

WHITE PAPER

Unified Messaging in Today's Business Environment

A Guide to Voice, Fax and Email

Anytime, Anywhere

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INTRODUCTION

For today's employees, managing various types of communications has become something of a challenge. Telephone calls, voice messages, email messages, faxes, messages from the customer relationship management (CRM) system, messages arriving by post and the use of instant messaging can find employees spending far too much of their day processing and managing their communications with their customers and coworkers. Most people deal with more than two hundred messages during a single business day. This number includes telephone calls, voice messages, email messages, faxes and instant messaging sessions. To help manage their communications, many technology companies are developing tools and solutions that focus on simplifying this communications process. This set of applications is generally called Unified Communications and includes integrating the communications process with other enterprise applications (unified messaging, integrated document management, integrated CRM, etc.), new tools and protocols for extending the range of communications (mobile wireless, WI-FI, IP Telephony, etc.) and building special devices to enable access to communications from a wider range of devices (mobile wireless devices, tablet PC, smart phones with PDA capabilities, etc.).

This paper will focus on the messaging challenges companies face today, with some discussion of other communication solutions.

TRADITIONAL MESSAGING PROBLEMS AND COSTS

Most existing messaging systems were implemented over time by different companies and supplied and maintained by different vendors. Because different departments were responsible for their implementation, little concern was given to integration of functionality or intelligent managing of resources. As a result, most businesses find themselves facing a similar set of problems when it comes to dealing with their messaging systems.

TOO MANY MESSAGES AND MESSAGE TYPES

In a typical business, employees find themselves dealing with three basic message types; email, voice and fax messages. As each of these technologies has evolved, it has become easier to send messages to a business contact. This has added to the number of messages an average person receives and sends during the day. A few years ago, a user might have received ten or so messages a day-a few voice messages, faxes and several email messages - today it's not at all unusual for a business person to receive more than 200 messages or more in a single day. Unfortunately, as the number of messages someone receives increases, the expectation of a prompt reply from the sender does not decrease. This leads to spending more time processing and managing messages and less time performing more critical business functions.

MULTIPLE DEVICES REQUIRED TO ACCESS AND PROCESS DIFFERENT MESSAGE TYPES

As the various types of messaging originally evolved, each required the user to handle the message using a different format or device. Faxes were available only as hardcopy at the fax machine and voice messages were stored on a separate voice mail system and could only be accessed from the telephone. Further, users had multiple voice mailboxes for their business, mobile phone and home phone. Email messages were only available from the desktop computer. Not only were all message types accessed using different methods, there was also no way to store the various messages in a single location based on subject, projects or priority.

POOR MESSAGE NOTIFICATION

In order to respond to messages in a timely manner, the recipient has to first know the message has arrived. Originally, voice mail systems would light the message-waiting indicator on the user's telephone at their desk and later added the ability to call the user at a single telephone number or pager for notification. Email systems could show a new message icon or perhaps sound a beep at a user's computer to indicate the arrival of a new message, but lacked any means of notifying a user that was away from their desk. Faxes generally sat at the fax machine until someone noticed them, or were, at best, distributed once a day. Without effective message notification, it was almost impossible to be responsive to business needs.

EMPLOYEES ARE INCREASINGLY MORE MOBILE

In today's business environment, people are more mobile than ever. Being mobile may be as simple as being down the hall in a conference room or could involve traveling around the world. In many businesses, it has become financially beneficial for businesses to allow a certain portion of their employees to work from home on an occasional or regular basis. With the traditional messaging systems, they do not have an effective way to be notified of new messages.

COST OF MULTIPLE MESSAGING SYSTEMS

As businesses implemented additional messaging systems, the costs to deploy and maintain these systems grew out of proportion to their value. Companies ended up with additional expenses including telephone line resources (lines for fax machines, voice mail, lines for notification callouts, for dial-up to the network to access email, etc.). Since each system was separate and distinct, administering the systems was time consuming and involved training the administrators and users on multiple systems.

AN OVERVIEW OF UNIFIED MESSAGING

Unified Messaging, a subset of unified communications, focuses on enabling users to access and process their entire message types from virtually any location using a wide variety of convenient devices. Unified messaging ties

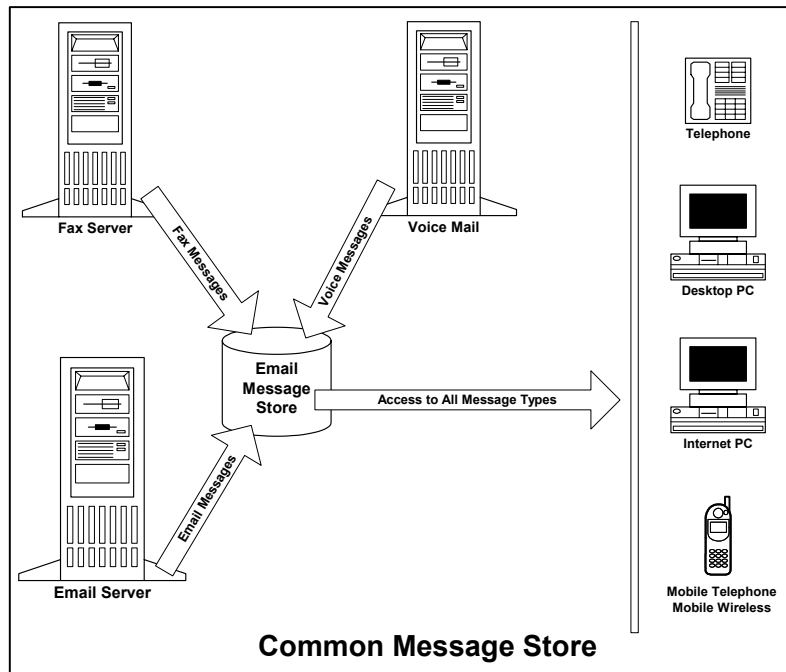
together the functionality of the enterprise email, voice mail, fax server and enterprise web server systems. As unified messaging has evolved, a common approach has been taken that involves using the enterprise groupware system as the common message store for unified messaging and supporting message processing for all message types from the email messaging clients.

MULTIPLE MESSAGING SERVERS CAPTURE INCOMING MESSAGES

The enterprise voice mail system and fax server are modified to serve primarily as front-end message capture devices for unified messaging. The voice mail system remains integrated to the telephone system and captures the voice messages generated from both internal and external callers. However, in unified messaging environments, voice messages are moved from the voice mail server to the respective user's email message store. As these messages are sent to the email server, they are marked with special attributes identifying them as voice messages. Likewise, the fax server captures the incoming faxes for the user and, rather than leave them stored on the fax server, moves the fax messages to the email Inbox for the specific user, marked with attributes as fax messages.

SINGLE MESSAGE STORE - ALL MESSAGES PLACED IN THE EMAIL MESSAGE STORE

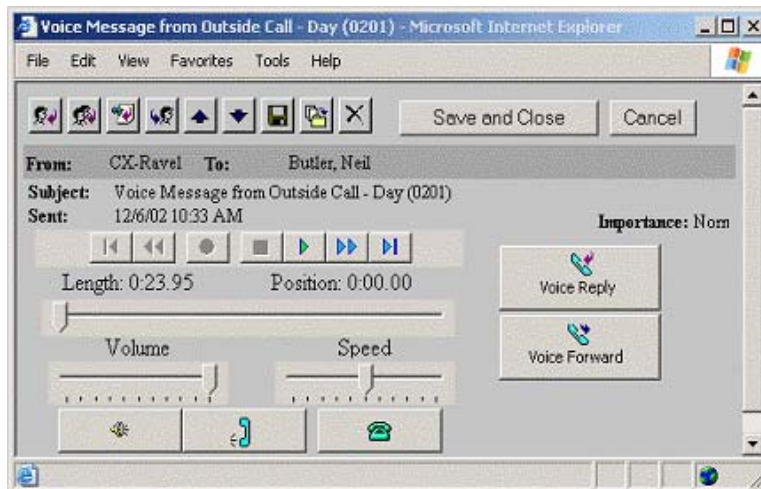
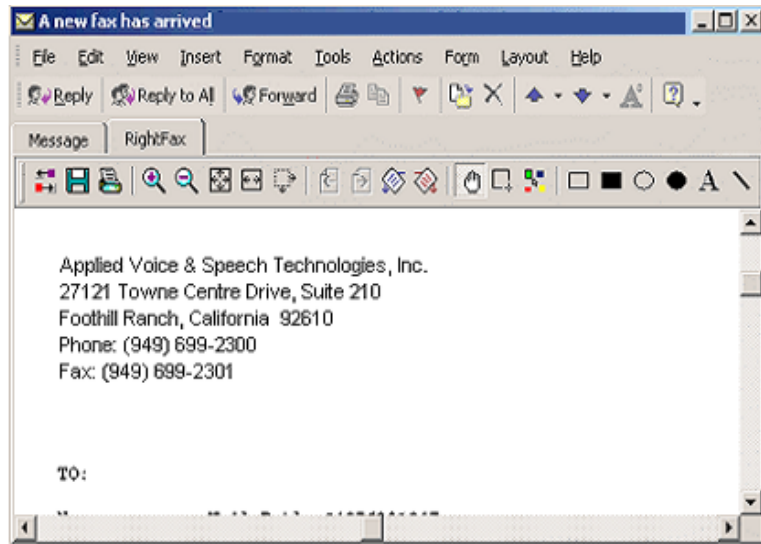
Since the email messages are already in the email Inbox, this now creates a single message store for all of the user's message types. Voice and fax messages are treated as email messages with the specific content (voice message or fax message) appearing as attachments.



Using this single message store approach is key to creating the wide range of functionality and ease of use required for the successful implementation of unified messaging.

MESSAGING CLIENTS ARE EXTENDED TO ALLOW FOR ACCESS TO ALL MESSAGE TYPES

Rather than have voice and fax messages accessed as standard email messages with attachments, the special attributes of the messages allow for the email clients to be modified to display and handle these messages differently than a typical email message. First, the email client is modified to show different icons for the messages in the message list. Rather than display the traditional envelope icon used to designate an email message, voice messages typically display a speaker icon to identify them as voice messages and fax messages typically display a fax icon to identify them as fax messages. When a user opens these messages, special attributes are used to trigger the opening of a special form for processing the relative message type as opposed to opening the traditional form used to process an email message. These custom forms include the tools needed to effectively process the message, based on its attachment content type. The form used for voice messages includes a player control to simplify the process of playing the message and tools for adjusting the volume and speed of the message. The form used to process fax messages includes the graphical tools needed to handle fax messages such as zoom capabilities, rotation and navigation between pages.



MESSAGE SERVERS FOR OTHER MESSAGING FUNCTIONALITY

In addition to serving as the entry point for messages, the voice mail and fax servers are also used in processing their relative message types. Most unified messaging voice servers allow the user to call in and access their email mailbox using the telephone. This includes the ability to listen to their voice messages, have their email messages read to them using text-to-speech technology and access the information about their fax messages. The fax server is also used to allow the user to forward their fax messages, and in some cases their mail messages, out to a fax machine from the telephone interface—creating a mobile printer.

OTHER GROUPWARE FUNCTIONALITY LEVERAGED FOR UNIFIED MESSAGING

Most unified messaging systems leverage other groupware system functionality to expand the unified messaging capabilities of the system and make it easier for the user to process their messages. These additional capabilities include:

Using folders...

Since all message types are stored in the user's mailbox, users can create folders that store voice and fax messages as well as email messages. This allows users to create folders based on specific subjects and store all the relevant messages on that subject.

Accessing all messages from the Internet...

Most unified messaging systems provide the tools to allow users to access their voice and fax messages from the groupware Web client. Programs such as Microsoft Outlook Web Access and IBM Lotus iNotes can be used to allow Internet access to all of a user's messages, from virtually any location.

Using email rules...

Users can create rules for processing their incoming voice and fax messages in a manner similar to how they process their incoming email messages. Voice and fax messages can be moved to specific folders, trigger specific types of message notification or can be automatically copied to other users.

Using the backup functionality...

Since all messages (voice fax and email) are located on the email server, system administrators can backup all messages when they do scheduled backups of their email servers.

UNIFIED MESSAGING FROM A USER'S PERSPECTIVE

One of the main goals of unified messaging is to allow users to access all of their messages anytime, anywhere. In order to deliver this functionality, unified messaging systems offer the user a number of possible interfaces for accessing and processing all of their messages. The following interfaces and functionality are available from most high-end unified messaging systems:

THE GRAPHICAL USER INTERFACE (GUI)

The best-known unified messaging interface is the modified email client. This graphical user interface is modified to provide users with all the tools needed to access and process each message type. Most unified messaging graphical interfaces provide the following set of features:

Single Inbox and folder system...

Since voice and fax messages are placed into the user's email store, all their messages can now be handled with the same set of folders. This gives the user a single Inbox and allows them to create folders that can hold any combination of email, voice and fax messages.

Multi-media or phone access to voice messages...

Most systems allow users to play and record their voice messages using either their desktop telephone or the speakers and microphone installed on their computer.

Email forward outside of organization...

Some systems allow users to forward voice messages out of their system to external recipients (to Internet email addresses). Some systems will send the voice message in its standard format while others will convert the audio portion of the message to a standard .wav file to insure accessibility by the recipient.

Email directory...

Most systems allow the user to address new voice and fax messages sent from the GUI client using their existing email address book. This greatly simplifies the process of sending messages and alleviates the need for creating or importing additional address books.

Fax initiation...

Some systems allow users to initiate new outbound fax messages directly from their email client eliminating the need to install and support an additional user interface.

Telephone call initiation...

Some unified messaging systems enable the user to initiate outgoing telephone calls from within the email client. This feature can be used either to place return calls to those people who have left them a voice message (using the calling party ID from the caller) or to place calls to the telephone numbers listed in the user's personal or system address books.

THE TELEPHONE USER INTERFACE (TUI)

The voice mail systems used in unified messaging implementations have also been modified to provide the enhanced tools and functionality needed to efficiently process all message types from the telephone interface. Most high-end unified messaging telephone interfaces provide:

Message processing by type...

Most unified messaging systems inform the user of how many messages of each type they have when they first log into their mailbox ("You have twenty-two email messages, twelve voice messages and three fax messages"). Some unified messaging systems also allow the user to have their messages presented to them in separate queues, allowing users to access one particular type of message at a time ("To listen to your voicemail messages, press one. To access your fax messages, press two. To read your email messages, press three.")

Text-to-Speech for email...

Using text-to-speech technology, users can have their email messages (including header information, the subject line and the body of the message) read to them through the telephone interface.

Voice reply to email messages...

Some unified messaging systems allow the user to reply to an email message with a voice message from the telephone interface. In this case, the user records an audio message and it is sent to the sender of the original message as an email with a standard .wav file attachment.

Message forwarding to a fax machine...

Most systems enable users to forward their fax messages to any convenient fax machine by either entering the fax machine telephone number or a short code that represents a fax machine telephone number. Other systems will also allow users to forward their email messages to a fax machine.

Live reply to messages...

A few of the more advanced unified messaging systems allow users to automatically place outgoing calls to the person who left a voice message. This assumes that the system captured the caller ID number or the caller entered a callback number.

Partial mailbox enumeration...

Some email users keep an unusually large number of messages in their Inbox (often above one thousand). While most unified messaging systems will pause for an unusually long time (up to thirty seconds) while the system tries to count and classify the messages in order to present the message count to the user, a few of the most advanced systems have the capability to allow the user to start processing messages as the system continues to count and classify the messages in the background.

THE TRADITIONAL INTERNET BROWSER INTERFACE

Most unified messaging systems provide additional functionality to allow the user to handle their voice and fax messages across an Internet connection using the email system's Internet access applications such as Microsoft Outlook Web Access and IBM Lotus iNotes. Typical functionality available from these interfaces includes:

- Playing voice messages
- Recording and sending new voice messages
- Viewing fax messages
- Replying to all message types
- Forwarding all message types

THE MOBILE WIRELESS DEVICE BROWSER INTERFACE

A few of the leading unified messaging systems have also added the ability for a user to access and process messages from the browsers available on mobile wireless devices. This includes accessing messages from the Wireless Application Protocol browser on their mobile telephone and accessing messages from the cHTML browser on their wireless PDA. These devices provide the user with the following functionality:

- Access to all message types
- Listen to voice messages
- Create new voice or email messages
- Reply to email message with a voice message
- Forward fax and email messages to a fax machine

ADDITIONAL UNIFIED MESSAGING FEATURES

Some providers of unified messaging systems have added additional functionality to their products that goes beyond the standard functionality associated with unified messaging systems. Not all of these features are available on all unified messaging systems.

MOBILE TELEPHONE ENHANCEMENTS

Some unified messaging providers have added additional functionality to their systems to make access from mobile devices easier and more powerful. This includes features such as:

Auto login...

This feature allows the unified messaging system to automatically recognize the user when they call into the system to access their mailbox from their mobile phone. If the system recognizes the user, they do not need to enter their mailbox number, only their security code to access their mailbox. This feature relies on calling party ID information being sent from the user's mobile telephone.

SMS notification...

Some systems can send the user notification of new messages to their mobile device using the SMS (Short Message Service) transmission format. SMS is available on most GSM mobile telephones.

Consolidate messaging...

Some systems can be programmed to allow the users to use a single messaging mailbox to handle calls forwarded from both their business lines and their mobile

telephone. This greatly simplifies messaging and reduces the amount of time spent accessing messages.

Transfer to mobile phone from mailbox...

Some systems allow callers the ability to transfer to a user's mobile telephone when leaving a message for a user. In the event the caller does not answer or declines to accept the call, the caller is prompted to leave a message for the user.

OFFLINE ACCESS TO VOICE AND FAX MESSAGES

True unified messaging systems use the email data store to hold all of the user's messages. As a result, when the user synchronizes or replicates their message database down to their laptop computer to allow them to work offline with their messages, voice and fax messages will be available as well as email messages. Users can view faxes, listen to emails and process messages by saving, forwarding or deleting them. When the user next goes online, the changes to their Inbox will be pushed back to their email server.

ENHANCED MESSAGE NOTIFICATION FUNCTIONALITY

Various unified messaging providers have added enhanced message notification to their products. In recognition of the importance of message notification, these systems offer many notification enhancements including:

Enhanced message notification list...

Most systems allow a user to set notification for a single user, some systems allow the user to create a list of numbers for notification. When a new message arrives that meets their message notification filter criteria, the unified messaging system will traverse the list of notification numbers in an attempt to notify the user of the newly arrived message.

Message notification filters...

Rather than allow notification for all messages or only for urgent messages (the standard for most systems), a few vendors have added the ability for the user to set filters that control what types of new messages will initiate message notification. The filter settings include urgent/all, message type (voice, fax or email), message sender, time of day, etc.

Support for a wide range of notification devices...

Most unified messaging systems support notification only using outcalls to telephone numbers, while other systems include notification abilities via SMS.

FAX AS A MOBILE PRINTER

Some unified messaging vendors have added additional functionality in the way their system interfaces with the fax server allowing the fax server to serve as a mobile printer. These systems allow users to forward fax and email messages to

any fax machine from either the telephone user interface or the mobile wireless interface. These systems may also render the attachments to the email messages as well, depending on their file format.

ACCESS TO OTHER GROUPWARE FUNCTIONALITY

In addition to allowing access to messages, some unified messaging systems allow access to other groupware features such as the calendar, task list and system address book. Generally, this access is offered from the mobile wireless device interface.

EMAIL SYSTEM ENHANCEMENTS

The most important aspect of unified messaging is how well it simplifies the processing of all message types by users. It makes the processing of voice and fax messages much easier but it also adds a considerable amount of enhanced functionality to the email system. This new functionality includes creating notification and telephone-based access to email messages. Users can now be notified of their new email messages when away from their desk and can access those messages from any convenient telephone. Unified messaging users also have the ability to forward email messages to any fax machine using the telephone interface. This includes the ability to render most common types of attachments out to the fax machine.

ADMINISTRATION FUNCTIONALITY

Many unified messaging systems offer a wide range of administrative features aimed at making life easier for the IT staff tasked with maintaining the system. Some of the common administrative features you might find on a unified messaging system are:

User administration from desktop or Web...

Most unified messaging systems include some type of GUI-based utility to allow the users to administer the settings of their mailbox from a computer rather than just from the telephone interface.

System administration across the network...

Most systems support an administrative client that can be accessed from the administrator's desktop computer rather than requiring all of the maintenance to be performed at the unified messaging server itself.

Global system administration...

Some of the more advanced systems support a single administrative client being used to maintain all the unified messaging systems on the customer's network. This type of functionality allows a single well-trained administrator to perform the more critical maintenance functions while allowing local administrators to perform the more day-to-day tasks such as adding and deleting users.

UNIFIED MESSAGING SYSTEM ARCHITECTURAL DIFFERENCES

Not all unified messaging solutions offer all of the features described in this document. As vendors began to design unified messaging systems, they had several architectural decisions to make. Since unified messaging involves merging several different technologies such as email, voice mail, fax servers and networking, each vendor tried to design an architecture that combined these elements in such a way as to create the most compelling application possible. Most vendors went through three distinct stages of product evolution:

Separate proprietary client...

Most early attempts at providing unified messaging involved the manufacturers of voice mail and fax server systems providing a proprietary desktop client to allow users to access their voice and fax messages from their desktop PC. This approach offered very limited functionality and required the system administrators to deploy, train for and support an additional client on desktop PCs.

Simple message forwarding...

The second generation of unified messaging systems typically forwarded the voice and fax messages to the email store, providing no client enhancements or tools. These systems allowed users to click on the voice and fax attachments and use whatever tools were available on the user's PC to process the messages.

Integrated single message store...

The final stage of unified messaging architecture for most of the leading systems today involves integrating with the email system and using the email store as a single message store for all message types. Besides using the email store as the single message store, these systems offer further integration to the email system including extension of the email clients to provide the tools needed to process the new message types, supporting the access of voice and fax messages from the email system's Internet client, and allowing for all message types to be stored in email folders.

UNIFIED MESSAGING ARCHITECTURE AS IT EFFECTS THE SYSTEM USABILITY AND FEATURE SET

The architectural choices made by a unified messaging vendor have a direct effect on both the system's usability and the availability of certain features. A few systems on the market still maintain a separate message store for voice and fax messages. These systems offer less in the way of features requiring proprietary software and clients to be installed on the user's PC. Most of these systems don't support access to voice and fax messages from the email systems Internet clients and some don't allow users to manage their email messages from the telephone interface.

TELEPHONY-LEVEL RELIABILITY

Customer expectations for reliability for products that handle telephone calls are extremely high. Most customers demand uptime levels in the range of 99.99 percent for telephony applications. Some current unified messaging systems actually run on the email system software. While this approach may make it easy for the vendor to create the desired unified messaging functionality, it makes it nearly impossible to meet the customer's reliability expectations as email system or network failures can have a direct negative result on the telephony portion of the unified messaging application, including losing the ability to answer incoming calls. In order for unified messaging applications to be acceptable to customers, they need to be architected to be immune to network failures, groupware crash and other network related disasters. This requires the voice server providing a backup directory and message store to be used in the event of the failure of any of the network or groupware components.

IMPACT ON THE EXISTING INFRASTRUCTURE

As new generations of unified messaging systems have been developed, great strides have been made in minimizing the effect unified messaging installations have on the existing networking and groupware infrastructure. Most systems allow the system administrator to control the type of audio codec used to create the voice messages to insure they are small enough to have a minimum impact on the their email server and network but can still move throughout the customer's IP network without a serious degradation in quality.

Some systems allow fax messages to remain on a separate server and still be integrated with the email system, reducing the amount of additional storage needed on the email server. A few of the most advanced systems cache voice messages on the voice server and allow users who access voice messages from the telephone interface to use the cached copy. This reduces the need to move the messages from the email server to the voice server to be played, reducing network impact by up to 50 percent and reducing the amount of traffic handled by the email server. Most systems that are using the email store as a single message store also allow users to create local storage folders to hold their saved voice messages further reducing the amount of storage required on the email server.

THE TRUE BENEFITS OF UNIFIED MESSAGING

Unified messaging has been available in the market for nearly 10 years. Although the uptake has been slower than expected, due primarily to the fact that its implementation requires efforts from both the telecom and IT groups within a company, there is little doubt today that unified messaging is a valuable addition to a company's infrastructure. Unified messaging adds value in three arenas.

Productivity enhancements...

The most obvious gain when adding unified messaging is the immediate productivity boost that will be experienced by the company's employees. Employees who work primarily from their desk will see an immediate reduction in the amount of time spent accessing and processing messages. The ability to access all messages from a single location (email client), originating fax messages without leaving their desk, having fax messages automatically routed to the email Inbox and the ability to organize all messages in convenient folders - all contribute to a more efficient messaging experience.

For remote or traveling employees, the ability to access messages from any location and from any device is convenient and contributes to spending less time processing messages and more time available for other more critical functions.

Improved customer responsiveness...

An equally important but somewhat less obvious advantage to adding unified messaging is the immediate increase in responsiveness that will be seen by customers and coworkers. Employees will receive their fax and voice messages in their email Inbox and will be able to make decisions on what messages are most important. They will be able to respond to those important messages immediately from their desk by forwarding voice messages, initiating outbound faxes and replying to any message type.

Traveling and remote employees will enjoy an even bigger improvement in their ability to respond to the needs of their customers and coworkers. The ability to be notified of the receipt of any type of new message allows remote users to respond to those messages in a more timely fashion. The ability to use a mobile phone, mobile data device or any convenient Internet connection means employees can process their messages as soon as they receive them. By being able to forward their fax messages or email messages to a fax machine, mobile employees can conduct business from whatever their location - meeting the expectations of their customers.

Cost savings...

The Return On Investment proposition for unified messaging is a simple one. Companies can expect to save money in three ways. First, the increase in productivity will enable employees to spend more time focusing on their key job functions. This will translate to savings and increases in revenue such as more sales from the sales staff, lower staff levels required for administration groups and the ability for support staff to handle more work. Second, long distance charges will decrease as employees send voice responses across the Internet via email rather than calling customers and co-workers directly. Third, the fax server functionality included in most unified messaging solutions saves a significant amount of money through employee timesaving, least cost routing and a paperless office. In addition, businesses will see savings in reduced phone line charges and lower supply costs.

NOW IS THE TIME

The unified messaging industry has developed to the point where it now delivers a strong and valuable set of solutions. Potential customers can feel secure that most of the major systems on the market today deliver proven value and can integrate into their current environment. Prospective customers should evaluate the systems available in the market and address the few remaining issues of possible concern:

Ability to integrate with existing and new systems...

While most systems today can integrate with the major groupware and telephony systems, prospective buyers should be sure that the system they choose can support their current groupware and telephony mix and should also allow for integration into future environments that may come from growth or acquisition. They should be sure the system they choose supports both Microsoft Exchange and IBM Lotus Notes at a minimum and that the system can integrate with all the major telephony systems in the market.

Features and functionality...

Prospective buyers should closely evaluate the functionality of the systems they are considering. They should pay special attention to the user interface features since this has the most effect on acceptance and use of the system. Some questions to consider/answer: Does the telephone interface allow effective access to all message types? Does the system use the standard email clients or does it require special proprietary clients to be installed and maintained? Is there a strong notification component in the system? How strong is the fax functionality in the proposed solution? Does the system offer a mobile data interface component?

Implementation and architecture...

The final consideration is architecture. While most systems on the market today use a single message store, there are still a few systems that rely on separate message stores. These systems offer less in the way of functionality and require the installation and maintenance of additional software on the user machines. Some systems are still built upon the email system and will be unlikely to meet the customer's expectations for the high levels of telephony functionality.

Vendor experience...

While unified messaging is not a new solution, new vendors are constantly emerging. Prospective customers would be well advised to ascertain the experience level of the vendor before purchasing the product; asking for, and closely interviewing, a number of unified messaging references from the prospective vendor is highly advised.

There are great advantages to be had by implementing unified messaging - the increase in employee productivity will strengthen business overall. The improved responsiveness to customers will increase revenue and customer retention rate. The additional labor required to install and maintain the solution will be more than offset by the financial gains that will be recognized. With all the latest

advancements in unified messaging technology and the maturity of the market, now is the optimum time for businesses to invest in this solution to improve employee productivity and save time and money.

FOR MORE INFORMATION

Applied Voice and Speech Technologies, Inc. ("AVST") is an emerging force in the unified communications ("UC") marketplace uniquely combining the strengths of its world-class messaging platform, CallXpress®, with its innovative speech applications platform, Seneca™, to create a powerful, next-generation unified communications solution. The Company's products are designed to scale and support organizations of all sizes. For more information please contact us at: www.avstgroup.com or +1.949.699.2300.