of DTMF from a keypad or speech inputs from the caller. The best part is, the Auto Attendant never has to go home.

Exchange Unified Messaging Architecture

The Exchange Unified Messaging architecture is quite different from the legacy voicemail systems. There are three major components in the architecture: Microsoft Exchange Unified Messaging Service, Unified Messaging Worker Process, and the Speech Engine Services. Figure 9-3 details the architecture.

In terms of running processes on the UM server, the architecture is based on two executables: UMService.exe and SpeechService.exe. The executable UMService.exe spawns UMWorkerProcess.exe and is responsible for voice and fax message access and storage in the

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Exchange 2007 mailbox store. The executable SpeechService.exe spawns the SESWorker.exe worker process and is responsible for DTMF, ASR, and TTS. The UM Worker Process Manager starts each of the UM worker processes defined for the UM server and monitors their activity. The UM Worker Process Manager is responsible for directing inbound calls to the correct UM worker process. Each UM worker process works with the speech worker process to process all requests made to the UM server. Communications to and from the UM server are established using SIP over TCP. This is different from many other VoIP solutions from other vendors. Most other vendors use SIP over UDP. The UM server listens for communications on port 5060 (unsecured) and port 5061 (MTLS). Service Pack 1 allows the UM server to listen to both ports simultaneously. The worker processes listen for communications on TCP port 5056 and 5066 (unsecured). Service Pack 1 allows the worker processes to listen on 5057 and 5058 for secure connections. The RTP traffic that carries voice input from an IP gateway will use UDP ports 1024–65535. The UM worker process also contains a fax service provider that uses UDPTL and the T.38 protocol to receive inbound faxes.

SP1 Service Pack 1 improves the security of the UM architecture by extending support for secure connections.

Microsoft Unified Messaging cannot communicate directly with a legacy PBX. It is necessary to use an IP gateway device between the Unified Messaging server and the legacy PBX. However, if an organization has deployed an IP PBX, there is a chance an IP gateway

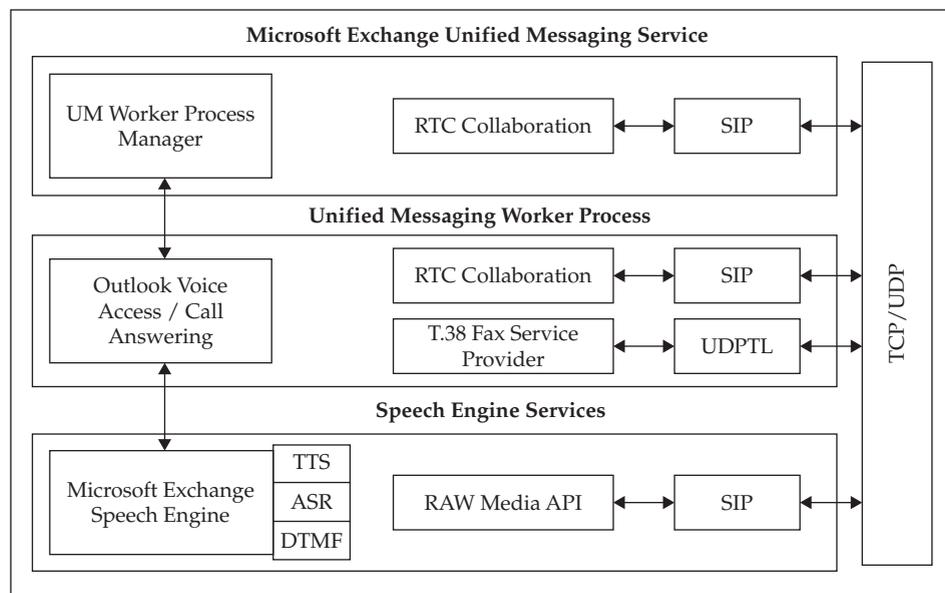


FIGURE 9-3 Exchange 2007 Unified Messaging architecture

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is unnecessary if the IP PBX is compatible with the Exchange 2007 Unified Messaging server. Figure 9-4 shows how the Exchange Unified Messaging server integrates with both types of PBXs. Note that the connection from the IP PBX to an IP gateway device is necessary if Exchange 2007 does not support the IP PBX.

The “Inbound Call Handling” and “Retrieving Messages with OVA” sections illustrate how the IP PBX and the legacy PBX integrate with the Exchange 2007 Unified Messaging server.

Inbound Call Handling

The inbound call handling steps performed by the UM server role:

1. An external caller dials a UM user’s phone number on the PSTN.
2. The UM user’s office phone rings for a preset number of times.
3. The legacy PBX routes the call to the IP gateway or the IP PBX establishes a direct VoIP connection to UM server.
4. The IP gateway identifies an available UM server. Once the UM server is determined, the voice input is converted to VoIP: SIP and RTP.
5. The UM server queries AD to determine the mailbox server of the recipient by filtering for a user with the extension specified by the caller.
6. The UM server plays the user’s greeting, encodes the voice message, and attaches it to an e-mail.

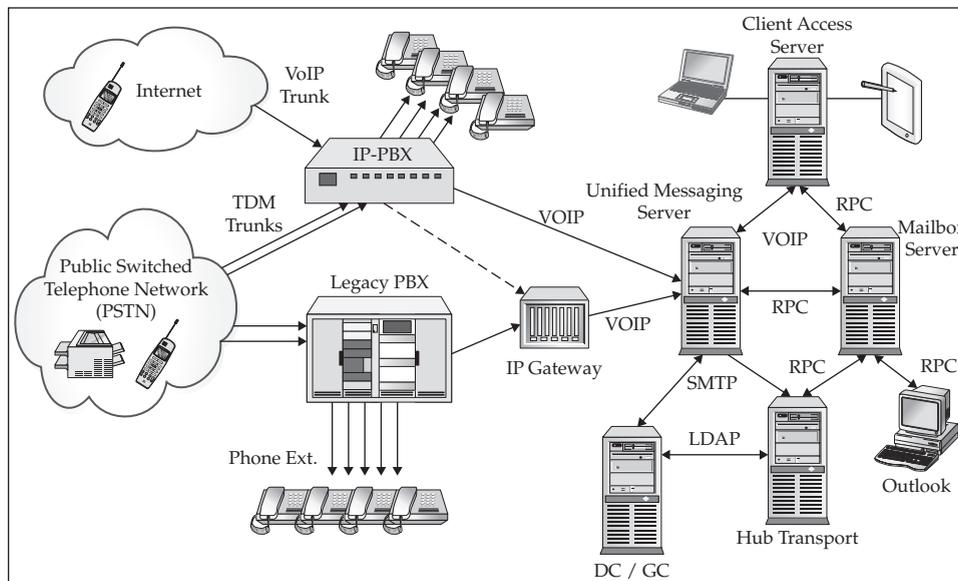


FIGURE 9-4 Exchange 2007 Unified Messaging PBX integration

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7. The UM server sends the message to a Hub Transport server.
8. The Hub Transport server in the same Active Directory site as the user's mailbox server submits the voicemail/e-mail to the database where the user's mailbox data is stored.

Retrieving Messages with OVA

The process to retrieve a voice mail from the UM server role:

1. The UM user dials a preconfigured OVA call-in number from the PSTN.
2. The legacy PBX routes the call to the IP gateway or the IP PBX establishes a direct VoIP connection to UM server.
3. OVA requests the user's extension number and PIN.
4. OVA queries AD to determine which mailbox database belongs to the UM user and to validate the PIN.
5. The UM server waits for input from the user. When a request for a message is made, the appropriate menu of options is presented.
6. If the user request that the message is read, the Text-To-Speech engine will read the mail header and content (it cannot read the attachments to the e-mail).
7. The UM server retrieves the message from the Mailbox server role and plays the voice message.

For more details on PBXs, see "PBX and IP Gateways vs. IP PBXs" later in this chapter.

Deploying Unified Messaging Servers

The Unified Messaging role can be installed as a standalone server role. It can also be installed with the Hub Transport, Client Access Server, and/or Mailbox server roles, but not clustered Mailbox server roles. Dedicating hardware to the Unified Messaging server will make it easier to properly size the hardware required for your environment. Microsoft's deployment of Unified Messaging servers in North America supports 30,000 users on only five dedicated Unified Messaging servers. To deploy Unified Messaging in your Exchange 2007 environment, you need to carefully consider a number of factors from the number of Unified Messaging users, and the type of features you will provide them to the voice codec you select. For more information on the requirements and processes for installing Exchange Server 2007, see Chapter 4.

Hardware

Consider the hardware requirements for the UM server role. Table 9-1 shows the recommended processor and memory configurations from Microsoft.

Resource	Minimum	Recommended	Maximum
Processor	One core	Four cores	Four cores
Memory	2GB	1GB per core	4GB

TABLE 9-1 Unified Messaging Serve Role Processor and Memory Requirements

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As a general rule of thumb and a default limit, a single Unified Messaging server can support up to 100 simultaneous connections for phone calls and 100 for inbound fax connections. The server can be configured to support twice that number of connections for phone calls and faxes, respectively, but the hardware would need to be scaled up to support that load. It is suggested that if you need to scale a Unified Messaging server for more than 100 connections that you add more Unified Messaging server roles to your organization. If you need to adjust the number, you can change it to a value between 0 and 200. You will need to use cmdlets like these:

```
[PS]C:\>Set-UmServer -Identity OCS-EX1 -MaxCallsAllowed 70
and
[PS]C:\>Set-UmServer -Identity OCS-EX1 -MaxFaxCallsAllowed 60
```

Microsoft recommends that you configure a Unified Messaging server role with four processor cores to support the processor intensive conversion of voice messages to digital files. Disk requirements are nominal because there is no critical data stored on the Unified Messaging server, except during the processing of voice and fax messages. The factor that impacts scalability the most is the size of the voicemail messages. Voice messages can vary in size depending on the codec used by the IP gateway and Exchange 2007. The Exchange Unified Messaging server role supports WMA, GSM 0.610, and PCM G.711. Each codec has different storage formats. WMA generates .wma files whereas the others generate .wav files. The longer the voice message, the larger the file attachment will be when it is delivered to the recipient's mailbox. Choosing a codec that keeps the size of long messages down, while keeping the integrity of the voice message, is essential to UM's performance. Next to WMA, GSM 06.10 has the best compression, but GSM uses an 8-bit sampling rate whereas WMA and G.711 use a 16-bit rate. The bit rate directly impacts the quality of the voice message (16-bit is better than 8-bit). WMA is a Microsoft proprietary codec and is the recommended codec as long as the IP gateway UM connection supports it as well.

If you use WMA, you can anticipate supporting up to 60 concurrent calls on each of your Unified Messaging servers and 75 concurrent calls if you use GSM. With that in mind, Microsoft estimates that it is possible to support a minimum of 2000 users and a maximum of 10,000 users per server, depending on the volume of messages and the length of the messages. It is important to note that a user who is making an inbound call to leave a voicemail (unauthenticated user) actually uses fewer resources on a Unified Messaging server than a user who calls in to check their voicemails (authenticated user) via OVA.

Deployment Process

The size of an organization and the complexity of the existing phone system affect the amount of time the deployment of Unified Messaging will take. The process of deploying Unified Messaging in an organization is custom built by administrators to meet the organization's needs. However, there are some lessons you can learn from what others have already deployed for Unified Messaging. For example, Microsoft documented their deployment of Unified Messaging in a showcase article titled, "Using Exchange Server 2007 for Unified Messaging." They devised a deployment process that allowed them to not only implement Unified Messaging, but also to integrate with a variety of PBXs and migrate off

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of the third-party Unified Messaging solutions that they have been using for many years. Here are the high-level phases to the process they utilized:

- **Preparation phase** Install the Exchange UM server, configure the PBX, and gather all the required data for installation: IP addresses, hunt group, and operator numbers. Identify test users group.
- **Procurement phase** Procure the gateway, cables, patch panels, interface cards, and other hardware.
- **Gateway installation and configuration phase** Install IP gateways. Configure, test, and validate the installation.
- **UM server integration phase** Configure the IP gateway with the UM partner servers with which the IP gateway can communicate.
- **Testing phase** Use a test account and detailed checklists to test and verify that all UM components are operational.
- **Pilot number and production rollout phase** Create a pilot number to use with the PBX and IP gateway. Verify that when the pilot number is dialed that the PBX forwards it to the IP gateway with call details. After successful testing, roll out UM services to users.
- **User support and education phase** Live testing with test user group. Document any issues that arise during live testing. Make changes to configurations as necessary. Communicate changes to the users along with timeframes and options. Provide documentation with step-by-step procedures for user self-service, such as PIN resets.

Unified Messaging Coexistence and Migrations

When you have an established voicemail system or Unified Messaging system, you will have to determine how and when the transition to Exchange 2007 Unified Messaging will occur. Among the factors to weigh are the connectivity, signaling integration, and PBX requirements for each site as well as the IP gateway options. Because existing solutions may have more or fewer features than Exchange 2007 Unified Messaging, it may be necessary to keep some of the legacy components around to support your current service levels. Some of the additional considerations are:

- PBX integration
- IP gateway selection
- Consolidation
- Fax integration
- System monitoring
- Security

Table 9-2 can be used to help you evaluate how you should transition. The options are to stage your migration or to perform an overnight migration.

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Migration Considerations	Overnight	Staged
All hardware must be implemented at once.	X	
Hardware can be deployed over time.		X
User migration can occur in phases.		X
Requires configuration and testing.	X	X
User education required prior to migration.	X	
User support and education occurs in line with migration.		X
Can monitor system capacity and performance for design miscalculations before they reach critical mass.		X
Allows periodic issue resolution.		X
Can pilot with smaller set of users.		X

TABLE 9-2 Overnight Migration vs. Staged Migration

PBX and IP Gateways vs. IP PBXs

Unified Messaging server roles are deployed as part of the Exchange 2007 Server deployment. The Unified Messaging role need only be added with the default configurations during the server installation. However, before the UM server can be configured to receive calls, a VoIP solution must be in place. Two VoIP solutions are supported by the Unified Messaging role with the RTM version of Exchange 2007. You can have a legacy PBX connected to an IP gateway or you can use a supported IP PBX. In short, a three-step process is used to integrate UM with a VoIP solution: Install the UM Server role, install and configure the IP gateway with the legacy PBX or install an IP PBX, and then configure the UM Server role to use the IP gateway or IP PBX.

Legacy PBX and IP Gateways

Legacy PBXs vary greatly. Your choice of an IP gateway should be based on its support for the legacy PBX. The critical features that need to be supported by the IP gateway are:

- **Line provisioning type** T1 PRI CAS trunk, T1 PRI, ISDN BRI, individual voice lines.
- **Signaling integration** SMDI, Q.SIG, or digital set emulation (DSE). Q.SIG and DSE have built-in signaling integration. T1 CAS requires SMDI for signaling.
- **Line call plan** Settings on the PBX that define the supported call scope. This can be as broad as worldwide and as limited as internal calls only.
- **Hunt group/pilot number** If existing hunt groups and pilot numbers are in place from an existing solution, consider whether you want to reuse voicemail numbers or create new ones.

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Vendor	IP Gateway	Supported Protocols
AudioCodes	MediaPack 114/8 FXO	Analog with In-Band DTMF Analog with SMDI
AudioCodes	Mediant 1000	T1/E1 Q.SIG
AudioCodes	Mediant 2000	T1/E1 CAS T1/E1 Q.SIG
Dialogic	PIMG80PBXDNI	Digital Set Emulation
Dialogic	PIMG80LS	Analog with In-Band DTMF Analog with SMDI
Dialogic	TIMG300DTI, TIMG600DTI	T1 CAS T1/E1 Q.SIG

TABLE 9-3 Supported IP Gateways

It is important to review the, “PBX Configuration Notes – Tested by Microsoft or Gateway Vendor Partners,” at <http://www.microsoft.com/technet/prodtechnol/exchange/pbx-partners.msp> to locate the configuration notes document for the PBX and IP gateway that you will be using. These documents are created by the vendor specifically to show how to configure their devices to work with your PBX. Reviewing the capabilities of these documents prior to purchasing an IP gateway is recommended so you can make an informed decision. The supported IP gateways are listed in Table 9-3.

IP PBX

The IP PBXs that are supported by Exchange 2007 Unified Messaging Server are few and far between. However, the list is expected to grow as adoption of Unified Messaging increases. The key to their integration is support for SIP over TCP. Table 9-4 lists the currently supported IP PBXs.

PBX Manufacturer	PBX Model/Type	Minimum Software Version
Avaya	Avaya Communication Manager	V2.0
Cisco	CallManager	5.0, 5.1
Interactive Intelligence	Customer Interaction Center	2.4
Mitel	3300 CXi, CX/MXe	7.1 UR2
Nortel Networks	CS 1000 (a.k.a. CS1K)	5.0

TABLE 9-4 Supported IP PBXs

Configuring Unified Messaging Servers

After the PBX has been integrated with an IP gateway or an IP PBX has been deployed, you will need to integrate the Unified Messaging server with the IP gateway or IP PBX. Although a number of administrative tasks can be performed from the Exchange Management Console (EMC), you may want to review the cmdlets available for administering the Unified Messaging servers and UM users from the Exchange Management Shell (EMS) shown in Table 9-5.

Integrating Unified Messaging servers with a VoIP solution requires a minimum number of configurations performed in a specific order. These steps should be performed after the gateway and legacy PBX or IP PBX have been tested and are functioning:

1. Create a dial plan.
2. Create a UM IP gateway.
3. Create a UM mailbox plan.
4. Create a UM hunt.
5. Create UM dialing rules.
6. Assign UM dialing rules to the dial plan and to the mailbox policy.
7. Generate GAL Grammar.

Following this procedure will guarantee that you have meet the prerequisite(s) for each step you are performing in sequence.

Get-UMActiveCalls	New-UMDialplan	Disable-UMAutoAttendant
Get-UMAutoAttendant	New-UMAutoAttendant	Disable-UMIPGateway
Get-UMDialplan	Set-UMServer	Enable-UMIPGateway
Get-UMHuntGroup	Set-UMAutoAttendant	Enable-UMMailbox
Get-UMIPGateway	Set-UMMailbox	Enable-UMAutoAttendant
Get-UMMailbox	Set-UMMailboxPolicy	Enable-UMServer
Get-UMMailboxPIN	Set-UMMailboxPIN	Remove-UMHuntGroup
Get-UMMailboxPolicy	Set-UMIPGateway	Remove-UMAutoAttendant
Get-UMServer	Set-UMDialplan	Remove-UMIPGateway
New-UMIPGateway	Test-UMConnectivity	Remove-UMDialplan
New-UMHuntGroup	Disable-UMMailbox	Remove-UMMailboxPolicy
New-UMMailboxPolicy	Disable-UMServer	

TABLE 9-5 Unified Messaging Cmdlets (Service Pack 1)

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Dial Plans

A UM dial plan defines a link from the telephone extension number of a user to the corresponding UM-enabled mailbox. Regions around the world have different access numbers and extension patterns. Dial plans allow you to specify unique dialing rules for different locations in your organization. UM dial plans store the configuration information necessary to communicate with the telephony system in Active Directory. Each UM dial plan has an associated UM mailbox policy.

SP1 *The New Dial Plan Wizard is enhanced in SP1. This allows you to configure the URI type and VoIP security level.*

Creating a Dial Plan

Use the following steps to create a new Dial Plan:

1. Open the Exchange Management Console with an administrator account that has the Exchange Organization Administrator role.
2. Expand Organization Configuration and select Unified Messaging.
3. Select New UM Dial Plan in the Actions pane.
4. Type the name of the dial plan in the Name field, as shown next.
5. Enter a value that matches the number of digits in your users' extensions in the field Number of digits in extension numbers. The default is 5.
6. Select the option in the URI Type drop-down list that is recommended by your IP gateway or IP PBX vendor. The options are:
 - Telephone Extension (Default)
 - E.164
 - SIP URI
7. Choose a security method from the VoIP security drop-down list. The options are:
 - SIP secured
 - Unsecured (default)
 - Secured
8. Click New.

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New UM Dial Plan

New UM Dial Plan
 Completion

New UM Dial Plan
This wizard helps you create a UM dial plan for use by Microsoft Exchange Unified Messaging. A dial plan is a grouping of unique telephone extension numbers.

Name:
Rochester NY

Number of digits in extension numbers:
5

URI Type:
Telephone Extension

VoIP security:
Unsecured

i After you create a new dial plan, the dial plan must be added to one or more UM servers before it will be used.

Help < Back New Cancel

9. Click Finish.

As an alternative to the EMC, you can also use the `New-UMDialplan` cmdlet in the EMS, like in this example:

```
[PS]C:\>New-UMDialplan -Name "Rochester NY" -NumberofDigits 5
```

If you do not choose a URI type or a VoIP security option, the default values will be used.

UM IP Gateway

The IP gateway must be identified in the UM IP gateway object configuration for the UM server to be able to communicate with it. It is possible to configure the UM IP gateway object in Active Directory to use an IP address or the Fully Qualified Domain Name (FQDN) of the physical IP gateway device. If you use the FQDN, there must be a corresponding DNS host (A) record so that the UM server can resolve the FQDN to an IP address. This address is used by the Session Initiation Protocol (SIP) to establish each session between the IP gateway and the Unified Messaging server. Integrating voice with a data network does increase its exposure to data network vulnerabilities. For additional security, the Unified Messaging server is configured with a list of trusted SIP peers. If a SIP connection attempt is made from an untrusted SIP peer, the connection attempt will be blocked and a 1187 event will be logged.

After configuring the UM IP gateway object, you can associate it with the UM dial plan you created first. Be sure to verify that there is a UM server configured for the UM dial plan.

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The UM IP gateway will also need at least one UM hunt group associated with it so that it knows the range of user extensions it covers. Fortunately, when you associate a UM dial plan with the UM IP gateway, a default UM hunt group will also be created if one does not already exist.

Creating a New UM IP Gateway

Use the following steps to create a new UM IP Gateway:

1. Open the EMC with an administrator account that has the Exchange Organization Administrator role.
2. Expand Organization Configuration and click Unified Messaging.
3. Click the UM IP Gateways tab.
4. Select New UM IP Gateway in the Actions pane.
5. Type the name of the UM IP gateway in the Name field, as shown next.
6. Type the IP address for the UM IP gateway in the IP Address field or type the FQDN in the Fully qualified domain name (FQDN) field.
7. Click New.
8. Click Finish.

New UM IP Gateway

New UM IP Gateway
 Completion

New UM IP Gateway
 This wizard helps you create a UM IP gateway for use by Microsoft Exchange Unified Messaging. UM IP gateways represent the connection between a physical gateway or IP PBX and Unified Messaging.

Name:

IP Address:

 Example: 192.168.10.10

Fully qualified domain name (FQDN):

 Example: smarhost.company.com

Dial plan:

i If a dial plan is selected, a default hunt group will be created to associate this new UM IP gateway to the specified dial plan. If no dial plan is selected, a hunt group must be created manually.

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As an alternative to the EMC, you can also use the New-UMIPGateway cmdlet in the EMS, like in this example:

```
[PS]C:\>New-UMIPGateway -Name "AudioCodes-Mediant 2000" -Address 192.168.10.254
```

UM Mailbox Policy

Configuring each and every mailbox with the common settings, such as PIN lengths and dialing restrictions for the various locations, would be tedious and could lead to inconsistent or even invalid configurations. The UM mailbox policy object allows you to apply settings to groups of UM-enabled mailboxes in a consistent way. A default mailbox policy is created when you create a new UM dial plan. You can choose to leave the default settings, customize the default policy, or create a new policy to link to the UM dial plan. You will need to configure the UM mailboxes to use the custom UM mailbox policy.

Creating a New UM Mailbox Policy

Use the following steps to create a new UM Mailbox Policy:

1. Open the EMC with an administrator account that has the Exchange Organization Administrator role.
2. Expand Organization Configuration and click Unified Messaging.
3. Select the UM Mailbox Policies tab in the Work pane.
4. Select New UM Mailbox Policy in the Actions pane.
5. Type the name of the UM mailbox policy in the Name field, as shown next.

6. Click Browse, select a UM dial plan to associate with the mailbox policy, and click OK.
7. Click New.
8. Click Finish.

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As an alternative to the EMC, you can also use the New-UMMailboxPolicy cmdlet in the EMS, like in this example:

```
[PS]C:\>New-UMMailboxPolicy -Name "ROC-NY-UM Mailbox Policy" -UMDialPlan "Rochester NY"
```

UM Hunt Group

The UM hunt group is an Active Directory object used to represent an actual hunt group on a PBX. From the perspective of a UM servers deployment, the UM hunt group links a pilot number (inbound call number) to a specific UM dial plan. An administrator can specify a specific pilot number by assigning a custom hunt group to a dial plan. Additionally, the dial plan will need to be associated with one or more UM servers. The UM hunt group itself is created for a specific UM IP gateway object. It is also possible to create more than one UM hunt group per UM IP gateway. These objects work together in the following order:

1. The IP gateway initiates a session with the UM server by using SIP.
2. The SIP header includes the pilot number.
3. The UM server verifies that the number in the SIP header is part of a particular hunt group.
4. The associated UM server accepts the call.

Two parameters in a UM hunt group can be configured: the UM dial plan and the pilot identifier or pilot number. You will add the UM hunt group to the UM IP gateway that you previously created and then specify the UM dial plan you want to link to. Finally, specifying a pilot number and creating the new UM hunt group allows the UM server to begin accepting inbound calls.

Creating a New UM Hunt Group

Use the following steps to create a new UM Hunt Group:

1. Open the EMC with an administrator account that has the Exchange Organization Administrator role.
2. Expand Organization Configuration and click Unified Messaging.
3. Select the UM IP Gateways tab.
4. Select an existing UM IP gateway.
5. Select New UM Hunt Group in the Actions pane.
6. Type the name of the hunt group in the Name field, as shown next.
7. Click Browse, select the UM dial plan you want to link to, and then click OK.
8. Type the number of the pilot identifier for the hunt group and then click New. (Be sure to enter in the correct pilot number because you cannot change this number without removing and then re-creating the hunt group.)

9. Click Finish.

As an alternative to the EMC, you can also use the `New-UMHuntGroup` cmdlet in the EMS, like in this example:

```
[PS]C:\>New-UMHuntGroup -Name "ROC-HG" -PilotIdentifier 12700 -UMDialplan
"Rochester NY" -UMIPGateway "AudioCodes - Mediant 2000"
```

UM Dialing Rules

The default settings on the Unified Messaging server do not allow UM-enabled users to dial outbound calls to any phone numbers that are not defined as part of the organization. In fact, users are limited to making calls only to UM-enabled users configured to use the same UM dial plan.

Outdialing is a term used to describe the call-handling process that occurs when a UM-enabled user makes a call to an external phone number. Outdialing requires the following configurations:

- Dialing group rules
- Dialing rule entries
- Dialing restrictions

To enable outdialing for UM-enabled users, you must perform the following tasks:

- Configure the UM IP gateway to allow outgoing calls
- Create dialing rule groups/entries
- Configure dialing restrictions on the UM mailbox policy

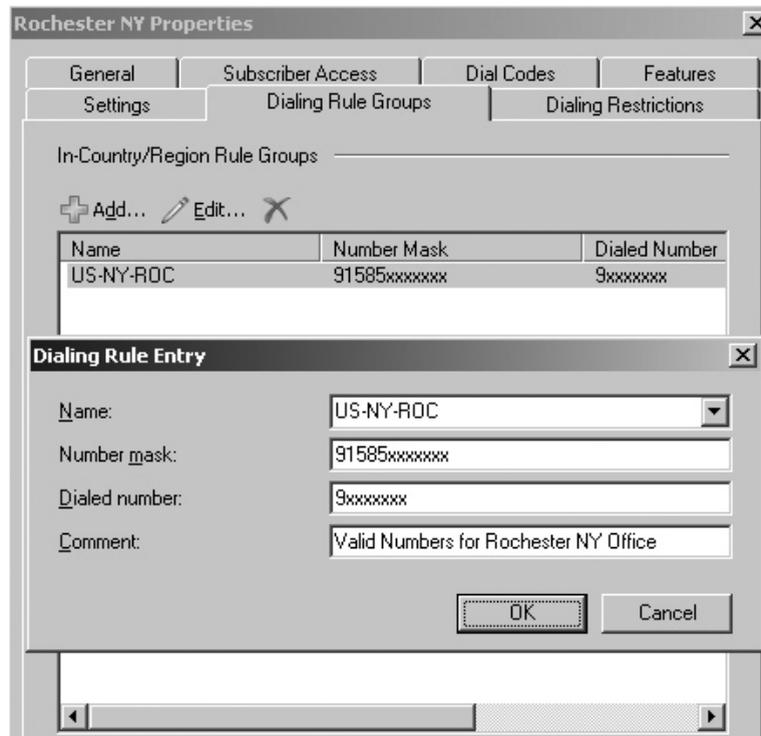
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As a Unified Messaging administrator, you will need to create appropriate dialing rules and properties for each location in your organization if you are going to allow outdialing. When you create a dialing rule entry, you will simultaneously be populating one of the two types of dialing rule groups: in-country/region rule groups or international rule groups. A dialing rule entry is used to define the telephone numbers and number masks for in-country/region and international calls that can be made by UM-enabled users who are associated with a UM mailbox policy. Each dialing rule determines the types of calls that users within a dialing rule group can make. However, you must correctly configure the dial rule entry with a valid number mask and a dial number. After you create a dialing rule group and define the appropriate dialing rule entries on the Dialing Group Rules tab, you must add the appropriate dialing rule groups from the UM dial plan to a UM mailbox policy on the Dialing Restrictions tab.

Creating a Dialing Rule Entry

Use the following steps to create a new Dialing Rule Entry:

1. Open the EMC with an administrator account that has the Exchange Organization Administrator role.
2. Expand the Organization Configuration and click Unified Messaging.
3. Select the UM Dial Plans tab and then select a UM dial plan to edit.
4. Click Properties in the Actions pane.
5. Select the Dialing Rule Groups tab, click the Add button under In-Country/Region Rule Groups or International Rule Groups.
6. Provide the following information, as shown in the next illustration.
 - **Name** Select the name of an existing dialing rule group, or create a dialing rule group and type the name of the dialing rule group.
 - **Number mask** A number mask is used to limit the outgoing telephone numbers it will dial for a user. An example of a valid number mask is 91585xxxxxx. This example will limit the user to just calls made to the 585 area code in the U.S.
 - **Dialed number** Your IP gateway vendor will expect to see numbers in a specific format. Use the Dialed number field to define in which format the number should be, especially if it is different from the numbers obtained by the Unified Messaging server. An example of a valid dialed number is 9xxxxxx.
 - **Comment** Type a description of the dialing rule entry.
7. Click OK to save your changes.



As an alternative to the EMC, you can also use the Set-UMDialPlan cmdlet in the EMS, like in the following examples.

For an in-country/region rule group:

```
[PS]C:\>Set-UMDialPlan -Identity "Rochester NY" -ConfiguredInCountryOrRegionGroups
US-NY-ROC, 91585xxxxxxx, 9xxxxxxx, "Valid Numbers for Rochester NY Office"
```

For an international rule group:

```
[PS]C:\>Set-UMDialPlan -Identity "Rochester NY" -ConfiguredInternationalGroups
"International, 901144*, 901144*, International Calls"
```

If you have complex dialing rules and a large number of dialing plans to configure, you may want to create a .csv file with the **Name,NumberMask,DialedNumber,Comment** headings and use the following cmdlet to import the file:

```
[PS]C:\>Set-UMDialPlan "Rochester NY" -ConfiguredInCountryOrRegionGroups
$(IMPORT-CSV C:\CustomDialingRules\InCountryRegion.csv)
```

Assigning UM Dialing Rules to a Mailbox Policy

The final step to enable outdialing is to assign the UM dialing rules to the appropriate UM mailbox policies. Until this is done, the outdialing settings do not affect the UM-enabled users.

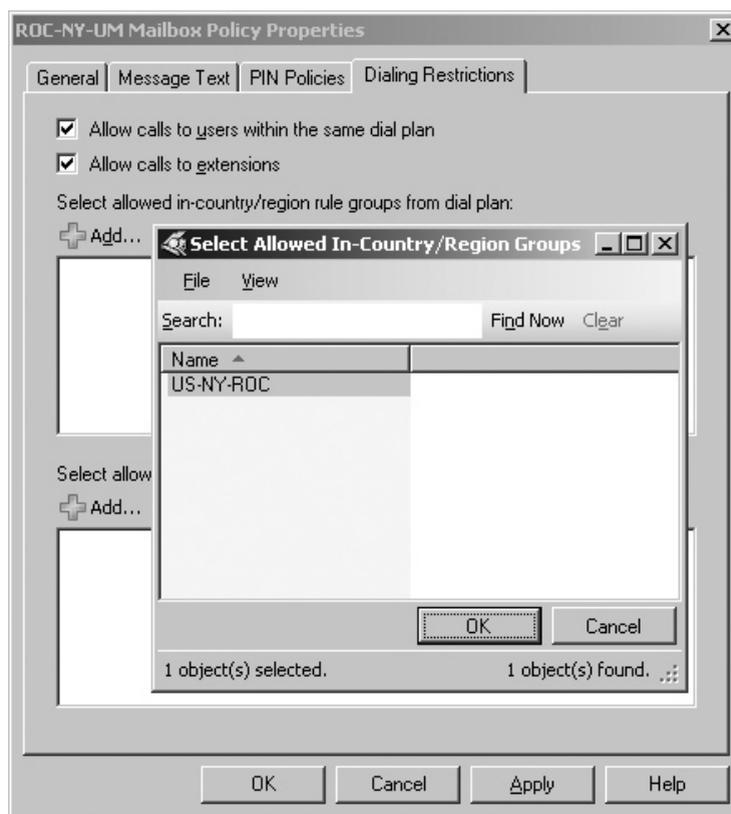
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Once the rule groups are assigned, their settings will apply to the UM-enabled users configured to use that specific mailbox policy.

Configuring Dialing Restrictions on UM Mailbox Policy

Use the following steps to configure Dialing Restrictions on a UM Mailbox Policy:

1. Open the EMC with an administrator account that has the Exchange Organization Administrator role.
2. Expand the Organization Configuration and click Unified Messaging.
3. Select the UM Mailbox Policies tab and then select a UM mailbox policy to edit.
4. Click Properties in the Actions pane.
5. Select the Dialing Restrictions tab.
6. Click the Add button for in-country/region rule groups or international rule groups.
7. Select one of the rule groups you created previously from the list of rule groups and then click OK, as shown next.



8. Click OK to save the change and close the Mailbox Policy Properties window.

Generating GAL Grammar

Exchange 2007 Unified Messaging server roles include the English language pack by default. This provides grammar files used by the Unified Messaging server speech engine to recognize words and phrases that a caller might use to interact with Automatic Speed Recognition (ASR). The grammar files also define what options are available to a caller. When the Exchange Unified Messaging servers are deployed, they generate the grammar files based on default settings. The default settings will work fine the majority of the time, but Microsoft recommends that grammar generation be performed manually under the following circumstances:

- When you complete a new installation of the Unified Messaging server role
- After creating a new UM dial plan, UM Auto Attendant, custom address list, or custom distribution list
- After creating UM-enabled users
- After modifying a UM dial plan
- After modifying a UM Auto Attendant

By default, grammar generation occurs every day at 2:00 A.M. The schedule can be modified with Set-UMserver in the EMS. To make sure that the very first users of the Unified Messaging services are able to connect without errors, you should plan on running the executable galgrammargenerator.exe as the last step in the deployment process before allowing users to access the Unified Messaging servers. The grammar files are updated when:

- Unified Messaging servers join a UM dial plan
- Default or custom update schedules occur
- The file galgrammargenerator.exe is manually run

The galgrammargenerator.exe tool should be used to force an update when changes occur in the organization that affect the users' ability to find other recipients. As a side benefit, the tool can be used to repair missing or corrupted grammar files. Table 9-6 lists all the possible switches available with the tool.

Switch	Description
-d <dialplan>	Creates a grammar file for a specified UM dial plan.
-g	Generates the grammar file.
-l	Generates a grammar file for a distribution list.
-o	Generates a log file. The default path is \UnifiedMessaging\Temp.
-p	Preloads all generated grammars into the Microsoft Speech Server platform.
-s <UMserver>	Creates a grammar file for each UM dial plan to which the specified Unified Messaging server belongs.
-u	Creates or updates DTMF maps for users who are enabled for UM and who are not enabled for UM.
-x	Defines the speech filter list that is used in XML format.

TABLE 9-6 Galgrammargenerator.exe Parameters

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The recommended command to issue after the initial deployment of a Unified Messaging Server is:

```
Galgrammargenerator.exe -s <UMserver>
```

Unified Messaging Users

Exchange 2007 Recipient Administrators have the ability to mailbox-enable user objects that exist in Active Directory. When a Unified Messaging server role is deployed into an Exchange 2007 organization, the Exchange Recipient Administrator role also has the ability to enable Unified Messaging for existing mailbox-enabled users. After the users' mailboxes are enabled for UM, e-mail, voicemail, and fax messages can be delivered to their Inboxes. A wide variety of clients can take advantage of the unified mailbox, including Outlook 2007, Outlook Web Access, Windows Mobile with Exchange ActiveSync, and telephones.

Once you become more familiar with Unified Messaging concepts and the Exchange Management Shell, you can administer UM users exclusively from the command line with the following four cmdlets:

- Enable-UMMailbox
- Disable-UMMailbox
- Get-UMMailbox
- Set-UMMailbox

It is probably best to start administering UM-enabled users with the Exchange Management Console to become more familiar with them.

UM-Enabling Users

An Active Directory user object is arguably the most significant object in the directory. Exchange 2007 greatly extends the definition of what a user object is. With the release of Service Pack 1 for Exchange, which includes additional enhancements for Unified Messaging, user objects will now be able to support integration with not only Unified Messaging but also Office Communications Server. Organizations that choose to integrate Exchange 2007, Unified Messaging, and Office Communications Server as a VoIP solution will take full advantage of the latest enhancement to the user object in Active Directory made by Service Pack 1. For more on Office Communications Server and Unified Messaging integration, see Chapter 13.

SP1 *When you enable a user for Unified Messaging, SP1 provides the ability to add a SIP or E.164 address along with the required phone extension number.*

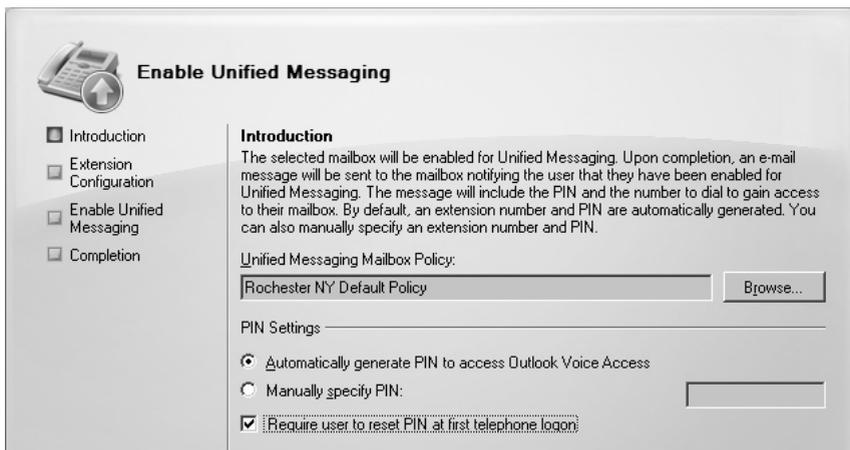
There is an administrative gotcha when you configure a new UM-enabled user with a SIP or E.164 address: You will no longer be able to change the user address with the Set-UMmailbox cmdlet. You can configure the new Unified Messaging proxy address (EUM) with the EMC on the E-Mail Addresses tab on the user's Mailbox Properties page.

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UM-Enabling a User's Mailbox Using the EMC

Use the following steps to UM-Enable a user's mailbox:

1. Open the EMC with an administrator account that has at least the Exchange Recipients Administrator role.
2. Expand Recipient Configuration.
3. Select the user mailbox to enable for Unified Messaging.
4. Click Enable Unified Messaging in the Actions pane.
5. Click the Browse button, select a UM mailbox policy for this user, and then click OK.
6. Configure the following PIN settings for the user, as shown next:
 - Automatically generate PIN to access Outlook Voice Access (default)
 - Manually specify PIN
 - Require user to reset PIN at first telephone logon
7. Click Next.



8. Configure the options on the Extension Configuration page, as shown in the next illustration.
 - **Automatically generated mailbox extension** Only available if the Business field on the Address and Phone tab in the user's properties are populated.
 - **Manually entered mailbox extension** If you have a dial plan that is configured to use E.164 or SIP as the URI type, you must manually enter a mailbox extension for the user.
 - **Automatically generated SIP resource identifier** This option will be available if the user you are enabling for Unified Messaging is associated with either a SIP URI or E.164 dial plan.
 - **Manually entered SIP resource identifier** This option will be available if the user you are enabling for Unified Messaging is associated with either a SIP URI or E.164 dial plan.

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9. Click Next.

10. Click Enable.

11. Click Finish.

Summary

As more established communication solutions (voice and fax) find a new life on IP networks, a new means of storing and facilitating access to the information is required. The Unified Messaging server role provides that capability natively in your Exchange 2007 organization. The new Unified Messaging server role in Exchange Server 2007 extends the functionality of your Exchange messaging infrastructure, allowing it to transmit and store more than just traditional e-mail. Voice and fax technologies are traditionally analog technologies, whereas e-mail has always been a digital technology. Because of the vast difference between the analog world and the digital world, the ability to merge the technologies has only come about in the last decade. Voicemail is the primary voice system that the Exchange Unified Messaging server role replaces. Call management still requires a PBX. Voicemail is commonly associated with the Private Branch Exchanges (PBXs), which are premise-based (business) phone systems. Exchange 2007 Unified Messaging is more than a substitute for an existing voicemail system. Besides the basic voicemail functionality that can be expected of any voicemail system, there are unique features that make Exchange's UM server attractive. The key features that make Exchange's UM solution stand out are:

- Outlook Voice Access
- Outlook Calendar Access
- Directory and Personal Contacts Access
- Outlook and OWA Voicemail Form
- Auto Attendant