

Unified Communications for Higher Education

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Executive Summary

Collaboration is a core ideal in the higher education environment. The sharing of information between students and instructors, between colleagues and between different departments is a part of everyday life at every school. Given the importance of information exchange in higher education, institutions need to do all they can to facilitate this vital process.

A growing trend among higher education institutions is the adoption of unified communications (UC) solutions. The three main benefits a UC solution offers are an upgrade in the users' communications options, increased productivity and centralized management of the institution's communications channels. These benefits quickly add up to a substantial return on investment for the institution.

Given the mobility of staff who often need to access the institution's network and resources while away from their desks, UC is able to deliver the same services and functions to remote staff, no matter the location.

Collaboration no longer needs to be confined to a school's halls and meeting rooms. With the adoption of a sound UC solution, institutions can strengthen their communication capabilities, and thus their ability to fulfill their educational missions.

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Centralizing UC

Unified communications, formerly known as IP telephony, has made significant advances in the past few years and has started to fulfill its initial promise of a seamless user experience, regardless of location. Still, managing communications continues to be challenging for colleges and universities as they navigate this continued expansion of communications technologies.

These technologies now expand further than ever from the user's desk and include such devices as the standard office telephone, mobile phones, PDAs, notebook computers, e-mail and video solutions. Integrating all of these disparate technologies has become increasingly essential for institutions.

By bringing UC solutions to a centralized and secure environment, schools can apply rapid changes to the entire institution as well as provide enhanced security and management. For example, imagine a college that has 1,200 staff members in 10 buildings spread out across a campus. Some of the departments range from very small 10-person teams to medium 100-person groupings.

They all need access to the same services. These services could be unified messaging (delivery of voicemail to e-mail), five-digit dialing across the college, mobility and extension of services to off-network devices such as cell phones. Via UC technology, the school can scale an entire solution to provide the right services to the right people, regardless of department size.

Until recently, implementing a full unified solution for a 10-person department was quite expensive. But today these services can be delivered, secured and managed from a central site far more cost effectively. With a centralized solution, an institution can also add many more advanced applications to the network such as presence, instant messaging, desktop collaboration and emergency notification.

Moreover, with the advances in video conferencing from the desktop, web conferencing and desktop collaboration, institutions have the ability to place staff anywhere on the campus, regardless of job function.

Staffers need to count on the delivery of communications services regardless of location inside or outside the university. While UC brings together a host of formerly stand-alone technologies, it actually allows institutions to deliver consistent and tailored access to staff based on the unique requirements and circumstances of those users.

In a recent 2008 survey of CIOs conducted by IDG Research, some consistent responses arose as to why an institution would make the move to unified communications. Some of the top reasons were:

- Reduction in operational costs
- Greater security in network access
- Ability to streamline and optimize operations processes
- Increased flexibility in infrastructure
- Consolidation of infrastructure
- Simpler maintenance

Advanced Applications

Advanced applications are the next wave of solutions to roll out of the unified communications field. When institutions start to examine the potential benefits of a UC solution, presence is generally at the forefront of the discussions.

Presence

Simply put, unified presence is a standards-based platform that collects information from multiple sources about user availability and communications capabilities. The information is used to provide rich presence status and facilitate presence-enabled communications. This scalable and easy-to-manage solution can help staff:

- **INCREASE PRODUCTIVITY:** Connect with colleagues on the first try by knowing their availability in advance
- **ENHANCE COLLABORATION:** Share availability information and instant messages with staffers within your institution or between departments
- **STREAMLINE COMMUNICATIONS:** View telephony status of staff from a variety of applications such as Cisco Unified Personal Communicator, IBM Lotus Sametime or Microsoft Office Communicator, and simply click to call them
- **LEVERAGE PRESENCE-ENABLED OPERATIONS APPLICATIONS:** Expose presence information and user communications capabilities in web directories, as well as other applications and management systems

- **IMPROVE FIRST-CALL RESOLUTION AND END-USER SATISFACTION:** Allow individuals anywhere in the organization to handle incoming calls pertinent to their expertise

Presence applications allow staff to see the availability of others in the UC network instantly. Recent research indicates a reduction in staffer “wasted time” of up to 34 percent by simply being able to view the availability status and the preferred communication methods of other staff members.

Instant Messaging

Instant messaging (IM) solutions create the possibility of real-time, text-based communication between two or more participants over the Internet or some form of internal network or intranet.

It is important to understand that what separates IM from technologies such as e-mail is the perceived synchronicity of user communication. Though it is beyond the scope of this paper, many IM services have additional features: immediate receipt of acknowledgment or reply, group chatting, conversation logging and file transfer, and conference services such as voice and video.

Many institutions will allow for the “federation” of IM solutions. Federation allows users outside of the IM solution to be added to a user’s IM contact list. This capability has proven quite valuable for colleges that need to maintain effective communications between departments, outside agents and representatives.

Mobility

Today’s work environments have become increasingly mobile. The ability to connect to the right person depends not only on being able to view their availability, but also discerning what device to use when reaching them.

By extending the UC network outward to devices beyond the formal network (such as mobile phones, home-office phones or two-way devices), users can establish connectivity methods based on personal convenience and preference.

Single Number Reach and Single Voicemail

Unified communications users now have the ability to consolidate all calls with a single IP phone number and immediately connect from wherever they are working. A school can provide even more responsive service with no additional effort. For mobile staff, unified mobility (UM) also reduces the burden of having to share private mobile phone numbers.

Mobile staff can also manage all voicemail using a single voicemail box. If a mobile call cannot be answered, UM will store the unanswered call in the centralized UC voice messaging system or other organizational voicemail system.

Additionally, a user answering a call on a mobile device can seamlessly move the call to a physical desk phone when entering the office. A call started on a physical desk phone can equally be moved to a mobile device. This advance eliminates the need to hang up and redial a party or conference call already in session.

Mobile Voice Access

Extending the institution’s voice system for traveling staff has also become significantly enhanced in today’s UC world. Unified mobility technology makes all major IP communications features available to traveling staff.

For example, a mobile staffer who needs to call one of the university’s offices while traveling can use a mobile voice access line to place the call as if from on campus. Dialing such a line from the mobile phone places the call on the institution’s IP communications network over a tie line. The connection is completed, and telecom costs are minimized.

Collaboration

Regardless of user location, unified communications can connect people via voice and video services. This kind of collaboration further enhances the value of UC by coupling these services with the capacity for mutual engagement on critical documents in a real-time format.

Whether one-on-one or in a conference-call setting, collaboration permits the sharing of specific documents, computer desktops and applications. Some benefits of collaboration include:

- Encouraging innovation in operations processes
- Increasing efficiency and minimizing wasted time
- Making projects and resources available to multiple participants
- Eliminating the need to pass a project back and forth between multiple stakeholders
- Maximizing working relationships with coworkers, departments and outside agents

Unified Contact Center

Unified contact center (UCC) extends the ability of a base UC solution into a true multifunctional contact center for either internal or external callers. UCC makes use of the unified communications infrastructure to deliver skills-based contact routing, voice self-service, computer telephony integration (CTI) and multichannel contact management.

By combining multichannel automatic-call-distributor (ACD) functions with IP telephony in a unified solution, UCC helps an institution rapidly deploy a distributed voice-over-IP (VoIP) contact center infrastructure.

UCC segments callers, monitors resource availability and delivers each contact to the most appropriate resource in the school. The software profiles each caller contact using related data such as dialed number and calling line ID, caller-entered digits, web-form submitted data and caller database information.

Simultaneously, the system monitors the resources available in the contact center to meet caller needs, including staff skills and availability, interactive-voice-response (IVR) status and queue lengths.

This combination of caller and contact center data is processed through user-defined routing scripts that graphically reflect an institution's operations rules. This processing enables the routing of each contact to the right place. Regardless of staff location, the system delivers a rich set of call-event and end-user-provided data to the targeted desktop as a contact arrives, personalizing service and increasing efficiency.

UC Questions to Ask

To guarantee your system is flexible enough to fulfill your needs now and in the future, before implementing a unified communications platform, ask yourself these questions:

- What functionality are we looking for?
- Will the new system work with any additional platforms we might upgrade to?
- What impact will the messaging system have on our existing networks?

A centralized UC environment significantly enhances these solutions by allowing staffers to reside anywhere in the network. Staff, for example, do not have to remain in a physical call center location but can function as a home-based agent securely connected to the institution's voice environment.

UCC Routing

The routing functions of a UCC provide further intelligent distribution of contacts as they enter the school's network, enhancing caller experience. When a contact requires redirection, the UCC applies operations logic, sending the contact to the best available organizational resource.

For contacts flowing between sites or among staff members, skill groups or IVRs, the routing optimizes each caller's interaction by retaining collected data, thereby eliminating the need for the caller to restate information.

Unified contact centers extend the sources of data available for making contact routing decisions and for populating staff desktop applications. For instance, the logic in the UCC can perform a lookup in the caller database during routing in order to guide its decisions. You can also use information from customer relationship management (CRM) applications to match callers with staff and expand the data available to screen pop applications.

With a UCC, end users can access the call center from a variety of communications methods. Traditionally, dialing into an 800 number was the only way to reach staff for communications, but multichannel support for unified centers can extend a user's reach beyond traditional voice to include direct web chat, e-mail and click-to-contact options. In each of these cases, the complete end-user detail can still be provided to the staffer accepting the communication, regardless of the method of connects.

Unified Video

No discussion of UC would be complete without a review of the most significant advances in the technology. The ability to extend video services and collaboration to all users in the sessions, no matter what the connectivity method, continues to expand communications options.

The vast majority of all human communication is visual by nature. People regularly observe and assess subtle nonverbal queues from others in conversations. Video communications has, up to now, proven a somewhat daunting solution to deploy successfully and effectively in large numbers. However, UC now embraces all facets

Utilizing UC Requires Training

Acquiring new technology is great, but it's worthless if users don't know how to take advantage of its benefits. Proper training is required, especially for IT staff. Here are some areas in which to develop the right know-how in support of a new UC solution:

- **Managing presence indicators across all devices:** Learn how to prepare directories and integrate presence software for desktop displays.
- **Supporting voice applications and services:** Learn how to support fixed and mobile phones, as well as other voice applications, and how to change configurations and the interface to the phone server.
- **Optimizing desktop collaboration software:** Learn how to integrate features across multiple protocols and networks to deliver the best collaborative desktop environment.
- **Enabling a single identity for users:** Learn how to normalize multiple identities across different systems to create one identity for users, whether an e-mail address or a telephone number.
- **Integrating communication platforms:** Learn how to manage disparate systems so that application servers can share information on the UC platform.

of communications. Video has become the next logical step for an institution to include.

Current video conferencing technology has improved the user experience so that it is now a viable mode of communication internally among staff and externally with other departments and end users. The seamless blending of high-quality audio and video provides advantages to users on both sides of a virtual meeting, as all are privy to the nonverbal cues that further contextualize and inform dialogue.

There are several additional benefits to be gained from extending video communications out across the institution.

EXTENSION OF UC PLATFORM: To maximize effectiveness, use of UC solutions should not stop at traditional forms of communication such as e-mail and phone. Video telephony conferencing can become a further practical enrichment of user experience at the desktop via

a unified software client. Video conferencing becomes as simple as a phone call. Institutions should examine which videophone systems are already compatible with their UC solutions.

INCREASED WORK-GROUP COLLABORATION: Video maximizes scheduling time during the workday by eliminating travel times between locations and incorporating access to operations-critical information and applications from the desktop.

Over the past year, manufacturers have rolled out UC solutions that integrated formerly stand-alone communication methods such as voice and video. This integration has provided streamlining and optimization across the organization via both desktop and mobile devices.

Institutions that incorporate video telephony into their UC architectures enable meeting or project participants to minimize delays that arise from participant handoffs. With video, information is more easily shared among team members.

ACCESS FOR REMOTE STAFF AND TELEWORKERS:

Traveling and remote users often find it difficult to feel connected to colleagues. Video gives these staffers a far more palpable means of maintaining viable, productive relationships than audio-only teleconferencing. It gives them much the same advantages of actual presence in a meeting and thereby encourages their full engagement.

REDUCTION OF TRAVEL EXPENSES AND CARBON

FOOTPRINT: Gas and oil price increases have made air travel prohibitive for many travelers. Even ground travel can now prove unreasonably expensive. Institutions and their work staff have begun to seek more cost-effective ways of meeting.

In conjunction with financial initiatives to limit travel increase, many schools are taking on a social responsibility to decrease their carbon footprints. Videophone conferencing can support the dual benefit of travel savings and green IT compliance.

Advanced Video Options

Deploying video communications within a UC solution has now become as simple as implementing traditional voice solutions. With the addition of video-capable phones or desktop cameras, the UC control mechanism can establish a video call automatically if both parties have the capability for such service.

Along with desktop video conferencing, institutions can acquire significantly extended methods of video communications via TelePresence solutions. Offering a fully immersive video conferencing experience, TelePresence creates an innovative "in-person" meeting

experience over the converged network that allows users to feel as though they are in the same room with other participants.

It delivers real-time, face-to-face interactions using advanced visual, audio and collaboration technologies. These technologies transmit life-size, high-definition images and spatial discrete audio, which maximizes the ability, for example, to discern facial expressions for crucial discussions and negotiations across the “virtual table.” With actual face-to-face meetings becoming more difficult, this technology offers the closest thing available.

Case Study: Inside a Real Virtual Classroom

Get in there and play with the technology: That’s the hands-on learning approach that DeVry University likes to create for its students.

It’s a style that makes sense in an age of fast-paced technology use and development, and one in which students now expect access and learning to happen at any time and from any location, says Dr. Ted Mikell, director of the network and communications management program for the university, which has its parent company headquarters just outside Chicago.

To that end, Mikell, who works in Texas, and a team from the university created a Voice-over-IP curriculum and platform that gives students access to a hands-on VoIP lab from virtually anywhere through a broadband connection.

Claire Schooley, an analyst who covers distance-learning technologies for Forrester Research, agrees with Mikell’s statement. “In the Internet era, students are less and less interested in lectures, and are demanding an interactive experience in a real-world environment,” Schooley says.

“To them, lectures can be recorded and accessed asynchronously as a reference. This virtual VoIP lab is an example of how the distance-learning environment is getting richer and richer as technology evolves. It’s not PowerPoint-based e-learning, which can be kind of flat.”

There’s nothing theoretical about the DeVry VoIP curriculum. Centralized Citrix servers deliver the course software to widely distributed students. Students experience the same lab environment

VoIP Website Assistance

The Massachusetts Institute of Technology (MIT) in Cambridge, Mass., recently installed VoIP in its new Ashdown Graduate Residence Hall. Officials expect to realize significant administrative and cost benefits from the decision to move away from traditional phone service.

Next MIT introduced VoIP to its students, both as a concept and a service. To speed the process, the school set up a website to familiarize students with how it can be used — including information on using a special phone that plugs into the wired port, converting a traditional handset to VoIP, downloading software to utilize a notebook as a VoIP device and accessing the service through their cell phone — and what service options are available.

whether they are at one of the DeVry campuses or online. Operating the lab is quite simple; no special equipment is required in the classrooms or at remote student locations.

“We can now offer a networking degree online,” Mikell says. “We could never do that before because there was no way students could attend the lab online.”

“Before” was about three years ago, when DeVry — which has grown in part by acquisition — had a mix of traditional voice equipment at its many campuses. The gradual migration to IP telephony then sparked the development of new courseware that would help meet the growing demand for online attendance and network professionals skilled in VoIP management and administration.

“For the VoIP course, the challenge was to create a consistent lab environment across brick-and-mortar classrooms and online access, and to do so cost effectively,” says Guy Clinch, Avaya’s education solutions director.

Check, Please

DeVry put together a lab committee consisting of Mikell and several network experts. They rounded up major telephony vendors, rigorously testing gear in a lab environment using a requirements checklist:

- real-world applicability;
- cost-effectiveness;

- hardware and bandwidth efficiency;
- support for simultaneous multiuser access by remote students and classes;
- availability of vendor support and training;
- amount of custom development required;
- ease of use;
- reasonable learning curve for professors and students.

"Of every five pieces of software we tested, four would fail to meet our requirements," Mikell recalls. "And the pilots also gave us an opportunity to evaluate the quality of support."

At the end of the exhaustive trials, Avaya's IP Office software was the only candidate still standing.

"VoIP was one of the more difficult labs to implement, and we soon found that most of the IP telephony platforms came up short on some of our criteria," Mikell says. They required special hardware at each campus location, which would shortchange students attending the lab online. Ultimately, Mikell's team was able to use IP Office software extensions to develop the VoIP learning-lab courseware.

Citrix has long been used by organizations to deliver applications to remote users cost effectively. All Windows applications and other software processes run on the centralized Citrix servers that sit in a hardened data center in Dallas. Each remote user has a separate virtual workspace in the Citrix server, and the remote PCs simply function as displays. The client is a standard web browser (primarily Internet Explorer at DeVry) that looks like a Windows desktop.

The client hardware and software does not have to be standardized, maintained and updated, assignments submitted by students are always in the appropriate format, and troubleshooting can be handled by shadowing the student's virtual workspace in the central server facility.

During the evaluation phase, no one knew for sure that Avaya's IP Office software was Citrix-compatible. Mikell's team had to verify that and make sure the combination could support enough multiple users simultaneously. There are now 100 to 200 students taking the course at any given time, about half of them online, and a farm of six Citrix servers has had no trouble handling the load.

DeVry can now offer the course in a classroom at any DeVry campus that suddenly has a local demand for it. "It's what we call radical simplicity," says Ira Kuchek, the Avaya territory sales manager who configured the Avaya software for DeVry.

Lab Satisfies Students

The institution began offering the VoIP lab based on IP Office in early 2006, and the feedback from students was "positive from the outset," Mikell reports. Students simply log in to the IP Office lab environment and launch the Citrix presentation application.

IP Office provides a versatile training environment; it can function as a traditional public branch exchange, a hybrid Time Division Multiplexing/VoIP system, or a pure IP-based telephony platform. IP Office offers enterprise-level functionality but can scale down to provide a cost-effective environment even for small sites and organizations.

Features and applications include integrated voice and data messaging, three levels of call management, a conference bridge, call-center capabilities, support for IP handsets and softphones and traditional phones, computer-telephony integration applications for outbound dialing and inbound screen-pops, and the ability to link multiple sites through an existing data network.

Students learn both why particular VoIP functions are important and how to implement them. They are given scenarios for various office phone systems, and learn to set them up step by step.

Flexible Future

Unified communications are helping enrich the classroom experience for some schools. Dance instructors at Temple University in Philadelphia and the University of Liverpool in England employ a standard video camera, video monitors and Adobe Connect web-based conferencing software to exchange images of their respective dance students via high-speed Internet (known as Web 2.0), explains Tim O'Rourke, vice president of computer and information services at Temple.

The capability allows instructors an ocean apart to compare and contrast students' movements and even choreograph routines together.

"A split screen showed the dancers in both classrooms side by side," he says. "It looked like they were doing choreography together, dancing with each other in one environment."

"If [classrooms are] more interesting, students will be more motivated to learn and faculty will be more interested in teaching," he adds.

When assignments are completed, they can print out the remote screens and submit them to the professor.

The courseware had to be simple and user-friendly. "That was the big challenge — the students had to be able to learn enough from the software to meet course objectives," says Mikell.

The cost of the solution is minimal. DeVry pays a nominal fee for the CDs with IP Office, and the vendor gets exposure for its product while building a base of network professionals skilled in managing and maintaining it.

The Lab Lowdown

- Avaya IP Office, an integrated, business-quality voice platform including an IP PBX, three tiers of voice management, voice and data messaging, call center capabilities and a conference bridge
- A centralized Citrix server farm running the DeVry-developed virtual lab and providing virtual Windows machines for classroom-based and remote students
- PC clients running standard web browsers, with a high-speed connection to the Citrix servers
- The eCollege distance-learning environment

Key Manufacturers

Institutions have numerous options for finding the right unified communications solutions for their needs. Several manufacturers offer a wide array of UC products.

Cisco

Cisco covers the full spectrum of unified communications. It offers IP telephony software and hardware including phones, UC applications and hardware, contact center applications, communications infrastructure products and UC management tools.

One of Cisco's premier UC products is TelePresence. This product delivers real-time, face-to-face interactions between people over a converged network utilizing advanced visual, audio and collaboration technologies. TelePresence does this by transmitting life-size, high-definition images and spatially discrete audio, allowing participants the added communication feature of discerning facial expressions that are typically lost over video.

Microsoft

Microsoft has a presence in the UC world through its two server offerings: Office Communicator 2007 and Exchange Server 2007. Office Communicator 2007 assists with real-time communications, enabling several different communications options including instant messaging, voice and video. Utilizing presence features, this product allows users to share information about their availability and preferred method of communication.

Exchange Server 2007 gives computers the functionality of advanced IP phones. Staffers can simply click to call anyone in their address book. And simple phone calls can quickly be transformed into a conference call or a video conference.

Nortel

Nortel offers a diverse range of UC solutions, including its Contact Center products, which enable institutions to engage their staff and students more fully and efficiently, allowing for staff and supervisors to be located anywhere a secure IP connection can be enabled.

Call Center Management Information System allows managers to view staff and queue statistics in real time, and assists in generating a variety of reports. Another product, Contact Center Express, delivers skills-based call routing, allowing callers to be guided to the most appropriate staff member for their query.

Avaya

Avaya's product offerings include integrated web conferencing solutions, mobile solutions, voice messaging solutions, unified messaging platforms, video conferencing technology, UC suites and desktop telephony solutions.

One of Avaya's more popular products is the Unified Communications Standard Edition, a bundled suite of communications applications that cover telephony, messaging, conferencing and mobility needs to assist agencies in delivering the right applications to staff members' devices at the right time.

This product can integrate well with IBM Lotus and Microsoft's Office Communicator, allowing for both centralized and desktop deployment.