



Getting the Foundation Right: Unified Communications

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

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1. Get Ahead with Unified Communications

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 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. However, 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.

While these 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.

Just what is this full palette? Analysts at industry research firm Gartner have identified 16 features that comprise a complete UC solution:

1. Telephony
2. Unified Messaging
3. Desktop Client
4. E-mail
5. Instant Messaging (IM)
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
16. Collaboration

To get the full benefits of UC, businesses need to build an infrastructure that can integrate the best applications into a seamless UC environment. After all, UC is really about eliminating islands of communication. A communications system that integrates completely and easily into your desktop environment and your business processes can help transform the way you work and communicate.

Hitachi Consulting is in the business of selling expertise, and has been using ShoreTel's distributed architecture for years to engage its widely dispersed experts on demand. IT specialists have 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, ShoreTel enables Hitachi salespeople to pull specialists from across the globe into impromptu virtual meetings at the drop of a hat, based on their knowledge about a particular industry application and their current availability.

2. 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. Early UC adoptions include video conferencing and Web conferencing using customer-provided equipment (CPE), secure enterprise IM, and IM with integrated chat and voice. Ultimately, though, a complete, converged, and vendor-independent UC environment is about ensuring users have all the collaboration tools they need to improve efficiency and increase productivity.

For example, suppose 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 another activity. Not only can you reach the person, but you can do so using a communication mode that makes the interruption less disruptive. To take it a step farther, not only can you determine if someone is available for a voice conversation, but you can also know if the individual is online with full display capability. If so, you can drag and drop visual information into the call, transforming it into a collaborative Web conference.

Despite the clear advantages of UC, many organizations today are still dealing with an inefficient mix of voice and data silos. Errors are introduced as communications move among them, and information gets lost in translation.

There are three main communications components:

- **Modes:** These include real-time voice, real-time data (IM), asynchronous data (e-mail), multimedia communication (video), and 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 communications tools.

To effectively leverage these communications components, organizations need a context-sensitive communications system that uses presence and other intelligence to offer a choice among all these types of communications, and do so in a way that is seamless and transparent to the user. From anywhere, users can leverage corporate intelligence to see the best way to reach someone at that particular moment, and then use whichever mode and device is most convenient, without having to hop between communication silos.

Just as importantly, users can automatically filter incoming communications by assigning priority treatment to certain individuals or organizations. Alerts are sent in real time to

users regarding important communications, while other communications are sent to the UC inbox as voicemail or e-mail to be dealt with later. Such capabilities greatly increase the probability of achieving effective communication, and doing so in the most convenient and appropriate mode.

3. Presence: The UC Enabler

Presence is a key component of the UC paradigm. It enables users to find the best person available for live contact, and view their status, so users can choose the most appropriate communication mode. Presence is an absolute requirement for true UC, and is available in several ways:

- **Basic presence** is simply replacing traditional 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 they on the phone? Are they using their keyboard and thus at their computer? Rich presence also considers the various capabilities of different modes and devices. If you have a digital camera in your mobile phone and the person at the other end of the conversation is sitting at a PC screen, you can send photos from the camera phone to the PC. If both your devices have cameras, you can send photos 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 presented with your presence as unavailable, even though you are in your office using your computer and phone.
- **Process presence** adds another layer of visibility, 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 shows you whether or not at least one of them was available or, provide information on the estimated wait time if they are busy, like a traditional Automatic Call Distribution (ACD) system.

Presence is a powerful concept that is changing 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 also facilitates federation, which extends presence and other 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. Here are 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 currently using.
- **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 offsite.
- **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.

4. Aligning the Infrastructure

Companies that are first to exploit presence and benefit from UC have a big competitive advantage, so aligning your enterprise infrastructure to support UC is critical. The traditional phone system 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.

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 disk drives—decrease the system’s mean time between failures (MTBF) considerably. 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. Voice over IP (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 voice and data silos and is not limited or constrained by them. It offers high reliability and scalability at a very reasonable total cost of ownership, and is fully distributed to enable location transparency. This IP telephony architecture also allows easy integration of third-party communications applications, so you can build a UC environment from best-of-breed products.

5. 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 challenge to implement. Wireless carriers want captive audiences inside a closed system, like 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, communication 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 2G networks have trouble doing two things at once: you can send data at a sub-100 Kbps rate or 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 384 Kbps to 2 Mbps. 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 additional security challenges for IP networks, because the data they are transmitting typically 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 (RIM) 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 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, 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 the 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. Mobility needs to be completely transparent, with everything back at the office remaining the same. The enterprise shouldn't have to build separate systems 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 communication 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 directory dialing, and presenting your enterprise phone number as the caller ID for the calls you make.

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. This was important for the attorneys at St. Louis law firm Lashly & Baer who can now look at voicemail messages in their Microsoft 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.

6. Non-Real-Time Communications

In sheer volume, communications that are not in real time, 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 the impact of real-time conversations for convenience. As such, communications that are not in real time and their superset, unified messaging, will always be huge components 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. Many solutions have focused on Microsoft’s ubiquitous Outlook application, but there is a dearth of standards and commonality across them that create integration complexity. These solutions use different APIs and have different ways of “talking” to various interfaces and processes. IP telephony vendors are working on universal connectors that 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.

Ultimately, unified messaging can be integrated with data applications so that opening a message triggers an immediate screen pop-up 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.

Eventually, 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.

7. 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, many enterprises require their employees to book a video conferencing room to take advantage of this collaboration tool. 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.

The key contribution of video is its ability to enable us to 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 must support a range of resolutions, have low latency, and be tolerant of network quality issues.

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 exceptional 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 and knowledge about the calling and called parties, the operators help the court to run more efficiently.

8. Mixed-Mode Communications

Mixed-mode communications illustrate the remarkable flexibility of IP telephony and UC. The participants in a 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.

Similarly, a mixed-mode UC platform enables mobile workers to shift seamlessly among modes as a conversation progresses. As you enter your office, calls are automatically handed off from the cellular network to your enterprise WiFi network or your desk phone. And the same process occurs 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 see 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.

9. 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 that result 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, the ShoreTel system 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 unique and fully distributed voice system makes presence available throughout the network. It is also an open system that is pre-integrated with Microsoft Outlook and includes open APIs for integration with other applications.

"We can turn around complex custom applications for our customers using the ShoreTel UC 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," said 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.

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.

Since its first release in 1998, ShoreTel has been enhancing the information available at your fingertips by delivering UC capabilities before UC existed as a technology category. In its initial release, ShoreTel's award-winning ShoreWare Personal Call Manager user interface incorporated presence and offered integrated voicemail to help ensure incoming calls were answered. 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 UC system is renowned for its ease of use and management, and the UC capabilities are embraced enthusiastically by all users—even the most committed technophobes. ShoreTel's UC 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 to use 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.

In fact, this unique design enables ShoreTel to provide very cost-effective application integration services. ShoreTel supports Microsoft's CTI APIs, and now includes native support for Session Initiation Protocol (SIP). This enables ShoreTel to deliver comprehensive, integrated UC capabilities whether you are a Microsoft-centric shop or not.

10. Conclusion

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 already complex infrastructure while adding some of the more advanced UC technologies on the horizon, such as context sensors and business activity monitoring.

As the focus of the UC industry now turns to business process integration, organizations find it easy to implement UC solutions 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 best-of-breed UC capabilities and can easily incorporate others from third parties. ShoreTel was the first to make key UC capabilities—presence, voicemail, and unified messaging—an integral part of an IP telephony system. UC is simply just another name for what ShoreTel has been doing all along.



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