

Unified Communications



To achieve UC and other next-generation benefits, companies must build the right foundation



Enterprises have committed to IP telephony, and completing the conversion to VoIP is just a matter of time and money. VoIP equipment sales surpassed TDM in 2003, and Infonetix projects that 89% of worldwide enterprise voice lines will be IP-PBX based for calendar year 2008. However, while IP telephony is moving into its second decade with enormous momentum, most users are still waiting for full convergence and voice-enabled applications. Increased network efficiencies have been the primary benefit of IP telephony to date as enterprises struggle with infrastructure and organizational issues. These first-generation benefits have been considerable, but the focus is now shifting to converged applications, with the initial spotlight on Unified Communications (UC).

- To Cisco®, UC is about enhancing your IP network infrastructure
- To IBM®, UC is about communications-enabling the Notes suite of applications
- To Google™, UC is about ad clicks
- To Jabber®, UC is an instant messaging server
- To Avaya™, UC is a PBX enhancement

While vendors naturally see UC from the perspective of their own product portfolios, what users really want is a rich and flexible communications system that meets particular business needs. They should be able to sample from a complete palette of UC capabilities, and not be restricted to a mere subset designed to enhance a particular vendor's existing products.

To achieve UC and other next-generation benefits, companies must build the right foundation, eliminate the voice silo, and make telephony a seamless part of information technology.

UC is a moving target right now, with various vendors using the term in different ways to emphasize a subset of an evolving group of capabilities.

- To Microsoft®, UC is about communications-enabling your familiar Office suite of applications

Just what is this full palette? According to Gartner, there are 16 features that comprise a complete UC solution: (1) Telephony, (2) Unified Messaging, (3) Desktop Client, (4) e-mail, (5) Instant Messaging, (6) Audio Conferencing, (7) Video Conferencing, (8) Web Conferencing, (9) Converged Conferencing, (10) Notification Service, (11) Personal Assistant, (12) Rich Presence Service, (13) Communications-Enabled Business Processes, (14) Contact Center, (15) Mobile Solutions, and (16) Collaboration.



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And as Gartner points out, all of these UC capabilities cannot possibly come from a single vendor—not in any form today, and never in a best-of-breed collection. To get the full benefits of UC, businesses need to build a UC infrastructure that can integrate the best UC applications into a seamlessly unified UC environment. After all, what UC is really about is eliminating islands of communication. You need a communications system that integrates completely and easily into your desktop environment and your business processes.

UC from the user's perspective

Users have been nibbling around the edges of UC, driven by the needs of their particular businesses and constrained by the context of their particular vendor environments. These early ventures into UC capabilities include CPE-based videoconferencing, CPE-based web conferencing, secure enterprise IM, and IM with integrated chat and voice. Ultimately, though, a complete, converged, and vendor-independent UC environment is about making you a smarter, more informed person.

For example, say you need certain information for an important bid. With presence-enabled communications, you can locate and communicate with an expert who has that particular piece of information—even while that individual is engaged in a meeting or some other activity. You can not only reach the person, but do so using a communication mode that makes the interruption less disruptive. To take it a step farther, you cannot only determine that the receiver is available for a voice conversation, but also establish that the individual is online with full display capability. Then you can drag and drop visual information into the call, basically transforming it into a collaborative web conference.

Hitachi Consulting, which is basically in the business of selling expertise, has for years been exploiting ShoreTel's distributed architecture to engage its widely dispersed experts on demand. The IT specialist has go-to-market teams of salespeople and consultants who are constantly looking for new business, and who must leverage the knowledge and experience of experts working with existing clients. When a prospective client is targeted, people across the globe can be pulled into impromptu virtual meetings

at the drop of a hat, based on their knowledge about a particular industry application and their current availability.

Today's businesses are still dealing with an inefficient mix of voice and data mini-silos. Errors get introduced as communications move among them, and a lot of information gets lost in the translation.

- **Modes:** These include real-time voice, real-time data (IM), asynchronous data (e-mail), multimedia communication (video), collaborative media (start with phone call and add other media as needed, ad hoc)
- **Locations:** Employees find themselves in a variety of different fixed and mobile locations, including office, home, hotel room, public lounge, and car or other transport.
- **Devices:** These range from traditional phones to PCs, laptops, and an ever-evolving list of more specialized digital communicators.

With such a mixed bag of technologies, it is difficult for the communication process to leverage corporate intelligence well, if at all. Similarly, the communication process is largely in the dark about who is available to resolve critical issues quickly.

What businesses need is a context-sensitive communication system that uses presence and other intelligence to offer a choice among all these types of communication, and do so in a way that is seamless and transparent to the user. From anywhere, you can see the best way to reach your target at that particular moment. And you can use whichever mode and device is most convenient, without having to hop between communication silos.

Just as importantly, you can automatically filter incoming communications by assigning priority treatment to certain individuals or organizations. You are alerted in real time to important communications while others are sent to your UC inbox as voicemail or e-mail you can deal with later. Such capability greatly increases the probability of achieving effective communication, and doing so in the most convenient and appropriate mode.

“Presence is a powerful concept that will change how we communicate...”

Presence: The UC enabler

Presence is a key component of the UC paradigm. It enables you to find the best person available for live contact, and also shows you the state of the receiver so you can choose the best or richest communications mode. Presence is an absolute prerequisite for true UC, and the gap between theory and practice persists as presence technology continues to evolve.

- **Basic presence** is simply replacing traditional telephony's dial tone with a “user tone.” While the dial tone tells you that the voice system is ready, the user tone tells you the user is ready.
- **Rich presence** combines multiple pieces of information about a user's state. For example, are you on the phone? Are you using your keyboard and thus at your computer? Rich presence also considers the various capabilities of different modes and devices. If you have a digital camera in your mobile phone and your target is sitting at a PC screen, then you can share visual information uni-directionally. If both your devices have cameras, you can communicate video information in both directions. And you can do so with few restrictions if both ends of the communication have high-end cameras, high-end displays and high-speed connections
- **Contextual presence** uses an individual's context to enhance the information provided about their availability. When people attend meetings their availability changes as they focus on the situation at hand. If you are focusing on a critical task, callers can be made to see your presence as unavailable, even though you are in your office using your computer and phone.
- **Process presence** adds another layer of abstraction, indicating the availability of someone who can fulfill a business specific role. For example, if there are three individuals in the finance department who can answer a certain question, process presence would show you whether or not at least one of them was available or, like a traditional Automatic Call Distribution (ACD) system, provide information on the estimated wait time if they are busy.

how we communicate, but its evolutionary progress is currently constrained by single-vendor solutions that serve to enhance existing products. Instead, you need a communications infrastructure that lets you assemble best-of-breed presence applications. This universal approach will also facilitate federation, which extends presence and other enhanced capabilities across enterprise and service provider boundaries to improve communications with partners, suppliers, contractors, and other third parties.

Once the presence “user tone” is established, the technologies that can exploit it are virtually unlimited. Some examples:

- **Calendar-based presence.** Your status is automatically changed by the state of your Outlook calendar. When you are in a meeting, you are unavailable.
- **Smart media.** Your presence is based on activity across multiple devices, and your availability for different media changes according to the capabilities of the device you are using at the time.
- **Network transparency.** Presence transcends the network and separates accessibility from the type of media you are currently able to accept. You are simply available or unavailable, whether you are mobile or on or off site.
- **Priority management.** Your actual presence status doesn't have to be an open book. You can assign people and groups different priority status, and give them different levels of access to you depending upon your current state.

Aligning the infrastructure

Companies that are first to exploit presence and benefit from UC will have a big competitive advantage, so aligning your enterprise infrastructure to support them is critical. The phone system is the biggest stumbling block—an unwelcoming environment that has little history as an application development platform. To recast it as such, some vendors have moved the entire phone system to open application servers. However, in large enterprise environments this involves constructing huge server farms and increasing IT staffing to add the expertise required to manage these complex server environments.

Presence is a powerful concept that will change

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General-purpose servers also decrease the reliability and availability of communications systems. The operating systems are rife with vulnerabilities, and the server hardware components—particularly the disk drives—decrease the system’s mean time between failure enormously. Only switch-based IP telephony systems are immune to these problems.

The server issues are compounded by the acquisitions path most IP telephony vendors have taken to build and enhance their voice platforms. VoIP and UC capabilities developed separately by different companies get cobbled together, often somewhat tenuously. The result is a highly complex amalgamation of discrete, disjointed components that are difficult and expensive to implement, manage, and upgrade. The slideware and Flash demos often look great, but there is no practical way for businesses to experience what they present.

The ideal IP telephony architecture for supporting UC is one that transcends the voice and data silos and is not limited or constrained by them. It offers high reliability and scalability while imposing a very reasonable total cost of ownership, and is fully distributed to enable location transparency. This IP telephony also allows easy integration of third-party communications applications, so you can build a UC environment from best-of-breed products.

Mobility: A key real-time requirement

Mobility is a critical enabler, because you can’t achieve ubiquitous real-time UC without it. It is also a major stumbling block. The wireless carriers want captive audiences inside a closed system, like the cable or satellite television systems. This creates communication barriers, especially as you move up the technology layers into enhanced applications.

Mobile UC has also been handicapped by the size and capabilities of handheld devices. With such a small display space, communications applications and client interfaces designed for desktops are often reduced to a rather truncated and crippled form. Similarly, data input can be laborious and frustrating without a full keyboard and mouse, and bandwidth limitations are a major problem on carrier networks that

haven’t been upgraded to 3G. The slower 2.5G networks have trouble doing two things at once: You can send data at some sub-100Kbps rate, or you can make a call, but not both. Such form-factor and bandwidth challenges have made it very difficult to put a telephony application—one that gives you intuitive, visual control of your calls—on a mobile phone.

Fortunately, the smartphones that are flooding into the enterprise provide a much more suitable platform for mobile client software and telephony applications—particularly when they are used in conjunction with the newer generation 3G wireless networks. Designed to provide mobile users with broadband-class services, 3G transmits voice, text, multimedia, and video data at rates ranging from 384Kbps to 2Mbps. Voice signals and data applications can run across 3G simultaneously, letting you augment or illustrate conversations with visual communication. Ultimately, 3G and its successors will enable even more advanced services for mobile phones, including video calls and seamless integration with enterprise WiFi networks.

Meanwhile, mobile phones create some additional security challenges for IP networks, because the data they are transmitting bypasses enterprise firewalls. Enterprise mobile messaging services, such as forwarded e-mail and voicemail, create opportunities for Denial-of-Service (DoS) attacks and are vulnerable to eavesdropping as messages move between the mobile device and the network. These messages must also be protected while stored on the mobile device. For example, handheld pioneer Research in Motion has taken an early lead in addressing this problem by deploying mobile firewall software that runs on its enterprise server and BlackBerry® devices. This solution provides secure policy administration, prevents DoS attacks and eavesdropping, and eliminates the risk of malicious use of information from lost or stolen mobile devices.

Such mobile security systems will protect the enterprise network by encrypting data moving between the mobile client and server, providing authentication and secure access, and preventing DoS attacks. The messages themselves as well as access to the enterprise network should be protected with device or application lockout,

“Real mobility is the ability to communicate using whatever device you have at the moment...”

stored data encryption, strong password security policies, remote device bitwipe, and remote secure policy assessment and updates. Unfortunately, we can count on the same infrastructure issues and malware that have plagued PCs and laptops to be visited on smartphones, even though the handhelds are far less open and malleable than their bigger computing predecessors. The key difference is that handheld technology is being driven by the consumer world, not the enterprise. Collectively, employees are buying these devices by the millions and bringing them into the workplace, where your ability to manage them is very limited at best.

This new model for technology acquisition is not the least bit enterprise-friendly. To implement mobile UC today, you must prioritize user needs to come up with the best subset of capabilities that will fit within the physical constraints of the handheld devices and their connections.

Real mobility is the ability to communicate using whatever device you have at the moment, and instead we see people carrying multiple mobile devices to cover all the bases. Such communications are anything but unified. What they need is mobile phones and smartphones that can serve as a full-function IP PBX extension. In this role, the mobile phone device at minimum needs to:

- Support bi-directional corporate directory dialing
- Exchange call transfers bi-directionally with the enterprise voice system
- Receive and make business calls with an enterprise number identity
- View corporate voicemail messages and cache the first few seconds for local playback
- Make all levels of presence and associated user control seen in the desktop environment available transparently to the mobile user

Mobility is really an availability issue. For example, when you are out of the office on your mobile phone, your assistant should be able to see your availability and transfer calls to you when you are free. The mobility needs to be completely transparent, with everything back at the office remaining the same. The enterprise shouldn't have to build separate silos to support mobile users or add other UC capabilities. And you should be able to change

the corporate extension call handling mode on your mobile phone as needed to manage caller access to you. “Twinning” approaches that can make your enterprise desktop phone and mobile phone ring simultaneously are a poor substitute for this type of capability.

Availability preferences are often associated with the user's current communications mode. In particular, when you are mobile, you may want to restrict your availability to certain callers and topics. However, a complete UC system should also let you define your availability by a variety of factors when you are actually in the office with a full array of communications modes at the ready.

In brief, the mobility component of UC shouldn't require users to change their behavior. Rather, it should give them the freedom to tie in whatever device and mode they have available at the moment. They should also be able to restrict access very granularly, and on an ad-hoc basis. They can be available at all times for the right level of caller, and do not have to send everyone the same out-of-office auto responder, or dump everyone indiscriminately into the same voicemail greeting.

Mobility contributes a great deal to the “reachability” aspect of UC. The integration of mobile technology into UC greatly increases both your accessibility and your ability to find the people you need quickly and easily. Mobile phones can already function as enterprise phone system extensions to some extent, enabling you to do directory dialing, and presenting your enterprise phone number as the caller ID for the calls you make. Soon mobile phones will be able to provide presence information that covers both voice and real-time data (IM), and ultimately they will support multimedia applications.

Non-real-time communications

In sheer volume, non-real-time communications such as e-mail and voicemail dwarf their real-time counterparts, and the forthcoming video mail technologies can only tip the scale even more. Simply put, they eliminate the effort it takes to synch our lives up with the individuals we want to talk to, so we trade off the impact of real-time conversations for convenience.

“Video enriches communications by engaging more of our senses simultaneously.”

As such, non-real-time communications and their superset, unified messaging will always be a huge component of UC.

In UC terms, non-real-time communications are about the integration of e-mail, voicemail, and—ultimately—video mail, using existing enterprise contact directories as a common database. To date solutions have focused on Microsoft’s ubiquitous Outlook® application, but there is a dearth of standards and commonality across them that create a lot of integration complexity. All the solutions use different APIs and have different ways of “talking” to various interfaces and processes. IP telephony vendors are working on universal connectors that will work with any API set, but they are laboring under an extreme handicap if the underlying IP telephony platform was not designed from the ground up as an open system.

A key benefit of unified messaging is the ability to view your messages out of order. You can prioritize them quickly and deal with the most important ones first. The attorneys at St. Louis law firm Lashly & Baer can look at voicemail messages in their Outlook inboxes and BlackBerry devices and spot calls from important clients, even when they are in the middle of a meeting. They can decide whether they need to disrupt the meeting to return particular calls—a capability that has enabled the century-old firm to be much more responsive to clients.

Ultimately, unified messaging could be integrated with data applications such that opening a message could trigger an immediate screen pop with information about the individual or company. For example, you call a call center and end up leaving a voicemail message because you got tired of waiting in the queue. When an ACD agent pulls up the message, your phone number automatically triggers a screen pop showing the status of your order. This saves time on both ends and reduces errors.

Ultimately, the integration will reach all levels. You could have contacts open automatically as you listen to their voicemail messages. Similarly, voicemail messages could be listed under the name of the caller rather than the phone number, making them easier to sort through.

Video communications

UC isn’t complete without video, which enriches communications by engaging more of our senses simultaneously. While desktop video is starting to make an appearance, enterprise employees still typically add video to the mix rather non-spontaneously, by booking a videoconferencing room ahead of time and then moving to it to get into the video dimension. Video won’t be a full-fledged component of UC until it is ubiquitous across desktops, laptops, and even handhelds so we can engage it on demand from our endpoint of choice and receive high-resolution images that aren’t restricted to postage-stamp size.

Video’s key contribution is letting us interact more completely with people we can’t see in person. We can “meet” with remote individuals from wherever we happen to be. To accomplish this in the foreseeable future, video needs to support a range of resolutions, have low latency, and be tolerant of network quality issues. Meanwhile video—as a real-time and high-bandwidth application—is still rather fragile on IP networks. Network disruptions cause display blocking and information loss, and suddenly you are spending the meeting tweaking the video instead of focusing on business.

ShoreTel® and other vendors are working on technologies that will make video more network-friendly, easier to use, and higher resolution. Once video comes of age, smart media emerges. You will be able to engage in video communication or any other type as easy as making a phone call, with the session taking place in the media that is available and preferred by both users.

Mixed-mode communications

Mixed-mode communications illustrate the remarkable flexibility of IP telephony and UC. The participants in a given communication session can be using different types of devices, and advances in technologies such as voice-to-text and text-to-voice conversion mean that they can even be using different modes. You can reach out and interact with others in the richest way(s) supported by each party’s current situation. By not having to match up endpoint circumstances and connection types, you replace the current norm—leaving a voicemail or e-mail message and hoping for the best—with an actual interaction.

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Similarly, mobile participants will be able to shift seamlessly among modes as a conversation progresses. As you enter your office, calls get automatically handed off from the cellular network to your enterprise WiFi network or your desk phone. And the same process can occur in reverse when you have to leave the office during a conversation, or when you are moving to or from your home while talking.

Today we have separate tools for different types of communications, and each has its own place to store a duplicate set of contacts. As mixed-mode UC evolves, we will get a unified directory with one entry per contact, a consolidated view of presence across all media, and ultimately a single tool for initiating communications across multiple media types. Support for mixed modes also means we can share documents spontaneously in the middle of a conversation, and not just during a scheduled meeting.

The right architecture for real UC

Most IP telephony systems are essentially retrofits of technologies originally designed for a different purpose—either traditional data communications or traditional telephony. This fundamental flaw has been compounded by aggressive enhancement-through-acquisition policies resulting in patchwork platforms with very apparent and often disabling seams. Different UC capabilities may have their own interfaces, some of them resembling crude e-mail clients from many years ago.

In sharp contrast, ShoreTel was not only designed from the ground up as an IP telephony system, but conceived with UC capabilities and business process integration in mind. Consequently, ShoreTel is UC-friendly at its very core. ShoreTel's uniquely and fully distributed voice system makes presence available throughout the network. It is also an open system that is pre-integrated with Outlook and includes open APIs for integration with other applications.

While other IP telephony systems implement presence through interaction with ever-longer and increasingly unwieldy buddy lists, ShoreTel delivers just-in-time presence. As you type in the first couple of letters of your target's name, ShoreTel starts matching them up with names in the directory, and the presence information is displayed immediately along with the names. In short, targeted information about specific people is made available just when you need it.

ShoreTel's ShoreWare® Operator Call Manager software gives Napa County operators at the Superior Court of California key information and control capabilities that enable them to provide callers with an unusual level of personalized attention. Even before answering an incoming call, the operator sees a call-routing log displaying the caller's history within the system. A call-transfer screen also reveals which appropriate court employees are currently available, so the operator doesn't send calls to extensions that are busy. With the complete organization at their fingertips along with knowledge about the calling and called parties, the operators can help the court to run more efficiently.

Since its first release in 1998, ShoreTel has quietly been enhancing the information you have at your fingertips by delivering UC capabilities before UC existed as a technology category. In the initial release, ShoreTel's award-winning ShoreWare Personal Call Manager user interface incorporated presence and the system had integrated voicemail so incoming calls always got answered in some manner. The following year, ShoreTel became the first IP telephony system to ship with unified messaging capabilities built in, through support of Microsoft Outlook. The ShoreTel IP telephony system is renowned for its ease of use and management, and the UC capabilities are delivered in this same vein. They are embraced enthusiastically by all users—even the most committed computerphobes—and are not just check-off features no one ever actually uses. ShoreTel's IP telephony system capabilities also stand out for their reliability.

Not limited by the siloed approach used in other IP telephony solutions, ShoreTel can support best-of-breed UC applications from third parties. ShoreTel's architects started at the drawing board with the goal of integrating the entire user computing and communications experience, and making UC capabilities easy to use. They built a platform that sits on top of the IT infrastructure and integrates telephony and data.

ShoreTel was the only vendor that used Computer Telephony Integration (CTI) technology and interfaces to build its own IP telephony system. The ShoreTel platform includes APIs that are used by ShoreTel applications and by third-party developers, and make the integration of UC applications very easy.

“The ideal platform for UC in general is a fully converged IP telephony environment which includes some best of breed UC capabilities and can easily incorporate others from third parties.”

“We can turn around complex custom applications for our customers using the ShoreTel system in a very short period of time and for a lot less money than competing platforms because of its open architecture and ease of integration,” reports Jim Lewis, president of voice and data integration specialist PlanIT Solutions. PlanIT has integrated ShoreTel IP telephony with a variety of off-the-shelf and custom software, including ACT! and Goldmine CRM applications and a unique Do-Not-Call application for telemarketing companies.

In fact, this unique design enables ShoreTel to provide very cost-effective application integration services—typically for fees that have two or three fewer zeros than those you pay on competing platforms. ShoreTel supports Microsoft’s CTI APIs, and now includes native support for Session Initiation Protocol (SIP). Thus, ShoreTel can deliver comprehensive, integrated UC capabilities whether you are a Microsoft-centric shop or not.

Conclusion

UC is a spectrum of capabilities that are not all available from any one vendor. You will have to mix and match to get all of them, and there is no practical way to integrate this collection into most existing IP telephony environments. IP telephony platforms that were not designed with UC in mind are tacking UC capabilities on piecemeal, with all the attendant complexity, cost, and reliability problems that such an approach entails. Imagine trying to manage this mess while adding some of the more advanced UC technologies on the horizon, such as context sensors and business activity monitoring.

A lot of the buzz at IP telephony gatherings is now focusing on business process integration, which will be a lot easier to implement on an IP telephony system designed from its inception with such a capability in mind. The ideal platform for UC in general is a fully converged IP telephony environment which includes some best-of-breed UC capabilities and can easily incorporate others from third parties. ShoreTel was the first to make some key UC capabilities—presence, voicemail, and unified messaging—an integral part of an IP telephony system. UC is really a name for what ShoreTel has been doing all along.



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