Accelerating Unified Communications with an Enterprisewide Architecture

by Zeus Kerravala | June 2010

Executive Summary

The communications industry has touted VoIP and unified communications (UC) as technologies that can raise the bar on worker productivity and transform the way they collaborate. However, despite much industry hype, most UC applications revolve around basic conferencing services and unified messaging. More strategic UC applications, such as presence and mobile integration, remain near the bottom of the deployment list. This raises the question: If UC has so much corporate value, why hasn't it been adopted more readily?

The answer lies in the underlying architecture used to support UC. Traditional communications systems are highly siloed, closed systems that must be deployed on a location-by-location basis. Although these systems met the communications challenges of our work environment 30 years ago, they cannot scale for today's increasingly mobile and remote work force. To support today's business challenges, a new architecture for communications is required—one that is:

- **Standard:** It should be built on industry standards such as SIP and XML to allow for multivendor interoperability and long-term scalability.
- **Loosely coupled:** It should be designed as a set of loosely coupled application objects, similar to a company's Web or IP application infrastructure.
- **Three-tier:** It should use a three-tier architecture that decouples users and their devices from systems and applications.
- **Centralized:** It should deploy UC services and applications centrally and distribute them from the corporate data center over the company network to all remote workers and branch locations.

This report defines UC and the business needs that drive it, raises awareness of the challenges associated with UC deployment and defines what a new UC architecture should look like. Finally, we provide the reader with insights into how best to choose a solution vendor and pursue the next steps in UC deployment.

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I. UC Enables the Anywhere Enterprise

Organizations have torn down their corporate walls and are moving toward becoming Anywhere Enterprises—globally integrated companies that are networked together and productively combine a variety of constituents (for more information on the definition and evolution of an Anywhere Enterprise®, see the March 2007 Yankee Group Report "Consumers Define the Anywhere Enterprise"). Employees, partners, suppliers and customers are all important components of an Anywhere Enterprise. They need the ability to communicate faster and more collaboratively over a variety of devices and media.

Over time, organizations have deployed myriad communications tools to help people communicate better with one another. These tools include telephony systems, conferencing, collaboration tools, e-mail and a number of other communications devices and applications.

Although these tools address the need for faster communications, few of them are linked together. This disconnect creates a manageability headache for workers and IT departments, hindering their productivity.

To achieve their full potential, organizations need to communicate and collaborate better. Competitive advantage is no longer about any single person or core capability. Today, the ability of the entire extended enterprise to communicate and collaborate with each of its constituents in real time forms the basis for competitive advantage. The technology inefficiencies created by having multiple communications tools are a significant challenge for workers trying to collaborate better. Organizations have turned to UC as a method of meeting this challenge.

UC Defined

UC brings all of a company's communications and collaborative capabilities together. It improves the company's manageability and effectiveness and makes it more responsive and agile. UC enables enterprises to achieve their full potential and ultimately gain an advantage over the competition.

UC is the convergence of all forms of audio, video, Web, desktop and mobile communications on an IP network that breaks down all distance, time and media barriers. UC enables people to communicate with each other anywhere, any time, over any device.

The Yankee Group taxonomy for UC is based on the concept that there are two foundational UC elements and a number of other related, but optional applications. The foundational elements of UC are:

- **Presence:** This is the ability to understand another user's availability and communications preference. Consumer instant messaging (IM) tools have raised users' awareness of presence, but have incorrectly linked it to chat. In fact, presence can be associated not only with users, but also devices, such as medical equipment, alarm systems and event documents, to accelerate workflows and business processes.
- **VoIP:** In the long term, voice services will be embedded in almost every business application. Because of this, we see VoIP as a critical component of UC and one of its foundational technologies. The reliability, scalability and security requirements now associated with voice will be extended to the applications and media needed to deliver all forms of UC.

Optional UC components include the following:

- **Voice mail:** Voice mail has been a standard telephony feature for years and is widely deployed through small and large businesses. Innovation in the UC space has been to provide a single voice mail box that is accessible from multiple devices—inclusive of voice mail, voice mail via text to speech, e-mail, etc.
- **E-mail:** Many UC components will be integrated into e-mail, another widely deployed application.
- **Unified messaging:** The convergence of voice mail and e-mail, this is the most basic form of non-real-time UC and has been around for over a decade.
- **Mobile client:** Enterprise mobility is rapidly becoming a key driver for UC. A robust mobile client enables users to access their UC tools from their mobile device.
- **Fixed-mobile convergence (FMC):** FMC enables a worker to seamlessly move calls between the desktop and mobile phone, as well as maintain the state of a call between cellular and wireless LAN networks.
- **Integrated multimedia conferencing:** Conferencing applications have been around for more than a decade, but only recently have the solutions been integrated by UC providers. This includes video, Web and audio conferencing.

- **Chat/IM:** IM started in the consumer world, but it rapidly evolved into a corporate tool. It is widely deployed in enterprises as a secure, corporate communications solution.
- **Contact center integration:** The contact center was an early adopter of integrating telephony into business applications. Providing screen pops and other enhanced telephony features has enabled contact center agents to streamline and improve the customer service process.

These are the main components of UC, but under the Yankee Group taxonomy, other telephony or presence-enabled applications such as speech recognition and telecommuter solutions such as soft phones or click-to-call can be included. Exhibit 1 shows the penetration rate of UC applications to date.

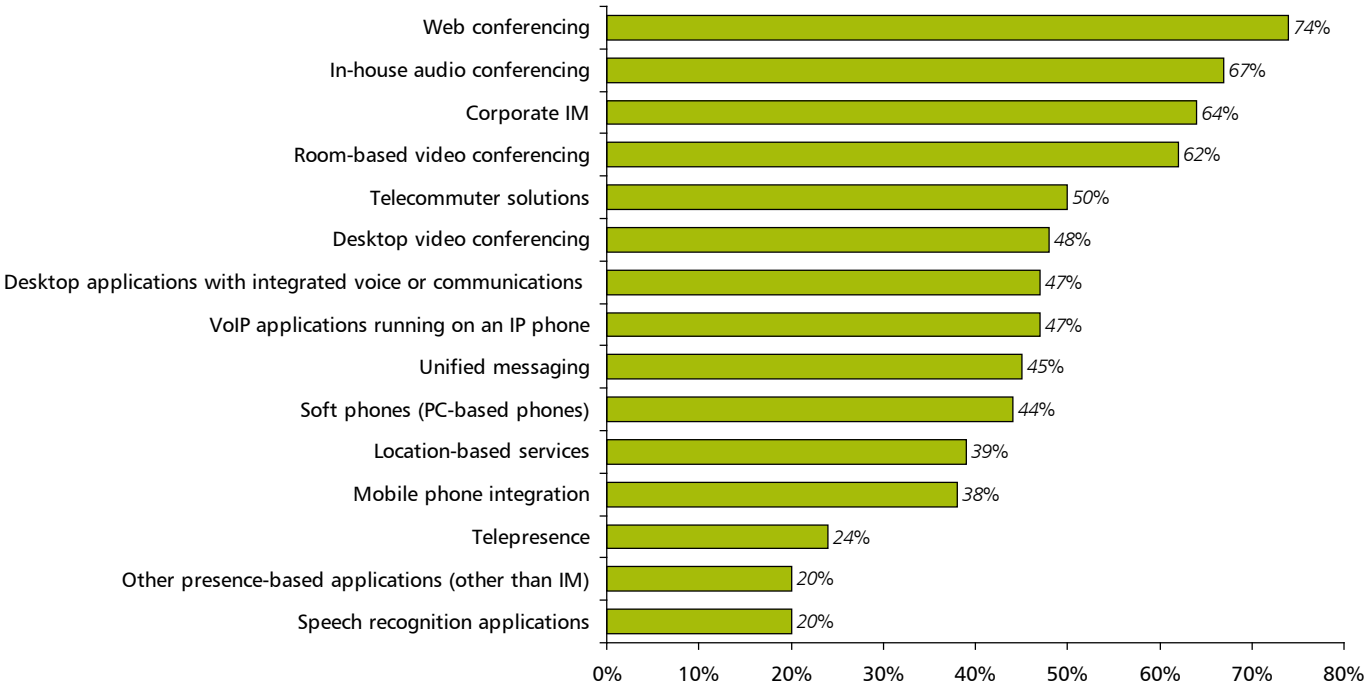
As the market evolves, the definition of UC will further expand. The value proposition of UC is multifaceted, and it is one of the few technology initiatives that can help organizations lower overall IT costs while improving user productivity. Specifically, UC can:

- Lower the cost of corporate communications
- Improve worker productivity through advanced collaboration tools
- Create new communications-enabled business processes
- Improve customer satisfaction

Historically, UC was considered a cost-saving initiative. Over time, however, the focus of the value proposition changed. Although cost savings still remains a big part of the decision to move to UC, especially in today's tough economic climate, UC's real potential is as a foundation for fundamentally changing business and building long-term competitive advantage. UC will evolve from providing seamless communications to being embedded in corporate applications, allowing companies to create communications-enabled business processes. These communications-centric processes will streamline or even automate many tasks, eliminating much of the human delay we see today.

Exhibit 1: Basic UC Applications Are Most Widely Adopted

Source: Anywhere Enterprise—Large: 2009 Transforming Infrastructure and Transforming Applications Survey, Wave 1-12



II. The Challenges in Deploying UC

Despite its benefits, UC deployments remain low. As Exhibit 1 shows, most UC applications revolve around conferencing services and unified messaging. More strategic UC applications, such as presence, mobile integration and video, remain near the bottom of the list.

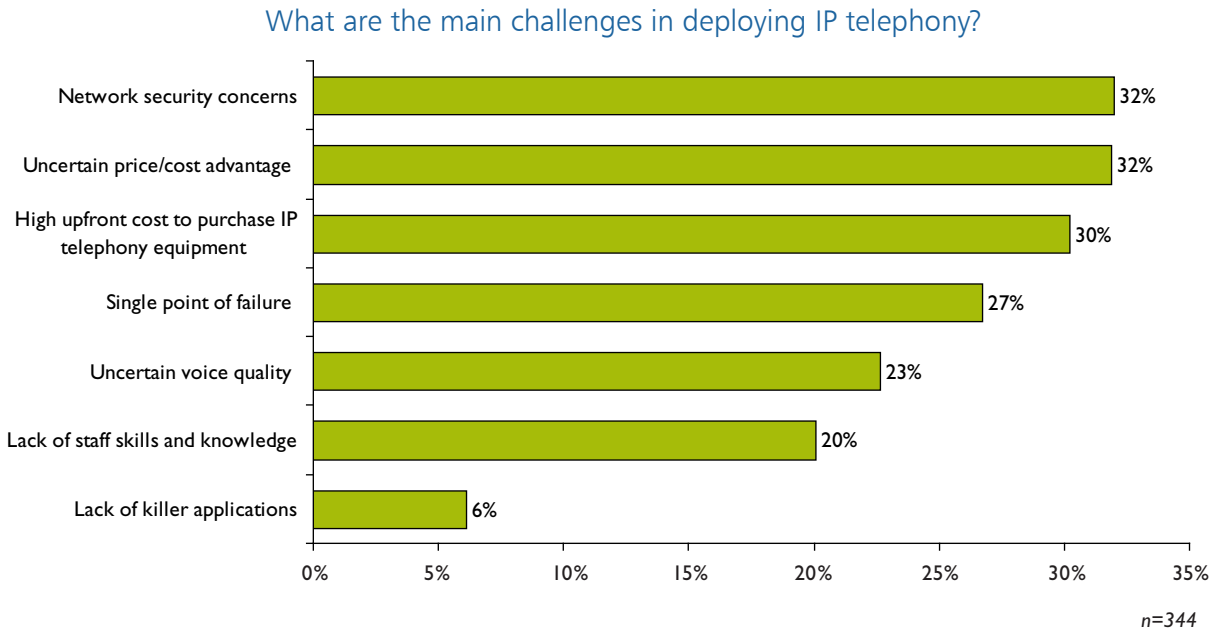
UC is a software, IP-based application that requires a different deployment architecture than traditional communications. Using the same communications architecture employed by traditional voice services adds complexity that drives the cost of the UC solution up to the point where the cost exceeds its value to the organization. Almost a third of the respondents to Yankee Group's Anywhere Enterprise—Large: 2008 U.S. Fixed-Mobile Convergence/IP Communications Survey cite uncertainty about the price/cost advantage of UC as the No. 1 inhibitor to deploying IP-based telephony, an important component of UC (see Exhibit 2). Additionally, 30 percent of the survey respondents cite the high cost of upgrading the voice infrastructure as a barrier to UC deployment.

One of the main reasons cost has become an issue is that many UC vendors, most notably vendors that tie their solutions to the network infrastructure, promote a "rip and replace" strategy that requires the deploying organization to remove every old PBX and replace it with a new IP PBX. The truth is this strategy limits the value of the deployment. To understand the problem better, the traditional deployment method needs to be reviewed.

Traditional TDM voice services run at Layer 2 of the OSI stack, and that means they are confined to the LAN. Because they cannot traverse the WAN, they require a PBX for each location. In the past, each location within a traditional TDM voice setup often held decision-making authority over its voice infrastructure, purchased its own local maintenance contract and chose its own vendor. As a result, no corporate standard existed. The problem with making decisions on a location-by-location basis is that features and user experience vary from location to location, making working in smaller remote locations or locations that just have earlier software releases very difficult. Traditional PBXs met the business challenges when workers tended to be in fewer, larger locations, but they do not meet the challenges of a continually growing mobile work force.

Exhibit 2: Security and Cost Are Top UC Challenges

Source: Yankee Group's Anywhere Enterprise—Large: 2008 U.S. Fixed-Mobile Convergence/IP Communications Survey



As companies go through a UC deployment, the following challenges cannot be overcome using an architecture designed for TDM-based PBXs:

- **Location-dependent features and functions:** Because infrastructure decisions tend to be made on a node-by-node basis, telephony features tend to vary between branches, creating a highly inconsistent user experience.
- **Inefficient use of IP:** Many organizations Yankee Group interviews tend to use VoIP only on the LAN. Calls over the WAN go through a gateway and then out over the PSTN. The IP network is only minimally leveraged, so the promise of IP communications is not fully realized.
- **Heterogeneous, multivendor environments with a mix of TDM and IP that won't scale:** Although the traditional node-by-node deployment model allows for companies to run a variety of PBX and IP PBX systems, the deployment will always be a collection of independent boxes rather than a "system," where consistent features and functions are delivered across the organization.
- **The transition to IP needs to be a "hot cutover":** If an organization follows the traditional deployment architecture, a typical deployment tactic is to remove the old PBX and put in a new IP PBX. However, this simply replicates all the problems that traditional systems had and gives none of the benefits of having the systems run at the IP layer.
- **Limited ROI:** Using an architecture made for traditional systems requires a heavy up-front investment in capital equipment because each branch requires new hardware. This can delay the VoIP ROI for several years.
- **A long road to UC:** Deploying UC will be very difficult if a traditional deployment model is followed because each system will have its own upgrade path to UC and different UC tools. This means the ability to share information across the systems will be limited.

There are many benefits for companies that choose to move to VoIP and UC. However, a new deployment architecture is needed for companies to realize UC's full benefits.

III. A New Architecture for UC

UC and VoIP are not like traditional voice services, so the underlying architecture that supports them needs to change. As discussed in the previous section, traditional voice runs at Layer 2 of the OSI stack, meaning it doesn't have the ability to run over a WAN. For this reason, each location needs its own infrastructure. Conversely, IP-based applications tend to be centralized and then distributed over an organization's WAN. Take, for example, a Web-based application. The Web runs at Layer 3 of the OSI stack, or the IP layer, meaning it has the ability to traverse the entire length of a network as long as it's configured correctly. When an organization deploys a Web application or any other IP-based corporate application, the servers are centrally located in the company's data center and the endpoints (laptops, PCs, mobile phones, etc.) make a request back to those servers to fetch the required information. It doesn't matter where in the world the user or the servers are, the communications between the client and servers work because of IP.

The new architecture needed for UC would follow the same deployment model of today's Web- and IP-based applications, using a centralized architecture based on standards-based, loosely coupled components. In this architecture, telephony and other UC services would be centrally deployed services that could be distributed to remote locations over the WAN, just like other corporate applications. This type of centralized architecture is significantly simpler than traditional voice architectures and will scale with the organization. The architecture is characterized by:

- Communications applications deployed centrally in corporate data centers and distributed over the IP network
- Foundation based on industry standards such as SIP and XML
- Three-tiered architecture that removes the dependencies among the user devices, access points and applications
- Support for multivendor environments, and mixed legacy and new IP systems
- Ability to add new features incrementally without having to forklift upgrade
- Use of central SIP trunking that is shared across the enterprise, reducing the need for local trunking at separate locations

- Ability to securely bring more advanced SIP-based consumer, service provider and cloud services into the enterprise

This type of architecture is essentially the enterprise equivalent of what service providers have had in place for IP multimedia subsystem (IMS) deployments for years. Using a more loosely coupled architecture lets service providers roll out new services to millions of subscribers globally. Enterprises need to become service providers themselves and leverage similar principles and ideas to more easily serve their own people, wherever they are. Using the same SIP standards within the enterprise will also simplify the connection between enterprise communications and external service providers—starting with SIP trunking but expanding to rich media services in the future.

This new UC architecture offers many benefits, primarily due to overall design simplification (see Exhibit 3). With a traditional architecture, connections need to be made between every location, creating a management burden. With a Web architecture, all of the data is sent back through a centrally managed infrastructure. This type of architecture delivers the real value of IP because it is truly manageable, another key to successful deployment and adoption of business-critical UC applications.

Typically corporate benefits from IT projects fall into one of two categories: they help companies save money, or they improve user productivity. Deploying a new UC architecture will actually accomplish both for organizations, while also providing a foundation for the future.

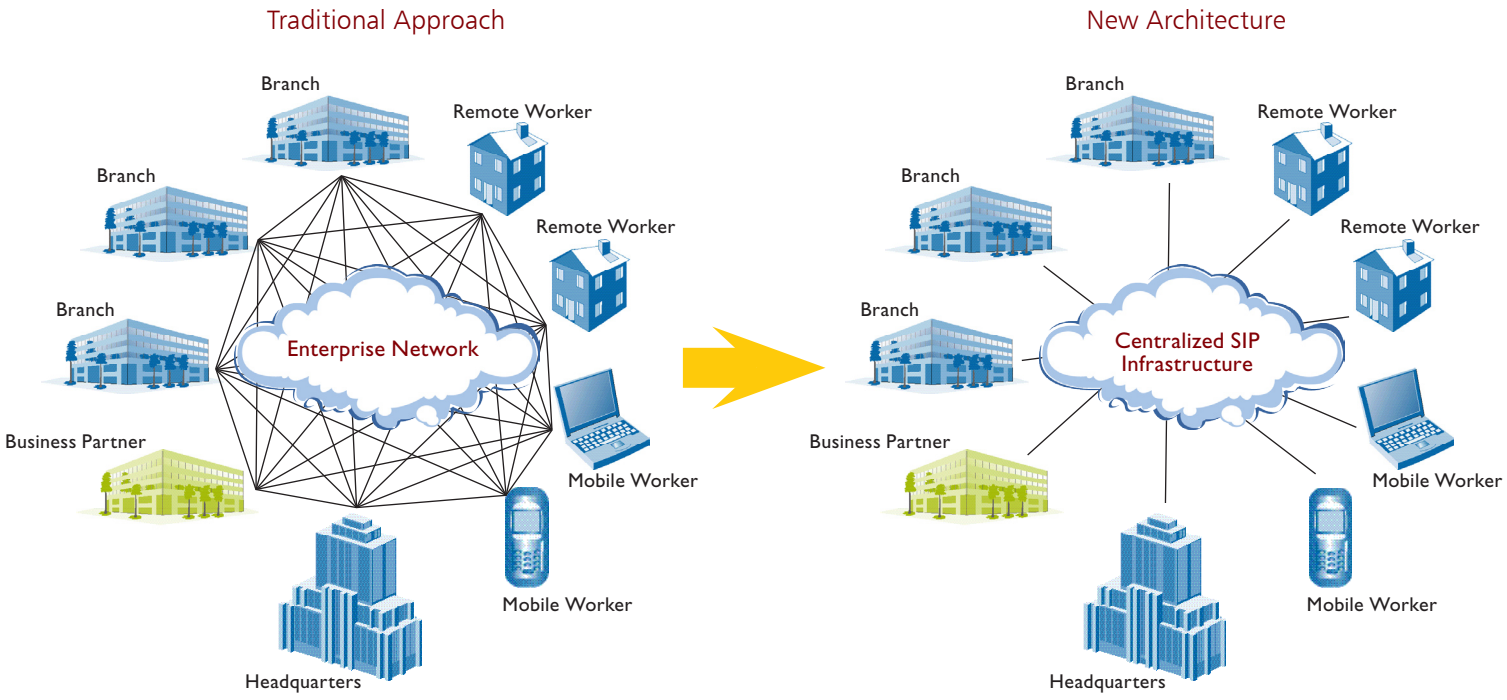
Immediate Cost Savings

By deploying UC with a more Web-like architecture, companies will realize immediate cost savings. In this current economic climate, it's important that all IT projects deliver immediate payback. Some of the more impactful areas of savings are listed below:

- **Corporatewide, on-net calling:** Although long-distance rates have fallen by orders of magnitude during the past 10 years, some organizations still spend millions of dollars every year making calls between locations. This new, IP-based architecture enables organizations to have all office-to-office telephone calls ride over the corporate data network, similar to other applications.

Exhibit 3: UC Architectures, Before and After

Source: Yankee Group, 2009



- **Least cost routing:** On-net calling addresses calls that are made between locations, but companies also make a significant amount of calls to numbers that are off-net. A global, least cost routing plan allows a corporate, off-net long-distance call to ride the corporate network to the closest egress point, saving on long-distance toll charges. For example, if a worker in the U.S. wants to call a customer in Japan, where the company also has an office, the call could be sent from the U.S. across the corporate data network to Japan, and then terminated as a local call.
- **Reduction in trunk lines:** With traditional voice architecture, each location has dual trunks connecting the office to the PSTN. That means a company with 500 locations would have to purchase 1,000 trunk lines to provide telephony service to every site. Using an IP-based architecture, a company could purchase a reduced number of centralized SIP trunks and have all off-net calls exit the corporate network through these centrally managed shared trunks whenever possible. Depending on the organization and the location of the offices, this can reduce trunking costs by as much as 90 percent and save companies millions of dollars every year.
- **Integration with legacy systems:** Because the new architecture is built on IP and SIP, the new system can easily integrate with legacy systems from multiple vendors through the use of cost-effective SIP gateways. Traditional architectures force organizations to either replace all their systems at once or have no interoperability between the old systems and the new ones. Enabling legacy and IP systems to be mixed allows companies to migrate to new technology at their own pace.

Improvements in Employee Productivity

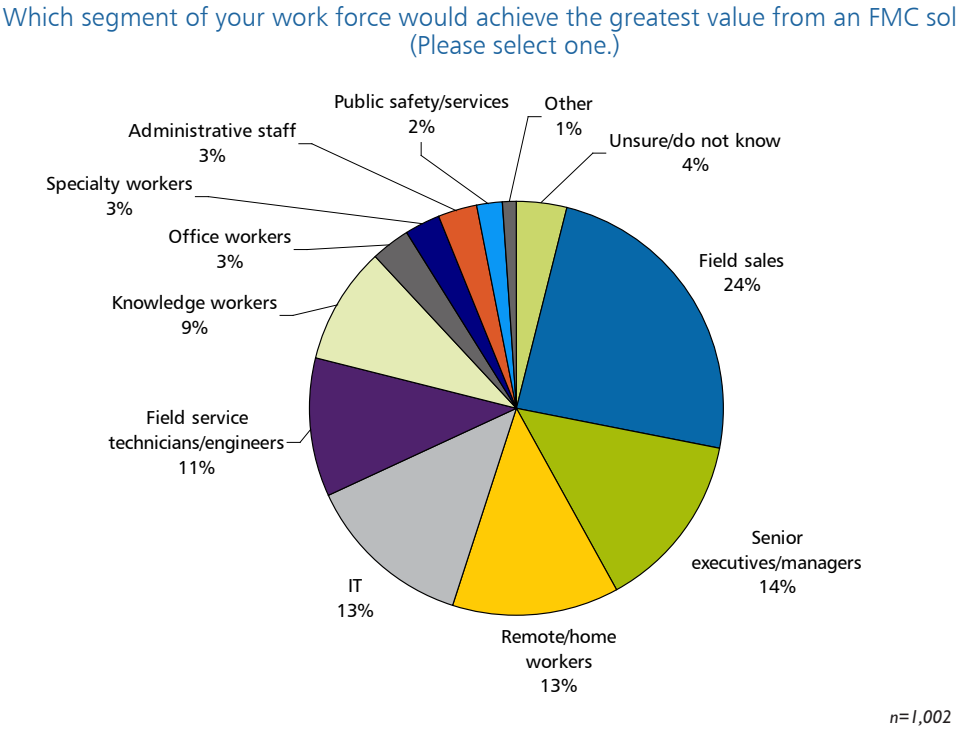
- **Simplification of communications-enabled business solutions:** A new architecture based on service-oriented architecture (SOA) and Web services allows for end-user communications, mobility and collaboration applications to be quickly created. Additionally, application centralization lets apps be deployed to business users over any device and platform, no matter where the worker is located.
- **Video to every desktop:** Companies have experimented with video for decades, but until recently, the technology has been too difficult and the experience too fickle to make it practical to deploy to every worker. However, broader use of video is on the way due to the following:
  - **New UC architectures based on SIP can provide plug-and-play management and control of high-definition (HD) video**. The architecture can also enable employees to connect in real time with other individuals, making starting a video conference as easy as sending an IM. SIP interoperability allows for the integration of various UC elements such as presence, voice, IM, video and even social media, and can deliver a seamless end-user experience across desktop and mobile endpoints. This architecture can also serve as the foundation for nimble collaboration solutions that support virtually any combination of media and that utilize SIP-based sessions to simplify gathering people.
  - **New UC architectures leverage video endpoints at the desktop and on a PC**. Video has traditionally been viewed as a luxury or boardroom tool, and much of the recent industry focus has been on high-cost telepresence rooms. That focus is changing today. With UC architecture evolving to become enterprisewide, this new flexibility enables desktop video endpoints, PC soft clients and group systems to deliver HD-quality ad-hoc video conferencing to almost any desk worker, enhancing productivity at a low TCO.
- **Consistency of communications services, regardless of location:** In older architectures, infrastructure was deployed on a case-by-case basis and not all services were accessible in the same way or available in all locations. A centralized UC architecture, however, ensures the same services are accessed the same way in all locations.

- **Support for mobile workers:** Yankee Group's Anywhere Enterprise—Large: 2009 Transforming Infrastructure and Transforming Applications Survey, Wave 1-12, reveals that more than 17 percent of the work force is remote or mobile. Additionally, mobile workers are becoming increasingly diverse. Exhibit 4 shows how UC solutions, like FMC, can benefit more than just the traditional mobile worker. The new architecture allows for seamless integration with mobile devices, providing the mobile worker with a number of benefits such as:
  - A single phone number across fixed and mobile devices
  - Access to corporate information, such as presence information or corporate directories, when mobile
  - Seamless roaming across independent wireless and wired networks
  - Consistent user experience across mobile and desktop devices
- **Improved customer service:** An architecture based on open systems allows for the integration of front-office, back-office, contact center and sales information, as well as any other customer-relevant departments. This ensures that any worker who is communicating with a customer has the best available information and can reach the best associate in the enterprise to better support the customer request. It also ensures that when another worker is dealing with the same customer, the information provided is consistent.

The new architecture also opens the door for context-based customer service, which can enable businesses to leverage real-time persistent context to anticipate customer needs. It can also simplify automating manual processes through the development of communications-enabled business systems-based applications (enhancing voice and Web self-service).

Exhibit 4: Mobile Workers Are Increasingly Diverse

Source: Yankee Group Anywhere Enterprise—Large: 2009 Transforming Infrastructure and Transforming Applications Survey, Wave 1-12



Foundation for the Future

A final set of benefits for companies choosing to deploy a new architecture for communications is that it drives enterprise agility by accelerating and enhancing UC deployments for the future by providing:

- **A scalable foundation for UC services**. Deploying UC using traditional communications architecture means the UC services a company chooses to deploy may be limited to a single location. A new architecture based on Web design provides an enterprisewide platform for organizations to deploy UC applications, enabling them to roll out a variety of easy-to-manage services at their own pace.
- **Multivendor integration**. Because the deployment is based on open standards, the new architecture allows products from multiple vendors to work together. It enables an organization to choose best-of-breed solutions rather than being locked into one vendor for UC services. For example, a company may choose to use Cisco for network infrastructure, Avaya for communications services, Microsoft for desktop clients, IBM for collaboration and Polycom for video.
- **Faster deployment of UC services**. Because the UC services are centrally located and distributed to all workers over the corporate network, users can reach these services much faster than with a traditional architecture, regardless of how they access the corporate network. This means to deploy any new service, the IT department simply needs to upgrade or add the new service in one central location to make it available to all users.
- **Endpoint innovation and flexibility**. A centralized, enterprisewide deployment opens the door for many innovative endpoints because of the way applications are delivered from the core. SIP endpoints can automatically find the centralized call control and directly register themselves. This is a highly resilient process as well, since endpoints can register with multiple communications servers. If a communications server or trunk access failure occurs, such redundancy provides them with almost immediate service recovery.
- **Rapid response to corporate change**. As companies merge, consolidate or resize, they have to integrate and change applications to meet new work force needs. This requires both interoperability between existing applications, and the ability to more rapidly provide standard corporate applications to new or relocated workers.
- **Improved customer service**. One of the important objectives of UC is empowering people and organizations to better serve their customers. An enterprisewide architecture enables much richer integration between customer-facing locations and the right people and resources to serve them, including knowledge experts, speech and video self-service applications, and back-end contact center agents.
- **A future-proof foundation**. As companies look to take advantage of new social networking and Web 2.0 real-time technologies, having a controlled and secure point of connection with a service provider or cloud-based network services makes it easier for companies to leverage future market innovations.

Using an architecture based on SIP and Web principles provides the deploying organization an open, standards-based platform that is significantly simpler to build and manage than a traditional communications design. This new architecture enables companies to lower the overall cost of communications, as well as improve the productivity of their workers and the effectiveness of their business.

IV. What to Look for in a UC Solutions Provider

If corporations are going to unleash the full potential of UC, a new architecture is imperative to create a scalable, manageable foundation. However, deciding what solutions provider to use can be difficult. The UC industry has many vendors that tout "end-to-end" or "best-of-breed" solutions, but which one is the right one? The following criteria can be used to help guide any organization considering UC:

- **Adherence to industry standards:** No single vendor can provide all elements of a UC solution. This makes adherence to industry standards critical. Although most vendors say their products are "standards-based," many use proprietary protocols to get products to market faster. Ultimately, this reduces a solution's overall flexibility.

- **Presence federation:** Ensure the vendor is standards-based so they can be federated with all of the leading UC vendors. This will provide a higher degree of choice in the future. Federated presence will create a seamless experience across vendor solutions. Without federation, workers will be managing separate UC environments for each solution provider.
- **Open platform:** "Open" is another term that is used by many solution providers. However, many solutions are only open to a limited degree. For example, a solution may provide one or two open interfaces for basic features, but advanced features remain closed to that vendor's solution only.
- **A long history and experience in communications:** High-quality, real-time communications is not simple, especially over an IP network. A vendor with a long, successful history in communications, as well the capabilities to deliver a solution over a global scale, can give customers confidence that the solution will work as promised.
- **A broad set of managed and professional services:** Deploying UC over a new type of architecture can be complex. Enterprises should seek vendors with robust, global professional and managed services to help them navigate the transition.
- **Real-time security:** Securing a real-time IP service can be difficult. Any solution must include security that has been built in, not added on as an overlay.
- **Robust and highly available solution:** Providing five 9s of reliability has historically been table stakes for telephony vendors, but it's significantly harder to do at the IP layer than at Layer 2. However, as difficult as it is, it needs to be done for the solution to successfully support mission-critical business needs.
- **Multivendor compatibility:** There is no single vendor that can provide every element of a network, telephony infrastructure and UC. A solution that can work within a multivendor environment is a must for a robust, scalable implementation.
- **Robust developer ecosystem:** The UC architecture being promoted in this report is built on software. Success in the software space requires an ecosystem surrounding the vendor that not only supports the solution, but also builds on it. One of the measures of long-term success will be a strong ecosystem of application providers that build vertically oriented software on top of the UC platform.

Obviously, other standard criteria such as price, performance, etc., are important, but the criteria listed above are key to long-term leadership in the UC software space.

V. Conclusions and Recommendations

For most organizations, VoIP and UC adoption is a matter of when, not if. The productivity benefits of UC are undeniable, but the complexity and unknown costs can overwhelm an IT department and eliminate many of the benefits. To combat these problems, UC needs to be thought of as a centrally deployed, standards-based software platform built on loosely coupled services, similar to an organization's Web platform.

Transitioning away from traditional communications architectures and adopting a next-generation architecture will allow companies to incrementally deploy UC without having to do a "rip and replace" of existing investments. Additionally, organizations will be able to create a scalable multivendor environment with the UC services that best align with corporate business challenges. To get started, Yankee Group recommends the following:

- **Think of UC as a platform, not a product**. When evaluating UC solutions, many customers tend to only consider specific desktop and telephony functions. However, UC should be thought of as a platform to build on, and IT departments should look at architecture, integration structure, software communities and other criteria similar to those examined when choosing a Web platform vendor.

- **Choose a vendor that adopts and supports industry standards such as SIP and XML**. Almost all vendors will claim they follow industry standards but many build their solutions on proprietary extensions to those standards. Challenge vendors to explain which features are delivered as proprietary and which ones truly follow industry standards.
- **Establish a UC strategy that best fits your needs**. UC is too complex to be deployed across the organization overnight. Instead of a full-scale rollout, start with a department or group of workers that would benefit most from UC. A highly mobile group or distributed team that would benefit from faster collaboration would be ideal. This will help you establish a strategy for ongoing results-focused deployments.
- **Use professional services to guide you through deployment and consider managed services for ongoing support**. When organizations that have implemented either a UC or mobile deployment are asked what they would change if the deployment were done again, most say they could have used more help up-front to redefine operational procedures.

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Headquarters

Corporate
One Liberty Square
7th Floor
BOSTON, MASSACHUSETTS
617-598-7200 phone
617-598-7400 fax

European
56 Russell Square
LONDON WC1B 4HP
UNITED KINGDOM
44-20-7307-1050 phone
44-20-7323-3747 fax