

The Spiky Workflow Collaboration Landscape

BY RON ROSZKIEWICZ

Collaboration is one of the hottest concepts in workflow management today. The term is being attached to every function and workflow component that allows interaction between users and machines. It's used to describe interoperability, groupware (remember when that was hot?), file sharing, remote viewing and on and on.

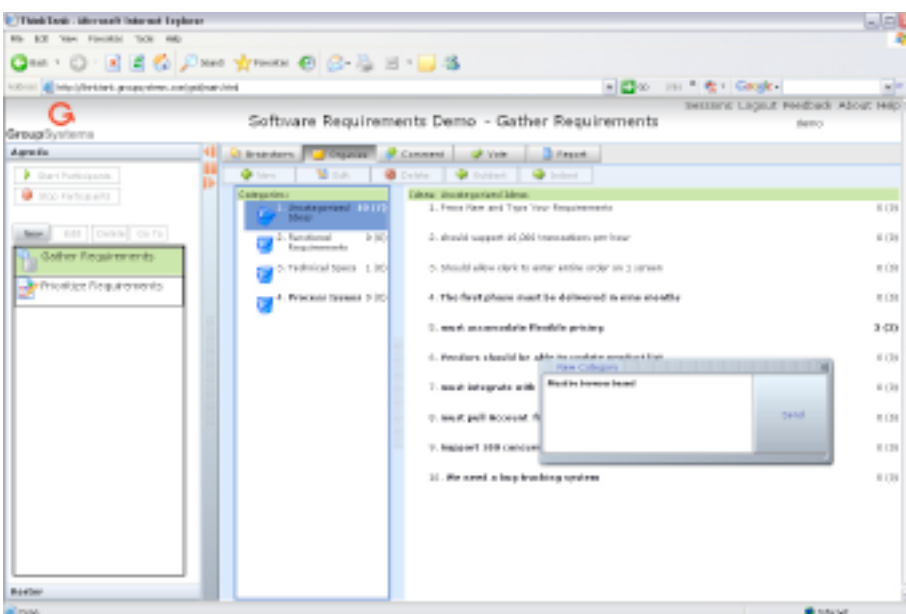
Many of the mislabeled collaboration functions depict less-immediate interactivity rather than real-time interactivity. In the publishing world, where content is created and destined for some sort of digital or physical output, collaboration generally has an immediate nature — a way of working that leads to decision-making, where stakeholders in the process are involved with the content and the quality of the finished result. While a single individual or a few people might be responsible for creating the original piece, in all but the smallest shops it is often the responsibility of more than one person to review and approve content and quality.

Over the past decade the workflow used in prepress and communications in general has become digital. Portable Document Format (PDF) files have become the standard format for read-only viewing and are increasingly becoming the format of choice for editing and review. More companies are utilizing digital asset management systems (DAM) for distributing files for use and review. Despite these advances, the routing and management of content that is in development still suffers from a noticeable lack of streamlined efficiency. This includes design for print and Web, logo design, packaging mockups, presentation development and so on. The inefficiencies take the form of soft and hard costs, including the time and manpower necessary to package the digital progressive review files for delivery on CDs, DVDs and through e-mail.

In the past, various factors have limited the development of a digital alternative. Bandwidth was insufficient for piping the high-resolution images for soft-proofing, for example. In addition, cultural factors led some people to resist using online digital solutions. Account executives, for example, were unwilling to relinquish their responsi-

bility to deliver to their customer hard copies of high-quality proofs for sign-off. Nonetheless, the collaboration movement is swelling and intruding upon every application and solution within and without the traditional communications world. Just as Web conferencing brought efficiencies to training, distance learning, product sales and demonstrations, so too is collaboration poised to bring efficiency to integrated vertical applications.

It's a small world after all. Collaboration is key to the success of many multinational companies in industries as diverse as automobile manufacturing and textiles. Even the notion that the business world is flat, popularized by Tom Friedman (“The World Is Flat: A Brief History of the Twenty-first Century”), is itself too high-level. According to John Seely Brown at this year's Collaborative Technologies conference in Boston, the world is actually “spiky,” with the spikes representing loci of special skill sets, access to materials, manufacturing capacity and so forth.



Key Terms

Some of the key terms, concepts and drivers in today's collaboration market:

- Presence awareness: tracking the status of participants, online and offline
- Contextual collaboration: ad hoc collaboration from within an application or workflow
- Functionality moving into the operating system infrastructure — ubiquitous collaboration
- Core set of integrated applications for instant messaging, chat, file and window sharing, file annotation

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Collaborators connect the spikes to make efficient workflows. From a 20,000-foot perspective the globe might appear flat, but from ground level the view is significantly less homogenous. All of these multinational manufacturers depend on enterprise-level, integrated, interoperable solutions that together with their product brand comprise an important part of the corporation's value and success. This interoperable "machine" collaboration was the first step in connecting the spikes.

The intelligent, database-driven systems that corporations use are not going through a transformation and becoming accessible to desktop users or small to medium businesses (SMB). Collaboration in the sense that is being used in this article represents human-to-human interaction, not the machine-to-machine interaction that is represented by the interoperability mentioned above. Unlike machine-to-machine interoperability, which relies on standards and business rules, collaboration depends more on human work analogs and user interfaces. Integration into applications and systems must be more discrete and transparent to the process; that's where the real value in the product lies.

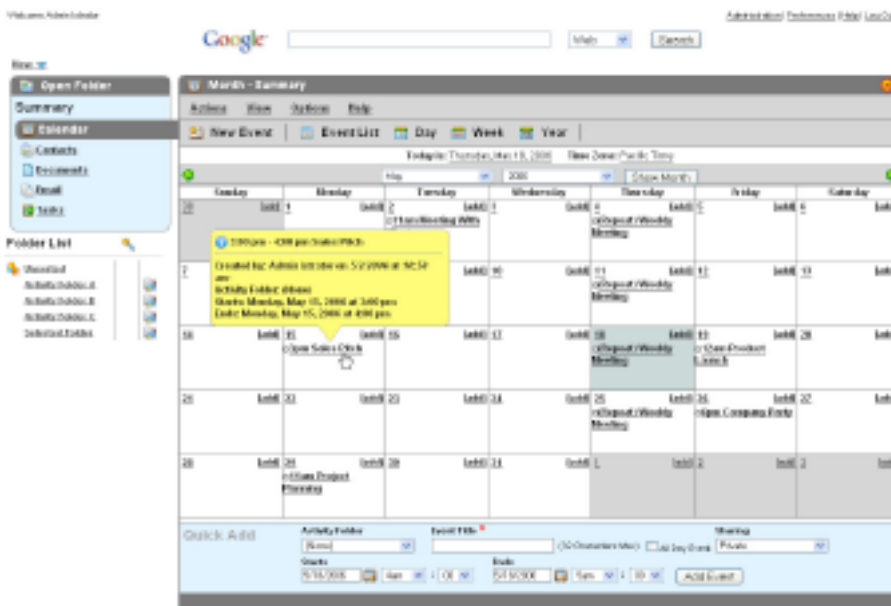
It is in this new area of development that the application of the term *collaboration* becomes a bit confusing. To some software developers, collaboration refers to a sharing of data, data about data, or rules on how the data is used. For others it is a function in an application, generally known as contextual collaboration, which provides a means to interact from within an application with other users. Both of these approaches seem to be perfectly legitimate uses of the term. The other popular form of collaboration is real-time sharing for review and editing of a shared document over the Internet. This activity can be done on a local area network or between a LAN and a wide area network (WAN). The net result is the same as users sharing applications and computer screens to express their thoughts about what they are viewing.

A suite of applications is now migrating from Web conferencing and is being associated with interactive collaboration: instant messaging, Web conferencing (file, application, screen sharing) and video conferencing. Communications through these applications is typically direct and immediate; in some cases they are an always-on presence that virtually links team members live to one another.

It's still about standards. The current focus on collaboration is a shift from years of concentration on application interoperability. Interoperability is about standards and compliance — how machines communicate with machines, databases with databases — while collaboration refers to people interacting with other people. Standards and protocols are still important, but the recently recognized value in collaboration lies in the development of easy-to-use applications built on top of these standards. Unfortunately, settling on a development platform is not a simple task. A platform that serves as the foundation for secure, validated, predictable communications once again requires fierce competitors to work together.

Companies such as Sun Microsystems, IBM, Microsoft, Oracle and Novell are all proposing variations of environments that can be identified as collaborative workspace platforms. As with most industry-initiated pseudo-standards, the issue is proprietary control vs. openness. In addition to the major applications and workflow solution developers, communications giants such as Lucent (technology), Cisco, HP and AOL (software and community development) are adding their own hardware and software initiatives to this matrix.

Regardless of how much or how little these vendors cooperate with one another to adopt common standards, the development of applications for collaboration will continue unabated. Even without a de facto set of standards that cross over software develop-



Standards and Platforms

Standards. While there might not be a standard platform on which to build collaboration systems, there are communications standards in effect to transmit the data. This is the basic reason for all of the activity today. Two of the most relied on are H.323 and T.120, which are International Telecommunications Union (ITU-T) standards. H.323 concerns audio and video over an IP (Internet protocol) computer network. This standard also includes server registration, call setup and termination, and security and authentication. T.120 concerns transmitting data such as application sharing, whiteboard and transfers. The most common standard for video is H.263. Additional standards for audio, such as G-711, G-723.1 and G-728, are also used. Session initiation protocol (SIP) for instant messaging and presence awareness is commonly used today. Extensible messaging and presence protocol (XMPP), and SIP for instant messaging and presence leveraging extensions (SIMPLE) are emerging.

Collaboration system developers rely on the standards mentioned above for transmission and functionality.

As far as platforms that tie together applications so that they can support interoperable and contextual collaboration technology, there is no standard. It's easy to understand why this form of support might be important. Without it developers must second-guess industry trends and momentum and take a chance on one standard or another. Generally, a developer will choose to follow and evangelize the standard included with its development environment. So Sun, Microsoft, Oracle, Novell and others will follow the lead of those companies whether or not it is the most widely accepted standard. The following illustrate the different approaches the major players are taking to collaboration. These vendors will, along with Internet standards influencers, play a part in determining which standards become ubiquitous.

IBM. IBM relies on Lotus Notes and Domino for collaboration. Its IBM Lotus Sametime collaboration tool uses "presence awareness," instant messaging and Web conferencing. Presence awareness is the status of team members while not connected. It's similar to what many experience using a chat application. Sametime is also introducing IP telephone through support for third-party telephony applications. Lotus' QuickPlace is an application and a development envi-

ronment for building Web-based collaboration tools for teams. It integrates well with Sametime, includes compatibility with SAP and Lotus Notes for SAP, and works well with Java, HTML, LotusScript, C++ and service oriented architectures (SOAs).

Microsoft. Microsoft Office Live Meeting provides Windows users and .Net developers with collaboration tools such as Web conferencing, whiteboard, file sharing, real-time polls, mood indicator (presence awareness), chat, annotation and a selective question manager. There is some integration with Microsoft Office programs and meetings can be initiated from within these applications. Microsoft utilized Outlook as the messaging application for meeting invitations and scheduling.

Microsoft Communicator Web Access works in conjunction with Live Communications Server 2005 through a Web browser. Its functionality can also be extended to mobile phones.

Microsoft Office Groove 2007, a new, integrated Office collaboration tool coming soon, is intended to be a contextual tool so that users can work collaboratively from within the applications and use SharePoint Files and InfoPath Forms interactively.

Novell. Novell Groupwise provides e-mail, calendaring, instant messaging, document management, task management and contact management. It is billed by Novell as the leading alternative to Microsoft Exchange Server 2003 because it provides an alternative solution to all of the functions listed.

Novell is very heterogenous as far as platform support (Mac, Windows, Unix, Linus) and Groupwise is a component of an overall Linux strategy. As such, Novell also supports open standards and open source development communities.

Oracle. The Oracle Collaboration Suite brings the same messaging tools, from e-mail to calendaring, with the addition of voice mail, faxing and threaded discussions. It is presence aware, supports SOA and provides for contextual collaboration. It supports Java and users can integrate with heterogeneous platforms and Outlook. As is the case with Novell, Oracle integrates with SAP, Peoplesoft and Microsoft applications, providing collaborative application building tools and content management to the enterprise. **TSR**

ment environments, we still have standards such as HTTPS that were created to ensure secure communications on the Web and in the meantime are filling the need and being accepted as de facto standards. Banks and other institutions use these standards daily in conjunction with other authentication methods for secure communications. So while it would be nice to have platform-supported code to plug into an application, the lack of such standards has in no way impeded the

progress of collaboration solution development.

The Evolving State of Collaboration

Some people view collaboration as a shared client/server database system, such as a customer relationship management (CRM) system. Collaboration also can be viewed as an environment where users log into a central virtual location and check items in and out for their local use (DAM, asset repository). This article

does not include these indirect approaches to collaboration even though they are certainly key ingredients in team project interactivity. Instead we are focusing on what we believe is fast becoming the new definition of collaboration: real-time interactivity between two or more users through applications and Internet connectivity. This would be the digital equivalent of a face-to-face meeting, complete with all of the meeting notes, decision-making, markup and document editing.

The core set of tools that we are familiar with today in Web conferencing will continue to be key components of the next collaboration suite: instant messaging, screen sharing with optional annotation

Outsourcing knowledge worker services and tying together the systems that support them are clearly key infrastructure drivers for better collaboration services.

and commenting, application sharing, file sharing, whiteboard, video conferencing and Internet protocol telephony. E-mail will still perform a useful role but will continue to operate as an indirect messaging application without the timely user experience supplied by the combination of the components listed above. The value that developers are providing in the next generation is integration into existing workflows, which is known as contextual collaboration.

Security will be front and center in this area simply because the current batch of applications being used in corporations lack such features. Consumer versions of these applications rely on simple authentication methods. Professional integrated solutions rely on secure, trackable sessions. It is far easier to control workflow

and security through a standalone application or as part of an embedded client server solution than it is when the collaboration functionality is embedded in an application.

The workflow analogy for collaboration in graphic arts and content creation is a real-time digital review and approval process. It is marked by real-time sharing of applications, screens, files, contacts and calendar data. The immediacy of the session reduces the lag inherent in an analog review and approval process. An analog process requires hard and soft costs where PDF files are RIPPed or hard-copy proofs printed and CDs are burned and often sent via FedEx to a reviewer. Eliminating this step improves the workflow and streamlines the process.

The current graphic arts applications are all adopting some level of collaboration functionality. QuarkX-Press 7 allows layout elements to be edited by remote users, synchronization for items so marked, and project management functions where members of the workgroup share rules and templates for maintaining consistency. Changes made by one member are reflected in copies or derivatives of the originals.

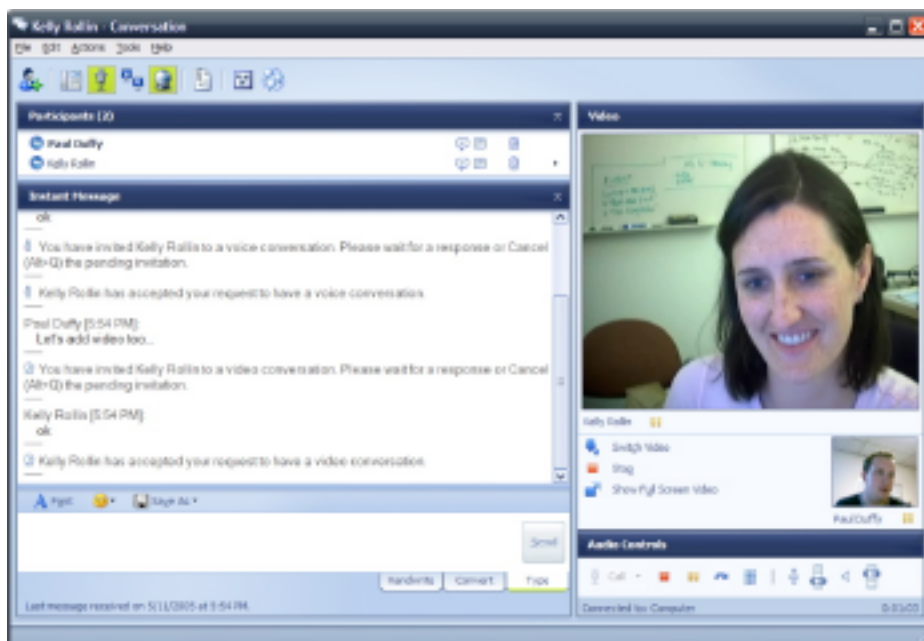
Adobe's Version Cue, which is part of Creative Suite, provides for distributed access to digital content. This access can happen on a local or wide area network. Microsoft Project 2003 includes collaboration within the application based on a shared Internet-accessible server. Microsoft Communicator will provide virtually every form of instant messaging, voice and mail option to its applications based on a shared address book and a contextual right-click of the mouse (at least on Windows machines).

In addition to the desktop applications, hosted solutions for sales, project and human resources management are thriving as alternatives to staffed in-house solutions. While not directly collaborative in nature, they do allow team members to manage files in real time.

Catalysts for Real-Time Collaboration

The global nature of corporate knowledge management is a key motivator in propelling the development of collaboration solutions for the information workplace. Projects can be made modular and distributed anywhere in the world that Internet access is available. This flattening of the global information workplace has exposed the need for secure interactivity. Outsourcing knowledge worker services and tying together the systems that support them are clearly key infrastructure drivers for better collaboration services. In companies where collaboration is used for product development, cutting unproductive lag cycles out of the workday results in quicker time to market and a competitive edge.

The development of legitimate collabora-



tion systems is also being driven by a recognition of the chaos caused by e-mail and chat sessions over insecure channels outside of the purview of the IT department. These sessions often include the transmission of sensitive files and privileged information. Recognizing the grassroots demand for easy-to-use applications to share information is also a key driver in prompting developers to seek secure ways to achieve the same goal.

Who Will Be Affected by Collaboration?

Collaboration systems affect every department where project stakeholders share responsibility for reviewing and approving product planning and execution details. One scenario of a typical collaboration involves the graphics department conducting a session with marketing and sales to review the contents of a flyer. In another, a freelancer, ad agency and consumer product company might hold a real-time session to review and approve a corporate logo. Other examples include sales departments using collaboration tools to demonstrate a new product to a remote prospect; trainers illustrating to a customer step-by-step how an application works; and support personnel remotely diagnosing a customer's application problem by observing how the product is used.

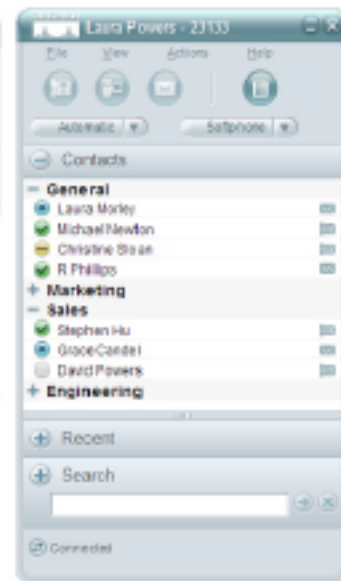
Architects in remote locations can discuss and mark up plans, programmers can review code and medical clinicians can share information in developing a diagnosis. These are just a handful of the many opportunities for sharing information and interacting with it digitally. With all of these opportunities for collaboration in so many different disciplines, it's easy to appreciate the necessity for easy-to-use tools that are reliable and integrated into the existing workflow.

Issues Facing the Development of Collaboration Systems

The key issues facing successful collaboration systems are data security, verisimilitude, ease-of-use and the ability to co-habit in a secure IT environment.

Security. Security generally means end-to-end encryption of the data (information) transmitted between collaborators. One of the main reasons for the panic in corporate America over the widespread use of chat applications is that they are unregulated and unmoderated. Anything can be said, shown or sent using these deceptively simple applications. Users can communicate using programs from different suppliers and can remain anonymous, identified only by their screen name. The recognition of this problem with chat has cast a pall over all forms of interactivity. Unencrypted e-mail, insecure Web demonstrations through hosted systems and simple authentication as a guest in a hosted meeting are all now suspect and in need of industry standardization and security.

Of course, banks face similar problems hosting



their own online banking environments. They are regularly evaluated by an outside auditor to determine if their security is state-of-the-art in hack-proof methodology. In recent months, banks such as Bank of America have moved to a double-authentication method to add an additional level of security to their login procedure. All businesses need secure communications. Schemes such as the Diffie-Hellman key exchange uses cryptographic key exchange methods to provide a peer-to-peer secure communication.

In the case of the bank, standard hypertext transfer protocol is added to a secure socket layer (SSL) or transport mechanism (TLS) to add an additional encryption and authentication layer between the HTTP and TCP. Whatever approach is taken, the assignment and exchange of public and private keys will have to be simple and part of the overall messaging to insulate users from complex setup and maintenance.

Making it real. Some collaboration developers seek to achieve verisimilitude — creating the appearance of a real meeting through technology — in their collaboration solutions. At the low-tech end, Apple's iChat video creates a meeting-like environment, with attendees seated at a virtual card table and angled toward the host. At the high end, HP's Halo does the same thing, with an actual room festooned with plasma displays showing life-size video images arranged at a virtual conference table.

Both methods provide a more comfortable and realistic experience for users. Unfortunately, reliable, realistic video conferencing is expensive. It is hardware and bandwidth intensive and plagued by difficult issues of management and overall reliability. iChat suffers from relatively low bandwidth from home computers carried on shared cable and DSL pipes. Meanwhile, a high-end Halo room can cost \$500,000, plus \$18,000 in maintenance fees per month.

Cost and unreliability contribute to the slow adoption of video conferencing systems in business. For government use, where dedicated transmission lines carry heavily encrypted data, conferencing is the most

prevalent method of collaboration. This is not due to a lack of effort by vendors involved in communications technology. Cisco, a major hardware and solution provider for network communications, earlier this year described its new “telepresence” system designed to transmit full-size, quality images capable of conveying body language. This system consists of numerous current Cisco components bundled as the Unified Communications suite. Without further information to go on, it seems that Cisco’s approach will be similar to HP’s, with similar administration requirements and pricing structures.

Integrating a video conferencing system into the IT department is a problem for many companies where IT is already hard-pressed to support new intellectual property management systems and developments related to Sarbanes-Oxley data management. Vendors will in time develop solutions for these problems, but in the meantime users are left to rely on non-video collaboration approaches that combine new Web-based screen sharing initiatives with POTS (plain old telephone system).

Ease-of-use. The widespread adoption of new collaboration tools will require ease of use and transparent integration into project elements of familiar applications. Unlike the day-to-day applications we depend on, such as Microsoft Word and Excel, collaboration tools must be intuitive from the outset. We don’t need extensive training or skills to attend a real-life meeting. As an application used with other applications, collaboration software must be as transparent as an application can get — an extension of the functionality of the application that is being shared.

This sort of collaboration is different from Webinars and Web conference demos. Collaboration implies give and take between attendees operating within an application or moving easily between appli-

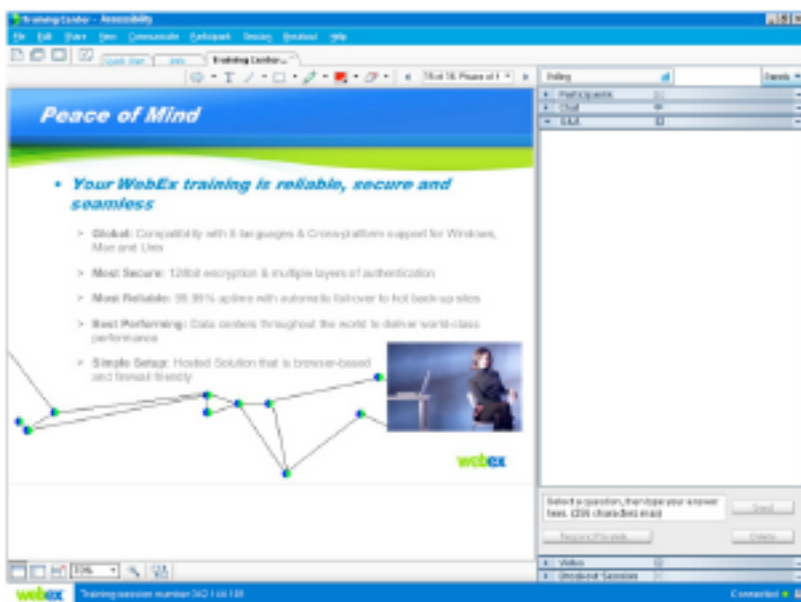
cations. It means that the presenter is also the moderator who controls his/her meeting and guests interact with the presenter at his/her pleasure. This interaction includes annotation, chat and file sharing.

A case might be made that chat and e-mail applications achieve this level of intuitive operation. The problem is that these stand-alone applications are not integrated into a solution that allows chat about a viewed onscreen object and do not allow annotations made on that object to take place. Integrating chat into the suite of communications functionality enhances the overall value to a level that’s greater than their individual parts. Commenting on a bit of content just highlighted by the presenter in a chat window has greater immediacy than highlighting a PDF proof, sending it via e-mail or discussing it over the phone. Once again, the notion of contextual collaboration shows how important it really is.

The meter is running. Hosted solutions can be expensive. The first generation of collaboration tools, such as WebEx, clearly saved companies cash over the alternative of in-person meetings at distant locations. However, using these applications introduced a new recurring expense into the operation, one that for many companies — especially small to medium-size ones — has become a cause for concern. And while nearly every company with a product to sell can come up with ways to use collaboration tools, small to medium-size businesses have trouble justifying the costs. Smaller companies have the alternative of using free open source screen-sharing tools, such as Chicken of the VNC, a client application available as a free download under GNU General Public License. Since the freeware alternative operates as a peer-to-peer solution, it’s not hosted. Despite its unreliability and glitches, many companies use it because the technology is free. You do pay a price in setup, which is often tricky; lines that are frequently dropped; and screens that arrive half drawn on the guest’s monitor. Nor do the free solutions include many of the suites of functions from the paid alternatives.

The tide is changing on hosted solutions. The arrival of more cost-effective hosted and non-hosted solutions is driving costs down. Competition is resulting in more innovative functionality and the development of more robust systems to solve the security and reliability issues that have plagued the collaboration market.

Plays well with others. Setting up another local area network with access beyond the firewall to the Internet is a tricky administrative and technical challenge for many companies. Insecure communications between users on both sides of the corporate firewall is the critical issue facing IT departments today. Merely replacing the current insecure chat and e-mail transmissions with the connectivity of an entire LAN to the outside Internet without imposing corporate policies and pro-



tools is an order of magnitude worse.

There are two perspectives on how to solve this. One is to pipe everything through the corporate infrastructure and force applications to conform to existing data management policies. The other is to allow the communications to exist on a separate channel, parallel to the existing corporate structure but outside the existing IT protocols. For some companies the second scenario is unacceptable. Of course, for many companies without an IT department, policies and protocols are not an issue. Companies with a secure infrastructure would find designating a port open for collaboration and possible hacking unacceptable.

For hosted solutions, where every transmission is routed through a third-party server, the issues are a little different. These transmissions can be moderated and controlled according to the policies even though the server is not owned by the client company and is not located on its site. Partnerships such as the one between Reuters and AOL attempt to solve this problem by filtering transmissions at the server. Trust in the third-party server security is key here, and in cases where the transmission is about training or support, potential breaches would not be catastrophic. The indirectness also further insulates the client corporation's internal server from hacks.

Compatibility pertains to prepackaged collaboration, Web conferencing solutions and existing IT infrastructures. Once we enter the next generation of hybrid and locally installed standalone collaboration solutions, a new level of potential incompatibilities and security vulnerabilities is opened up. In a number of instances, collaboration is being introduced into solutions with built-in security policies and authentication. Adding collaboration to a CRM or workflow management tool means that the collaboration functionality will only be available to a client already authorized to use the customer relationship management or workflow management system. When EMC/Documentum integrates eRoom collaboration, it wraps the set of collaboration functionality that enhances its content management solution into its system's rules and policies.

Building collaboration into tools is satisfactory for situations where the collaboration functionality is narrowly defined. In an optimal situation, metadata from a project built in the host application is used to characterize the object of the collaboration. However, when broader functionality for collaboration is required, a standalone application is critical. The standalone collaboration application must interact with other applications in a consistent, predictable way. It must be available to all applications in the same way as operating system functionality is available to all the applications it supports.

The standalone application must work in the LAN and WAN in a seamless manner. This means that it

must be available to all members of the LAN who are authorized to use it and then access the Internet using existing connectivity. This is generally possible through software in a smart router or by adjustments to the corporate firewall. While this approach to collaboration might seem possible through a standalone collaboration application, it can also be a black box of collaboration functionality called by code in other applications: the contextual connection.

Our Take

Collaboration using digital tools for content creation is intended to support the review and approval process and the collective, subjective decisions we make throughout a digital workflow. Before broadband, all of our efforts to create tools for viewing content and quality were hacks that in the best of circumstances required expensive, dedicated hardware to create consistency. At worst the result was unreliable and choppy communications that detracted from the experience. With broadband and a new wave of digital tools, we can almost transcend the medium and focus on the content. We actually can achieve real-time interactivity.

While collaboration is being applied in myriad ways within and without applications, it still can be a gimmick rather than a useful function. For example, merely running a meeting without recording the session means that decisions made are just as memorable as those made in a face-to-face meeting. Computers can add value to such an experience by recording the session and then providing playback whenever it is needed.

Contextual and standalone implementations. Integrating digital communications into applications and solutions will tie together the functionality as part of managed project. This will be the next step as standalone desktop applications provide alternative functionality to collaborate on the same projects. More generic standalone applications that transform applications to collaborative ones will add new value and provide functionality beyond that needed by applications and solutions.

The success of collaboration functionality will ultimately depend on the following attributes:

- Control over the collaboration session.
- Security of the communications among team members.
- Ease-of use of the collaboration application.
- Access to collaboration session logs for recourse and review.

Regardless of the approach taken, collaboration is a fact of life and the next best way to streamline the digital workflow and squeeze another layer of productivity with minimum of disruption. **TSR**