Collaboration

Collaboration is the process of working together to achieve a common end. Leading the way in establishing Knowledge Management (KM) as a veritable industry, collaboration tools offer practical solutions to support business intelligence. Organizations can benefit in the sharing of knowledge by advocating the use of collaboration tools.

Collaborative software like email, calendaring, text chat, and wikis helps people involved in a common task achieve their goals. Social software refers to collaborative systems used outside the workplace such as social networks like LinkedIn.

This toolkit includes resources and tips on how to foster a collaborative work environment by implementing collaboration tools.

aiim®

The ECM Association

1100 Wayne Avenue, Suite 1100
Silver Spring, MD 20910
Tel 301.587.8202 / 800.477.2446

www.aiim.org

Collaboration

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The Art of Working Together

The simple act of working together with your colleagues on a common project (from creation and development to completion) is collaboration. In order to accomplish this goal, collaborative technologies and software ("social software" or "groupware") were designed to allow multiple users to work together on collective documents with the ability to coordinate tasks over local and remote networks. It's about providing access to the same data for all authorized users.

Generally, groupware has three functions: communication, conferencing, and coordination. Communication tools share information by sending messages, files, data, or documents among users. Examples include synchronous conferencing, email, instant messaging, faxing, voicemail, Wikis, and Web publishing. Conferencing tools share information interactively like Internet forums (message/discussion boards), online chat, video conferencing, and Electronic Meeting Systems (EMS). Coordination (Collaborative management) tools facilitate and manage group activities by using electronic calendars, project management systems, workflow systems, knowledge management systems, social software (LinkedIn (http://www.linkedin.com/), ITtoolbox (http://www.ittoolbox.com/)), and online spreadsheets.

Although groupware can be beneficial, the biggest challenge lies in adoption and training. If people are not comfortable with the software, they will not use it.

When selecting collaboration software to support your projects, keep these points in mind:
- **understand your process** (choose technology to support your process)
- **remember the needs of outside collaborators** (choose technology that does not require installations or training)
- **focus on workflow** (find a good balance between real-time and workflow systems)
- **consider team adoption** (find a system that supports clear, fast paths to information needed)
- **initiate and advocate** (find a flexible solution)

Janelle Julien is associate editor of AIIM E-DOC Magazine (jjulien@aiim.org).

Tracking Trends in Collaboration

Online collaboration is sure to be a hot topic throughout 2007 as organizations try to figure out how to best use collaborative technologies. This column looks at some of the key trends in collaboration and identifies a few industry conferences designed to help technology and business executives learn more about the issues that will affect their organizations' collaboration plans.

One trend is using collaborative technology to build virtual communities to improve business processes and better serve customers. Building communities through online collaboration can help companies expand their markets and create stronger customer loyalty.

Rather than just jump into community building, organizations must first thoroughly explore what makes people join online communities in the first place and stick with them over time. Find out some of the lessons learned from existing online communities, and how can they be applied to your customers, employees, or business.

It's important to learn how to create and deliver content that will keep people coming back. Determine whether the goals of community members match up with the goals of the organization. If you're involving outsiders in communities, set clear rules as to who owns any ideas generated through the online community. Also, develop metrics that will help the organization gauge the short-term and long-term value of communities.

Another trend is the development of enterprise portals for content aggregation and the integration of business applications. Among the issues to consider are whether portals from different vendors work well together, and how the organization can overcome any interoperability issues that arise when using multi-vendor portals. Determine if portals can be linked to content-generating applications such as messaging systems, enterprise resource planning (ERP), and business intelligence.

Again, it's a good idea to look at what other organizations have done in this area before plunging ahead, to discover some of the common mistakes companies make in the planning and deployment of portals.

A third trend is the ongoing quest to find ways to leverage collaborative technologies for training and education of the workforce, business partners, and others. Key issues here include the development and presentation of timely and accurate content plus the best use of technology such as video, messaging, electronic whiteboards, and voice over IP to enhance online training programs.

Finally, organizations will seek to make their collaboration technologies and initiatives as secure as possible. Because collaboration involves the use of distributed systems and the exchange of information that can be proprietary and in some cases private, security is vital. Explore the use of technology such as access controls, firewalls, encryption, and intrusion detection and prevention to ensure that only authorized users have access to collaborative sessions.

Here are a few industry events that cover some of these issues:
- The Community 2.0 Conference, organized by the Community Management & Marketing Council, will show how companies are using community and social networks to radically change the performance of their organizations in the areas of marketing (direct access to customers), product development and customer service (communities that allow customers to help each). Companies such as Autodesk, Nokia, Levi Strauss & Co. and Lenovo will discuss best practices. For more details, see http://community2-0con.com/?page_id=2.

- The Gartner Portals, Content & Collaboration Summit will cover topics including collaboration, content management, portals and Web infrastructure. Among the planned sessions are Do's and Don'ts in Portal Governance, Operations and Security, Connecting the Dots: Portal Interoperability, and Portals: From SOA to Mashups. See http://www.gartner.com/2_events/conferences/pcc2.jsp.
- The 2007 International Symposium on Collaborative Technologies and Systems will feature workshops and sessions on collaboration and security, Web 2.0 and collaboration grids, and mobile collaborative work. See http://www.engr.udayton.edu/faculty/wsmari/cts07/.
- Portals, Collaboration & Content Conference (Las Vegas, Nev. May 22-24) will cover issues such as how to interconnect portal, content and collaboration technologies to business information and corporate applications, and relating portal environments to enterprise business processes. See http://www.sharedinsights.com/events/conferences/overview.aspx?e_id=067EA7C7FBF241AD83A98A 5A012AA731.
- The 5th International Conference on Education and Information Systems, Technologies and Applications is expected to include sessions on topics such as education and training systems and technologies, application of education technologies, Internet-based learning tools and knowledge management. See http://www.cyber-inf.org/imsci2007/website/default.asp?vc=5.

Bob Violino is a freelance writer and editor who has covered information technology, communications, consumer electronics, health care, general business, and other topics. He can be reached at bviolino@optonline.net.

"Really Simple RSS"

Are you reading feeds yet?

RSS stands for several acronyms, the most common of which today is Really Simple Syndication. Originally created in 1999, RSS is a lightweight dialect of XML that is used primarily to syndicate content—for example, entries on a blog or audio/video podcasts. There are a number of flavors of RSS available, including a related but separate format called Atom. Most websites that offer RSS feeds will display a logo or other mechanism to let potential subscribers know the feeds are there.

The key benefit of RSS feeds is that updates are pushed out to subscribers. Instead of having to check for changes several times a day, users can subscribe to an RSS feed and receive notification of updated content. This is great for those of us who check blogs and websites every hour on the hour; if you don't think that's you, would you benefit from knowing about updates in your industry as they happen?

Since you subscribe to only the feeds you want, you never are spammed. If the posts are not of interest, you don't have to read them and can unsubscribe at any time simply by removing the feed from your reader.

Feeds can also be aggregated and in some cases filtered using any number of tools. They can also be shared or set up in advance using a related XML format called Outline Processor Markup Language or OPML. Many feed readers can import from, or export to, an OPML file. You can find all the feeds I'm following these days at the Share Your OPML website at http://share.opml.org/.

RBB (Real Business Benefits)
Most RSS today is used to keep abreast of blog postings. This is a great benefit—if you surf dozens of blogs a day. If you don't, the business value of RSS may not immediately be apparent. But consider how much information you access a day by opening yet another application. We send dozens or hundreds of emails a day to each other, and it isn't that hard for a single message to get lost in the email flood. Same thing with your other enterprise applications—it's a pain to have to constantly recheck or refresh the figures from the sales forecasting application, or to examine log files for updates, or to refresh a browser-based interface.

Any application that uses structured data can have that data stream converted into an RSS feed. The California Highway Patrol offers feeds of police logs, while eBay and Amazon will let you track the status of items for sale using a feed. Making common real-time updates available through RSS feeds can reduce the clutter and make the odds the information will be read more likely.

Here's a more specific example: project management. Most organizations use some sort of project management tool and manage projects using a steady stream of Gantt charts. Simply keeping up to date on the schedule and tasks can become a full-time job. Enter RSS—task and schedule updates can be pushed out either to everyone or to only those who are affected by the changes.

RSS support is starting to make its way into the ECM stack, notably in the Web content management segment. Moving forward, RSS offers the ability for users to subscribe to a repository, folder, or even a single document and automatically be notified of changes.

Readers

There are hundreds of tools available for reading RSS feeds, including Google Reader, My Yahoo!, NewsGator, Attensa, Outlook 2007, Firefox, and Internet Explorer. These last two in particular make it simple to add feeds—just click on the orange RSS icon in the toolbar and select the reader you want added to the feed. Enter "RSS reader" or "feed reader" in your favorite search engine to discover many more.

Most readers support the major flavors of RSS and notify you of valid or invalid prospective feeds. Some readers will go the next step and search the Web page you're viewing to discover any RSS feeds present; many blogs list common readers and will allow you to add the feed to those readers in one click.

RSS Concerns

RSS presents a couple of issues to organizations. First, most RSS readers are set to poll for updates on a periodic basis. If all of your 10,000 employees are polling your feed server at the same time every hour, it could slow down the network.

Second, RSS and Atom support **enclosures** that can contain other binary content, such as audio, video, or executables like viruses and Trojans. For internal feeds this will not be an issue, but if your employees have access to external feeds as well, it's important to stress feeds as a potential security risk and take appropriate precautions.

Finally, is RSS a record? For most applications it won't be; the record will be whatever information was the basis for the feed (e.g., for a blog RSS feed the record would be the original blog post). In the event of discovery, it may be important to store the RSS feeds as an indication of when certain information was pushed out to employees.

Jesse Wilkins (jesse@jwilkinsassociates.com,CDIA+, LIT, EDP, ICP, is an independent consultant. A frequent industry speaker, Jesse is involved in both AIIM and ARMA chapter activities and a karaoke connoisseur.

Synchronous vs. Asynchronous Collaboration

Online collaboration technologies can be either synchronous or asynchronous, and each of these can deliver benefits to individual users and organizations. Given that each has strengths and weaknesses, many organizations will probably need to use both methods to accomplish their goals.

Pros and Cons

Asynchronous collaboration involves an exchange of information in which different people might receive the information at different times. Examples of asynchronous collaboration include email, document sharing (when individuals look at uploaded documents at different times), newsgroups, discussion boards, and Webcasts that can be stored for later viewing.

There are some key advantages to asynchronous collaboration tools. For one thing, they enable flexibility. Participants can receive the information when it's most convenient for them. There's less pressure to act on the information or immediately respond in some way. People have time to digest the information and put it in the proper context and perspective. Another advantage is that some forms of asynchronous collaboration, such as email, are ubiquitous. These days, it's hard to find a co-worker, customer, business partner, consultant, or other party who doesn't have an email account.

The drawbacks of asynchronous collaboration are that they can lack a sense of immediacy and drama. There's less immediate interaction. Sometimes people have to wait hours, days, and even weeks to get a response to a message or feedback on a shared document. The lack of immediacy means that information can be out of date by the time someone views it. This is especially true in light of the rapid pace of change in today's business environment.

Synchronous collaboration involves two or more people exchanging information at the same time, such as in a face-to-face meeting or on a conference call. Examples of synchronous online collaboration are real-time chat, Webcasts that are viewed immediately, instant messaging, and electronic whiteboarding.

One of the advantages of synchronous collaboration is its immediacy. You can send and receive information right away. This more closely resembles a face-to-face or telephone conversation between two or more people, so can present a more natural way of communicating. The sense of immediacy is more like to solicit a timely response from people. Synchronous collaboration, in general, is more interactive than asynchronous.

The downside of synchronous collaboration is that not everyone uses it. Although instant messaging, chat, and other such tools are becoming more common, they're still not as ubiquitous as technology such as email. Another drawback is that synchronous collaboration is not as flexible as asynchronous. All the parties involved must be ready and willing to collaborate at a given moment-or the session doesn't work as well. Also, not everyone does well with this kind of collaboration, particularly people who like to think over what they want to communicate.

Collaboration at Work

So when should you use asynchronous and synchronous collaboration? Much of the decision-making on this involves common sense. Asynchronous collaboration, such as email and document sharing, can certainly be used for day-to-day communications when an urgent response isn't needed. This sort of

communication is suitable for sending out broadcast messages that don't necessarily need to be acted on right away, or for corresponding with clients, customers. and business partners without putting pressure on them to respond immediately.

On the other hand, you wouldn't want to use asynchronous collaboration if you need immediate interaction with people or if you seek to collaborate with a large group at the same time. Email wouldn't work, for example, as the sole means of conducting a staff meeting.

Synchronous collaboration is ideal when the collaboration needs to be immediate and spontaneous, like a conversation between two or more people. Using real-time chat, instant messaging, electronic whiteboarding, and other such tools is appropriate for virtual meetings, where parties in remote locations are expected to participate and ask questions. In many cases, these types of collaborations might serve as supplements to telephone conference calls.

Synchronous collaboration wouldn't be suitable for situations that call for less immediate response or where parties aren't able to respond right away. For example, it might not work as a way to collaborate with customers on new product design or development.

For many organizations, asynchronous and synchronous collaboration will each prove valuable in their own way.

Bob Violino is a freelance writer and editor who has covered information technology, communications, consumer electronics, health care, general business and other topics. He can be reached at bviolino@optonline.net.

Is Your Office Ready for Office 2.0?

More than 90% of organizations use some flavor of Microsoft Office to create their "unstructured data," and almost every organization that doesn't use Office is using some other installed office productivity suite. Hundreds of millions of dollars have been spent on software solutions to capture, manage, store, preserve, and deliver those documents. Organizations have implemented document management systems and collaborative tools to allow users to share and collaborate on documents and presentations. And it's more than just the money - these systems increase the complexity of the process and take a lot of time and energy to learn and use correctly.

But today Office and its desktop-based counterparts face a new challenge from online suites that include word processing, spreadsheets, email, and presentations, as well as from providers of point solutions for each of these areas.

These products, collectively referred to as "Office 2.0," often don't require any installation and are accessible from any computer with access to the Internet. They are often not as feature-rich as Office, but for the 90% of us that only use 10% of the available functionality, that might be a blessing. Updates, whether to add functionality or fix defects, are much more frequent and typically less painful because of that. They are compatible with all but the most complex Office documents. And the price, which ranges from under $100 to free, is pretty compelling.

Let's take a look at how these online office productivity suites will impact the organization.

Collaboration
Collaboration remains a significant challenge in most organizations. The way it usually works is that someone creates a straw man document and then either stores it in a document management system (good) or emails it to a host of people (well…). These folks then access the document, make comments, make changes that are either tracked or not, and either save the latest version or send it back to the originator, who then has to piece together which comments are salient and which are contradictory, what changes are requested, etc. It's an ugly process.

With some of these online tools it is much easier to collaborate because they contain a strand of wiki DNA. Instead of users making changes to their own versions, or being constrained through a DM interface, users can make changes in real time to a centrally hosted document. Even those applications that don't offer this wiki-ish functionality make it easy to collaborate: instead of sending versions of documents, users send links to the desired document or version. Everyone works on the same thing. All the changes are stored in one place. And because the documents are stored online, they are always accessible; no more worrying about whether the VPN client will work, or forgetting the flash drive with the updated version of the presentation.

Security and Disaster Recovery
Security presents an interesting question to organizations-do you trust Google with your financial spreadsheets, your business plan, or your contracts? Do you trust all these Office 2.0 startups? What happens if one of them has a server crash and loses all your information-or if they go bankrupt or get acquired? This is an organizational culture issue more than anything else-it requires a certain mindset to trust a third party to keep your information secure and available.

All of these solutions offer some degree of security from the casual user, but they do require a certain amount of trust in the application provider. But the combination of ready access to the most current document and the reduced costs associated with implementing and updating solutions and managing repository and storage subsystems can be pretty compelling. And some of these solutions offer the ability to save a local copy of your documents to provide offline access and ease of mind.

Records management

If the documents are available over the Web, and users can store local copies of them, how do you ensure that these documents are retained for the required length of time, and then that all of the instances of them are destroyed once the retention period expires? The security functionality for each suite addresses some of this through permissions, but the fact is that today you really can't guarantee that someone who otherwise has access to the document doesn't save it, print it, etc. The ultimate solution might be to take those published documents which are to be declared as records and save them into a traditional electronic records management system. Users still get the benefits of easy collaboration, while the recordkeeping requirements are satisfied as well.

Getting started with Office 2.0

Most of the applications noted above have free versions; do a search for "Office 2.0" and you'll find any number of them available. It's easy to take an application for a test drive when it's free. Consider whether the application or suite has all the functionality you need, including security, complexity of document supported, ability to save offline copies of documents, and ability to import and export to common file formats. And Microsoft isn't just idly watching-look for Office Live to continue to add functionality to compete with Office 2.0.

Office 2.0 Suites:

Google Docs & Spreadsheets (https://www.google.com/accounts/ServiceLogin?service=writely&passive=true&continue=http%3A%2F%2Fdocs.google.com%2F&ltmpl=WR_tmp_2_lfty&nui=1)
Zoho (http://www.zoho.com/)
Thinkfree (http://www.thinkfree.com/common/main.tfo)
gOffice (http://goffice.com/)
Ajax13 (http://www.ajax13.com/)

Point solutions:

Zimbra (email) (http://www.zimbra.com/)
Basecamp (project management)
wikiCalc (spreadsheet)
Or see the Office 2.0 roundup at IT/Redux (http://itredux.com/office-20/database/)

Jesse Wilkins (jesse@jwilkinsassociates.com, CDIA+, LIT, EDP, ICP, is an independent consultant. A frequent industry speaker, Jesse is involved in both AIIM and ARMA chapter activities and a karaoke connoisseur.

Electronic Collaboration and Records Management

The output from your collaboration tools, of whatever type, may be business records.

Imagine a brave new world with employees interacting in real time—sharing and commenting on documents, even having an interactive discussion. Of course, we call these meetings, and we've been doing (too many of) them since the day after the office was invented. This type of collaboration is comfortable (excepting the length of the meetings), but meetings suffer from a couple of flaws. It's difficult to get the right people into the same room at the same time. There is always a risk that discussions will break down into monologues, arguments, or diatribes. Perhaps the biggest problem from an organizational perspective is the quality of the notes and action items that typically comes out of a meeting—thereby requiring another meeting to clarify those notes and items.

A number of solutions have cropped up to address these various issues. To conduct business, a number of organizations are using these solutions. For example, numerous organizations, including Microsoft, use instant messaging, webconferencing, and shared desktops to provide real-time customer support while Texas Instruments and Yahoo both use wikis for project management and product design. In fact, wikis provide an excellent basis for internal collaboration on document creation, revision, and publication. Instead of sending an email with attachment for comment and then receiving, aggregating, and addressing comments in a series of messages, a document such as the corporate records policy could be posted to a wiki, where users could make their changes directly and see what the resulting document looks like. A recent *BusinessWeek* article quoted Gartner as predicting that wikis would become mainstream collaborative tools in at least 50% of companies by 2009.

The Record Within

There are two fundamental tenets of records management: first, records are anything that document a transaction or inform a business decision; and second, records are saved regardless of media. Collaborative tools are no exceptions, but they do pose unique challenges to an effective records management program:

- **Proprietary tools and approaches**. Even the tools that use standard protocols can't interact with each other. As one commenter recently noted on the CentralDesktop blog, email doesn't care whether you use Outlook, Gmail, Lotus, or Thunderbird to create a message. If one department or organization uses Webex, and another uses EMC's eRoom, there is no easy way for them to collaborate across application boundaries.
- **Lack of organizational awareness**. Many of these collaborative tools are introduced without the knowledge of the organization or its IT staff. This has been a key concern regarding instant messaging, as most commercial clients provide minimal capability to archive conversations and result in numerous silos of information between users and even between applications on the same machine. This may result in undocumented decisions, on the one hand, and information being stored that IT, records, and legal are unaware of on the other hand, creating significant discovery issues either way.
- **Lack of organizational control**. Because the organization doesn't know about the tools or the extent of their use, there are limited policies, procedures, and training in place. Users create their own IDs in instant messaging ("BigBossInTX") and don't properly manage potential business records. Similarly, email and distributed collaborative tools may allow users to access them using free email accounts from Hotmail, Yahoo!, Google, AOL, and others, bypassing internal controls and processes.

Managing Your Collaborative Records

Most of the information created and stored during a collaborative interaction does not rise to the level of a record for most organizations. Think about it like this: When you have a scheduled staff meeting, what are the records? Typically, there's an agenda, and at the end of the meeting there may be minutes that need to be kept, at least for a while. If the meeting regards a deliverable, there may be changes required to the deliverable—but once the revised deliverable is published, the requested changes may only be kept for a short period of time or not at all. Very few companies would attempt to make, much less keep, a verbatim transcript of what was said.

Now compare this to an electronic collaboration. The agenda might still be published, either prior to the collaborative session (perhaps via email) or during the session through a shared application. We already have the original agenda—so the copy stored within the collaborative session is superfluous. Next, the session commences, and as it progresses, comments are made within the document using markup and/or annotations, and some textual chat takes place as well. The changes we'll need to keep, using the native tools (if sharing the application) or the collaborative tool's technology. A wiki will track all its changes natively, while a web conferencing application should provide a mechanism for rolling up the changes and comments until they can be incorporated into the original document. And the chat? Some applications have a mechanism for effectively storing and managing all the chat—assuming the organization needs to do that. Most organizations will choose to discard it, perhaps summarizing it first into meeting minutes.

So what's the record here? For most organizations, it's the same in the collaborative world as it is in the document-oriented world. In the example above, that means the deliverable and perhaps meeting minutes around major decisions and comments. For organizations that are highly regulated or in litigious industries, it might make sense to use a solution that provides a mechanism for storing comments, attachments, chat, and the like. Some of the solutions available today do this by "rolling up" the entire session into a single package, which is effective for managing all of the disparate pieces. But it's more of a short term solution: as applications change, vendors get acquired, etc. it will quickly become a significant challenge to unwrap these proprietary packages. A better approach would be to store the data in some kind of an industry standard wrapper, most likely using XML as the container. This type of functionality is not available today but must become a baseline sooner than later if the vendors are serious about collaboration and compliance.

Taking Control of Collaborative Tools

The first step is to take control through organizational policies indicating what technologies are allowed and the procedures for using them effectively and appropriately. Users then have to be trained on the policies and procedures.

Before you choose the tools, think more strategically about the use of these types of tools in your organization. Does the culture support collaboration or will it be an expensive white elephant that is never used? Is your IT staff prepared to support users using these decentralized tools, and if not, what would it take? If you are a user, have you considered the possibility that your collaborative tools/sessions might be discoverable, and are you using them appropriately?

Choose collaborative tools that support, at a minimum, the ability to archive and subsequently retrieve the information generated during the collaborative session. Many collaborative tools have production or enterprise versions that support these requirements. Turn archiving and audit trails on, and review periodically to ensure the tools are being used and managed effectively.

Jesse Wilkins (jesse@jwilkinsassociates.com, CDIA+, LIT, EDP, ICP, is an independent consultant. A frequent industry speaker, Jesse is involved in both AIIM and ARMA chapter activities and a karaoke connoisseur.

Collaborative Tools in 25 Words or Less

- **Email**. Enough said – for more information on effectively managing email see the 2004 and 2005 September/October issues of AIIM E-DOC Magazine (accessible in the Archives section of www.edocmagazine.com).
- **Discussion forums**. These include threaded discussions that group postings according to topic as well as real time chat sessions with many users.
- **Instant messaging**. Allows two (or more) users to hold "chat" sessions in real-time. Commercial examples include Yahoo, AOL, MSN, ICQ, and GoogleTalk.
- **Wikis**. Web-based authoring applications that allow multiple users to edit the same document using a simple interface. Wikipedia (www.wikipedia.org) is a well-known example.
- **Shared whiteboards, applications, and desktops**. Tools that allow multiple users to see the same workspace ("whiteboard"), application, or the entire desktop. Typically, one person controls the workspace while others view.
- **Webconferencing**. Combines application sharing with audio and/or video.
- **Presence tools**. Originally found in instant messaging clients ("buddy lists"), these are increasingly found in desktop applications and can be used to start ad hoc collaborative sessions.
- **Calendaring and scheduling**. The ability to see someone else's calendar and schedule meetings based on availability of people and resources.

Talking About My Collaboration

A glimpse into five enterprises using collaborative tools.

Collaborative software has come a long way since growing roots in document management years ago. Now a diverse category all its own, collaboration applications help enterprises get the job done on a day-to-day basis, allowing geographically dispersed workers to meet, plan, and collaborate online. Companies can collaborate with vendors and share information with customers. Many collaborative systems house robust document repository and workflow processing features and support activities like email, Web conferencing, and text messaging.

The core of the collaborative category lies in a range of applications that are replacing static forerunners. "The 1990s were a run up of document management tools. Now we see an entirely new cycle of tools that are retiring and replacing old stuff that didn't work and was too clunky," says Chris Cummings, vice president of collaborative document management at Interwoven, Inc. "This isn't only for the back-office but for front-office applications where professionals are and need to be working together."

According to IT research firm Gartner Dataquest, the collaborative software and knowledge management market will generate $3.9 billion in new licensing revenues in 2005, and grow at an average annual growth rate of more than 9% annually through 2008. Gartner attributes much of this growth to compliance-based spending, (like Sarbanes-Oxley requirements) as well as innovation in creating content through multiple channel devices and applications.

Consider the following case studies, which illustrate the many ways organizations employ the latest collaborative technologies.

Going Beyond Content Management to Make and Sell
Proficiency, planning, and content management all come together in elaborate collaborative workspace applications. One example is the U.S.-based energy and automation operating company of electrical engineering giant Siemens AG. Chip Yonkee, senior manager of ebusiness for the Siemens unit in Atlanta, says the company's use of SiteScape's Forum 7.1 has grown exponentially since it started with SiteScape basic knowledge management application in 1997.

"SiteScape is much more than an e-doc repository and a browser. You can do so much more, including best practices for managing projects and workflow," Yonkee says. Much of the work around managing some 135,000 Siemens parts, from concept and design to marketing and sales, happens on SiteScape Forum. From Sri Lanka to Munich, disparate groups of workers—from both inside and outside Siemens—form virtual teams, collaborate, and get their jobs done on more than 1,000 forums on the system.

In fact, only about 45% of the many thousands of Siemens system users in 30 countries work in Siemens' energy and automation division. These are anything from resellers, systems integrators, and other channel partners to subcontractors and vendors.

"It's not just our products but we're responsible to sell the product," Yonkee says, noting it posts product information daily to resellers. "The old way was inefficient mailing. Now sales and marketing gets information to 1,000 users every day at 3 p.m.," he says.

The SiteScape system also works as a "relationship tool" with customers, Yonkee says, where customers

can view CAD drawings and product specifications. Some product forums act as virtual marketing brochures, replacing considerable dispatching of documents, images, and "service packs" with Siemens headquarters. "We're not waiting for DHL from between here and Germany," he says, noting it's simply a matter of going to a product's document repository area.

The rules around working on SiteScape's Forum have allowed Siemens to improve its business-process best practices around emailing and project management protocol. "You don't email through Outlook or hit 'reply all' through Outlook. Now, you build a community to talk about the project over time, on a centralized basis," Yonkee says, noting emails are posted in the appropriate forum or community area of the project.

Yonkee says untold productivity gains and savings have come from the company's ever-evolving use of SiteScape. "It's difficult to take it to a hardcost savings. The value of tacit knowledge is hard to measure," he says, adding, "We know we've saved gigabytes of space in server consolidation."

Similar forums reside on secure and public extranets at Emerson Process Management, a maker of process automation controls, and a division of St. Louis-based Emerson. Mark Heindselman, manager of knowledge network and information services at Emerson Process Management explains the company taps into more than 150 business applications by Stellent Universal Content Management to manage documentation and workflow around its engineering, manufacturing, marketing, and quality control processes.

Heindselman emphasizes that today's competitive pressures mean products have to be developed and marketed at a fast rate. Notably, the Emerson division recently used the Stellent system to help manage the documentation for the design and launch of the company's new GX Control Valve. For this project, extranets were used to manage everything from initial design concepts to coordinating with suppliers in China for manufacturing the product.

"We also used Stellent technology to allow multiple GX Control Valve design teams to have one repository to go to for documentation," Heindselman says, noting that thousands of documents were involved. Users can check out a document, make their changes, and return it to the system. "We used this functionality during the design of other new products," he says.

Heindselman cites the Stellent system as integral to reducing the product development-to-sales cycle to 24 to 36 months, down from cycles as long as five years. "In the GX Valve project, we had a geographically dispersed team. With the content-management based foundation, the process was much more effective and efficient," he says, noting about $20,000 in savings per supplier per year for distribution and handling costs associated with documentation, printing, and communications. Emerson Process Management plans to grow the number of suppliers with secure online access to its information network, including expanding the concept to include joint venture partners as appropriate.

"One of our largest applications of the Stellent system is in distributing information to customers across a range of industries that need highly detailed product data in order to make purchasing decisions," Heindselman says. Approximately 40,000 users per month typically visit the company's product literature extranets to access and download product specifications and other critical product information.

Online Environmental Impact
Watertown, Mass.-based engineering firm Vanasse Hangen Brustlin, Inc. (VHB) uses a collaborative solution by Interwoven to manage its cumbersome invoice processing to pay thousands of contractor invoices on a monthly basis. VHB also uses the solution to manage a runway expansion project.

A few years ago, VHB started with the WorkSite NT Server solution by Interwoven in moving invoicing online, a daunting task considering it manages about 2,000 projects at any given time, explains Greg Bosworth, director of IT at VHB. "The solution drastically reduced administrative time by VHB staff in processing about 4,000 to 5,000 invoices each month, and eliminated the need to photocopy invoices, chase contractors for detailed backup, or our own project managers to approve invoice payment," Bosworth says. The automated solution accelerated VHB's payment processing by putting the review and approval process online and integrating it with an Oracle-based accounting system. All told, the system has reaped efficiency gains at VHB, including a $1 million improvement in cash flow.

Given that success, VHB was motivated to manage a major consulting project with Interwoven's WorkSite MP Server when the Philadelphia International Airport and its municipal authorities hired it about two years ago. Bosworth says authorities fast tracked the environmental impact project, which involves extensive communications with agencies like the Federal Aviation Administration as well as the public.

"A leading reason we won the project was because we could speed up the process through automation. The system allows for email management and project documentation with project boxes, and the ability to send email to all appropriate parties, making sure everything gets referenced," Bosworth says, noting WorkSite facilitates live messaging and Web conferencing by WebEx. VBH staff and outside authorities appreciate the ease in finding documents and collaborating on the WorkSite solution. "Some of our clients are really gung ho and use it as an extension of their own document center for managing projects," Bosworth says.

Cummings of Interwoven says a good collaboration system should be built from the ground up, incorporating email, document management, and collaboration features like a shared calendar or discussion threads (emails). "You have to have these all together in the same area to do your job," he says.

Mapping It Out

Business mapping software has evolved since its origins in the early 1990s. "Our product is about how globally dispersed people can think and work together," says Robert Gordon, CEO of Mindjet, Inc. The company's MindManager collaborative presentation software allows for group meeting facilitation, or the individual, to map out talking points, solutions, and next steps. The software integrates with Microsoft solutions (Excel, PowerPoint, Project, Outlook, and Word).

As Gordon explains, the maps created with MindManager are popular with executives because it takes away much of the fluff found in static presentation software like PowerPoint, allowing managers to instantly identify key issues. "Invariably, problems and issues are presented at the end of a presentation. Our solution allows users to see what's coming and allows for a forum rather than 'we have five minutes to talk about the real issues' at the end of a presentation."

MindManager also allows enterprises to share ideas and information via integration with other solutions or in Web meetings. MindManager also partners with other solutions providers such as CRM company Salesforce.com that offer Mindjet as an add-on option to customers. "It allows sales people to brainstorm and analyze an account and roll out that opportunity to their sales managers," Gordon says.

Lehigh Valley, Pa.-based Air Products and Chemicals, Inc. uses MindManager to develop new products or find new markets for its existing chemical and gas products. Paul Pfiefenberger, continuous improvement manager at Air Products, notes brainstorming sessions include as many as 20 employees from a host of functions. He calculates about a 25% time reduction in meeting time companywide versus

its old methods of flip charts and white boards. The company uses the solution to form meeting notes and exports the maps to other solutions. Science-minded staff at Air Products uses the mapping software for cause-and-effect analysis, among other analysis.

Going to Task at the Café

Philadelphia-based Wharton School of Business at the University of Pennsylvania already had a yen for collaborative learning in its MBA program when it adapted Documentum's eRoom solution in 1998 to create "webCafé" as its own collaborative platform for students and faculty. Now, WebCafé is used in more than 400 Wharton graduate and undergraduate courses each year, touching nearly 7,000 students and most faculty members.

Dedicated eRooms in webCafé allow for virtual meetings where faculty and students can have online discussions on topics of interest as well as share documents, group calendars, and tasks lists. "It allows for collaboration online, regardless of schedule or location," says Rob Ditto, senior IT project leader at the Wharton School. "The primary application is for Wharton courses, with some additional eRooms made available for faculty research and departmental needs, as well as for affinity groups of current students." Including about 100 grouprelated eRooms, Wharton operates some 1,250 eRooms.

Ditto says that over the years many professors have learned to leverage the online collaborative tool. "A key to the success of webCafé is the willingness of faculty to put collaboration-based learning tools into their courses. Though the Learning Lab, our IT staff works with faculty to develop experiential-based learning exercises that use real-world data and scenarios with real-time online interaction among faculty and students," Ditto says. WebCafé's use isn't just limited to Philadelphia. Students at Wharton's San Francisco campus log online as to participants in its Global Consulting Practicum program in which Wharton students work with teams based at business schools in Chile, Colombia, India, Israel, Jamaica, and Peru.

"WebCafé is highly practical in that instructors post syllabi, course readings, and even poll students to settle issues such as preferred time for review sessions," Ditto says. He notes follow-up surveys show the overwhelmingly majority of graduate and undergraduate students give webCafé the highest satisfaction rankings, along with their personal email accounts.

Lance Shaw, senior product marketing manager for Documentum, suggests organizations indeed implement eRoom to fashion their own mission-critical applications. Perhaps the metric universal to all adopters of the product is maximized ROI from the storage perspective. "It drastically reduces email storage, and you only need a single version of a document living on the content server," he says.

Shaw is clear that collaborative workspace tools have evolved enough in recent years to help companies shed inefficient ways of collaborating. "Email and phone results in duplicate work, things get mixed up, or not around their context. Solutions like eRoom serve as a great reference tool, with everything store in one place so there's one version of the truth," he says. "But if collaboration isn't easy to use, people won't use it," Shaw concludes.

Marcia Jedd is president of MJ & Associates (www.marciajedd.com), a marketing communications and research consultancy in Minneapolis.

Case Study Snapshots

Air Products and Chemicals (www.airproducts.com) implemented MindManager from Mindjet (www.mindjet.com) to develop new products or find new markets for its existing chemical and gas products.

Emerson Process Management (www.emersonprocess.com) uses Stellent Universal Content Management (www.stellent.com) to manage documentation and workflow around its engineering, manufacturing, marketing, and quality control processes.

Siemens AG (www.siemens.com) uses SiteScape's Forum 7.1 (www.sitescape.com) for, among other things, product project management.

Vanasse Hangen Brustlin (www.vhb.com), an Interwoven (www.interwoven.com) customer, implemented WorkSite to manage its invoice processing.

Wharton School of Business (www.wharton.upenn.edu) used eRoom from Documentum/EMC (www.documentum.com) to create webCafe, which allows onsite meetings among faculty and students.

Sustaining Collaboration and Information Sharing

Collaboration isn't just, or even mostly technology, it's a culture that must be nurtured.

Collaboration sounds simple—let's talk, let's share information, let's be more productive. Reality is far different. Achieving effective collaboration and information sharing in the enterprise is complex, painfully difficult, and requires one to understand a range of human emotions that inevitably constrains effective collaboration.

In many ways, sustaining that collaboration can be even more difficult. However, if you focus on several key characteristics, actions, and maintain the new system's momentum, the benefits of an enterprise collaboration system will be significant. Sustaining a collaborative environment requires you to:

- Build it right the first time, for many end-users will give you one chance to show them why they should spend their time using your system.
- Work closely with future end-users to understand their requirements and current pain-points—solve those pain points.
- Add value to the organization. Do not just mimic a manual process or duplicate the content from other systems.
- Integrate the system fully into the existing business processes.
- Promote the system early on to gain momentum.
- Build and nurture the trust of the end users. Ensure that the system has and maintains critical mass, of both content and users.
- Strive to get senior management both involved in the system and as active users.
- Adequately maintain the system, just as you would with any other mission-critical enterprise system.
- Nudge users as needed.

Build it Right the First Time
The quickest way to achieve collaboration failure is to launch a new system that is a dud. Most users will give you one chance, and that new system had better be intuitive, enable existing business processes, and offer a true value-added function.

Michele Eichhorn, of Blue Bell, Pennsylvania-based Unisys Corporation, is in the trenches of sustaining collaboration and promoting information sharing. Michele is the collaboration manager for the Global Infrastructure Services Division, where their team recently implemented a new global portal for the division's worldwide employees. In order to sustain the Unisys portal starts, begin with delivering and maintaining a useful and value-added environment for its users. "I have learned to listen" states Eichhorn, "I have to start each new collaboration project with no preconceived notions about what my client wants." Working with future users was key to the successful implementation at Unisys. "We spent days with prospective end users, getting to know their processes, what information they really utilize, and what the root causes were of their current challenges" Eichhorn recently stated.

No matter what technology or tool one uses, getting it right the first time, and being able to show real value for the user, is the first step in sustaining collaboration and information sharing for the long-term.

Trust: A Requirement of Collaboration

Most of us perform collaboration to some degree, but we are guarded in how much information we share and what knowledge we impart to others. Employees, especially knowledge workers, are retained and rewarded for their expertise and intellectual value. Parting with our data, information, and knowledge, therefore, is a double-edged sword. We have to communicate and contribute to the organization's work processes and associated teams, yet we want to ensure that we will remain valuable over the long term. In order to achieve even a modest increase in collaboration between employees, the culture of the organization must be supportive. Trust, simply put, is a requirement for collaboration.

Most organizations continue to value and reward individual achievement. We are generally judged on our perceived value and on our recent accomplishments. All organizations are like this, in varying degrees. There are extremes in which collaboration flourishes or is lifeless. A highly competitive and adversarial organization offers little real hope of promoting collaboration and teamwork, and is at a high-risk for failing any implementation. Employees must also not feel as though collaborating will lessen their own value, status, or job security.

Assessing the culture of the organization is important prior to a new project, and can be performing through a detailed Knowledge Audit. The Knowledge Audit focuses not only on existing knowledge and related content, but also on the flow of knowledge between employees. This flow, or lack thereof, is often a good barometer of an organization's true culture. The likelihood of acceptance for any system that promotes collaboration is an important finding that should be conveyed to management and analyzed. Some organizations thrive on teamwork and welcome any new system that increases productivity. Other organizations, however, are adversarial and tend to hoard content, thus offering a challenge to the IT practitioner.

As you perform the Knowledge Audit, assess the hoarding versus sharing of content. The organization that allows hoarding will be the high-risk implementation. While some people are natural hoarders, focus on the overall culture, not just the exceptions.

Changing the culture will be difficult, if not impossible. Either way, changing the culture will likely be out of scope for your project. Those who do take on the culture will find themselves in for a challenge. Assuming the organization is receptive to change, there will still be times when you need to give a gentle—or not—nudge towards collaboration. You may need to coddle some influential users, or otherwise promote the collaboration system and its benefits. Some organizations offer modest rewards and recognition for those who utilize collaboration. Hosting online discussions and special interest groups is another way to encourage participation. Of course, getting a manager to actively use the collaboration system and participate in that environment always goes a long way towards user acceptance.

Focus on Processes

Imagine that your organization is planning to implement a collaboration or information sharing system using a portal, document management, ERP, or other system. There comes the email announcement from senior management that directs everyone, including you, to deposit your key content into this new repository.

What does that mean for you? More work. There you are, already struggling under your normal workload, looking forward to the new tool announced by management, and then it hits you that this will require you to do more, not less. Let's say that you are the financial administrator for the department. One of your standard functions is to run a weekly report and email it to a set distribution list. Now, with this new system from management, you have yet another requirement appended onto your original weekly report process. You now have to copy that spreadsheet from your local drive to some server and register it with

the portal. The registration requires you to fill out several metadata fields. Overall, not a hard thing to do, but it is more work. Now multiply the added process step of the financial administrator by hundreds or thousands of other employees, year after year, and that equates to a massive number of labor hours required to maintain the system's content.

At this point, one of two things will likely happen. Scenario one: the department's workload increases and people in the department start doing the unthinkable. They stop performing that added step of copying and registering their content in the system. If anyone notices this, it will likely be brushed off as just a temporary lapse; everything will get back to normal soon enough, and the system will be refreshed with current content in no time. Scenario two: the second way in which a repository dies a sudden death is when the chief sponsor, cheerleader, and mentor leaves. If the benefits and perceived value of the portal are not truly felt by most employees, the departure of the key sponsor will kill the system. Minimizing the probability of either of these two scenarios requires that the system become pervasive in the culture and inherent in the processes of the users. There also must be both a sizable content base and a sizable user base. For this to occur, the system must become ubiquitous throughout the organization. Otherwise, it will lack timely and accurate content needed to justify the cost of the system, and it will be yet another failed IT project and a mere memory to the users.

Adequately Maintain the System

Now your collaboration system is up and running, fully integrated into the organization's primary content repositories. The users are accessing valuable organizational content, and the system provides the latest content from many repositories throughout the enterprise and from third-party news and financial services. Whiteboarding and instant messaging are in full use.

Now you must maintain it in a similar manner as with any real-time, mission-critical, IT system in the organization. One key difference is the physiological factor. Since a collaboration system allows employees to access content in an easier and more efficient manner, those employees usually have an alternative source for the same content. Maintaining the users' trust that the system really is the preferred access mechanism for organizational content is paramount. If this trust starts to wither, users will revert to calling their colleagues for that updated weekly financial report or will use email to solicit ideas and seek content.

Maintaining this trust is more difficult than building the trust initially. Employees want access to data and information quickly to perform their jobs, and they will use the system if they believe it will provide them with that content. Otherwise, they will use whatever other means are available, regardless of what management may direct them to do. With that in mind, listed below are the key maintenance issues that one should consider when maintaining collaboration systems for the enterprise:

- **Establish rules for content**. What is defined for records management should defined what documents are worthy of retention. Integrate records management personnel into this task; help them help you.
- **Add more metadata**. With a portal or any other robust repository, the content may need more metadata than is currently used. This metadata will be required to put the content into context for someone who is just now finding the content and is not a member of the content author's community of practice.
- **System administration will be required**. Like any other mission-critical system, it will require constant monitoring, tweaking, and database-related administrative tasks.
- **The single sign-on offered by a well-integrated system is powerful, but it requires constant maintenance.** Passwords expire, users want access to new repositories, and employees come and go; all of which can put a real burden on the system administrator.

- **Taxonomies change over time**. As time and vocabulary changes, so do the organization's priorities. All this change requires the taxonomy to be maintained in an orderly fashion. Establish a taxonomy committee.
- **Finally, manage your bandwidth**. If portals start providing your employees with new services and access to new content that they never had before, expect network bandwidth to spike sharply. Just imagine what happens to your bandwidth requirements when a junior employee wants to access a document collection consisting of the past twenty annual reports. Multiply that by hundreds or thousands, and you may find your telecommunications group cursing your project. Conduct a bandwidth analysis to determine the expected resources needed once system usage takes off. Work with your telecommunications group up front on this requirement.

Jüris Kelley (Kelley@KinM.com) is president of the collaboration and information sharing consultantancy Knowledge in Motion LLC. Mr. Kelley has consulted to leading public sector organizations and Fortune 500 companies, and has held project- through executivelevel positions in virtually every aspect of enterprise content management. He is a technology mentor with the University of Maryland's Smith School of Business and serves on the AIIM/ANSI C.22 standards committee for electronic content legality.

Jared Spataro is director of collaboration and knowledge management solutions for Open Text.

Fundamentals of Collaboration Systems

Collaboration software (often called groupware) is technology designed to facilitate the work of groups. It may be used to communicate, cooperate, coordinate, solve problems, compete, or negotiate. Typical applications include email, reminder and notification systems, videoconferencing, chat systems, multiplayer games, and real-time, shared applications (such as collaborative writing or drawing). The focus is on interaction between people and assisting the creative and decision processes.

Everyone needs to collaborate. Though collaborative tools can be used for a variety of reasons, generally, users are hoping to accomplish the following four things:

1. Reduce communication overhead
2. Improve communication among workers
3. Provide coordination
4. Empower group productivity

A number of characteristics differentiate the range of collaborative software tools.

Time and space. Time elements include whether users are working together at the same time (synchronous) or different times (asynchronous). Email permits to people to communicate asynchronously, where electronic meetings require participants to be present at the same moment. Space elements include whether users are in the same place or in different places. Co-located collaboration products focus on aiding those already working together. These enhanced meeting room products are common in "war-rooms," where the concern is providing access to vast amounts of data and the tools to analyze and manipulate it. Distance, virtual meeting systems address bringing together a distributed group with tools that are more useful than a conference call.

Free-form versus task-focused. A collaboration system may constrain documents or records to fit into a specific format, or constrain some or all input values. Alternatively, it may permit them to be totally free form.

Active versus passive. Systems differ based upon the number of communication channels they permit and encourage. In addition, even if all users are permitted to participate, that permission may or may not be equal and encouraged.

Persistent versus ephemeral. Systems differ in whether they capture the collaboration stream or not.

Private versus group versus public. Control over who can see and who provide content to collaboration can be important.

Moderated versus un-moderated. Moderated systems are continually edited to reflect the standards of the sponsor. Unmoderated systems allow any form of free speech and are unedited.

Read-only vs. Read/Write vs. Write only. Some collaboration systems constrain who can read information and who can enter information. In a video broadcast system, there is one source, unalterable, and multiple viewers. Feedback and comments, if any, are handled independently. In some discussion systems, only authorized individuals can add content, and the list of readers may also be constrained.

Single versus multiple technologies. Some systems use a single integrated technology to operate; others combine other technologies to achieve a better solution. For example, conference systems can carry all the media channels over the network, or they can use the network to support slides and text, combined with telephone conferencing for the audio channel.

Major categories of Collaboration Software

Email and Calendaring. Email is the most familiar example of collaboration software, and we all exploit its asynchronous nature to time-shift. It has become ubiquitous in the business world. The associated calendaring functions are popular within an organization, where all the participants' calendars (plus meeting rooms) are available. They have not been as useful outside of organizations due to incompatibilities and access issues.

Publishing and Broadcasting Systems. Information distribution through a shared mechanism has expressed itself in a number of forms:
- List servers are a self-managed version of electronic mailing lists where a submission to the email address results in all subscribers being copied. They also can provide summaries and maintain histories of all messages.
- Bulletin board systems store messages rather than mailing them to all subscribers. Most importantly, they organize discussions around "topics and threads" aiding in later review, and focusing comments.
- File sharing systems, such as ECM products, make documents available to larger groups and keep a history of changes.
- Push feeds and streaming media, unlike the previous three examples, are active agents in delivering information.

Electronic Meeting and Conferencing. Electronic meetings are a way to reduce travel costs. The following system types, organized by increasing media richness and functionality have gained great popularity as tools for synchronous communication:
- Chat and Instant Messaging
- Videoconferencing
- Whiteboards
- Application Sharing

Aided decision-making. This niche of collaboration systems represents high-end, often tailored, solutions that are integrated with line-of-business systems and sophisticated analysis tools. These are often installed in "war rooms" so that alternatives may be presented and compared, and so that a wide range of information may be accessed upon request. They may include voting tools or real world simulation.

Bernard Chester (206-230-9253) is a principal consultant with IMERGE Consulting (www.imergeconsult.com). He has been active in the document management industry for over fifteen years. His practice specializes in addressing the issues of technology implementation and integration.

Secure Ad Hoc Collaboration

As working together between organizations becomes more common, a secure collaboration server may be the way to keep your content from going astray.

As the meeting ends, the group at the table begins to wrap things up. Then one person stops and says, "Now that the project is going ahead, how do we coordinate the information flow? Let's see, we have three different companies represented here, plus two independent consultants. We all have our own collaboration tools, but how do we get them to work together? And since we have to work across firewalls, how do we handle security? Most importantly, we need a solution in hours, not weeks. Suggestions anyone?"

The Internet may have taken the world by storm but collaboration technologies have been somewhat slow in catching up.

While there are many kinds of collaboration, one way to view them is by the methodology used. One side of collaboration involves the sharing of applications, often concurrently, while content is being created or shared by multiple participants, e.g., Webex or Placeware. The other side involves collaboration on files, typically with unstructured content and often on a discontinuous basis, e.g., Lotus' Domino Document Manager. This category involves heavy use of file sharing and email and shall be the focus of discussion here.

The rise of the Internet resulted in the interconnection of networks of formerly closed systems, which in turn has affected collaboration. First, collaboration has increasingly turned outward to connect participants across enterprises. Second, the mixing of heterogeneous environments has drawn collaboration solutions toward architectures that are more open. Third, the combined effect of the first two has created a need for ad hoc collaboration amongst diverse participants, with quick set-up and teardown, and without the usual attendant administrative delays. Fourth, the extensive use of the Internet for collaboration has increased the need to extend security beyond the firewalls.

In this changing environment, any evaluation of collaboration solutions should ensure that this emerging type of ad hoc collaboration be supported and that related security issues are well understood and resolved.

Ad Hoc Collaboration
Ad hoc collaboration differentiates in one key aspect. It enables employees to create collaboration groups "on the fly," with little involvement from the administrator. This self-provisioning is subject to policy guidelines and can be overridden by the administrator. Within the guidelines, however, employees can invite collaborators who may be non-employees and assign them various privileges. Some highlights of the ad hoc model include:
  • Immediate provisioning of collaboration membership and privileges
  • Participation by employees or outsiders, without administrative involvement
  • Granular control of privileges, with the option to revoke at any time
  • Easy Web-based intuitive user-interface, with no training required
  • End-to-end security (details below)
  • Basic file collaboration capabilities, including upload, download, sharing, check-in/check-out, versioning, and detailed audit trails
  • Support of open standard protocols including HTTP, WebDAV, Web services, etc.
  • File routing including notification, forwarding, tracking, etc. Since ad hoc collaboration typically brings external parties together across the Internet, security becomes a key aspect of making ad hoc collaboration work in the enterprise.

Secure Collaboration

Coming from a long history of closed systems, security is not yet well understood as applied to the Internet, and perhaps even less so with collaboration.

It is incorrect to simply equate security with encryption. Beyond mere encryption, security includes the "3 A's," i.e., authentication, authorization, and auditing, and much more. In the case of collaboration, which usually involves use of HTTP and email, security issues may include:
- Security in transport (Data in flight)
- Security in storage (Data at rest)
- Authentication of sender (Is the sender really who he claims to be?)
- Authentication of recipient (Is the recipient the only one who can read it)
- Authorization (Is he permitted to do this?)
- Non-repudiation (Only that sender could have sent it and no one else)
- Tamper proofing (Did the contents change from the original?)
- Time stamping (Was the email sent/received at that time?)
- Trackability and archival (Is there a complete and searchable archive?)
- Restricted privileges (Who is authorized to do what and when?)
- Audit trail (Is every message/action captured and logged?)

There is a common perception that an SSL session (an encrypted Web session) is secure. That may be acceptable for transfer of credit card information to a website to make a purchase. But for collaborative communications using email, using an SSL-encrypted session to retrieve or send email is practically meaningless in terms of security. That is because the SSL session only addresses one leg of a long circuitous route taken by the email. A better question to ask is whether the email was protected on an "end-to-end" basis.

For collaboration approaches, which rely heavily on email, there are multiple methods of secure end-to-end delivery. No one method suffices and most enterprises will need multiple methods at the same time. The best solution is one that enables all known methods of secure delivery in an integrated secure collaboration server (SCS) and lets the participants make their individual choices. Some of the main methods of secure end-to-end delivery are:

Autonomy: The Standard S/MIME Method. To date, the standard implementation for email security is S/MIME encryption, which utilizes public key infrastructure (PKI) technology via certificates installed at the desktop. But it has not gained widespread adoption because the desktop implementation is expensive and difficult. It also requires every end-user to perform many key management duties such as certificate creation, registration, changes, renewal, revocation, escrow, etc. An SCS can help eliminate some housekeeping chores for the end-user, such as certificate creation, registration, and maintenance. The Server-Side S/MIME Method. An easier alternative to the standard S/MIME method is to shift all key management tasks, including private certificates for individuals, to the SCS sitting at the gateway, which manages all the "cradle-to-grave" certificate functions, including creation, registration, storage, recovery, renewal, trust policy, distribution, etc. This way, the end-user is completely relieved of all the complex responsibilities of managing security functions and policies, while the SCS provides far better security through centralized control over all email traffic. This approach is also called "server-side S/MIME." For the end-user, security becomes transparent.

For example, an investment banker can simply send an email in normal fashion to his counterpart at another bank and the SCS recognizes that the other banker possesses his own certificate and automatically converts the email to encrypted S/MIME format, which only the recipient banker can read.

Note that the SCS should be powerful enough to handle certificates at the individual level, not just at the organizational level, thus providing authentication security down to the individual level, if needed.

Secure Email Delivery Methods	End-User Benefits			Typically Used For
	no client software/ certificates	off-line reading	content delivered to inbox	
No PKI Required				
Payload (Java Script)	X	X	X	document delivery (HTML only)
Payload*, Client-based (Plug-in, Applet, Key Server)		X	X	document delivery (any format) moredocument control
Staged Content (Push-Pull)	X			special deliveries, receipt confirmation, large files
PKI Required				
Client-side S/MIME Traditional)		X	X	traditional authentication, high administration overhead
Server-side S/MIME (Domain - level)	X	X	X	good enough authentication at corporate level, low overhead
Server-side S/MIME (Individual - level)	X	X	X	good enough authentication at employee level, low overhead

The Staged Server Method. To send secure email to correspondents who have no certificates, the most convenient method is via the "staged server" method also known as the "push-pull" method. For example, a regular email is first sent ("pushed") to the recipient banker, containing a URL link to the actual message content, which is stored or "staged" at a server. When the recipient clicks on the link, an encrypted SSL connection is established to the message or document (i.e., the recipient is "pulled" to the content) and the message or document is downloaded securely. While the push-pull method does not require any special software or certificates, it does require an Internet connection. Note that this method enables receipt confirmation since the server knows when the recipient picked up the contents. Also, it allows delivery of large files, exceeding the typical four or five megabyte limit of the email infrastructure.

The Payload Method. This method is distinguished by the fact that the actual content or payload is delivered encrypted all the way to the recipient's inbox, and can be decrypted without the use of digital certificates. There are three different variants of the payload method used by the SCS. One method is to

use script language at the browser to decrypt; another is to use "plug-ins." The former does not need any special software to be installed by the recipient. If more control is needed over the delivered contents such as expiration or revocation, the SCS can also enable a special key server to manage encryption keys for users or even for specific documents.

Mixing and Matching. The SCS picks and chooses among all the different delivery options based on established rules. It should make security totally transparent to the end-user.

Secure Communications Portal. While the SCS secures email from internal to external parties (including secure reply), there is often a need for external partners to initiate communications securely. To accommodate this, the SCS sets up a secure portal, which the external parties can use to initiate secure email to pre-approved correspondents. The portal also allows them to set up their own passwords and preferences, which makes communications simpler by dramatically reducing the number of passwords used and letting every recipient choose a meaningful password. Logs of all correspondence with the external parties are consolidated in one place. Also, authentication can be tailored to suit each recipient, ranging from browser and password access to individual certificates.

The Secure Collaboration Server can also offer other related services:

Secure Document Delivery with Special Privileges: The SCS's secure email delivery includes capabilities such as receipt confirmation; no limit on the size of attachments; single stored copy for multiple recipients to save storage; tracking of file accesses and downloads; file-handling privileges; time-window constraints; expiration; revocation; and many other features.

Large File Transfers: Typically, large file transfers are relegated to FTP transfers, which users find difficult to set up, cumbersome to download, and very difficult to control, track or secure. By contrast, the SCS is ideal for large file transfers and distribution, where endusers can upload files themselves and control access and distribution, with as much security as is needed. Audit trails are automatically maintained.

File-Access Gateway to Existing File Servers: The SCS can enable secure and controlled access to all existing files on NT/Unix servers, with policy enforcement on who can access which files and when, including detailed audit trails on every activity.
Digital Signatures and Time-Stamping Services: The SCS can offer notary services such as time-stamping services and digital signatures, which enable documents to be transported and worked on with full security and non-repudiation.

While addressing security in collaboration or other applications, there may sometimes be a tendency to overcompensate in controlling security risks. In that light, one caveat bears mentioning: The perfectly secure system will be perfectly unused.

Security
Security is a much broader topic than we have space for on these pages—physical security of storage infrastructure, digital rights management, digital signatures, and disaster recovery are a few heads to this hydra-like topic.

- **New Federal Agency Rules On Data Security**: A look at two best practice papers for healthcare and financial services. By Jack Scott
- **More on Digital Signatures—A Resource Guide**

- **Collaboration for Product Development**: Genzyme streamlines business processes with collaboration and knowledge management. By Martin Sumner Smith
- **Sign on the (Digital) Dotted Line**: The laws are in place, the technology is becoming more advanced, and companies are beginning to use digital signatures more often. By James Dukart
- **Gaining Trust for Digital Signatures**: A digital signature is only useful if all parties involved can be sure that the other party is whom they say they are. Public key infrastructure can create an environment of trust. By Jim Minihan
- **Keep On Keeping On**: Taking an Intelligent Approach to Business Continuity. By Elaine Price
- **XML Digital Signatures** By Dr. John Boyer
- **Security Issues and Concerns in Electronic Government** By Barry C. West
- **Security Misleads**: Despite the utility of cryptography in keeping information secure, it's not the only, or even most important, answer. By Thornton May
- **Securing Content In an Insecure World**: Information is the lifeblood of today's economy. What are you doing to keep your content secure? By James R. Dukart
- **Document Security and Privacy**: A few things to consider when securing your company's documents. By Jack Scott, with Dennis Martin

Kon Leong (kleong@ziplip.net) is president & CEO of ZipLip, Inc., a leading vendor of management software for email and files. Kon earned an MBA with Distinction from the Wharton School and an undergraduate degree in Computer Science and Business from Concordia (Loyola) University. He has been active in industry trade organizations and has served on the boards of the High Performance Networking Forum and the SCSI Trade Association. He is experienced in international business and speaks five languages.

Let's Work Together

Beyond instant messaging and email, more users are using collaboration tools every day. Here's a look at a few uses of collaboration and some trends to look for going forward.

In today's fast-paced, interconnected world, it seems no project or task is an island unto itself. Increasingly, everything that goes on within a company or large organization is interconnected with other processes or tasks performed either simultaneously with or sequentially to the task.

People have been operating in this fashion for centuries, holding meetings, circulating information, and conferring with one another every step of the way—in other words, collaborating. New generations and applications of software are now helping people collaborate electronically.

The best-known collaborative software applications are email and Internet (Web) access. By using email or the Web, employees, vendors, suppliers, customers, and business partners can share documents and information around the globe, nearly instantaneously. Those who want or need instant or real-time collaboration are turning to electronic meeting rooms, shared whiteboards, group instant messaging (IM), live videoconferencing, Web casts, and other technologies to help get the job done.

Collaboration in the Workplace

International human resources consultant Mercer Consulting, for instance, uses electronic meeting rooms to coordinate the establishment of employee benefit plans and executive compensation programs for its clients. Bob Buttacavoli, partner for global business at Mercer, says the company found it hard to keep up with complex projects based on standard asynchronous tools such as email and phone messages. "Managing large projects that span geographies and time zones can be daunting," Buttacavoli says. "It was difficult to keep everyone up to date and enable consultants as well as clients to work from current versions of project materials, manage collaborative discussion threads, and track important milestones."

Mercer uses eRoom from Documentum, a product that lets the company set up multiple secure electronic meeting rooms and invite user participation via secure Web access. Within each room, users can be assigned different access levels and different tasks based on their roles. When users log in, the eRoom system reads their profiles and automatically connects them to the appropriate rooms for collaboration. In addition to cost savings over worldwide fax, courier, and telephone charges, Buttacavoli cites speed of action or approval as a significant benefit. "Being able to automate the process for time-sensitive deliverables ensures that we can meet our deadlines cost-effectively," he says.

Another example of collaboration technologies in use is the Case Western Reserve University School of Medicine. As early as the mid-1990s, Case Western began creating an electronic curriculum for distribution to students, prospective students, and faculty. For years the information was collected, recorded, and distributed via basic text editors on the Web, but in 2001, the medical school bought and installed a collaborative solution from iMarkup that is now installed on all new incoming student laptops. Students and faculty using the program can now apply annotations (including sticky notes, highlighter pens, and free-form drawing tools) to actual live Web pages. Students and faculty can interact via email or instant messaging chat, or post messages for others to read and comment on. What grew to be more than 6,000 pages of typewritten notes, hardcopy material, lecture notes, graphs, and drawings in the early 1990s paper version is now accessible online, anytime to all new students.

"There are only 365 days in a year and only four years of medical school," notes David Pilasky, manager and network administrator at the CWRU Medical School. "With the volume of information increasing every day, we need to provide a way of getting more information across in the same amount of time."

Still another example is Britannia Airways, a UK-based operator of holiday flights and tours. Britannia uses Open Text's Livelink product to electronically distribute and maintain flight information that is available round-the-clock and around the world to authorized users. As with any airline, Britannia is required to brief cabin crews with information relating to each scheduled flight prior to its departure. In the past, flight crews needed to access and/or fill out dozens of more than 120 paper-based forms in order to complete the pre-flight briefing process. Today flight crews simply sign on to the company's Livelink application at an airport or from a secure terminal and collect the information needed. In addition to standard information such as crew and safety notices, the system offers forums where users can discuss initiatives and provide feedback as well as have access to email, roster management, and passenger information.

"Providing cabin crews with online access to a range of things they need to do have made their lives easier," says John Gough, Britannia Airway's e-business program manager. "We urgently needed to rationalize the amount of paperwork we were generating and the efficiency of our business processes around that paperwork."

Collaboration is growing rapidly in other industries. In the pharmaceutical industry, collaboration technology is used to coordinate drug development and large clinical trials. The shipping industry uses collaboration to coordinate insurance claims against and with products transported around the world. In corporate training, whiteboards and electronic meetings rooms are used to disseminate online courses in a variety of subject areas.

Trends in Collaboration
Vendors and analysts see several trends emerging within collaborative technologies. "We see many more areas being tied together," says Joby O'Brien, vice president of development for iMarkup Solutions. "Records management and imaging and scanning have often been islands of information that are now being pulled together to form a single solution."

"There is an increasing need to integrate pre-existing data with our products," adds Lance Shaw, senior project manager for collaboration technologies for Documentum. "A collaborative team might need to see spreadsheets or product specifications from other departments, so we have to be able to tie into external systems for that."

Other trends Shaw notes include the viral growth of collaboration technology. Traditionally, he says, one department or one sector will use collaborative tools for a discrete project only to have those they collaborate with decide that the technology will work for them, too. "People are starting to realize the old ways of phone and fax and email aren't getting it done," he says. "We have several instances where people have used it for client engagements, and as soon as the client sees the technology they want to have it too."

In terms of technical capabilities, Shaw sees greater implementation of instant messaging in collaboration tools. "We have been somewhat stymied by the lack of standards, but we absolutely see IM technologies emerging in the collaborative space," he says.

Increased use of collaboration technology also changes—to some degree at least—the way companies view document or content management. "When it comes to records management, collaboration software can make it more complicated or more simple," says Burke Oppenheimer, an analyst who follows collaboration technology for Gartner. "There is a lot of talk today about compliance and governance, and so when you are talking about RM now you have to create an auditable trail."

Oppenheimer says, "Collaboration helps do that, since all electronic tasks automatically create an electronic trail showing who accessed the record or document, where, and when. On the other hand, increased reliance on collaboration means more users are taking part in any one task or set of tasks."

Another trend is the increased use of workflow within or as part of collaboration. O'Brien talks about "structured collaboration," meaning not just working on joint tasks, but managing who can and cannot do certain things, when they can do them and what is the next order of business once a task is complete. Shaw notes that collaboration does not stop once an e-meeting is over—participants often need to be able to access records or content created out of the meeting.

Some organizations even cite workflow as one of the primary reasons they have adopted collaboration software. Rick Minicucci is CTO of the National Center for Missing and Exploited Children. The Center uses collaboration software from iMarkup to create videos and DVDs to promote child safety on the Internet. The software lets staff collaborate on HTML, JPEG, and Adobe documents, passing them not only among one another but also to external agencies such as the U.S. Department of Justice (the organization's funding agency) for approval. "Prior to this, we sort of had workflow but it was all meetings and notes and paper," Minicucci says. "Now we can track it all electronically, and the workflows are all so easy. That is particularly helpful because we are working both with our internal staff and with people outside the Center. We are now meeting deadlines like any other production company."

Ease of use is the final trend observers say will unlock the potential of collaboration software. The key is to make collaboration so easy that users hardly notice the software, and can instead focus on the tasks. Jared Spataro, director of collaboration solutions for Open Text, says users rarely care about the most advanced functions of collaboration tools. What they want, instead, is the ability to instantaneously and intuitively interact with far-flung users via computer screen. In recent studies, Open Text has found that people estimate they spend 38% of their time in meetings, and that meetings usually feature a specific type of collaborative interaction, such as reporting, sales, or information exchange. "Our challenge is to make sure that that reporting can be done, sales performed, or information exchanged," Spataro says. "Customers do not think in terms of the software so much as on what they are trying to accomplish."

Dan Ryan, executive vice president for marketing and business development for Stellent, agrees that the key is to make collaboration software as user-friendly as possible. "In terms of broad use, people want it to be in their standard environment," he says. "They don't want to have to launch a collaboration application, they want to be able to go to their document or spreadsheet or data and be able to collaborate from that native application."

Another key element to good collaboration tools, Ryan says, is the ability to quickly and easily create a team space or project space. "No one wants to spend a lot of time setting this up," he says. "It has to make intuitive sense to invite people in and approve of them being there." Ryan also points to the importance of having collaborative tools that can store and index content. "You have to be able to make a project a record," he says, "and do everything else associated with that."

Ryan, along with other vendors, is bullish on the uptake of collaboration software in the near-term future, calling it a "high growth area" that will only continue to grow as legal requirements require companies to save and record information for just about any meeting or process they undertake for approval.

Even though email and Web access have become relatively mature markets, a new trend is the extension of email to the "deskless worker", who may be a worker on a shop floor or a field sales rep. Many manufacturers have developed email kiosks in their break rooms so that employees can check their

email during the workday. Oppenheimer notes that real-time Web conferencing has enjoyed huge growth in popularity in the wake of the 9/11 attacks as well as corporate belt-tightening.

"In the economic climate we have been in, all corporations that use this kind of software do it as a cost-cutting and cost-savings measure," he says. "Everyone is interested in reducing travel time and costs in whatever way they can."

James R. Dukart is a freelance writer based in Minnesota. He can be reached at jdukart@thewriteplanet.com.

All Roads Lead to Collaboration

The convergence of other types of technology with collaboration is creating a hybrid discipline that's growing in relevance to production workers.

Collaboration is almost all grown up. Once the province of workflow and knowledge management (KM) vendors, collaboration has branched out in a number of directions. It now encompasses functionality as diverse as webcasting, videoconferencing, instant messaging, chat, and virtual communities. Collaboration can also be structured (scheduled email and live webcasts) as well as unstructured (team rooms, chat forums, and videoconferencing). It can further be broken down into synchronous (real time) and asynchronous (non-real time) categories. So you can have structured and synchronous collaboration like webcasts or structured and asynchronous collaboration like email. While unstructured and asynchronous applications are rare, unstructured and synchronous ones like chat are quite common.

As if that isn't enough functionality, collaboration in the last year has started to converge with another product space—content management. The result is a greater emphasis on central repositories where collaboration data streams can be recorded, retained, and leveraged for more KM-like applications as well as stronger alignment with production work processes embodied in enterprise applications like enterprise resource planning (ERP) and customer relationship management (CRM). But that's just the tip of the iceberg. A look at consolidation in the industry tells the whole story.

Consolidation
"Collaboration as it applies to content management is the new hot thing," says Rob Lancaster, senior analyst, Collaboration and Content Management at Yankee Group. What he means is that there has been a merger binge over the last year that involves companies that offer a diverse set of technologies merging with collaboration vendors. The trend began with Documentum, an enterprise content management vendor, buying collaboration vendor, eRoom, in December of 2002 (purchase close date). More recently (sale closed November 18, 2003) Interwoven, a Web content management vendor, acquired iManage, a collaborative document management vendor, to get both collaboration and document management capabilities. Even more recently, Vignette, the portal vendor, bought Intraspect, another collaboration vendor (announced September 15, 2003).

But some companies have chosen to build instead of buy. Stellent, a Web content management vendor, now offers its Collaboration Server that leverages its regular repository as well as the workflow tools that it had previously used for content authoring. Lotus has combined its content management tool, Domino.doc, as well as its collaboration modules, Sametime and Quickplace, into what it now calls the Lotus Collaboration Suite. To complement its robust document management and Web content management functionality, Oracle has launched a major product rollout that it calls Collaboration Suite which features most of the usual types of collaborative applications like Web conferencing, instant messaging, and chat.

Even companies in disciplines as far afield as project management are getting into the act. Niku, for instance, has added collaboration to its product offering.

But collaboration vendors haven't been twiddling their thumbs. For instance, Open Text, who's been doing collaboration for almost a decade, acquired Eloquent, a real-time Web conferencing company.

What's more, according to Lancaster, "the majority of the major portal and content management vendors either have native collaboration functionality or they integrate with one of the major messaging platforms and one of the major Web conferencing platforms like WebEx or Placeware."

That's the present situation. Down the road, Connie Moore, vice president, Forrester Research, thinks "the standalone, independent collaboration market is not going to last for a very long time—collaboration will be absorbed into other applications," even those as different as CRM. Ultimately, she believes collaboration could become a component of an operating system offered by major infrastructure players like IBM, Oracle, and Microsoft. IBM and Oracle have a good start with the Oracle Collaboration Suite and Lotus Collaboration Suite. Both offer application servers and portals from which to launch collaboration, as does Microsoft—Microsoft might spin off collaboration as part of its SharePoint portal infrastructure.

That gradual assimilation of collaboration into many different products might give rise to a problem for customers. Says Moore, customers may end up having four or five collaboration environments, depending on what application they're using. Aside from the redundancy and confusion of such a situation, customers will likely be loathe to pay for collaboration functionality they'll never use. The result, Moore thinks, is "there's going to be a backlash against that and companies will want to see collaboration as infrastructure, not something they have embedded in products."

Collaboration/Content Management
Collaboration is no stranger to content management. Indeed, Lancaster points out that it's been a component of many of the workflow engines that have been part and parcel of content management for a number of years.

But even when collaboration is separate it tends to create lots of information that needs to be stored and managed in an efficient way. "These applications actually end up creating more information for the message streams that come from messaging clients or content from a webcast or webinar session," observes Lancaster. And, he says, "that information needs to be stored somewhere, needs to be managed centrally. So the content management infrastructure becomes a logical host for it, particularly in heavily regulated industries such as finance where every customer interaction has to be logged and recorded." In some industries, for example, information has to be stored for up to seven years, he says, and rules need to be applied to make sure data is destroyed after that period to prevent massive buildups of irrelevant data.

Also, the fact that these two types of technologies are dovetailing makes sense because their combined functionality mirrors the way people actually work. Lou Latham, research analyst, Knowledge Workplace Community, Gartner, observes that "these two technologies marry the processes of realtime collaboration and individual work in a shared and managed environment very effectively. Obviously what you are creating is some kind of content, and what you're starting with—your presuppositions and the framework you're trying to fulfill—is embodied in documents." That makes collaboration applications already content management applications to a certain extent.

Business Problems
Collaboration, even in conjunction with content management, addresses a few fairly generic business problems. For instance, Moore remarks that it can support teams of individuals working on projects with communication methods like threaded discussions, instant messaging, lightweight workflow, lightweight document management—"all the things project teams need to do in order to share ideas and work as a workgroup together."

Lancaster says that collaboration especially helps transcend geographical separation. "Where you have geographically dispersed organizations and a ton of information flowing throughout them," he says, "it's often the case you've got workgroups or teams of people that are required to work on a project together.

Collaborative applications have emerged to enable those people to work together and eliminate a lot of the redundancy that occurred in the past in that type of environment."

Benefits

Eliminating redundant effort is a key benefit of these types of products. "If you think about the way people work together today…using telephones, fax, and email," explains Moore, "it's very inefficient and very easy for ideas to get lost. And information can be very hard to track in terms of what versions you're working on." For instance, she says, if you send an email to many people you'll quickly run into a version control problem and will likely have trouble getting everyone's input into the document. With collaboration, on the other hand, she points out, "you can do things like Web conferencing so that you're able to share slides and have everyone look at the same presentation at the same time" to provide an efficient real-time forum for trading and recording ideas.

Lancaster sees collaboration as a bridge between content management and knowledge management. Collaboration, he explains, "enables interaction among people, processes, and content—you've got people communicating with people as well as people following the same workflow or the same business processes so everyone is on the same page with the same content." Obviously, says Lancaster, such coordination improves both personal and group productivity, accelerates project creation time, and allows for tighter control over the project.

Latham notes that you also reduce latency in group communication so that the extended enterprise operates in real time. Collaboration also cuts costs, he says, because it obviates much of the need for travel and eliminates the downtime related to the logistics of collaborating. It also reduces headcount— "you don't need a lot of middlemen for communication between managers," says Latham.

Collaboration Applications

Collaboration is essentially a horizontal technology that can be tailored for many applications that might span several vertical markets. For instance, Moore says it can be used for processes as different as writing research reports, making sales proposals, and collecting market research. But it's not limited to those. She says it can also be valuable in working on consulting engagements, coordinating across a supply chain, managing legal cases, and working on mergers and acquisitions.

Latham explains that collaboration is often used in concert with CRM to improve customer service and in call centers to give agents instant access to contracts that customers are under so that the agents know what the customers are entitled to. It's also used for all types of electronic marketing, says Latham, as well as for many internal corporate applications like new product development, product launches, and investor relations. Investor relations is particularly hot right now, he explains, because the Security and Exchange Commission is stipulating that all information given to analysts be given to the general public simultaneously.

Other Trends in Collaboration

Latham says instant messaging has gone from being an online service gimmick for consumers to a productivity tool for collaboration within corporate workgroups. For instance, he continues, Microsoft is building "presence" awareness into all of Microsoft Office so that when you are working on a document and there are other authors associated with that document, you know whether or not they're online and able to collaborate immediately with you. You simply click and open a session to share that document with them and communicate with them or make the document available to co-workers through Microsoft's SharePoint portal.

Electronic forms are also becoming a standard collaboration mechanism. Latham says this is true "because when you fill out a form the form is basically a database record and the value of specific fields in that record can trigger specific events in a workflow that can cause emails to go to people and processes to be started."

And increasingly portals are becoming the default environment from which collaboration is launched and deployed in concert with content management. As a result, says Lancaster, dozens of smaller vendors offering collaboration point solutions are trying to develop strong relationships with portal vendors, especially those like SAP that also offer common enterprise applications. The aim is to link collaboration with two almost indispensable applications for most organizations.

Records management requirements are also affecting collaboration. Latham says Sarbanes-Oxley, for instance, requires that content be retained and made available for regulatory compliance and for new more stringent recordkeeping. As a result, two vendors who offer collaboration—IBM with its Lotus Collaboration Suite and Documentum with its workflow products—have each bought records management companies. This way, unstructured data streams can easily be tracked and kept to meet compliance requirements. Similarly, Latham says there are also records security requirements such as HIPAA (Health Insurance Portability and Accountability Act) that ensure that information is not made available in an uncontrolled way during the collaboration process.

Driving the Enterprise
Collaboration is no longer an ad hoc productivity tool on the fringes of linesof- business. As it aligns with enterprise applications that are the bread and butter of most organizations, it will become increasingly critical to enterprises that hope to compete in real time. While many of collaboration's new capabilities will be a function of content management overlapping with it, its availability will be directly proportionate to how well it's integrated with common portal infrastructures. In the long term, collaboration might simply cease to be a discrete product category as it's assimilated into base infrastructure like your operating system. Ironically, in this sense, the more it disappears, the more you'll find yourself unable to do without it.

John Harney is president of ASPWatch (www.ASPWatch.com); a consultancy that delivers market, partner, and technology strategy for ASPs and companies launching ASP services. He has recently published a book for Addison-Wesley on the ASP industry, Application Service Providers: A Managers Guide. He can be reached at jharney897@aol.com.

Something Wiki This Way Comes

Do you get too many emails a day? Can't keep track of which version of a document is the correct one, but don't want to spend tons of money on a content management system that maybe does way more than you need? The answer is here – and it starts with a lesson in Hawaiian!

What's a wiki?

Wiki comes from the Hawaiian word "wiki", meaning "quick". The first wiki, WikiWikiWeb, was created in 1995; today there are dozens of wiki applications available, including hosted solutions as well as more enterprise-focused applications that can be installed inside the firewall.

At their core, most wikis are websites that are easy to update for non-technical users. The wiki application provides users with a simple syntax or WYSIWYG editor and basic rules that streamline the creation of new pages as well as the editing of existing ones.

Wikis generally allow all users access to edit content, including deletion, and track changes as part of the core functionality. This makes it easy to keep content current – if a user sees something that is outdated or flat-out incorrect it's trivial to fix it. Many wikis also support RSS feeds for changes so users can see recent updates and back them out if necessary.

Perhaps the most well-known wiki is Wikipedia (http://www.wikipedia.org), "the free encyclopedia anyone can edit". Since its inception in 2001, Wikipedia has become home to more than 1.6 million articles in English and over 6 million articles total in 250 languages. By comparison, the 32-volume Encyclopedia Brittanica includes approximately 65,000 articles. The Wikimedia Foundation supports a number of other reference-oriented wiki projects, including Wiktionary, Wikibooks, and the WikiMedia Commons, a repository of images and other media files.

Wiki this!

Many organizations collaborate today using email to schedule meetings, exchange drafts, and gather feedback. These attempts often fall well short of the mark because users lose important messages in the flood of email they receive everyday. Someone also has to collate all the different versions and comments, determine which ones to keep, and send the revised document out to start the cycle again.

Instead, organizations could post a draft document or article to a wiki. By making changes directly to the document in the wiki, users can eliminate a significant amount of email traffic and ensure that their changes are included. At the same time, editors, or managers can review and accept changes or back them out and keep the previous version.

AIIM uses wikis to develop PDF-related standards including PDF/A – Archive, PDF/E – Engineering, PDF/UA – Universal Accessibility, PDF/X – Print, and PDF/H – Healthcare. The authors of Wikinomics have invited readers to contribute to the final chapter of the book, which is hosted on a wiki (http://www.socialtext.net/wikinomics).

A wiki can also be an effective tool for managing projects. Project plans, schedules, and deliverables can be posted to a wiki and updated by the team members doing the work. Nokia, Texas Instruments, Yahoo, and Ziff Davis all use wikis to brainstorm, put together project schedules, and collaborate anywhere users have internet access.

Something wiki this way comes (challenges wikis present to org)
One of the challenges organizations face in using wikis is that anyone can make changes to articles, including articles for which they have no expertise – or worse, where they are flat-out wrong. And those with an agenda are even worse. As the wiki gets larger, it becomes difficult to review all the changes all the time. As a result of these issues, Wikipedia now tracks the username or IP address of anyone making changes to an article, and articles that are subject to vandalism get locked down.

There is also a tendency for articles that are heavily edited to start to drift from the original topic. This may not be as much of an issue for a wiki focused on a particular deliverable such as a records retention policy or project schedule.

Wikis benefit tremendously from having someone who takes ownership for the focus of the articles, their readability, etc. – but the benefits may not be readily apparent to those paying for the wiki.

Finally, wikis can stagnate just like any other knowledge-centric endeavor. The wiki should be reviewed periodically for outdated or incorrect articles and those articles either corrected or removed.

Working for the wiki (getting started with wikis)
The easiest way to understand wikis is to start a wiki. There are a number of hosted services that can be used to start experimenting with wikis, and many of them are free for limited usage. Do a search for "free wiki" and take a look at the first few offerings.

Enterprises that want to implement a wiki should look for a solution that includes more robust security and audit trails, that ties into directory services, that has basic content management capabilities, is full-text searchable, supports multimedia files (images, audio, video), and that makes it as easy as possible for users to edit through templates and WYSIWYG editors. You'll also want the capability to "publish" specific articles and pages or the entire wiki. The good news is that there are a number of these available and the list continues to grow–search for "enterprise wiki".

Wikis show great potential to streamline collaborative efforts, particularly for document- and review-intensive processes. But they have to be used and tended periodically.

Jesse Wilkins (jesse@jwilkinsassociates.com,CDIA+, LIT, EDP, ICP, is an independent consultant. A frequent industry speaker, Jesse is involved in both AIIM and ARMA chapter activities and a karaoke connoisseur.

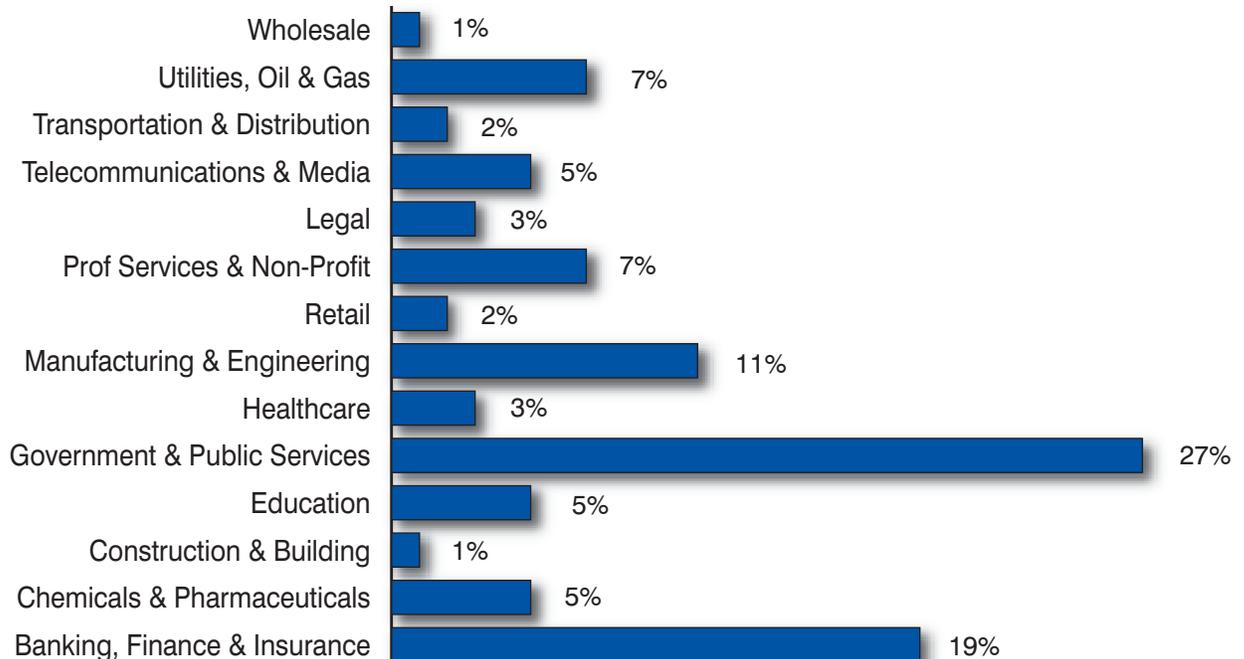# Electronic Communication Policies and Procedures

AIIM Industry Watch

In July 2003, AIIM and KCI conducted an industry study to find out how over 1,000 different organizations used and managed their electronic communications tools.

The results of the survey revealed troubling gaps between how companies used e-mail, instant messaging, and other technologies; and how those technologies were managed (if they were managed at all).

Eighteen months later, we conducted the same survey. Much of what was learned in 2003 was confirmed—business is now regularly transacted using a whole assortment of communications technologies. Clearly, the e-mail system has become a central business tool. While some organizations have recognized the growing need to take seriously their responsibility to manage electronic communication technologies, what is clear is that *risk management issues and compliance failures persist, in large part due to a gap between the implementation of new technologies and organizations' management of them through formal directives and training.*

The second survey was conducted in January 2005 using an on-line survey instrument. The core demographics of the survey sample were as follows:

Industry	Percentage
Wholesale	1%
Utilities, Oil & Gas	7%
Transportation & Distribution	2%
Telecommunications & Media	5%
Legal	3%
Prof Services & Non-Profit	7%
Retail	2%
Manufacturing & Engineering	11%
Healthcare	3%
Government & Public Services	27%
Education	5%
Construction & Building	1%
Chemicals & Pharmaceuticals	5%
Banking, Finance & Insurance	19%

SURVEY FINDINGS

USE OF TECHNOLOGY

Which of the following technologies does your organization allow employees to use for business purposes?

	2005	Percentage change from 2003
Instant Messaging	48%	+17%
Text-Messaging or Email enabled phones	63%	+11%
Wireless-enabled handheld devices	81%	+3%
Laptop computers	98%	+2%
Email	99%	0%
Discussion forums, message boards, etc.	69%	0%
Voice mail	97%	0%
File Transfer protocol (FTP)	72%	-8%
Peer-to-peer file sharing	43%	-12%
Newsgroups	50%	-12%

As anticipated, digital communications tools continue to expand throughout the enterprise. Nearly 20% more organizations now allow their employees to use instant messaging (IM) than did 18 months ago. The business use of text messaging and e-mail from mobile phones also grew by 11%. The survey demonstrates that Short Message Service (SMS) or text messaging to cellular phones, which has been used widely in Europe and Asia, has seen a significant upturn in popularity in the US.

There is overall policy on e-mail retention, but there is no associated training or user knowledge about the subject.
User comments, AIIM/KCI Survey

Despite claims from some that e-mail use is diminishing in the face of spam and viruses, threats from some employers to limit or ban it, or alternatives like instant messaging, e-mail is as popular as ever, with virtually all organizations allowing employees to use it for business purposes. Along with e-mail, nearly all organizations now allow the use of voice mail and laptop computers to carry out their business activities.

At the same time, one positive sign is that certain technologies saw a decline in use over the same period. This may be the result of organizations cracking down on technologies that have come to be viewed as providing limited business utility and more importantly posing serious risks for organizations. It may also simply mean that some organizations have found different tools that provide similar functionality. In this category, for example, 12% fewer organizations today allow employees to use peer-to-peer file sharing and newsgroups than did 18 months ago. It is not unexpected to see businesses shutting the door on peer-to-peer filing sharing, given that the technology has been the technology of choice for sharing music files and video clips over the Internet (raising the ire of the recording industry and spawning countless lawsuits).

FORMAL POLICIES FOR ELECTRONIC COMMUNICATIONS

For each technology below, indicate whether or not your organization has formal written policies regarding the use of that technology. Such policies may cover issues like security, retention of data, acceptable use, and related topics.

	2005	Percentage change from 2003
Instant Messaging	28%	+33%
Text-Messaging or Email enabled phones	27%	+29%
Wireless-enabled handheld devices	35%	+25%
Laptop computers	68%	+10%
Email	27%	+8%
Discussion forums, message boards, etc.	83%	+5%
Voice mail	22%	+5%
File Transfer protocol (FTP)	17%	0%
Peer-to-peer file sharing	34%	0%
Newsgroups	50%	-9%

The survey reveals an increase in the number of organizations that provide formal directives to employees regarding the use and management of communications technologies. For example, 33% more organizations have formal policies regarding IM use, and 25% more have policies regarding wireless-enabled handheld devices. Similarly, more organizations are managing the use of technologies like P2P file sharing (29%), laptop computers (10%), and e-mail (5%) through formal company directives. These increases are a welcome sign as policies provide the first and perhaps only line of defense to organizations from the bad acts of their employees.

However, in absolute numbers, significant and troubling gaps remain. For example, even though nearly half the organizations surveyed allow employees to use IM, a mere 28% provide formal directives regarding its use. This is particularly significant given that in the past year many companies learned (sometimes the hard way) that technologies like IM, though often useful to business, are not without security risks and do indeed create management challenges.

There is no technical way to retain e-mail records here except by printing them and filing them with paper records.
User comments, AIIM/KCI Survey

For example, the National Association of Securities Dealers (NASD) recently fined a securities analyst $75,000 for circulating false rumors about a company through instant messaging; rumors that caused the company's stock to fall by 10%. The stock only began to regain ground after the company publicly denied the IM rumors later that afternoon.

USE OF TECHNOLOGY VS. WRITTEN POLICIES

	Use It?	Have a policy for it?	% of those that use who have policy
Instant Messaging	50%	17%	34%
Text-Messaging or Email enabled phones	63%	22%	35%
Wireless-enabled handheld devices	69%	27%	39%
Laptop computers	81%	35%	43%
Email	72%	34%	47%
Discussion forums, message boards, etc.	97%	50%	52%
Voice mail	48%	28%	58%
File Transfer protocol (FTP)	43%	27%	63%
Peer-to-peer file sharing	98%	68%	69%
Email	99%	83%	84%

Organizations continue to lack formal directives regarding their electronic communications technologies. Even as the use of wireless devices and instant messaging proliferates throughout the enterprise, most organizations are still playing catch up when it comes to managing these tools.

For example, only one-third of organizations that allow the use of text and e-mail enabled mobile phones provide formal directives regarding their use. For other wireless devices, the number is less than half. The numbers are similar for voice mail and instant messaging as well.

Taking control of the organization's information and managing its new technologies begins with clear company directives. Continued gaps between technology use and company policy will likely mean that organizations will continue to experience fallout from employee misuse. Given the repercussions of misusing these tools, we would expect to see higher levels of management to accompany the expanding use of these technologies.

E-MAIL POLICIES

Does your organization address any of the following issues through written formal policies?

	2005	Percentage change from 2003
Acceptable uses of Email	86%	+5%
Guidelines for permissible content	76%	0%
Consequences for violation of Email policies	74%	+1%
Ownership of Email system & contents	73%	0%
Maximum mailbox size	60%	+2%
Length of time Email retained	45%	+5%
Where, how, or by whom Email retained	39%	+3%
Encryption of Email messages	32%	-6%

While the survey did not indicate significant changes in the topics covered by enterprise e-mail policies, it once again emphasized a critical gap that also existed 18 months ago.

While the vast majority of organizations today guide employees on the "acceptable use" of e-mail, most fail to provide guidance on e-mail retention issues. For example, while 86% tell employees how they should use e-mail, only 39% tell employees where, how, or by whom e-mail messages should be retained. Given the rash of high-profile cases involving a failure to retain or produce e-mail messages in the intervening 18 months, it is surprising that this percentage has remained virtually unchanged (a 3% increase).

The increasing business criticality of e-mail should be driving business to more aggressively manage the technology through formal company policies. That simply is not happening with the kind of regularity one would expect. As the business significance of e-communications increases, one might expect to find that management decisions about storage would be less dictated by mailbox size and more focused on making sure organizations are retaining business records found in these new business technologies. However, well over half the surveyed organizations indicate that they are increasingly "managing" the problem by limiting mailbox size.

This gap may illustrate that e-mail retention issues can be more difficult to address than acceptable use issues and that companies are still grappling with how to address e-mail content issues. It may also mean that a disconnect exists between the level of significant business done in e-mail and how IT and business executives perceive the business utility of these technologies and their role in managing business information assets. Companies are more likely to have management rules around e-mail box size than they are to provide specific guidance about how and where to retain e-mail of continuing business value.

Not surprisingly, industries where the retention and management of electronic records is more heavily regulated fared somewhat better, with half of financial services and pharmaceutical companies providing directives regarding e-mail retention.

E-MAIL AND LITIGATION

Describe any experiences your organization has had in finding and producing e-mail messages in the context of electronic discovery (i.e., for lawsuits, investigations, audits, other formal proceedings):

	2005
Have not experienced this	53%
Difficult, but manageable	23%
Very difficult, a major drain on system and human resources	10%
Routine	9%
No Answer	5%

As nearly 33% of organizations reported that responding to requests to find and produce electronic communications is "difficult" or "very difficult," organizations would be well served to more proactively deal with e-discovery issues. Nearly four times as many companies stated that the e-mail discovery process was "difficult" or "very difficult" than the number of companies who described the process as "routine."

53% of companies reported that they have not yet been involved in a discovery process involving e-mail; but as 99% of companies allow e-mail for business use (question 3), litigation today almost guarantees a discovery request for electronic mail in the near future.

BUSINESS VS. PERSONAL USE OF E-MAIL

2005	Mean	Median	Mode
What is the approximate percentage of your individual Email use on your company Email system that is BUSINESS related?	86%	90%	95%
What is the approximate percentage of your day spent on writing, reading or otherwise dealing with Email?	36%	30%	20%
On average, approximately how many Email messages do you personally receive each day?	75	50	50
On average, what is the approximate percentage of your Email that is SPAM?	17%	5%	1%

Note: Mean = average
Median = mid-point
Mode = most frequent answer

Even though employees generate and receive an average of 50 e-mail messages a day, it is clear that these messages increasingly deal with business-related activities. The business use of e-mail has solidified its position as the most significant and transformative force in how business is done today.

In addition, employees spend on average one-third of each day working with e-mail, further illustrating the importance of e-mail to the enterprise. With so much time being devoted to composing, reading and

managing e-mail for an ever growing number of business purposes, it is likely that the breadth and number of these communications requiring proper management and retention as company records will continue to increase.

For all the hype and horror stories centered around spam, one major positive development is that the survey respondents reported that on average only 5% of the e-mail reaching their inbox was spam.

USE OF MOBILE DEVICES
Many people now send and receive e-mail on a variety of devices and from a variety of locations. To the best of your ability, indicate the approximate percentage of your total business-related e-mail that is viewed on each device and in each location:

Device/location	2005
In the office on my office computer	82%
Out of the office, but connected on an office laptop	10%
From a "non work" computer and web connection (home computer, internet cafe, etc.)	6%
On a PDA	1%
On a Blackberry	2%

Reflecting the need to be connected even while not at work, nearly 20% of all business e-mail today is viewed outside the organization's facility on some type of mobile computer. As stated above, when employees spend roughly 1/3 of their day going through their e-mail inbox, it only makes sense that more and more organizations will turn to portable devices to keep workers connected and productive when out of the office. The survey results indicate that it is not uncommon for employees to check e-mail from home, which reflects a change in the way employees conduct business and the seemingly expanding workday.

Furthermore, the use of portable devices for sending and receiving company e-mail will likely continue to increase, as nearly half of organizations see increased efficiency as a major driver toward the implementation of new technologies.

INSTANT MESSAGING IN THE WORKPLACE
If you use instant messaging at the office, indicate what type of service you use:

	2005
Custom service provided by my employer	17%
Sametime by Lotus Notes	11%
Yahoo Instant Messenger	6%
AOL Instant Messenger	19%
MSN (Microsoft) Messenger	35%
Other, Please Specify	11%

Most organizations allow employees to download and install free "off the shelf" IM technologies apparently with little regard for security and information management compliance risks associated with such decisions. Most organizations are using IM tools that likely do not support enterprise functionality such as encryption and retention, and cannot be centrally managed. Fewer than 1/3 of companies have taken the time to address employee IM use in formal policy.

BUSINESS USE OF E-MAIL

Does your organization use e-mail for any of the following purposes?

	2005	Percentage change from 2003
Negotiating contracts and agreements	70%	+4%
Discussing HR issues, such as employee evaluation and performance	63%	+15%
Discussing operational or product strategies	84%	+4%
Exchanging confidential or sensitive information	71%	+15%
Responding to regulators	47%	+24%
Answering inquiries from customers	91%	+1%
Exchanging invoices, statements, and payment information	75%	+14%
Filing documents with official bodies	51%	+21%
Responding to litigation	34%	+42%

Significant business of all kinds is increasingly getting transacted in e-mail. 70% of respondents reported that they negotiate contracts in e-mail; 63% deal with HR issues; and 75% exchange invoices in e-mail. Nearly half of the organizations use e-mail to respond to formal regulatory inquiries about official business. Almost all organizations report that they deal with customer inquiries in e-mail. Across the board, e-mail is used by more businesses to do more important business than ever before.

Given the increasing use of e-mail to conduct real business, organizations would be well-served to take the management and retention of e-mail records more seriously.

MANAGING CONTENT BY ITS VALUE

Does your organization retain e-mail messages according to their content? In other words, are some e-mail messages retained longer than others because of what they contain?

	2005	Percentage change from 2003
Yes	44%	+26%
No	36%	-20%
Don't Know	19%	0%
No Answer	1%	0%

With nearly a 1/3 increase in the number of organizations reporting that they are retaining e-mail based on its on-going business value to their institution, more organizations appear to understand that e-mail is a core business tool and that their organizational interests are advanced by managing e-mail records properly. However, given the overwhelming use of e-mail to do all sorts of business, one would expect that even more organizations would be managing e-mail by content. Today, 54% of organizations report that either their organization does not retain e-mail based on its contents or simply did not know what if anything their colleagues were doing regarding e-mail retention.

BUSINESS DRIVERS FOR CHANGE

Has your organization made (or plans to make) any changes in the way that e-mail is used or retained at your organization as a result of:

	2005	Percentage change from 2003
Sarbanes-Oxley Act of 2002	30%	58%
Hi-profile media coverage of business failures and corporate malfeasance	24%	14%
The increasing volume of Email in your organization	56%	22%
The increasing use of Email messages in litigation, audits, and investigations across the private and public sectors	40%	33%
Lawsuits, business losses, viruses, system downtime, or other damages your organization has directly experienced	39%	30%

> *We retain all e-mail regardless of content.*
> User comments, AIIM/KCI Survey

Changes in the management of e-mail appear to be driven by the new regulatory environment, as nearly 1/3 of respondents report that Sarbanes-Oxley Law (SOX) has impacted the way they retain e-mail. This statistic is even more significant as many of the survey participants may not even be subject to the SOX regulation. While over half of the organizations report making changes to retention of e-mail due to volume; litigation and viruses also significantly impact the changes taking hold.

SPECIFIC ACTIONS TAKEN WITH REGARDS TO E-MAIL

If you have made changes in the way that e-mail is used or retained, what kinds of changes have you made?

	2005	Percentage change from 2003
Make the Email system more secure	66%	+5%
Restrict employee use of the Email system	24%	+20%
Retain more Email messages	27%	+13%
Retain fewer Email messages	36%	+13%
Retain Email for shorter periods	30%	-6%
Retain Email for longer periods	27%	+29%
Create new policies	73%	+4%
Conduct training	61%	+9%

The biggest increase in specific actions regarding e-mail is seen in the number of companies who said they are retaining e-mail for longer periods of time. This may indicate an increased awareness among organizations of the regulations and laws that require the retention of e-mail records, or may simply reflect the increased use of e-mail for business purposes.

All business related e-mails are kept. emails received or sent greater than five years ago are archived to CD / DVD. User comments, AIIM/KCI Survey

At the same time we see an equal percentage change in organizations that are increasing and decreasing the number of e-mails they slate for retention. This seems to indicate that many companies are still trying to decide what types of e-mail messages should be retained to best meet their business and legal needs.

There are other heartening signs that management of e-communications is taking place as well, with over half the organizations report developing new policies (73%) and training employees (61%) to deal with these issues.

E-MAIL SECURITY AND CONFIDENTIALITY
Which of the following apply to your organization?

2005	YES	NO	No Answer
Has your organization ever experienced the theft or loss of private, confidential, or trade secret information through the Email system?	11%	81%	8%
Does your organization require the use of a standard notice regarding confidentiality and other issues on each Email message?	36%	62%	2%

While nearly 75% of organizations use e-mail to exchange confidential or sensitive information, a mere 34% have a policy in place regarding the encryption of e-mail messages. A low number, considering that 11% of companies have had private, confidential or trade secret information sent via e-mail either lost or stolen.

> *The only governing factor right now is mailbox size. Will be instituting an age cap on items in the mailboxes shortly, but no assistance being offered in determining what is a "business record" and how long and where they must be kept. Senior Management is not open to such discussion.*
> User comments, AIIM/KCI Survey

USE OF TECHNOLOGIES TO MANAGE E-MAIL
Which of the following e-mail related technologies does your organization use? [Please select ALL that apply]

	2005	Percentage change from 2003
Encryption – desktop	20%	+5%
Encryption – gateway or server	36%	-5%
Separate back-end system for Email retention	29%	+7%
Automatic categorization of Email content	7%	-22%
Document management software	29%	16%
Records management software	19%	12%
Email management & archiving software	37%	19%

> *Our e-mail is backed up daily...what they do with it and for how long is not clearly documented. Also, if you do not choose to archive your e-mail, then it doesn't get backed up.*
> User comments, AIIM/KCI Survey

Less than one-third of organizations report that they use document management systems. Organizations are still more likely to use back-up systems for e-mail retention than records management software.

USE OF TECHNOLOGIES TO MANAGE E-MAIL—COMPANY SIZE

Which of the following e-mail related technologies does your organization use? [Please select ALL that apply]

	Small (0-100 emp)	Medium (100-1000 emp)	Large (over 1000 emp)
Separate back-end system for Email retention	26%	26%	32%
Document management software	31%	26%	31%
Records management software	17%	16%	22%
Email management & archiving software	38%	40%	35%

Organizations of all sizes and across all industries continue to use a variety of technology platforms to manage and store e-mail with most reporting they use e-mail management or archiving technology (40%).

	Banking, Finance & Ins	Chem & Pharm	Educ	Govt & Public Serv	Health	Mfging & Eng	Telecom & Media	Utilities, Oil & Gas
Separate back-end system for Email retention	38%	30%	32%	28%	42%	33%	32%	28%
Document management software	29%	33%	26%	28%	23%	27%	31%	33%
Records management software	22%	23%	15%	22%	23%	22%	15%	31%
Email management & archiving software	44%	42%	31%	33%	40%	37%	44%	27%

BUSINESS DRIVERS FOR TECHNOLOGY DEPLOYMENT

If you have deployed any of the above e-mail management technologies (or are actively considering doing so), what has driven your decision (check as many as apply)?

Business Driver	2005
Compliance	39%
Leadership, competitive advantage	12%
Improve efficiency	45%
Risk management & Business continuity	44%
Better customer service	26%
Reduce costs	25%
Faster turnaround, improved response	23%
Increased profits, better performance	10%

Companies are seeing both the carrot and the stick as justification for new IT deployments. Nearly half the organizations surveyed cited increased efficiency as a reason for implementing new technology—the same number of organizations also cited compliance as a reason. Solution providers would be wise to incorporate both themes in their marketing and communication efforts.

BUSINESS DRIVERS FOR TECHNOLOGY DEPLOYMENT BY JOB

If you have deployed any of the above e-mail management technologies (or are actively considering doing so), what has driven your decision (check as many as apply):

Business Driver--2005	Line-of-business or process owner	RM or DM practitioner	IT manager or executive
Compliance	26%	47%	44%
Leadership, competitive advantage	21%	11%	11%
Improve efficiency	49%	49%	47%
Risk management & Business continuity	43%	50%	47%
Better customer service	37%	25%	28%
Reduce costs	23%	27%	26%
Faster turnaround, improved response	32%	25%	18%
Increased profits, better performance	19%	11%	10%

Results from the previous question still applied when the respondents were broken down by department. Whether in business, IT or records management, the respondents viewed the need for technology deployments both in terms of the carrot and the stick. Regardless of their department, nearly half responded that improved efficiency was a driver; while half also cited risk management as a reason for implementation. However when explored more closely, not surprisingly, business leaders see e-mail management technologies as providing more competitive advantage than technology or information management professionals while the later groups see the use of e-mail management technologies as helping their organization attain compliance.

John Mancini has been President of AIIM since May 1996. Working together with the AIIM Board, staff, and thousands of volunteers around the world, his goal is to help AIIM connect the users and suppliers of enterprise content management (ECM) technologies and services. Prior to joining AIIM, John spent 11 years in various positions at the American Electronics Association in Washington, D.C., most recently as Executive Vice President and Chief Operating Officer. The American Electronics Association is the nation's largest technology trade group. John holds a Bachelor's degree from the College of William and Mary and a Master's degree from Princeton University.