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THE WORLD IS OUR CAMPUS

Synchronous collaboration software lets universities **unite** colleagues, students and researchers from all over the globe.

Here we evaluate nine products



Companies, government agencies and universities alike recognize the importance of collaboration. In universities, exciting mixed-learning initiatives blend face-to-face classes with remote participation. Researchers relish teaming up with far-flung associates, leading to a rise in virtual research centers and “collaboratories” where educators in multiple time zones share data and pool resources for complex investigations. In fact, the National Science Foundation has launched a major initiative to support these activities via its Cyberinfrastructure-TEAM

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AND DIUYA HURUP



(Training, Education, Advancement and Mentoring)

program. Forward-looking companies also are using Web conferencing to encourage employee interaction while cutting operating expenses. Universities that haven't yet embraced the technology should reconsider—Web conferencing applications are mature and include features from audio and video support to instant messaging and polling.

More than 40 products provide synchronous, Web-based collaboration for multiple groups but, of that number, only 14 met our criteria, which called for support for distributed group work and virtual teams; collaborative teaching and learning configurations; and the ability to run distributed seminars, research meetings, virtual labs and other activities to support geographically distributed teaching and research. We tested 10 of these products at our Syracuse University Real-World Labs®, with assistance from members of the Collaboratory on Technology Enhanced Learning Communities, or Cotelco.

Adobe Systems, Elluminate, Genesys Conferencing, Marratech, Microsoft, Pixion, Raindance Communications, Saba Software, WebEx Communications and WiredRed Software all accepted our challenge. CollabWorx, Linktivity and Cisco Systems never responded. Horizon Wimba declined to participate because Syracuse University has an Elluminate installation running in the Cotelco research lab,

something Wimba saw as an unfair advantage. We're glad other vendors don't follow that logic—given the number of apps in our Syracuse Labs, we'd soon run out of products to test. Of the vendors that accepted, six provide in-house and ASP versions, while four—Raindance, Genesys, Microsoft and WebEx—offer only hosted models.

To our dismay, after many failed attempts to install Pixion's Picture Talk Server, we reluctantly decided to exclude it from this review. It turned out that a separate Web server is needed to properly install the Picture Talk Web conferencing server. This is not obvious in the installation information. And it was unfortunate: Picture Talk is one of only four cross-platform in-house entries, along with Elluminate, Marratech and Adobe Breeze.

For our tests, we developed three Web conferencing scenarios. Scenario A was designed to replicate 40 users meeting simultaneously, in eight small teams of five. Scenario B simulated seminars, working groups or research teams, with free-flowing discussions in four simultaneous seminars of 10 participants each. Scenario C was a presentation-style session, intended to replicate a relatively large lecture course or meeting, with all 40 participants on the same Web conference. Finally, we created three test files—a 5.4-MB PowerPoint slide set, a 320-KB Microsoft Word document and a 28-KB Excel spreadsheet—to evaluate content loading and application-sharing features. We separated grading criteria into four overall categories: pre-, post- and in-progress meetings, and price.

+REPORT CARD

WEB CONFERENCING SOFTWARE

» IN-HOUSE

	Elluminate Live 6.5	Saba Centra Live 7.5	Adobe Breeze 5	Marratech 6.0	WiredRed Software e/pop Web Conferencing 4.2
PRE-MEETING					
Initial setup (10%)	4.5	4	3	4.5	5
Meeting management (10%)	4	4.5	4.5	3	3.5
Client installation (5%)	5	5	5	5	4.5
Platform support (5%)	5	3	4	5	3
IN-MEETING					
Features (15%)	5	4.5	4.5	4	3.5
User interface (10%)	4.5	4.5	5	4	3.5
Application/screen sharing (5%)	4	4	3.5	3.5	3
Image quality (5%)	5	5	4	4	3
Performance (5%)	4.5	4	4	4	3
Streaming media (5%)	4	4.5	3.5	5	4.5
POST-MEETING					
Playback (5%)	4	4	4	3.5	3
Recording (5%)	5	5	4.5	4.5	3.5
Reporting (5%)	5	5	4.5	3.5	3
PRICE (10%)	3.5	2.5	4	3	4
TOTAL SCORE (100%)	4.48	4.20	4.18	3.95	3.65

A≥4.3, B≥3.5, C≥2.5, D≥1.5, F<1.5
A-C GRADES INCLUDE + OR - IN THEIR RANGES. TOTAL SCORES AND WEIGHTED SCORES ARE BASED ON A SCALE OF 0-5.



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GET IT STARTED

Most of the products were strikingly similar: A server application hosts the client software; individual users can then connect to that server from nearly anywhere as long as they have sufficient Internet connectivity and PCs equipped with microphones, speakers or headsets, and Web cameras. For nearly all the applications we tested, when a participant logs in to the server Web site, she sees a daily meeting schedule; clicking on a link logs her into the session.

Cross-platform functionality varies widely, from Windows-only to full support for Windows, Mac, Linux and Solaris. Clients range from simple Java and Flash downloads to elaborate client-side installations. Elluminate and Marratech both have Java clients, while Breeze uses a Flash-based client. Conveniently, Marratech, LiveMeeting and Raindance also offer “stripped down” versions of their interfaces for use in environments where users cannot install software.

Most solutions have opted for a modular interface, with components for text chatting, session content, participant information, participant interaction and video. Saba Centra, Elluminate and Adobe Breeze have intuitive and uncluttered interfaces, with most major tools just a mouse click away. Genesys uses multiple tabs to cleverly maximize screen real estate, but some functions were hard to find. Microsoft LiveMeeting and Raindance were both difficult to navigate.

These packages offer a dizzying array of options for meeting setup, making the process more difficult than it should be. Granularity is important so that everyone understands the options, but you shouldn't be overwhelmed by it. Unfortunately, WiredRed's e/pop takes the idea of granularity too far. When setting up a meeting, we were asked nearly a dozen questions, several with multiple options—for example, “Do you want to enable video?” was followed by “h.263+ or MPEG4?” We even could specify the audio codec we wanted to use. Other products, such as Elluminate, eliminate that complexity by automatically enabling both audio and video.

Several applications offer more simplified meeting options, such as Elluminate's “Meet Now” and Marratech's “Time-to-Meet.” Elluminate's Live Manager program for meeting administration didn't require us to decide in advance about recording a session, or even about who would come in as moderators or attendees—all these decisions can be made during any session.

Managing meetings and meeting content is important for effective use of time and resources. We liked Adobe Breeze's flexible management interface, which uniquely let us add an event logo. Also, as we could with Centra and Elluminate, we could preload content created earlier; Breeze provides a curriculum wizard, training modules and a variety of authoring tools to create content for Breeze sessions, all of which make Breeze a leader in providing diverse session content. As educators, we liked being able to create registration questions and present a survey or “pretest” of users before a session, and Breeze's customizable URL and multilingual support were welcome. But we did run into a few user-interface quirks. A session we scheduled in our lab, for example, couldn't be found under “my sessions” or “my training”; it was under “my events.”

Distributed environments will appreciate Elluminate Manager's ability to set up cost centers, where the amount of server time allocated to a particular group can be tracked for billing. We also liked Elluminate's license management; when we set up a meeting for a proposed number of participants, the interface checked for other meetings established at that time and how many seats were allocated. Saba Centra is the only other application that made it as easy to manage and allocate licenses.

Some applications let us define the meeting room style. With LiveMeeting, for instance, we could choose between an “Auditorium Place” for structured events and a “Web Meeting Place” for collaborative sessions. Breeze provides customizable layouts, which it calls “meeting templates,” and Elluminate users can choose from four meeting layouts. WiredRed e/pop also provides customizable layouts, plus a feature that let us search availability of users during proposed meeting times.

MEETINGS THAT NEED PEOPLE

Once a meeting is created, it needs people—those who can be registered automatically, such as individuals signed up for a course—and those who will be invited

»HOSTED ONLY

WebEx Meeting Center	Microsoft Office Live Meeting 2005	Raindance Meeting Edition	Genesys Meeting Center 3.5
5	3	3	3
4.5	3.5	3	3
5	4	4	4
4.5	3	3.5	3
4.5	4	3.5	2.5
4	3.5	3	3
5	3	4	3
5	3.5	3.5	3
4.5	3.5	4	3.5
4.5	3	3	3
4	3	3	3.5
4	3	3.5	3.5
4.5	3	4	3.5
4	3.5	3	3
4.48	3.40	3.35	3.08





regularly, such as teams or research units. It's also important to have an option to send invitations, or make the session available to the public. The first objective can be accomplished using LDAP integration, but we also wanted to build groups for invitations, and to put a link on a Web site and let people go into the public session freely.

Getting participants into the meeting was, in nearly all cases, as simple as clicking a link. Centra and Elluminate checked new attendees for clients and loaded the applet where needed. In contrast, when entering a Genesys meeting, ActiveX controls and other components had to be installed. Entering a Webex meeting was a bit confusing, after a complex meeting setup. Exiting, however, was better—the software prompted us to save various items, such as chat transcripts, and prompted the meeting “note taker” to post meeting minutes.

We've all been on calls where some people are almost impossible to hear. Centra, Elluminate and LiveMeeting address this frustration by providing audio-tuning wizards; Centra and Elluminate automatically pushed us into the wizard after loading the user interface for the first time, a nice touch.

WHAT'S IMPORTANT TO YOU?

Based on a poll of colleagues, and our experience with

+ HOW WE TESTED

WEB CONFERENCING APPS

WE DIDN'T HAVE TO MAKE

many changes to our typical test bed to evaluate Web conferencing. We installed the server applications for the in-house Web conferencing software on Dell PowerEdge SC servers in our Real-World Labs® at Syracuse University, with minimum hassle. All servers had 64-bit, 3.0-GHz Intel Xeon processors and 3 GB of RAM, and were running Microsoft Windows Server 2003. We installed Web cams and some software on our clients, but the services did the rest.

Our client machines were Intel Pentium III computers, running Windows XP Service Pack 2. To test Macintosh support, we used a PowerBook G4, running Mac OS X 10.4.5 We chose USB Webcams from Logitech for the Windows machines and Apple iSight cameras for the Macs. Each camera was loaded with proprietary drivers before our tests began. To test for presenter audio quality, we used a

Logitech USB headset/microphone combo. In the instances when this headset could not be recognized by the application, we resorted to normal Labtech headsets/microphones.

We used two types of Internet connections: OC-12 on the Syracuse University network, and cable modems with 5-Mbps downlink and 384-Kbps uplink speeds. The clients on the OC-12 university network were behind a SonicWall firewall that blocked inbound connections. The clients on the cable modem sat behind a SonicWall device with NAT enabled.

To test performance, we identified three “typical” files from the Microsoft Office Suite that are used everyday on college campuses. These files were a PowerPoint presentation (5.4 MB), a Word document (320 KB) and an Excel spreadsheet (28 KB). We considered the ease and

distributed collaboration over the past decade, we identified 15 must-haves for Web conferencing: VoIP; video; participant roles; interactive capabilities for participants; diverse session content options; live application sharing; recording and archiving capabilities; break-out rooms; bandwidth management; accessibility, including Americans with Disabilities Act compliance; security; integration; session management; customization and support; and cross-platform functionality. We've broken them down into user- and management-oriented functionality.

USER-ORIENTED

» VoIP is important because we want to engage remote participants in research, teaching and outreach responsibilities, but not by replacing travel expenses with long-distance bills. We were pleased with VoIP capabilities overall—our audio-quality testing showed Marratech has the highest quality audio in our group, and lets you have private audio conversations with anyone else in a session.

Voice-traffic handling varied. Some applications, like WiredRed, let us choose the specific codec for a given meeting—a mixed blessing as more choice equals more complexity. Others, like Elluminate, handle bandwidth constrictions by speeding up the speaker's voice to maintain synchronization; this has the unfortunate effect of raising the pitch of the speaker's voice, a phenomenon called “chipmunking.” But we like that moderators using Elluminate can adjust the microphone

speed of loading these files into the application, and the resultant quality of the displayed object. In addition, we tested the ease and speed of application sharing of a blank PowerPoint file; the ease of initiating a recording of the session (if available) and playing back that recording; and we also subjectively measured voice quality, video quality, and stability.

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settings of any participant in a Web conference.

Another consideration in audio is how many people can speak simultaneously. Keeping multiple voice streams in place is complicated for the application, putting strains on both bandwidth and CPU usage—even more so when video is added. Although most of the applications tested promote this feature, few handle it well. Only Marratech seems to have a good grasp on managing multiple audio and video streams consistently, at an acceptable level.

We also evaluated the degree to which the apps support integration with conventional PSTNs, so that mobile users can participate. Breeze has this phone-bridge capability built in; Elluminate requires a third-party application. We could not find any evidence of Marratech, e/pop, or LiveMeeting offering a phone-bridge.

» **VIDEO OVER IP:** Video adds an important social dimension to geographically distributed collaboration and is seen by many Web conferencing pros as an essential—though often underutilized—component. We liked that Centra, WiredRed and Genesys let us make video full-screen, even though the resolution was low. Still, we would consider using it on occasion when a speaker was presenting without slides or other visual aids. We loved the Marratech video and audio quality and functionality, especially multiparty video and simultaneous audio. Marratech was the most stable and robust in multiparty tests, and it has a voice-activated option, which moves the person speaking the longest to the larger video window, while other video-enabled participants project thumbnail images, absolutely perfect for our small-group scenario.

» **INTERACTIVITY:** In a geographically distributed setting, being able to maintain high levels of interactivity among participants—text chat, polling, mark-up tools—with instantaneous feedback, is crucial. Centra, Elluminate and WebEx handle interactivity well, but Marratech and e/pop handle it poorly, with limited feedback mechanisms and discussion-control capabilities.

» **DIVERSE SESSION CONTENT:** Also important to the learning process is being able to bring different types of content into a session. We tested this functionality by importing PowerPoint slides and Word and Excel documents. Marratech made it very easy to load some content, such as PDFs, text documents and image files, but PowerPoint slides had to be converted to image files and then loaded as image files. We didn't mind this so much when we saw how incredibly clear they were and how easily they could be marked up by presenters and participants. Marratech also had no need to do application sharing in order to see a PDF, a major advantage. Centra did a good job as well; its knowledge objects studio let us build Agendas in advance. We could then upload the Agendas into a session, similar to the Breeze Curricula functionality. This nice feature outdoes Elluminate, in which we could preload content but not

organize it into a coherent agenda or curriculum.

Strangely enough, it was harder than average to load a PowerPoint file into Microsoft LiveMeeting, though it did offer good flexibility for importing other native Microsoft content. Unfortunately, it took us a long time to load most documents—on average, twice as long as with rivals—and then they were too small to be of much use during a session.

At the far end of the spectrum, we had the greatest difficulty getting our files into Raindance, as all content had to be converted to a proprietary Raindance format, then uploaded.

» **APPLICATION SHARING:** Being able to see and manipulate applications on a Web conference is critical. WebEx has the best application sharing (in terms of speed and ease), followed by Centra, Raindance and Elluminate. Breeze and e/pop also have good document, application and desktop sharing. Elluminate was unique in that the video window on Elluminate remained active when we were doing application sharing, whereas in all the other applications, the video disappeared—and with Centra, it had to be re-enabled afterward. We also liked that LiveMeeting allowed us to preview a Web site when incorporating one into a session, allowing us to ensure that it would load properly before trying to show it to participants.

» **RECORDING AND ARCHIVING:** With recording, important considerations are how easy is it to start, stop and pause the recording; what the recording captures; how easy is it to play back the recording; and the playback options. Elluminate and Centra both have a simple button on the main interface to start, stop and pause recording. Marratech and Genesys use a pull-down menu, still relatively easy. In Genesys, we could record whiteboard, slide and text content separate from the audio; video recording and archiving are not supported, however.

As for accessing session recordings, LiveMeeting gave us the option to not only view recordings of all sessions that we'd been in, but to access reports of those sessions; most applications allow only administrators or moderators to view reports. Elluminate Live Manager handled our user data, recordings and archives, and Elluminate offered very high-quality session recordings; however, we could not search through the recordings and archives.

Centra also did a good job of providing information about previously attended sessions. But, when we set out to search the server archives for content, Breeze was tops.

» **BREAKOUT ROOMS:** For university Web conferencing, it's important to be able to break a larger group into several smaller teams. Centra and Elluminate do this best, with break-out rooms built into the main room. Users can be moved to their respective breakout room by the moderator, and then moved back into the main room seamlessly. Most of the other applications

handle this by creating additional rooms that users can go into on their own. Breeze and Marratech do well with this approach; our “team” meeting rooms could be left in place, along with all pertinent materials.

MANAGEMENT-ORIENTED

» **ROLE DIFFERENTIATION AND SESSION CONTROL:** In most university settings, being able to differentiate between student and teacher roles is important—professors need the ability to maintain order in their “virtual” classrooms. Centra, Elluminate, Breeze and e/pop fill the bill here; all let us control the ability of participants to speak, and even to eject an unwanted or unruly participant from the Web conference. Marratech lagged on control features—it’s great for small-group collaboration, but in larger groups simultaneous multi-party audio might cause problems.

LiveMeeting, like Elluminate, allows multiple presenters in a session, but in LiveMeeting one of the presenters can be designated the “Active Presenter.” This prevents others from changing the slides of an active presenter.

» **BANDWIDTH MANAGEMENT AND ACCESSIBILITY ISSUES:** Increasingly, universities are striving to make all services accessible to the widest possible number of users, including distance-learners with low-bandwidth connections and/or people with some disability. Across the board, Elluminate has the highest level of accessibility. Using its Collaborative Communications Framework (CCF), it handles synchronization issues for wildly varying bandwidth during a single session. To test

this, we connected to a session with a 28.8-Kbps dial-up modem. Although those with broadband connections have advantages of speed and overall quality of experience, the dial-up connection user participated with a relatively similar experience.

Elluminate has the broadest cross-platform functionality, as well as an explicit focus on universal accessibility and full ADA compliance—including functionality for closed-captioning and screen readers. No other vendor even mentions the ADA or accessibility, though WebEx does offer closed captioning. Installing software that does not facilitate universal access may limit the ability for some students to have equal access to the quality educational experiences that can be delivered over Web conferencing. Universities must ensure their programs and services are accessible to persons with disabilities under the ADA and the Rehabilitation Act, because they commonly receive federal funds. Universally designed technologies typically go beyond compliance to a heightened level of access for the largest range and number of persons.

» **SECURITY:** All of our entries handle security via SSL, user passwords and password-protected servers, and all but e/pop use 128-bit encryption.

» **CUSTOMIZATION AND SUPPORT:** All of the in-house options—WiredRed e/pop, Marratech, Centra, Elluminate, Breeze—offer some form of interface customization and APIs; only WebEx does so on the hosted side. In addition, Elluminate, Centra and Breeze offer well-conceived developer options and SDKs.

Those serving international markets will want their

IMPACT ASSESSMENT: WEB CONFERENCING SOFTWARE

	BENEFIT	RISK
IT ORGANIZATION	These products let IT staff meet virtually to strengthen internal social networks. They are relatively easy to use, and users can set up their own meetings.	Although easy to use, these applications require significant training for users and IT staff, and troubleshooting can be cumbersome.
BUSINESS ORGANIZATION	Web conferencing enhances meeting efficiency for research, teaching and other activities and positions the organization to increase productivity.	Adoption rates may not be as high as expected. Physical infrastructure is not well-suited for virtual collaboration. Key features like VoIP and video may not live up to expectations.
BUSINESS COMPETITIVENESS	Helps to fuel national and global expansion strategies in teaching, research and collaboration, and strengthens the university's reputation as an innovative institution.	With distance less of an issue, there will be more competition for students and employees.
BOTTOM LINE	Universities and corporations are increasingly interested in expanding opportunities for geographically distributed collaboration. The ROI for a Web conferencing application is high, but could scare off potential users if implemented poorly.	

Web conference apps customizable in multiple languages. Breeze, Centra, Elluminate, e/pop, Genesys and LiveMeeting all offer some multilingual support.

» **CROSS-PLATFORM FUNCTIONALITY:** Finally, though Windows still dominates in the corporate computing environment, alternative operating systems such as Mac OS and Linux are quite common on university campuses. Elluminate and Marratech are cross-platform and run equally well on Windows, Mac OS, Linux and Solaris. WebEx and Breeze run on Windows and Mac OS.

Browser compatibility is another limitation of some applications. Although most entries will initiate with almost any browser, Genesys and LiveMeeting will work only with Microsoft IE 5.0 or higher, or Netscape Navigator. Video, however, is not supported in Netscape.

We were disappointed that Centra, an otherwise excellent Web conferencing solution, is Windows only. And not only is it not cross-platform, there's no indication of that fact when setting up or going into a meeting. When using a Mac to attempt to participate in a session, it seemed as though we were being moved into a meeting ... until the app hung without explanation. The primary clients for WiredRed e/pop, Genesys, LiveMeeting and Raindance are also Windows-only. However, both Raindance and LiveMeeting offer a limited mode, Web-based meeting browser for non-Windows platforms.

GET IN SYNC

A feature set, while important, only lays out the possibilities for a Web conference. How a system performs those various tasks is a major differentiator. We used our "typical file" set—the PowerPoint file, the Word document and the Excel spreadsheet—and tested the ease and speed of loading these files into the application, along with the resulting quality of the displayed object. In addition, we tested stability, application sharing of a blank PowerPoint file, and the ease of initiating a recording of the session (if available), as well as playing back a recording. We also subjectively measured voice and video quality.

The WiredRed e/pop service had serious problems with stability in our test. During a conference led by the company, we were repeatedly kicked out of the session and had to go back to the beginning to log in again. Granted, we had eight simultaneous video streams going. It's not clear whether that was the source of the problem, but these applications do promote the use of multiple video windows. Also, the conference would not recognize our Logitech camera or Labtech USB headset.

After we installed a special driver, Raindance was able to convert and import our test files in short order. However, though the speed was impressive, the resulting slides were of an unacceptably low quality. Also, we could not view the video streams simultaneously with application sharing. Also frustrating in terms of performance was Genesys. At one point during the tests it

gave us a message that a required download was under way but provided no indication of progress. We finally gave up. In contrast, many of the apps performed consistently well, especially Elluminate, Centra and WebEx, which exhibited exceptional stability. These stability concerns are important for a university, where most faculty and students who might be willing to try Web conferencing would want to focus on their research and teaching needs, and not on the technology.

WHAT PRICE TOGETHERNESS?

An initial Web conferencing deployment is no trivial investment, for either the in-house or the hosted applications. Moreover, the range of pricing models can be a bit overwhelming. We considered list-pricing options to cover each of the three scenarios in the evaluation

Fortunately, all the vendors except Saba offer a free download or trial period, from 10 to 30 days, as a standard option. Saba says such trials must be negotiated on a case-by-case basis. Elluminate offers what it calls a "competitive buy-out offer," to entice existing Web conferencing clients to switch to its application. Small shops may want to check out Marratech's Marratech Free offering, which provides limited Web conferencing for up to five people at no cost.

Overall, Elluminate, Centra and Breeze had the richest feature sets, while WebEx, Elluminate, Centra and Marratech had the most robust performance. Raindance and LiveMeeting lagged on synchronous performance, and WiredRed crashed several times during our demos and tests. By the aggregate numbers, Elluminate and WebEx ended in a tie; we're awarding our Editor's Choice for hosted offerings to WebEx, for in-house apps to Elluminate.

However, no one product performed best in each scenario. For Scenarios A and B, the small and medium-size simultaneous group meetings, Marratech performed best, followed by Breeze and Centra. The ability to have good quality audio and video with multiple speakers and video windows was key here. For scenario C, with the large lecture-style session, more structured meetings, and need for significant bandwidth management and maximum accessibility, Elluminate is a better choice. If cross-platform functionality is vital, or you prefer an in-house system, go with Marratech or Elluminate. WebEx and Genesys are the most versatile and



OUR INDIVIDUAL REVIEWS OF THESE PRODUCTS CAN BE FOUND AT WWW.NWC.COM/60/1707AD3.JHTML.

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REVIEWS: WEB CONFERENCING

By Derrick L. Cogburn and Divya Kurup

In-House Installations

lluminate Live 6.5 Elluminate offers consistently strong performance, has a focus on accessibility from low-bandwidth access (28.8 Kbps), and provides ease-of-use advantages.

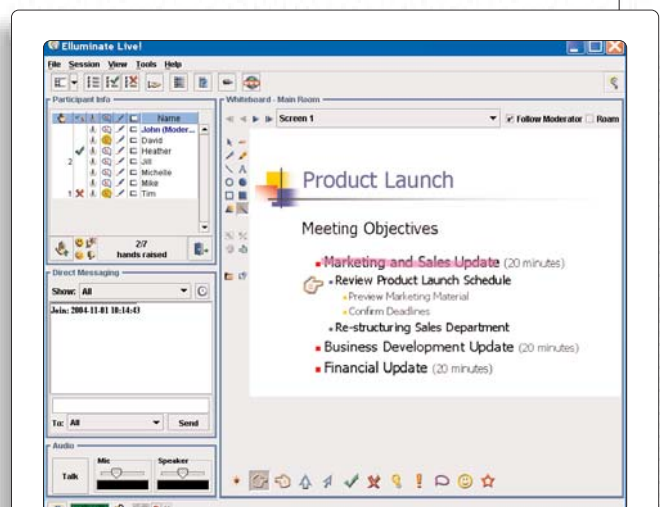
A You can have your pick from among three versions of Elluminate Live, which is also available as a hosted offering. The academic edition is specifically designed for distance education and academic collaboration; an enterprise edition focuses on a real-time collaboration environment for corporate training and collaboration; and the lite office version is a single-room setup, capable of handling up to 10 participants. We tested the academic edition, which uses Elluminate Live Manager (ELM) 2.0 to schedule meetings and manage user data, recordings and archives.

A wizard walked us through installation, which took about five minutes. We could choose the bandwidth the Elluminate server would have available to all the clients that connect. And it uses Java, which makes it relatively easy to deploy in a locked-down lab environment.



Among its features is the ability to make high-quality recordings of its sessions, cap-

turing audio, video, text, Web sites, slides and whiteboards. When we tuned in, we almost felt as if we were in a live session. The only thing lacking is the opportunity to harass the presenter. Among the products we tested, Elluminate has the highest level of cross-plat-



lluminate Live 6.5 offers high-quality recordings of audio and video, as well as the best cross-platform performance.

form functionality and an explicit focus on universal accessibility and full compliance with the Americans with Disabilities Act. Disappointingly, no other vendor even mentions ADA or universal accessibility.

Elluminate has some important limitations, though. With only one video window and no duplex audio, sessions are highly structured. This could inhibit the free flow of discussion for smaller group sessions. And you can't search through recordings and archives.

Creating new user accounts with the ELM 2.0 Manager interface is easy. We could give users one of three default roles—applications administrator, moderator or participant—and assign them to a private meeting or create user-group lists. We could preload content, both whiteboard and multimedia, and assign multiple moderators to a session. This is useful if you have one person setting up meetings that are moderated by someone else. Unique among the products we tested, ELM didn't require us to decide in advance if we wanted a video or audio recording. And we liked being able to set up cost centers, where the amount of time allocated to a particular organization or group that has access to the server can be tracked for internal billing.

Loading slides and sharing applications was quick and easy, and video continued to roll in Elluminate when doing application sharing. One minor glitch: We ran into problems connecting with a USB headset-

microphone. Although the "select audio source" was able to see the headset, it would not work with the audio wizard. The solution was to go into the audio controls of my Mac, and to select the USB headset and microphone as the input/output device.

Saba Centra Live 7.5 Centra Live has one of the richest feature sets of the products we tested and

B+ turned in good performance, but it was hindered by a lack of cross-platform functionality and a high price tag—a deadly combination for universities. Business users may find these shortcomings offset by the fact that Centra has the most elaborate and comprehensive administrative interface among these products.

Management is indeed a strong point of Centra Live, which, with Centra Knowledge Center and the Centra Instant Assistant, is now part of an integrated "human capital management" suite from Saba, which acquired Centra earlier this year. If you're logged in as an administrator, you can easily add new users, who can be assigned to groups. You also can easily manage events (including cost centers), content and the server. We built our agenda in advance, including recurring content. Tutorials are built into the interface, so it's easy for users to get help and training.

Installing Centra Live took about five minutes and

WHICH WAY DO YOU GO?

As our review notes, a major variable when considering a Web conferencing purchase is whether to locate the Web conferencing application in-house on your own servers, or to allow the vendor to host the application for you on its servers, in a Software-as-a-Service (SaaS) model. This is a non-trivial decision, and there are clear pros and cons for each approach.

In-house systems are generally more costly and require a substantial up-front investment. Beyond the software purchase, this investment includes servers and bandwidth robust enough to handle the expected load on the server. Beyond that you'll need the technical expertise to install and manage the application. With hosted systems, all these issues are handled by the vendor, making the cost of entry much lower. However, going with the SaaS means giving up substantial control over the application. Implementing unique local security features and substantial integration

with LDAP and learning management systems are impossible.

In this same vein, there are some concerns about content and privacy when using a hosted application. We have to admit, we were a little uncomfortable loading our test files into the hosted servers, simply because we couldn't "guarantee" what was happening to them after we logged off—even though some of the applications stated that all files will be deleted after two days.

Another consideration is the degree of customization you require. Although most of the in-house applications allow at least some degree of customization, many of the hosted solutions are far less customizable and don't let the user engage in significant branding. Most U.S. universities wouldn't think of sending students to an unbranded site for courses.

Finally, consider the long-term cost strategy. Once an in-house application is purchased (depend-

ing, of course, on the terms of the license agreement), it's yours in perpetuity. Annual licensing fees may be required to receive software updates, training and support. But should you choose to not pay those fees, you will still own the version of the software you purchased. This isn't the case with hosted solutions, where as soon as you stop paying, you lose access to what may have become a valuable resource.

As Web conferencing moves from the exotic to the mundane, the in-house option will become much more attractive, according to Garner. On-premises deployments are predicted to nearly double in the next two to three years. Gartner also points to two hybrid alternatives: "blended" systems where you have a fixed number of seats in an in-house installation, with the option of expanding on-demand if necessary to hosted services, and a less prevalent "managed" service, where the vendor manages a local, in-house installation.

was simple; we just followed the wizard. Centra installs Microsoft SQL Server Desktop engine during the installation, if an instance is not available on your server, and its Centra Directory Synchronization Service (CDSS), which is used to synchronize user accounts in the Centra server with Active Directory, or any LDAP directory.

For users, joining a Centra Meeting is as easy as clicking on a link. The application checked to see if our test machines had the client loaded, and if not, it loaded the applet. Once the user interface is loaded, new users are immediately brought to the audio tuning wizard. Only Centra automatically pushes users into the wizard, increasing the likelihood of good VoIP audio during a session. Centra also provides a "Getting Started" screen with sufficient orientation to help new users get up to speed, as well as troubleshooting tips. Finally, when "stepping out" of the room, most regular functionality is disabled so that users don't forget to "step back in" when they are ready to rejoin the session.

Incorporating our test materials was a simple, relatively speedy process. It took less than two minutes to get our 320-KB Word document up and running and to push it out to the remote client. Recording sessions was likewise an easy, one-button operation from the main interface. Video is nicely integrated into the interface as well. When we turned video on, an embedded window launched nearly instantly; we could also move the video, and any other window, into its own browser instance.

Application sharing worked quickly, and when we switched to a new window, the application asked us if we wanted to share that window with other meeting participants, a very helpful feature. It was a simple matter to publish our recordings after meetings, and they were easy to access. We could play a recording from the server or download it to our PC.

Adobe Systems Breeze 5 Breeze's flexible management interface and ability to accommodate diverse

B⁺ session content are breaths of fresh air. We liked being able to customize the URL to make it short and easy to remember. Breeze also let us add an event logo in standard graphic format (.bmp, .gif, .jpg or .png). And, like Centra, Breeze let us preload content into the meeting from a Breeze library, training course or curriculum. A nice touch was being able to create registration questions in advance to survey or pretest users before a session.

Installation was simple with the Breeze installer. Breeze requires an SMTP mail server for sending and receiving e-mail notifications, and it checks for a SQL database.

Creating a new meeting in Breeze was, well, a breeze. Breeze meeting rooms are customizable and easily branded. Best of all, we could set up persistent, shared meeting rooms where searchable and retrievable content can be recorded and archived to allow for continued collaboration. The curriculum wizard and training modules helped provide a comprehensive learning experience, and other authoring tools, such as Capti-

vate, Flash and Authorware can be used to create content for Breeze sessions, though each of these applications requires substantial training. Breeze also has open APIs for integration with other systems.

The Breeze interface provides plenty of information to the user, plus links to substantial documentation and "getting started" guides from the login page.

Marratech 6.0 Marratech 6.0 scored well on our features evaluation, boasting high-quality audio and

B video over IP. In fact, in our evaluations of audio and video quality, Marratech led the pack. We were especially pleased with the ability to have private conversations with other session attendees. Like Breeze and e/pop, Marratech offers multiparty video, but it was the most stable and robust. Plus it has a voice-activated option so that the person speaking the longest goes to the larger video window. Other video-enabled participants are shown in thumbnail images—more than sufficient for most collaboration purposes.

Like all of the in-house applications we tested, Marratech licenses its server software and provides client software for free. It also offers a Time-to-Meet hosted option and a Meet Now! service that lets participants enter a session from a Web browser, without downloading the Marratech client.

After an easy installation, Marratech Meeting led us to its management Web page, which is rudimentary. We used Marratech Manager 3.3 to set up meeting rooms and issue invitations. It was easy to start recording and to launch video and IP audio. Like e/pop, Marratech provides a full-screen video mode, and it was easy to load our content—for example, there was no need to do application sharing to see a PDF. However, as with Elluminate, our PowerPoint files first had to be converted to image files, and then loaded, but when viewed they were incredibly clear and could be marked up by presenters and participants.

Marratech runs on Mac OS, Windows and Linux—only Elluminate offers more cross-platform functionality. Marratech also promises to run on most PCs without any need to upgrade performance capabilities; minimum specifications are Mac OS X 10.3 or higher using a G4 processor or higher, Linux or Microsoft Windows (Pentium III or above).

Some of the biggest limitations of Marratech come in its participant-interaction functionality. There is no discussion control and only limited differentiation between user roles. We would prefer not to have to determine roles of participants in advance.

WiredRed Software e/pop Web Conferencing 4.2 e/pop Web Conferencing is one module in WiredRed's

B⁻ suite of collaboration tools, which also includes e/pop Secure Instant Messaging and e/pop Alert. This product has a rich feature set, including multiparty video and audio over IP, and document, application and desktop sharing. The video capabilities

can be extended with voice activation, and the audio capabilities can be “push to talk” or voice-activated.

Server installation took all of 30 seconds; on completion, we got a URL to connect to the Web conferencing server. Scheduling e/pop meetings was easy. The program lets you delay start times and provides e-mail links to join. We could specify the frames per second of video received (up to 30) and adjust the audio quality to reflect the connection speeds of individual users. For scheduling, e/pop let us research the availability of users during proposed meeting times. The program’s customizable layouts can be chosen by the meeting organizer or individual participants.

With e/pop we could see if any scheduled meeting is audio-enabled, video-enabled, open or closed. But we prefer the approach taken by other applications, such as Elluminate, in which all meetings are both audio- and video-enabled by default. And audience interaction is unavailable unless you enable the chat window to provide this functionality.

Our imported PowerPoint slides were large and clear. But the attractiveness buck stops here. e/pop’s own interface is much less visually appealing than some of the other applications—namely, those from Centra, WebEx and Elluminate. We could, however, customize the URL for our meeting, and we had granular control over settings. In fact, when we set up a meeting, we were asked more than 11 questions. For example, “Do you want to enable audio?” was followed with a choice of quality options— fair, good, high or toll.

We had some problems with stability during our tests. WiredRed suggested that we had too little bandwidth (not an issue because I connected over a wired connection in my campus office) and that the Dell Latitude D610 I used, which had an Intel Pentium M processor nearly 1 GB of RAM running Microsoft Windows XP Professional 2000, Service Pack 2, was not powerful enough to participate in an e/pop session. Both explanations are problematic, because many university students will use less bandwidth than e/pop seems to require, and a laptop that is less than a year old would certainly be standard on campuses across the country. Still, the major limitation of e/pop is that it is a Windows-only application.

Hosted (ASP) Installations

WebEx Communications Meeting Center

Straightforward navigation, strong integration with other applications, and speed define WebEx

A- **Meeting Center.** The WebEx Meeting Center Web site has big icons, in an uncluttered space, with scheduled meetings for the day clearly marked. Once we logged in we were prompted with several options for downloading and installing new software, but the user experience continued to be smooth. We were given a URL for a personal meeting room, a nice touch. And icons on the left of the screen let us change our profiles, get training or ask for help—options include

24/7 self-help and live support. However, you’ll have to make decisions about your meeting during the setup, and won’t be able to have input about meeting functionality once the meeting is in session.



WebEx really highlights its integration with other applications. On the login screen to the meeting center, we were presented with two additional options: to install integration tools with Outlook; and to install the newest version of WebEx’s On-Click Meeting, which allows users to plan a meeting and send invitations without fully logging into the Meeting Center.

It was incredibly easy and fast to load our PowerPoint slides into WebEx; in fact, the test slides loaded faster into WebEx than any other application. The quality of the slides is also very good, and we could resize them or zoom in.

Only WebEx and WiredRed e/pop let us view participants’ video in full-screen mode; this could be a useful feature, especially in higher-bandwidth environments. We found the voice quality was extremely good, and WebEx recognized our USB headset, which affords a much higher quality than a regular microphone/headset combo.

WebEx also has some very nice features upon exiting a meeting. The software prompted us with various options of what may be saved—a chat transcript, for example. Finally, WebEx is the only product besides Elluminate to give a nod to the ADA, by including a closed-captioning feature.

Microsoft Office LiveMeeting 2005 This offering has a few extras you won’t find in the competition. You

C+ can send a meeting invite over LiveMeeting or your own e-mail client. And you can view recordings of sessions that you’ve been in and access reports. Those can be handy features, and scheduling a meeting in LiveMeeting also is relatively easy. But the interface is less elegant than some—notably those used by Breeze, Elluminate and Centra.

In addition, we had to enter a meeting as a participant or presenter, somewhat limiting the flexibility of the meeting, once in progress. And to get the “full fidelity” experience of LiveMeeting, we had to download and install the Meeting Console, a .exe file. That’s something many university users may have difficulty with when operating in locked-down secure computer labs or offices.

Microsoft does seem to care about your privacy, though, and about the possibility of unscrupulous moderators recording meeting conversations without notifying participants. When going to the Microsoft Office LiveMeeting site, there’s a prominent note about the possibility of sessions being recorded.

Raindance Communications Meeting Edition Raindance Meeting Edition has some likeable features:

C+ a Windows-friendly session environment, a nice audio bridge to include persons who have only phone access to a meeting, and a

voice-activated option, called follow-talker, that helps participants know who is speaking and filters out other audio conversations.


Unfortunately, Raindance's other features aren't as appealing. Its initial login page is packed with information unrelated to meetings; it seems to focus more on providing information about the company's offerings than your sessions. You can start a meeting at the push of a button from here, join a meeting or edit your personal profile. Once you log in, and take care of the many accompanying downloads, the conference interface appears relatively quickly. The application detects the presence or absence of a camera upon log in and alerts the user.

Setting up a meeting is slightly more complicated compared with doing so with some of the other applications, with an annoying need to input telephone numbers. Return visits to the Raindance server made you feel as if you were signing in for the first time—it's not very personalized.

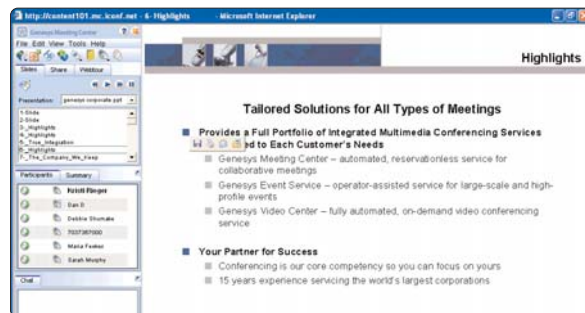
To get into a session we had to remember a 10-digit conference ID number and a PIN, another annoyance. And before we could add PDFs, PowerPoint slides and other files for use in our conference, we had to convert them to Raindance's format. This took some time, and then some of what we'd uploaded was too small to be read—in stark contrast to the Marratech's ability to quickly upload the PDF document and display it clearly and in a usable format. PowerPoint files seemed to convert more quickly than PDFs but also were difficult (though not impossible) to read. Although it was relatively easy to start recording a meeting, the recording indicator in Raindance is the most obtrusive of any of the applications we tested.

Raindance lets users include a snapshot of themselves at the bottom of a conference. And the company says it can pull a live Raindance support person into session in about 30 seconds during the day. But that may be small consolation for the other inconveniences.

Genesys Conferencing Meeting Center 3.5 One of the things you'll like about Genesys, which focuses

 on audio and Web conferencing, is being able to load your Outlook or Lotus Notes contacts into a meeting. This gives you several useful options for scheduling the meeting and sending out invitations, sending e-mail reminders and follow-up e-mails; asking participants to accept or decline invitations; sending surveys or quizzes; and including a calendar-link attachment with the invitation. You can also customize the invitation on the fly, creating a survey or quiz, for instance, and previewing the invitation before sending it out. Another interesting option is the opportunity to add other "optional media" to a meeting, such as streaming audio, video or custom media.

The product's Meeting Center is relatively easy to



Genesys Meeting Center 3.5 is easy to navigate and integrates Outlook or Notes contacts to make scheduling simpler.

navigate. The button to set up a new meeting is clearly identified on the opening page, as are any meetings in which the user is registered. You can't customize the URL for the meeting, but the defaults are in place in terms of date and time. There are also useful buttons to set up recurring and ad hoc meetings, and determine if they will need audio or video.

When entering the Genesys meeting, you must install ActiveX controls and two other components for moderators: a Java applet and a plug-in that lets the moderator initiate application sharing. These downloads may present a security concern for some. However, Genesys sees this as a strong point of its service.

When preparing to upload files, we were given many possible options. However, most were only for presenters, and should have to be chosen only once per computer.

Genesys let us keep the animations in our uploaded presentation. Also, Genesys accepts both PowerPoint and Astound presentations. Although the image quality of the PowerPoint presentations is less sharp compared with the quality on some of the applications, such as Marratech's, the overall image is larger, and there's a full-screen option. Unfortunately, when we tried to use this during testing, it didn't work.

Genesys uses multiple tabs on each window/module to cleverly maximize screen real estate. However, some functions are hard to find, and we couldn't find an intuitive way to mark up our slides.

The video window on Genesys is undocked, with no option to dock it. This approach to video has pros and cons. On the positive side, it means that you can move the video around the screen easily. The negative side is that it is always somewhat in the way of other things on the screen. The meeting organizer can decide if video can be initiated by the moderator or the participant.

Genesys has very specific requirements for adding new users. You must decide in advance, for instance, whether those users will go into a meeting as a moderator or participant. Participants may not go into any meeting that hasn't yet been started by the moderator. It's easy to start a recording, but video recording/archiving is not possible