The proliferation of messaging systems presents users with a challenging task: how to effectively use and manage many separate messaging systems. Unified messaging provides simplified management of different messaging systems through a single, unified interface.

Do you want to send an SMS (short message service) message to a friend? You’ll most likely use an SMS client on your mobile phone to send it. Would you like to use instant messaging (IM) to find out if a coworker is available for an impromptu meeting? Chances are you’ll use a specific IM client on your laptop or desktop computer to start an IM session. Do you find yourself trying to remember which messaging system a person you need to communicate with uses—whether they prefer text messaging, email, or one of the many available IM systems?

The proliferation of different messaging systems gives us more choices than ever to create and share messages. It also creates a new problem: How do we access and manage each of the messaging systems we use throughout the day? Many of us have become so used to working with multiple stratified messaging systems (see Figure 1) that we don’t consider it all unusual to start our work day by

- checking for voicemail using a telephone or dedicated interface,
- logging into one or more email systems to check for messages,
- starting up one or more IM systems in different desktop windows, and
- checking for new SMS or multimedia message service (MMS) messages on a mobile device.

We hardly even notice as we hop between messaging interfaces and devices throughout the work day, choosing the appropriate system to meet each messaging need. Have we become so used to working with multiple messaging interfaces that we don’t expect anything easier to use?

Unified messaging (UM) seeks to solve this problem by providing an interface that unifies all of these messaging systems. With UM, you need only remember who you wish to communicate with; UM will help you choose the appropriate messaging system. The UM interface will provide you with the set of valid communications options (for example, text messaging, email, or IM) based on the current service capabilities of a selected contact. In some cases, the user will specify the preferred communication method. In other cases,
the UM system itself will determine the best way to deliver the message to its ultimate destination.

**The Multiple Messaging Systems Problem**

The UM vision is complicated by the fact that many existing messaging systems have unique characteristics that reflect the communications domains for which these systems were developed.

Voicemail was developed for fixed and mobile telephony systems. It’s usually invoked when a user is unavailable for a voice session. A user must often dial a special access number to access and retrieve voicemail messages. More sophisticated systems support visual voicemail interfaces and speech-to-text conversion.

SMS/MMS was developed for mobile telephony systems. Short text messages are sent asynchronously to the destination user via a telephone number or short code. MMS lets users add rich content (such as URLs, graphics, photos, or videos) to their messages.

Email was first developed for fixed and later for mobile computer terminals. Email systems send messages asynchronously to an email address (usually in the form of user@domain_name.com) and let users attach or embed rich content.

IM was developed first for fixed and later for mobile computer terminals. IM systems use (or emulate) a session-based model to support texting and the sharing of rich content between users. Many IM systems also incorporate presence capabilities, which provide information about remote users’ availability and willingness to communicate prior to a user initiating an IM session.

Often, these messaging systems are available primarily on the type of device for which they were originally developed—for example, SMS and MMS are the most prevalent messaging systems on mobile devices, and email and IM systems are ubiquitous on computer desktops and laptops (although mobile device platforms have recently begun supporting them). The increasing popularity of mobile devices that support email and IM functionality (Blackberries, smart phones, and so on) shows there’s a market for messaging systems that operate on both mobile and desktop devices. But, do these products provide a true UM solution?

Multiple messaging systems can reside on a single device without providing a UM experience. For example, the desktop interface you use to compose and send email probably differs from the one you use to chat with your friends in an IM system. Because of this interface fragmentation, users must often work with multiple windows open on their desktops—one or more email clients, desktop or Web clients for Skype and Google Talk, and a corporate voice-messaging system client. When using a mobile device, users are often required to close the current application or switch between applications, limiting them to interacting with only one messaging interface at a time. Consequently, if you can’t see all of your messaging interfaces, you’re surely missing some messages.
UM aims to replace these separate messaging interfaces without losing functionality. The UM client provides a single inbox view that includes messages from different messaging systems in a unified list. The UM interface could be available on your desktop, laptop, PDA, cable box, or mobile device. It can also provide a user phone book/directory from which you can send any kind of message to other users, regardless of the messaging system they use. You could synchronize this directory with each of your UM-capable devices.

In UM, presence information helps determine the best way to communicate with members on your contact list. Presence information can tell both the user viewing the list and the UM application which types of communications systems are currently available for a specific user. This information leverages the current set of messaging and communications services supported by each device in use. Presence information can also indicate a user’s willingness to communicate. If you’re busy—say, in a meeting—you can use presence information to notify others that you don’t wish to be disturbed. Most IM systems offer such presence information, and many other messaging systems are also beginning to integrate presence capabilities. For example, Microsoft is manifesting its UM vision in the tight integration of address book and calendar information with its email and IM clients, using the display of presence information throughout common interfaces.

Benefits of UM Functionality
UM has a tangible value proposition. For the consumer market, the business case for UM might include the following possible benefits:

- greater convenience through a single sign-in to a converged interface and a converged message repository.

Enterprise customers enjoy these same benefits, but they also benefit from increased productivity (a difficult benefit to quantify), a converged enterprise directory, and improved employee communications.

Service providers benefit not only from messaging revenues, but also from ownership of the UM portal, which means that users see the service provider’s logo and ads rather than a competitor’s. In addition, offering UM sets the service provider apart from others that don’t offer this service and can help build a customer base or maintain loyalty.

Finally, a UM system benefits the system administrator by providing centralized message system administration capabilities. The system administrator has greater control over messaging traffic because all messages traverse the UM server, rather than multiple separate message servers, which might not all be under the system administrator’s control. This also provides a single control point to support a centralized message repository for message back up and to meet regulatory requirements. A UM system can increase system security by reducing the use of out-of-band, unauthorized messaging systems and increasing the visibility of previously out-of-band messages.

Continual updates and changes to deployed messaging systems, along with the inevitable appearance of new messaging systems, complicates the task of keeping deployed UM solutions up to date. Such changes might require vendors to constantly update their own UM systems. Popular or new proprietary messaging systems might be unwilling to integrate their systems with an external UM solution. The owners of these systems might be content with their market share and see no benefit in integrating with a UM solution that could draw customers (or information) away from their messaging portals.

It’s unlikely that any single UM solution will ever establish interoperability with every possible type of stratified messaging system. From a practical perspective, a UM system’s success depends on the wise selection of specific messaging systems to integrate. From the user’s perspective, this decision has a significant impact; users will
detect the lack of support for a prevalent messaging system and perceive this lack as a functionality gap. Because consumers and enterprises have different messaging system requirements, the specific needs of your UM solution’s targeted market should drive this selection.

IM has become an increasingly important means of communication in the workplace.\textsuperscript{1} Thus, a successful enterprise UM solution must support IM capabilities. One or more IM systems might already be in widespread use within a given enterprise. The proliferation of specific messaging system brands—such as AOL, MSN, Skype, Yahoo, and Google—complicates the integration of IM systems into the UM solution. Each of these IM system brands presents its own set of UM integration and interoperability issues. Fortunately, many of these systems already have, or are now developing, functionality to interoperate with other IM systems. The desire for interoperability across IM systems has contributed to the development of the Extensible Messaging and Presence Protocol (XMPP). However, many key IM systems still use proprietary interfaces and don’t support standards-based interface specifications.

UM provides much more than a simplified interface for messaging users. IT professionals constantly face new challenges resulting from the proliferation of Stratified messaging systems, and UM can be an important tool in dealing with these challenges. Your organization undoubtedly has policies to prevent the use of unauthorized messaging systems and to maintain official records. These policies’ effectiveness can vary greatly across and within organizations. A server-based UM system can increase the ways in which users communicate while providing mechanisms to control and record messaging traffic that previously bypassed organizational controls. Your organization must still clearly identify the messaging systems authorized for official communications. Obviously, UM won’t prevent determined users from using unauthorized messaging systems.

**Client- and Server-Based UM Solutions**

Figure 2 shows a client-based UM solution. In this system, the client provides a single interface from which the user can access all the messaging systems. The client-based UM solution accomplishes this by emulating the client functionality required for each messaging system. The UM client must therefore have the necessary credentials (account and password) and the functionality (protocol and server addresses) required to log into each messaging system server. As its name implies, a client-based UM solution places the burden of integration on the client—that is, a client-based UM solution providing access to four messaging systems must have four sets of sign-in credentials, four messaging servers, four paths along which messages can flow, and four source phone books. A client-based system might have to handle more client-to-network traffic (multiple sign-ins, registrations, connection maintenance methods, presence information, and so on) than a server-based UM approach.

![Figure 2. A client-based unified messaging system. In this system, a single client must interact with multiple messaging servers using interfaces that are unique to each messaging system.](image-url)

Figure 3 shows a server-based UM solution. Unlike a client-based solution, the server-based solution needs only one set of credentials at the messaging client for accessing the UM server. The UM server, which maintains the credentials and other information required for server-to-server interoperability, interacts with any external messaging systems. All messaging traffic from the UM client traverses the UM server in the
network. Therefore, the UM server offers a centralized message-management and storage capability that can provide visibility and some level of control over multiple messaging systems.

Corporate entities have several strong business- and regulatory-based requirements driving the need for a more centralized capability to manage and control messaging traffic. Thus, a server-based UM model will probably most benefit enterprise applications.

In all likelihood, client-based, server-based, and hybrid (using both client- and server-based components) UM systems will become available in the foreseeable future.

What’s Available Now

Now for the reality check: there’s no single UM system under development that will take over the messaging market. Mobile messaging systems such as SMS and MMS are expanding in the US (US users sent more than 1 trillion SMS messages in 2008) and will remain a significant force in the mobile messaging market for years to come. In addition, we can’t assume that the variety of email and IM systems will decrease. New messaging systems will likely continue to be developed and deployed.

Until recently, many corporate messaging systems were relatively simple and centered on email communications. Although email-based systems are being extended to mobile devices (for example, using Microsoft Exchange on Blackberry devices), these solutions don’t provide a fully converged mobile messaging experience. Users might be able to send and receive both email and SMS messages from a mobile device through a single inbox; however, they often can’t do the same from their laptop computer, cable box, or Web page. Relatively few PC-based systems support unified IM, SMS, MMS, and voicemail messaging. A hallmark of true UM capability will be full convergence of messaging systems across different messaging device types.

Several products available now advertise UM capability. Each of these products appears to focus on combinations of different messaging systems, devices, and markets. A detailed analysis of the differences between these products is beyond this article’s scope.

Pidgin (http://pidgin.im/about) and Meebo (www.meebo.com/about) are examples of client-based UM solutions that provide a unified user interface with connectivity to multiple popular IM systems. Both are primarily for computer desktop environments using a client or Web page. Fring (www.fring.com) is a similar client-based UM solution that was developed for mobile devices.

Alcatel-Lucent’s Rich Communications Manager, Microsoft’s Exchange Server, and Cisco’s Unity are examples of more sophisticated UM solutions that integrate multiple messaging and communications systems through a unified messaging interface using network-based UM servers or other specialized network-based components.

Future Directions

UM work is proceeding across two fundamentally different paths: vendor-specific proprietary implementations and open standards-based implementations.

Vendors will continue to develop proprietary server- and client-based UM solutions. Many of these solutions will leverage suites of services that are already in widespread use within an enterprise or the consumer market. All the UM systems I’ve mentioned are proprietary to some degree. These proprietary UM implementations will likely exhibit an increasing level of sophistication, functionality,
and interoperability. Server-based UM solutions will continue to be focused on enterprise solutions; UM solutions targeting consumers will likely only be offered through medium to large service providers. Client-based UM solutions requiring little or no specialized network support will continue to gain share in the consumer market.

A great deal of work seeks to define UM functionality based on open standards. For example, Converged IP Messaging is a Session Initiation Protocol (SIP)-centric approach to UM managed by the Open Mobile Alliance (OMA). CPM's stated goal is to define an enabler “to allow for both the consolidation of present and the creation of future interpersonal interactive multimedia communication services which accommodate different user experiences such as deferred and Immediate Messaging, session-based messaging, and half duplex/full duplex conferencing.” The CPM effort aligns with other standards to include OMA standards as well as the IP Multimedia Subsystem (IMS) specifications defined by the Third-Generation Partnership Projects (3GPP and 3GPP2).

Enhanced messaging (EM) is another example. It’s a SIP-centric approach focused on messaging for mobile 2G devices defined by the CTIA’s Wireless Internet Caucus Enhanced Messaging Action team. EM leverages some OMA standards work, but it focuses on integrating mobile messaging with IP-based messaging systems across mobile carriers (see www.ctia.org/business_resources/wic/index.cfm/AID/11506).

Both CPM and EM define requirements and standards that are moving the industry toward an open, comprehensive UM solution. There’s hope that UM will indeed encourage industry movement toward open standards and increased interoperability, and away from a fragmented and proprietary messaging future.

Jack Santos observes in CIO Magazine: “UC [unified communications, which includes unified messaging] is still a vision and long-term strategy—really the recognition of an overall trend with communications ... vendors take the UC moniker and run with it (any surprises there?) to sell products that may or may not be ready for prime time. The reality is unified communications will only be real when applications are developed based on the underlying technologies—and so far there has been no ‘killer app.’”

This is an important perspective. As UM-related development and standards mature, more sophisticated UM products will appear on the market. Investigate and assess these emerging UM capabilities with a critical eye, and ensure that applications touted as providing UM capabilities do in fact give meaningful value and ROI. Learn the capabilities of available UM systems so you can choose the right system for your organization.

In the meantime, continue managing your existing messaging systems. Ensure that you know the risks of using stratified or unauthorized messaging systems. As an IT professional, it’s your job to develop and enforce clear policies to increase awareness and reduce your vulnerabilities. But as a user, you have a lot of messaging systems to manage before the perfect UM solution comes along.

References

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