

Using Knowledge:

Advances in Expertise Location and Social Networking

MITRE Case Study

Site Visit Date: October 15, 2008

Site Visit Hosts

Name	Title
Thomas Bartee	Principal Information Systems Engineer, MITRE
Marc Cannava	lead technologist, MITRE
Trish Carbone	Technical Director of the Information and Computing Technologies Division, MITRE
Jean Colbert	lead software systems engineer, MITRE
Donna Cuomo	chief information architect, MITRE
Laurie Damianos	lead artificial intelligence engineer, MITRE
Bill Donaldson	head, applications development, MITRE
Abigail Gertner	lead artificial intelligence engineer, MITRE
Steve Huffman	vice president and chief technology officer, MITRE
Joel Jacobs	deputy chief information officer, MITRE
Robert Joachim	lead information systems engineer, MITRE
Carl Louton	technical co-op, MITRE
Doug Phair	technology evangelist, MITRE
Michele Smith	team lead and service manager, SharePoint, MITRE
Jean Tatalias	director of knowledge services, MITRE
Mary Lou Tierney	researcher, technology and user needs, MITRE
James Tymann	technical co-op, MITRE
Marcie Zaharee	information management principal, MITRE
Richard Games	chief engineer of intelligence center, MITRE

ORGANIZATIONAL BACKGROUND

Forty percent of our staff have less than five years with the company. They haven't built a network across the entire company. Their mechanisms for finding people who can help them are mostly electronic.
—Joel Jacobs, deputy chief information officer, MITRE

The MITRE Corporation is a nonprofit organization chartered to work in the interest of the American public. The organization provides expertise in systems engineering, information technology, operational concepts, and enterprise modernization to address the critical needs of its sponsors, including the U.S. Department of Defense, the Federal Aviation Administration, and the Internal Revenue Service. Acting as an independent adviser, it manages three federally funded research and development centers (FFRDCs) for those sponsors.

In addition to two principal locations in Bedford, Mass. and McLean, Va., MITRE has sites located across the country and around the world. With 6,800 scientists, engineers, and support specialists, MITRE also has its own independent research and development program that explores new technologies and new uses of technologies to solve sponsors' problems in the near and long term.

Figure 1 details MITRE's organizational structure, with four primary business units aligned with its sponsors: the Center for Advanced Aviation System Development, the Center for Integrated Intelligence Systems, the Command and Control Center, and the Center for Enterprise Modernization.

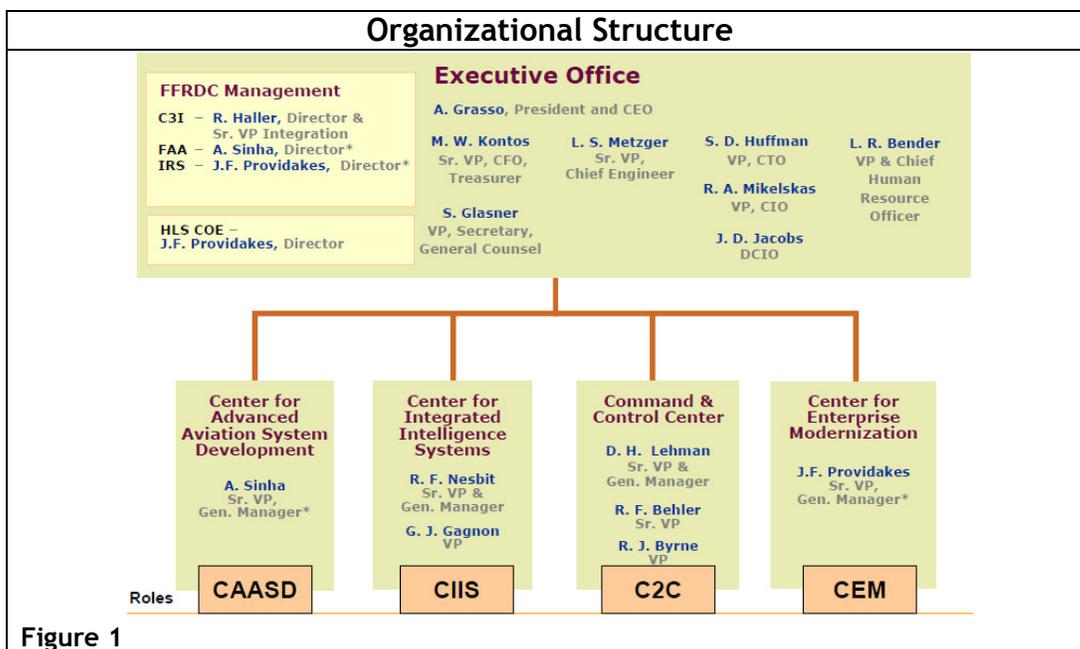


Figure 1

STRATEGIES FOR EFFECTIVE EXPERTISE LOCATION

Our employees do believe we have a collaborative culture that encourages knowledge sharing. We're also a very diverse organization, with a lot of independent thinkers.
—Jean Tatalias, director of knowledge services, MITRE

A high-level objective for MITRE is to “set the standard for excellence in business operations.” MITRE considers knowledge management (KM) and collaborative practices a necessary part of this objective.

MITRE's work force can be described as technically skilled and highly collaborative. It works side-by-side with its sponsors, often outside of MITRE's offices. Its skills base covers wide technological spectrum, including: systems

engineering, network and communication, information security, software and database engineering, business analysis, modeling and simulation, and sensors and signal processing. These skills are applied to equally diverse fields, including: acquisition and systems analysis, command and control systems, joint and multinational operations, global air traffic management, transportation security, enterprise modernization, homeland security and bio-security. At any given time, MITRE's work force is involved in about 1,800 projects. "So, it is a challenge to keep track of who is doing what," said Jean Colbert, a lead software systems engineer at MITRE. "It really is incumbent on every person to know who else is working in their space and network with those people to share our collective intelligence."

MITRE's KM program was initiated in 1997 to leverage this diverse skills base and its applications. Organized within and funded by MITRE's Chief Information Office, the KM program is situated in a knowledge services and corporate communications division that operates in parallel with the IT function. Two persons, in part-time capacity, lead the KM program and its six distributed Center knowledge managers. The program members work with representatives from the business units in a corporate planning, strategy, and championship function in order to foster knowledge sharing and practice. They also support collaboration and champion methods and practices to connect people and to manage knowledge assets for sharing and reuse. Every MITRE project leader can be considered a knowledge steward with KM responsibilities.

MITRE's KM portfolio is dictated by MITRE strategy, its Center for Information & Technology strategy, and MITRE enterprise architecture and governance priorities. The process for innovation within MITRE is detailed in Figure 2.

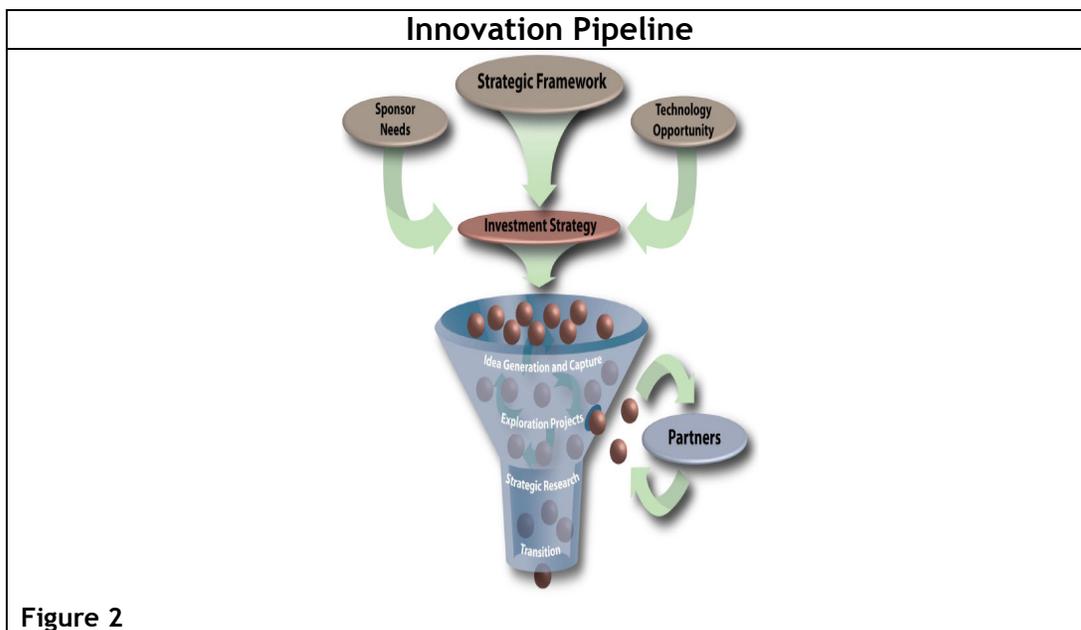


Figure 2

The innovation process is also driven by the organization's internally-focused R&D program. The mission of MITRE's research program is to apply advance technology to the most critical of sponsors' problems, look at future technologies to learn what is available that they can use, and then test and review the technologies. By examining the applications of emerging technologies five to tens years out—and even attempting to accelerate those technologies—the research program conducts leading-edge research and operational prototyping that often informs MITRE's knowledge-sharing efforts. "We work to improve our own capabilities to deliver services to the government," said Steve Huffman, vice president and chief technology officer at MITRE. "We have 200 people working in the research program. The other 6,000 people at MITRE working directly for customers need to know what those researchers have learned. So how do we distribute that information broadly across the organization? That's where our KM activities come in. We try very hard to develop a collaborative culture in MITRE. We believe it is part of our mission to make sure that the lessons learned and the issues resolved for one customer are applied to the advantage of another. That means having very good collaborative capabilities within the company through both

defined artifacts and defined people. So we're funding technologies such as social networking and expertise location to help people collaborate. This helps internally and externally."

As shown in Figure 3, the KM program is not focused on a single work group, system, or initiative. According to Jean Tatalias, director of knowledge services at MITRE, the organization relies on a set of knowledge-sharing tools instead of a specific KM process. Tatalias said, "At MITRE, I'm more interested in the end result than whether we stuck with one consistent model throughout the process. We don't use one process; we use a rich set of tools. Some may go away, some may get stronger."

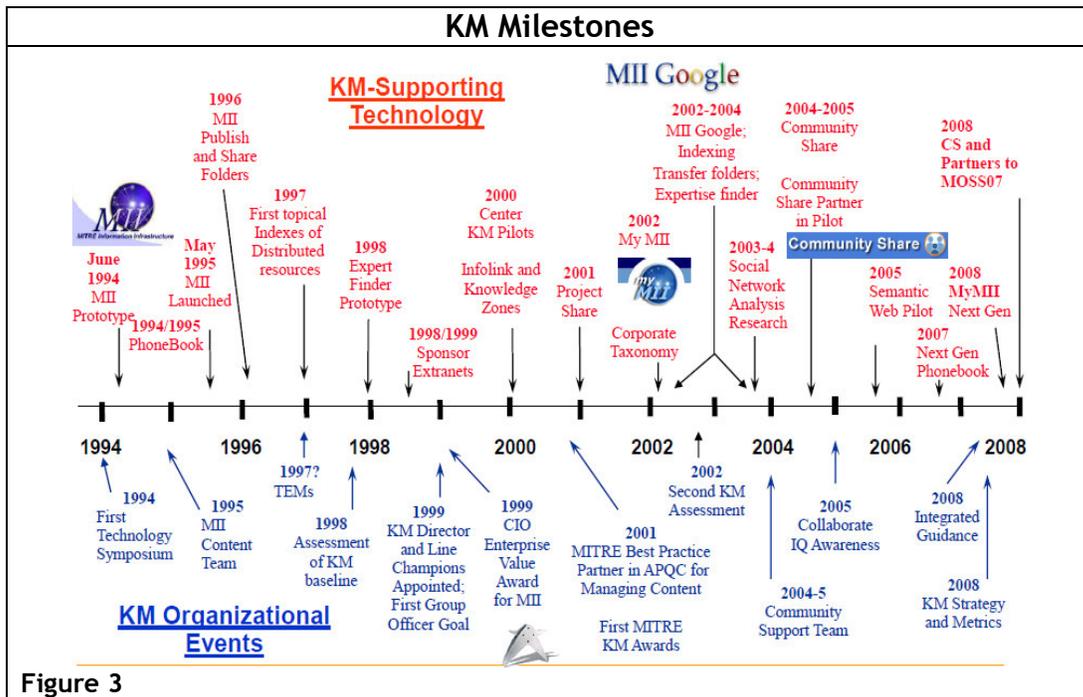


Figure 3

MITRE is currently working to revitalize its KM program with an updated strategy. As detailed in Figure 4 on page 5, the organization has identified four areas requiring improvement, as well as four thrusts to achieve the three primary outcomes MITRE is looking for. As of fall 2008, this strategy to strengthen person-to-person knowledge transfer, social networking, and expertise finding is being vetted by various stakeholders.

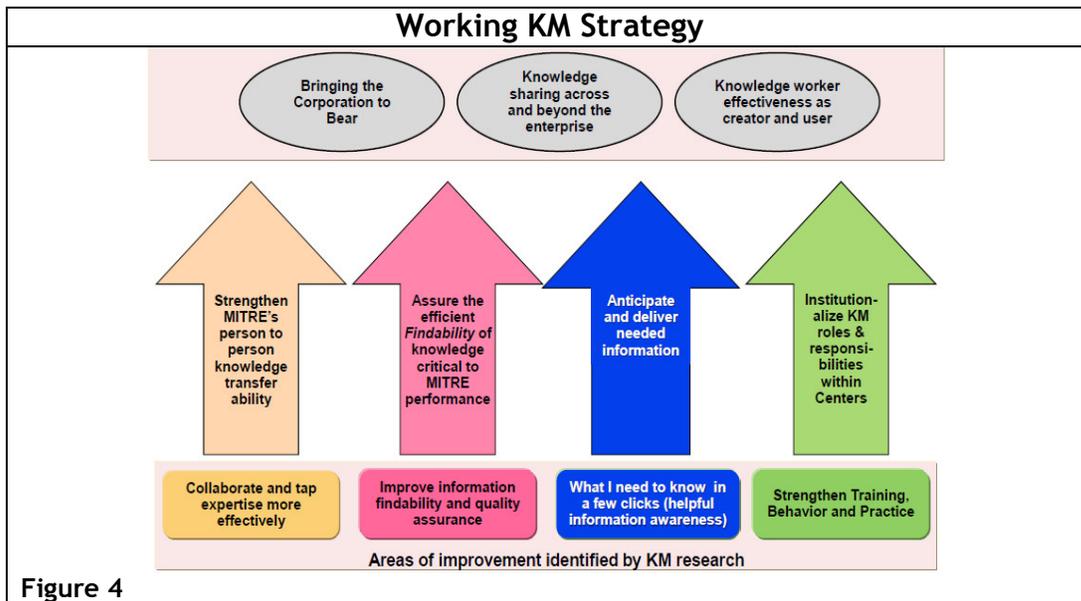


Figure 4

ENABLING PROCESSES, BUSINESS RULES, AND TOOLS FOR EXPERTISE LOCATION

It's an environment where everyone can be an internal publisher, and it has been that way for a long time.
—Jean Tatalias, director of knowledge services, MITRE

MITRE has a large number of support tools for sharing knowledge in the context of expertise location and social networking. This section details those tools, with many of them in the initial stages of prototyping, piloting, or developing. MITRE notes that not all of these tools will advance into production.

MITRE MII

A core KM tool is MITRE's Information Infrastructure (MII), the organization's corporate intranet and information management system. Implemented in 1994, MII contains a number of knowledge-sharing features and integrates with all other expertise location and social networking tools at MITRE.

Employees access MII through customizable portlets, with tabs for users to access their projects and relevant news. On a MII home page, for example, a user will have a menu list of links such as IT services and meeting support. The home page also may list project summaries (e.g., budgets and progress), upcoming events and calendar items, RSS feeds, local weather, favorite links (e.g., MITRE's public server), employee share folders, a timecard, and a corporate phonebook. A FastJump feature on the portlet allows users to see a tag cloud with the most used search terms in the last 30 days.

The phonebook allows users to search for people, communities, and mail lists. Populated by back-end repositories including a PeopleSoft database and a Microsoft Outlook calendar, the phone book is Java-based. It includes an availability calendar, core job information, project charges, communities an individual participates in, and recently published documents. And an "About Me" folder includes resumes. From the phone book, users can request a meeting or add a person to their contacts lists.

MII's capabilities are updated continually with major re-evaluations every three to five years.

MITREpedia

MITREpedia is an internal wiki for collecting knowledge about MITRE's projects, customers, organizations, technology, and staff. MITREpedia can be used by anyone at MITRE to share, update, and evolve knowledge about all things relating to MITRE. MITREpedia employs an easy to use WYSIWYG interface to allow almost 900

unique users across the different centers to share knowledge with the rest of MITRE. In a typical month, MITREpedia averages over 25,000 total visits. As the name suggests, MITREpedia is a community that mirrors Wikipedia to collaboratively develop content. Launched in 2005 as a supplemental knowledge repository, MITREpedia allows tacit knowledge and expertise to be captured from a grassroots perspective. Considered an experimental space for refining ideas, it is used as a place of quick reference on topics and a supplementary cross-reference to communities and projects.

The tool was set up much like Wikipedia so that users would be familiar with the functionality. The taxonomy has a loose structure that helps the tool act as a catch-all for MITRE tacit knowledge. It can run on any operating system and simply requires a Web server, PHP (a hypertext preprocessor), and MySQL (an open source database). With minimal set-up required and minimal maintenance needed, MITREpedia collects a substantial amount of information that has been integrated with MITRE's Google search function. In late 2008 MITRE may also experiment with applying Endeca's faceted search and navigation framework to MITREpedia.

ProjectPages Online

ProjectPages Online is a prototype web-centric project rolodex that promotes knowledge sharing across the MITRE community and "bringing the corporation to bear" on their technical work program. It does so by capturing an engineering snapshot of all MITRE's projects that comprise their technical work program and facilitates knowledge transfer and expertise finding among technical staff. By acting as a central source to retrieve technical project information (project plans, technology, and metrics), ProjectPages Online promotes transparency across work programs, establishes enduring project histories, and reveals patterns and opportunities for project managers.

"Right now, there's a wealth of information about projects in distributed repositories," said Jean Colbert, a lead systems software engineer at MITRE. "This is a simplified, aggregated look at the technical details. There is a page for each of MITRE's 1,800 current projects. With this, we're starting to move from a document-centric approach to a web-centric approach."

On a project page in ProjectPages Online, users can find a project's description, tags, goals, activities, impacts, links to the project's SharePoint community, external partners, and related MITREpedia articles, and other details such as size of project and end users, key milestones, and key project staff. The pilot team has created a mock-up of the ProjectPages service, which is loosely integrated into the MII phonebook as an adjunct to other project information and resources

The pilot team will continue to grow and evolve the Web service and the social culture to sustain it based on user feedback, technical content, improved access to project content and expertise, affinity matching across projects, sponsor feedback, and available technologies. As with MITREpedia, the tool will provide rich technical project content to feed Endeca's faceted search and navigation framework.

Blogs

MITRE uses blogs for self-publishing, disseminating information, and sharing informal information. MITRE initiated a blog pilot in 2003 entitled "Blogs @ MITRE" that is still being supported. It provides an avenue for individual and project-based blogs. MITRE also introduced executive blogs in 2008 to encourage candid conversation about MITRE strategies, goals and plans; this includes blogs by the Chief Information Office and the Office of the Chief Engineer. The blog content is searched by MII enterprise search.

Any MITRE employee can access the blogs, which operate on a flexible framework and require only minor maintenance. The integrated infrastructure includes an Oracle database, Cold Fusion Middle Ware, and Java when needed.

Figure 5 on page 7 details employee use. The next step at MITRE is to shift the effort from a pilot to a formal corporate initiative.

Blog Use	
Individual Blogs	354
Individual Blog Entries	4,739
Project Blogs	279
Project Blog Authors ^{1 2}	3,200
Project Blog Entries	9,896
Total Blog Entries	14,635
Comments on All Blog Entries	1,923
Subscribers to All Blogs ²	975
Total Blog Views (since 7/17/2003)	6,304,694

as of Oct 2008
Figure 5

Community Share

Community Share is MITRE's implementation of Microsoft Office SharePoint Services. SharePoint is a collaboration platform that provides a common Web space for lightweight document management; posting events and announcements; and tracking action items, meeting decisions, and agenda items. Through a central portal, Community Share acts as MITRE's central knowledge repository for all project information.

"It keeps information together and helps us log documents from a project management life cycle perspective," said Michele Smith, the SharePoint team lead and service manager at MITRE. Community Share's formal objectives are to:

- provide a corporately supported collaboration tool for people to post project-related information,
- educate community leaders on best practices and responsibilities for information sharing,
- encourage consistency in storing valuable content, and
- make information on a team or community accessible.

Community Share has a decentralized ownership model, with anyone able to request a site be created for a project by filling out a form online. The sites are supported by 10.2 FTEs including application developers, support liaisons, and a service/project manager. The Community Share team customizes a site for that project, the community owner configures it as needed, and the team retires the site after 90 days of inactivity. The community owner is responsible for keeping information up-to-date and reminding project team members to use the tool. And any project member can add an event or announcement and share or check out documents.

Sites are created by request based on the assumption that communities grow organically and may not reflect organizational charts or official projects. Its search function relies on metadata for projects/communities and not for individual documents. That is, Community Share can identify business centers, types of community, subject areas, project, etc. associated with each site for retrieval at a community level; but in order to ease the publishing requirements of end users, some individual document retrieval search functionality has been sacrificed.

Figure 6 on page 8 details the architecture for Community Share.

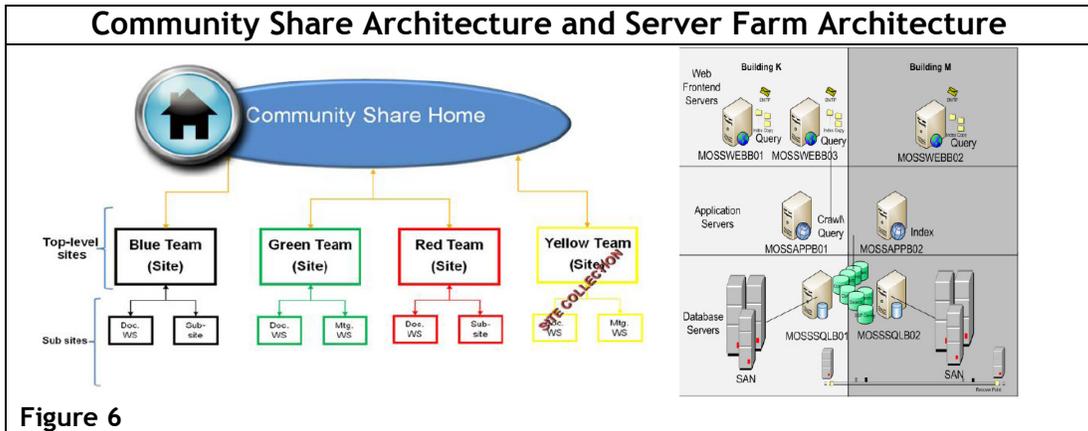


Figure 6

For Community Share, MITRE measures the number of users, support calls, training surveys, and sites. It also plans to administer a usability survey. As of October 2008, Community Share (internal to MITRE) contained 1,906 internal communities, the majority of which are for projects. These sites typically do not restrict access. In using restricted-access Community Share Partners (external) with MITRE sponsors, MITRE has tracked the metrics detailed in Figure 7. Internally and externally, Community Share Partners has approximately 8,500 users.

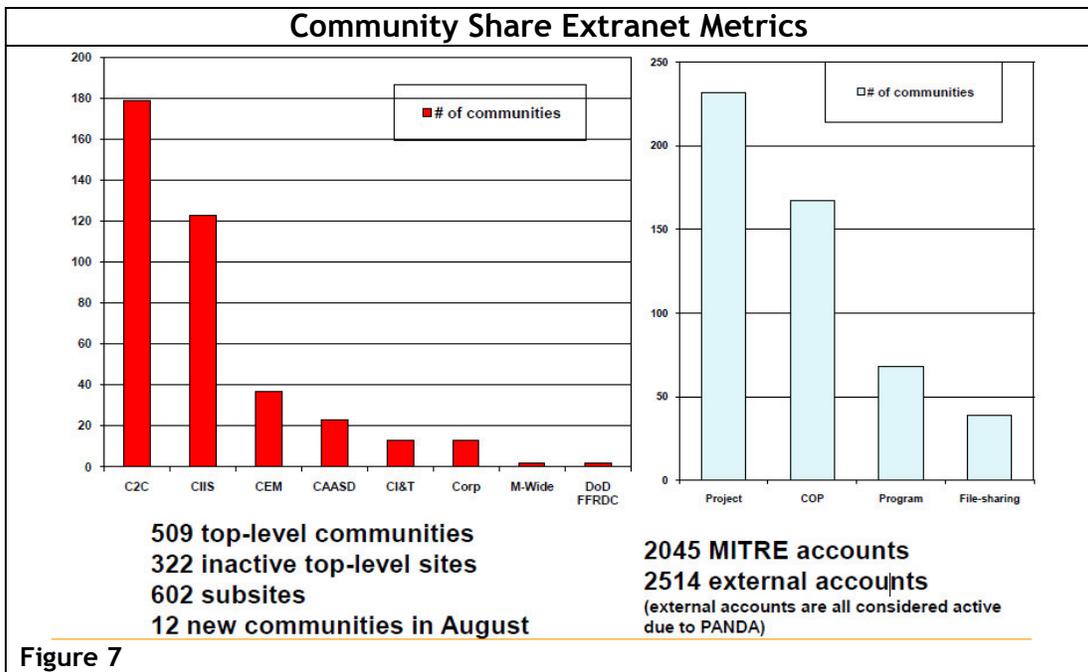


Figure 7

MITRE began using SharePoint in 2004 in an intranet pilot. The intranet version was formalized in 2005, and an extranet version was formalized in 2006. Community Share upgraded to SharePoint 2007 in 2007, and the staff is now focused on upgrading Community Share Partners as well. In the future, MITRE plans to improve search and navigation functionally and create web parts called electronic project files to provide a view of large files such as media that cannot be stored in SharePoint. It also plans to create life cycle-managed repositories to keep information over time and a consulting service to assist site owners who want to solve business problems with Community Share. MITRE may also integrate SharePoint features not currently offered through Community Share, such as content management functionality and blogs.

MII Search

MII Search, or MITRE Google, acts as the glue for all of MITRE's knowledge-sharing tools and separate repositories. In use since 2002, MII Search acts as MITRE's enterprise search system for MITRE's 2.2 million URLs, core expertise finder and e-mail list searcher, and source for locating technical exchange meetings. That is, one search box allows users to retrieve information on people, organizations, projects, social bookmarks, and technical information and events.

A small team of corporate search service resources support Google (with the production system based on GSA 5005 server). The search functionality indexes 400,000 URLs from the Community Share (SharePoint) document libraries, 1.4 million URLs from MITRE's Web-enabled file system and distributed Web servers, 450,000 URLs from e-mail list messages, database crawls, and XML feeds. Search results include tab options, best bets (from the MITRE Fast Jump system), and Google's 'Onebox' feature matches people, organizations, projects relevancy-ranked search results, and technical exchange meeting events.

Its expertise finder function helps new employees, tenured employees with new assignments, and increasingly, employees placed in interdisciplinary project teams. A user can start with a topic in a specific search interface and move through applications or repositories such as accessing Community Share information. A user can also find a person or group or post a question directly to members of an e-mail list. Expertise Finder search results include source options, e-mail contact options, display options (normal view, expand all, unattributed results, search details, and organizations), person with job title and link to phonebook, and content "evidence" (with title, links to object and repository, keywords in context, and object date). Figure 8 details the architecture for the expertise finder function. MITRE has found that the 'person' metadata used to identify MITRE expertise is of the best quality from resources or repositories where the metadata is derived, or where the repository is stewarded for quality control).

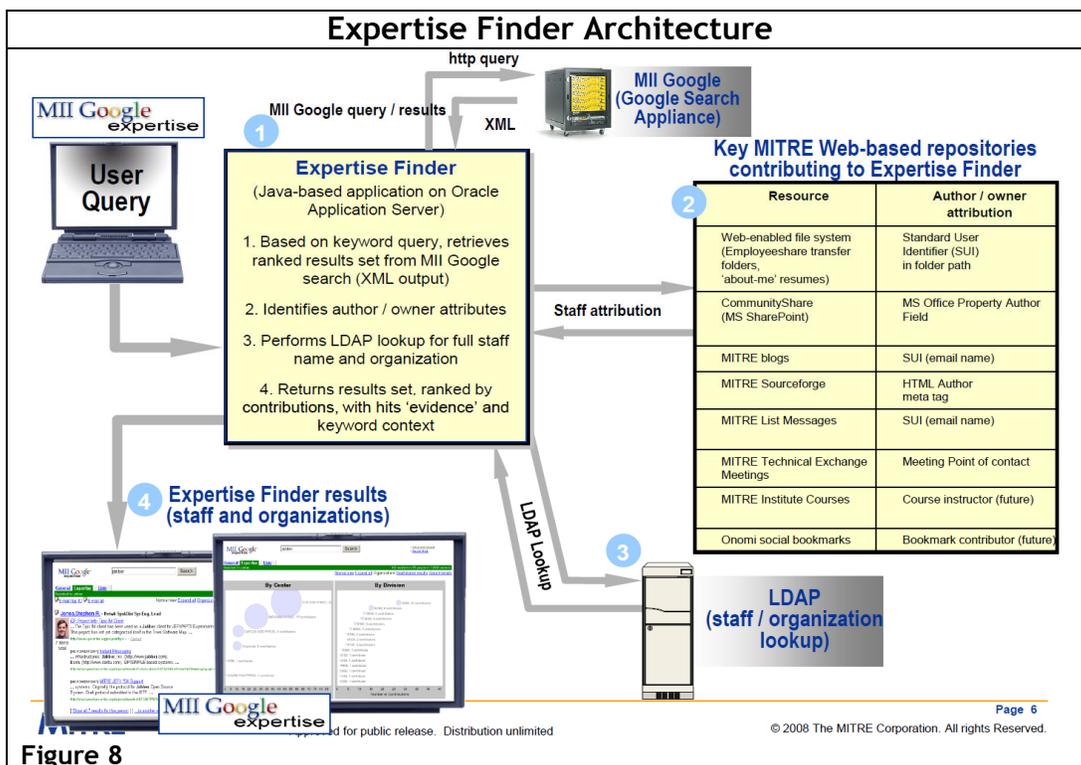
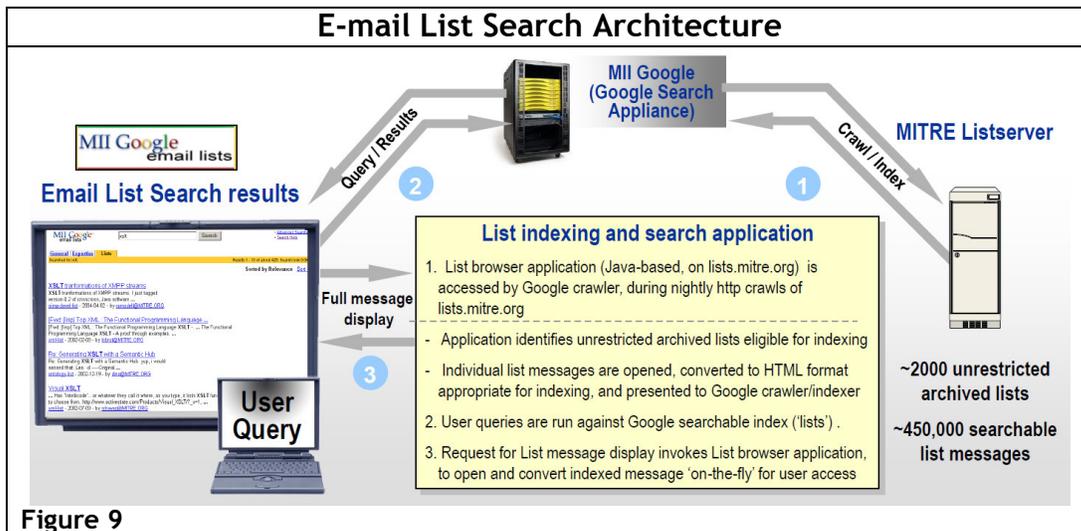


Figure 8

Its e-mail list message search function looks like typical Google results. The search function does not mine individual's inboxes, but instead indexes from a shared environment of MITRE Listserv email messages. Figure 9 on page 10 details the architecture for the e-mail list search function.



The search application for MII Search was developed in 2002 as a prototype and pilot, and then moved into production. Over time, searchable repositories have been added. MITRE continues to index new content for MII Search to retrieve.

MITRE tracks the value of MII Search through user surveys, help desk feedback, and metrics such as queries per month. Guided by this input, MITRE is looking for better ways to drill down within its expertise finder function and may integrate expertise finding with its future staff social networking profiles. Currently, although people use MII Search for employee backgrounds, the tool is not used to staff projects. But MITRE is developing a staff planning resource assignment tool that will be integrated with MII Search.

Onomi

Onomi is MITRE's social tagging and bookmarking tool, funded by corporate IT and integrated with MII Search. This tool allows employees to bookmark resources, tag those resources with metadata and comments, and share bookmarks with other employees. This helps MITRE employees to share internal and external resources internally, explore topics, discover new communities, find experts, and enhance the value of MITRE's other knowledge-sharing tools.

"We have a lot of teams that have to come together quickly to work on diverse projects and domains," said Laurie Damianos, a lead artificial intelligence engineer at MITRE. "So we need to share information fast and provide ways to share information very quickly. Social bookmarking complements many of our other social networking techniques. We found that a lot of people were already using these tools on the Internet."

While complementing MITRE's other knowledge-sharing tools, Onomi fills a gap in allowing users to share both internal and external resources, thus increasing the number of access points to content. The tool hyperlinks content and enables users to e-mail bookmarks or simply push a bookmark into a public space. (It does not index private bookmarks.) Users can retrieve tags and bookmarks through MII Search by center, popular topics, user, tag, file type, or description. They can also see who is interested in the same topics—thanks to integration with MII's phone book—and receive RSS feeds for every feature (e.g., what a particular organization is posting, bookmarks by topics). Onomi also contains corporately stewarded collections such as case studies and digital libraries.

The tool also provides life cycle support. It scans for broken links and removes them from public view, notifies authors of broken links, and creates temporary accounts so that users can access the bookmarks of employees who have recently left MITRE.

MITRE has tracked how this tool expands knowledge stewardship responsibilities across the work force. It has found that employees use Onomi not only for business resources but also external web sites. In addition to supporting individuals, the tool helps teams, subject area social networks, and virtual communities. Fourteen

percent of users also contribute tags or bookmarks, with that percentage continuing to rise. The tool has 14,000 unique tags and 20,000 bookmarks, 83 percent of which are external bookmarks. This is important in that MITRE employees have no other tool to share external resources.

“Onomi allows people to point to information anywhere, so it acts like a virtual repository,” said Damianos. “We’ve seen project teams take a specific tag and use it to mark all of their project-specific resources. Some of the project leaders say this is a great way to find out what their project members are working on or where other team members have put certain things.”

The tool has been in development since 2005, was integrated with MII Search in June 2008, and will be fully implemented by the end of 2008. MITRE plans to look at how this information can inform its corporate subject taxonomy and integrate Onomi with other socially enabled internal applications. The tool may also incorporate systems to provide recommendations based on a user’s actions.

TWITRE

TWITRE is microblogging tool that mirrors Twitter to leverage social networking and expertise finding. MITRE’s enterprise architecture planning and innovation function developed TWITRE as a solution for common business problems such as skills finding, staff location awareness, and availability. The tool is a mash-up built on commercial social networking tools geared toward fostering knowledge exchange across MITRE’s campuses.

From idea to its current pilot, this tool was developed solely by interns. In 2008 MITRE tasked three interns with determining how their generation’s most popular tools could be applied to real business problems, in the context of finding people and enhancing collaboration. MITRE also hoped to gain insight into managing business and public personas. The interns observed that MITRE administrative assistants play a key role in people finding each other and knowing their availability. That is, these assistants gather status from staff, send daily e-mail updates, and handle phone inquiries. The interns also found this system to be time-consuming, labor-intensive, supported by second-hand information, and dependent on a single point of contact. In response, the interns developed in five weeks a self-service tool for announcing availability and location.

TWITRE allows users to share and post meeting events on their calendars, as well as use presence indicators already available through the Microsoft Office suite to communicate availability. Its microblogging capabilities allow users to sidestep the drawbacks of traditional calendars (i.e., too focused on meetings, too much/little information shared, and not up-to-date) to provide a real-time stream of location and status. The TWITRE tool encompasses a desktop view of contact’s location and availability, an alert system for certain keywords, a phone-based expertise finder that is helpful for people outside the MITRE firewall, and large touch-screens in common areas for a public view of the system. The information is populated by users’ inputs, Twitter feeds, and integration with MITRE’s time reporting system. Users can even press a thumb print reader next to the public touch screen to indicate that they are now in an office’s common space.

During the first three months of the pilot, the tool had weekly upgrades of its capability and a large adoption rate, even among users that did not previously microblog. MITRE found that, in addition to leveraging existing connections, the tool fostered new connections among employees. In addition, its pilot public touch screen became the new water cooler space for socializing. MITRE plans to continue the pilot, adding customization features and working with Olin College of Engineering to explore how TWITRE can integrate with intelligent facilities (e.g., conference rooms) for sharing knowledge in common spaces.

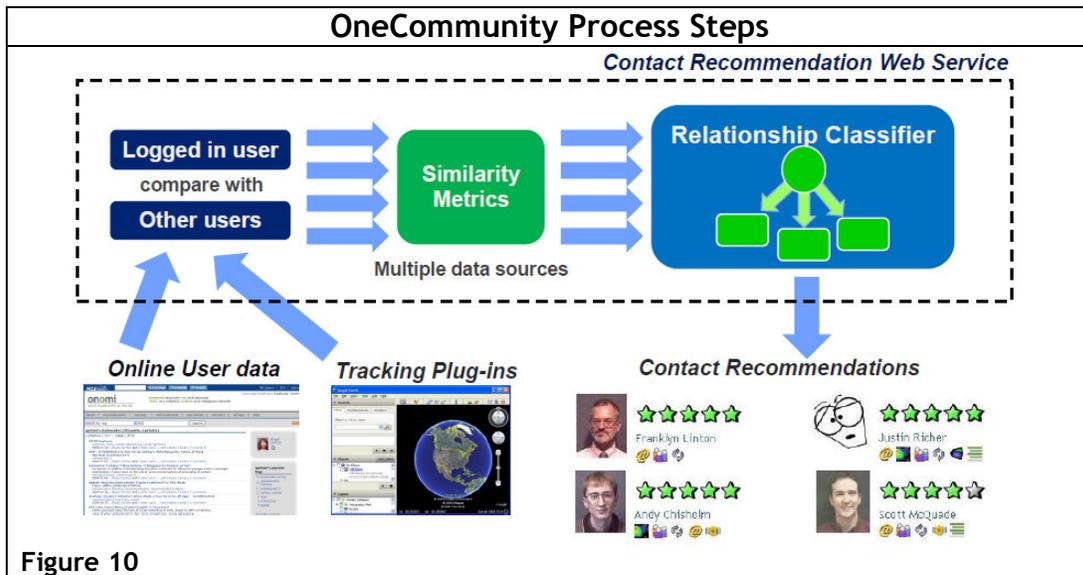
OneCommunity

OneCommunity is a social networking tool for intelligence community professionals that automatically collects information about participants and provides contact recommendations. MITRE intends for OneCommunity to be an integrated set of tools that will direct analysts to others with knowledge that may help them in their work—across agencies such as the Armed Forces, the U.S. Defense Intelligence Agency, the Central Intelligence Agency, the Office of the Director of National Intelligence, and the National Geospatial-Intelligence Agency.

“Analysts are encouraged to collaborate across the community but it is not always easy to find each other,” said Abigail Gertner, a lead artificial intelligence engineer at MITRE. “We are developing prototype tools to assist

analysts in finding others with similar tasks and/or interests relevant to their job. They need expertise from elsewhere in the community to supplement their analysis.”

Still in the prototype stage, this tool is different from MITRE’s other expertise locator systems in that users do not need to input keywords to find people. OneCommunity automatically generates profiles based on online user data and tracking plug-ins, as detailed in Figure 10. Using multiple data sources and similarity metrics, the system recommends contacts for the user. Users may enter keywords (or tags from Onomi) that become a searchable part of their skill base. They may also view heat maps that indicate areas of interest.



OneCommunity’s sister research project, MITREVerse, is an MII prototype of the same tool. Both projects are integrated with other MITRE knowledge-sharing tools and built on an open source platform that can easily incorporate new functionality. MITREVerse also allows individuals to control who has access to aspects of their profile and has a separate network for classified information.

MITRE is working to determine if the system is usable through a heuristic usability evaluation. It is also using quantitative measures and interviews to gauge user acceptance. It is determining if recommendations are useful and accurate by looking at click-through rates and creating focused experiments to compare system ratings to user judgments. Finally, MITRE is determining if this tool could bolster collaboration by conducting surveys and interviews, as well as measuring the number of co-authored products, the size of networks, and participation in online discussions. With this information, MITRE may integrate OneCommunity with external tools, improve its usability, and expand with contact recommendations through additional data sources.

ORGANIZATIONAL AND CULTURAL ISSUES

If it works, it works. Don't complicate users' lives with over-sophisticated technology that is not required to do their job.

—Robert Joachim, information systems engineer, MITRE

As demonstrated by MITRE’s numerous and, in some cases, overlapping knowledge-sharing tools, the organization has what Tatalias described as “a high tolerance for diversity.” She continued, “This is an expert culture. People want to be recognized for what they know and contribute. Putting your work out there is a way to get recognized. It’s innate in our culture.”

MITRE has conducted a number of campaigns over the years to promote its knowledge-sharing tools. A campaign called Collaborative IQ in 2004 and 2005 promoted—through MII, meetings with managers, desktop reminder

cards, and news center stories—sharing, finding, protecting, and stewarding information. In 2008 the communications campaign focused user guidance on information protection in an increasingly complex knowledge-sharing environment

In 2008 MITRE began an information management campaign entitled “Seven Essential Steps for MITRE Information Management” which promotes guidance for employees to manage information. The steps are as follows:

1. Keep project files in Community Share.
2. Share as broadly as possible and protect information according to policy, contractual requirements, and licensing agreements.
3. Use best practices to organize Community Share information.
4. Go beyond simple searches.
5. Manage project and team communication with a tool that works across your team, program, and management needs.
6. Leverage people connections.
7. Customize MII to meet your information needs.

In addition to organization-wide campaigns, MITRE bolsters knowledge-sharing tool adoption rates through training. Its fast-forward team is tasked with training employees on any new technology. The team offers Webinars, online tutorials, and lunchtime classes. The development team for each knowledge-sharing tool at MITRE works with this team to develop curriculum for users.

Beyond this training and support, new technology adoption at MITRE is largely an organic process, with employees free to use whichever tools they deem useful.

But the organization is focused on capturing and applying lessons learned from the deployment of its knowledge-sharing tools. These are often change management and cultural issues. MITRE has found a number of challenges in deploying social networking and expertise location tools.

- There are human/trust barriers, technological barriers, temporal and geophysical barriers, and security barriers.
- Choosing electronic project files, organizing content, and determining hierarchies and permissions are complex tasks.
- The nature of MITRE's work creates tension between sharing and securing content.
- It can be a challenge to position the numerous knowledge-sharing tools within MII.
- Users want to customize tools, which can impede supportability.
- Personal metadata quality can vary.
- Not all users are motivated to maintain résumés and profiles online.

And in response, the organization leverages a number of lessons learned and guidelines.

- By aggregating content, MITRE Google is the glue across its knowledge repositories and collections.
- Employees can be relied on to use tools in a professional manner.
- Expertise can be identified user-authored/-owned content.
- Central infrastructure management and reporting can quickly identify and address issues and manage growth.
- Users adopt tools, in part, that suit their work habits. If it works, it works.
- Metadata quality is best when derived or where content collections are stewarded for quality control. It is worst when poorly inconsistently applied
- MITRE's sponsors are open to tools that will help them collaborate across organizations. But success in using new tools may require significant cultural change.
- Championship in business units helps guide adoption and tailors the tool to the needs of different work practices and styles.
- With many tools such as Community Share not being intuitive, training is key. Create an active training and support program to help users overcome technology hurdles.
- Provide incentives for employees to share information online.
- To overcome trust barriers, provide the opportunity to users to post personal information and to vouch for contacts. And support fine-grained access control for all information.

- Educate and sustain users over time. For example, MITRE gained support for Onomi through demonstrations, bookmarks, e-mail announcements, and MII banners.
- Keep tools simple using existing infrastructures and user focused interfaces.
- Maintain the right balance of interest and brevity in developing pushed content.
- Limit formal data release processes that require a manager's approval to areas where absolutely necessary (e.g., the corporate Policy and Procedures).
- Develop strategic partnerships with other support organizations to make the best use of new technology.
- Involve technical and business stakeholders in a new technology's rollout.
- Secure active and engage content owners/contributors, such as for Community Share and MITREpedia.
- Automatically update data from open MITRE sources, but be sensitive to employees need for personal communications such as e-mail.
- Make technology transparent to the user. For example, TWITRE was developed in a manner so that some users were not even aware they were microblogging.
- Pull people in with useful content, even if not work-related, such as weather and traffic reports.
- Target public stewards and librarians in early stages to achieve a critical mass.
- Try to make things easy for users, such as by automatically importing all bookmarks from a browser into Onomi.
- Develop applications and repositories that can evolve, be reused, and be added to.
- Use open standards to build in data portability and interoperability as much as possible. Work with existing KM and enterprise 2.0 tools.
- For new technologies, start simple and let the customer create requirements. Then, let it grow little by little.

With the introduction of social networking and expertise finding tools, MITRE has seen a paradigm shift concerning the accessibility of information. Employees are more comfortable with unstructured data but desire advanced search techniques optimized to make sense of data. Many of the organization's analysts are still not strong users of public social networking tools but believe they could be helpful. Although the most-used communication tools are still chat, e-mail, and telephone, employees want to know both professional and personal information about each other.

The adoption of such knowledge-sharing tools at MITRE is propelled by a culture where individuals want to be known for their contributions and expertise. Knowledge sharing is also recognized through a KM award program, including an annual President's Award. In addition, the organization's KM and innovation goals are diligently reinforced through corporate goals and all levels of leadership. Ultimately, the adoption and success of these tools relies on their ability to help employees do their job. The tools must prove to make employees more effective and increase value for MITRE's sponsors.

IMPACT—INDICATORS AND MEASURES OF SUCCESS

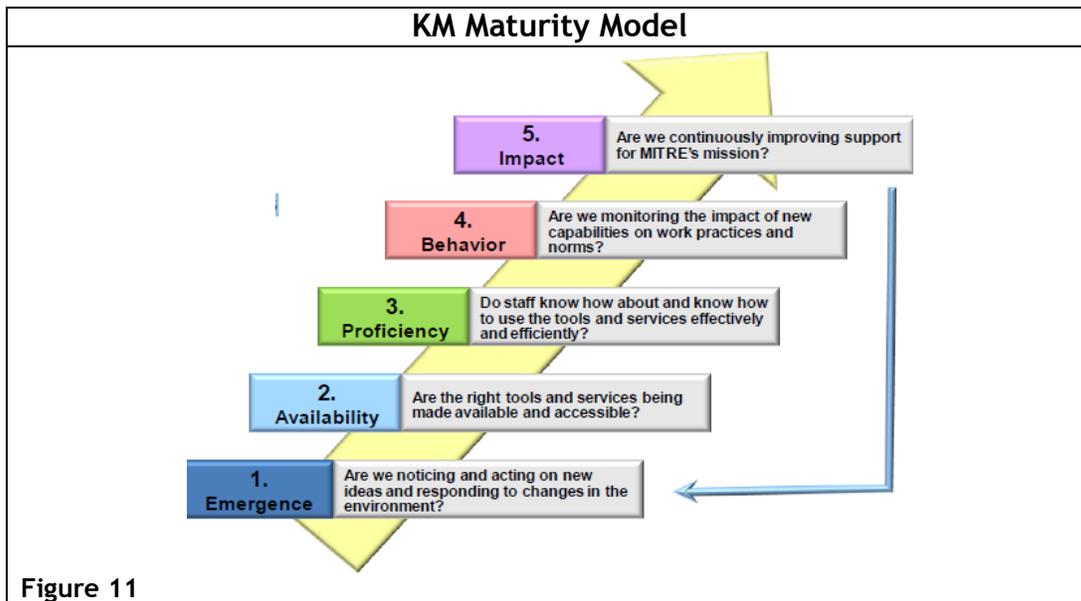
As long as employees are using a tool, we will continue to provide it. As a public service organization, we're more focused on how the technology helps our customers than its ROI. There's constant communication and information exchange through these tools, and that's what we perceive as value.

— Marcie Zaharee, information management principal, MITRE

MITRE has periodically assessed its overall KM program since 1997. It also measures the use of tools and methods and collects feedback. For each tool, MITRE has a customized approach to determine if the tool fosters collaboration. (For example, it measures the number of new contacts, increased trust, and more cross-organization products for OneCommunity.) An employee survey in 2008 asked:

- What is the perception of knowledge sharing at MITRE?
- What is the value (e.g., outcome to customer) of knowledge sharing at MITRE?
- What KM enablers/activities are in place to support knowledge transfer and bringing the corporation to bear?
- What are the barriers to knowledge transfer?

MITRE found that employees tend to prefer MII Search, Community Share, and an older file-sharing tool. But overall, employees appreciate the diversity of the tools available. Ultimately, all of MITRE's knowledge-sharing tools are gauged against the organization's KM maturity model (Figure 11 on page 15).



MITRE also began working in 2007 with Babson College to determine the value of its social networking tools. The project examined how collaborative tools such as blogs and social bookmarking affect innovative performance. That is, do the tools help employees generate creative work-related ideas, champion work-related ideas to others, search out new technologies and processes, and become connected to others in MITRE?

The project team conducted a survey in February 2008 of 350 users of technology-mediated networks. Those users' managers were also invited to rate the users' collaborative behavior. The survey results found that social networking tools do make a difference. That is:

- Technology networks (e.g., social tagging) provide unique, significant value.
- Social networks and technology networks complement each other.
- Use of social and technology networks has a positive impact on personal innovativeness.
- The frequency with which these networks are used is not as important as who users connect with.

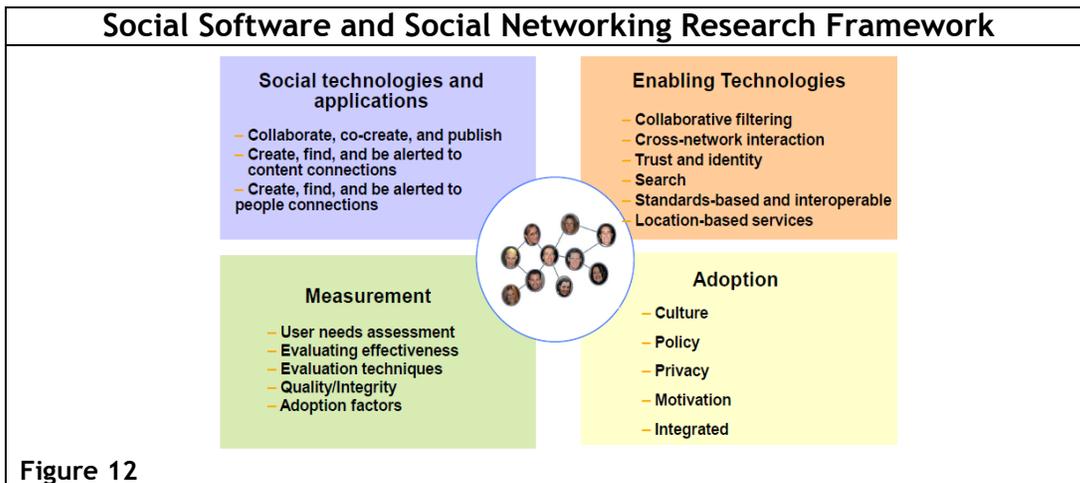
MITRE is now determining how to appropriately apply the survey results.

FUTURE PLANS

Because of the work force diversity and demands on people's time, KM has to be really simple. When it comes down to it, MITRE is still basically an e-mail economy. The biggest thing we need to do, from an investment standpoint, is understand these trends. That is, what is important in blogs and MITREpedia? When is it going to break from e-mail to blogs? It's what I call MII situation awareness. What is actually happening on the MII? And who is doing what?

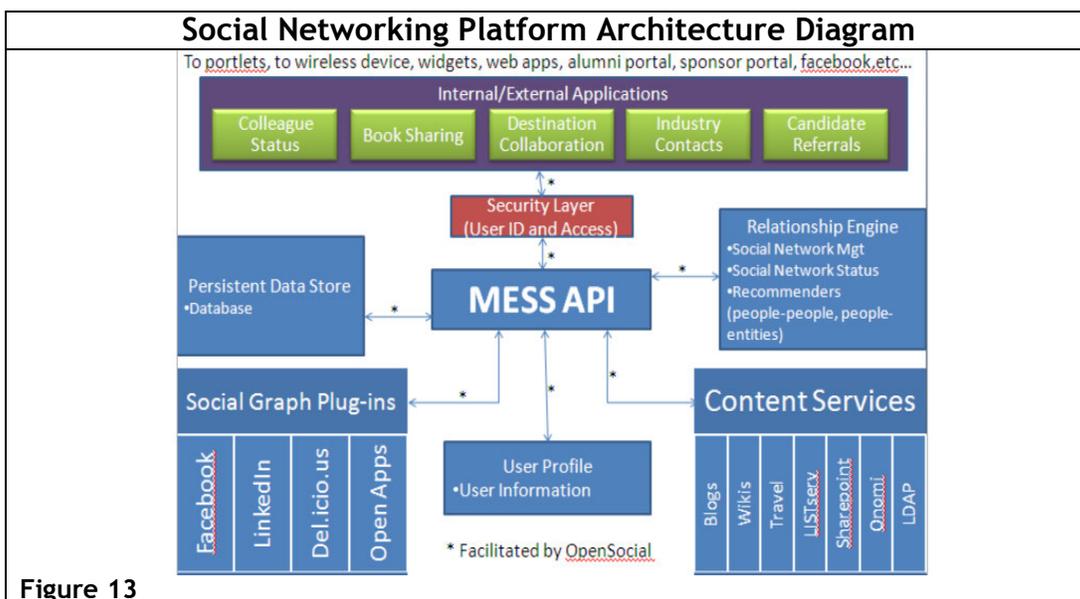
Richard Games, chief engineer of intelligence center, MITRE

Each year, MITRE's internal research program focuses on a number of key issues. In 2008, one of 24 key focus areas was social software and networking. MITRE established a social networking focus area group of 30 to vet and encourage proposals in this area. The group identified research needs concerning social applications, enabling technologies, measurement, and adoption (Figure 12 on page 16). This group created briefs concerning the types of proposals it was looking for, brought employees together to discuss the topic, received 14 proposals, and secured funding for five of those proposals for FY 2009.

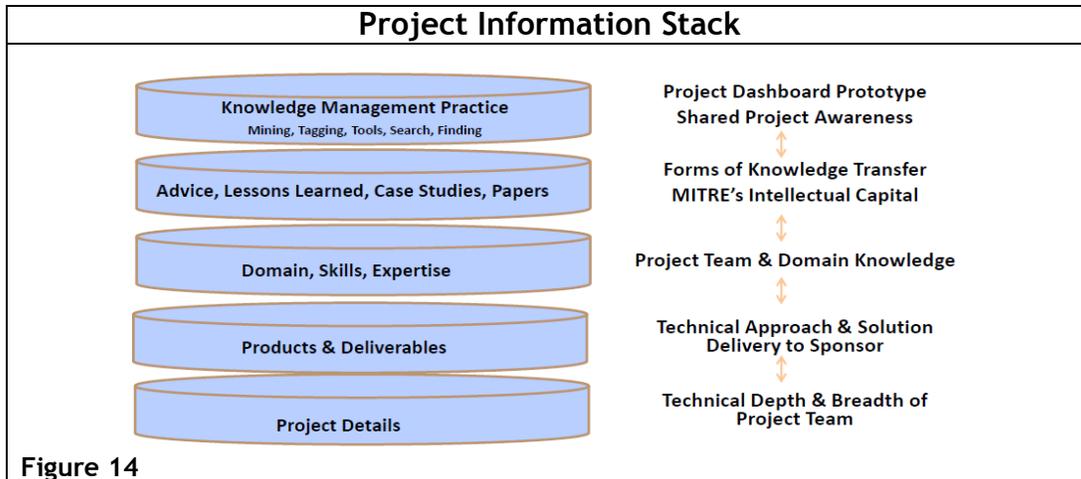


In 2009 MITRE will focus on the following five networking research projects:

1. **Extending MITRE's Reach**—This project will build an external relationship on an open social platform to support cross-organizational networking (Figure 13). Providing an opportunity to address data security issues and to create open source-compliant standards for social networking, the tool may be leveraged to improve relationships with sponsors, find external expertise, hasten new-hire orientation, leverage industry and vendor contacts, leverage alumni and consultant relationships, and create Facebook-style alerts.
2. **OneCommunity**—OneCommunity is the aforementioned social networking tool for intelligence community professionals.
3. **Wiki IQ**—This project will create an integrated quality index—that is, a peer rating system to assess quality and reliability to ultimately improve users' confidence in contributed content to MITREpedia.
4. **Visual Knowledge Integration**—This project will apply social networking analysis techniques to wiki pages in order to give holistic view of content and provide more effective navigation. MITRE anticipates this project providing an easier way for users to visualize results than is found on MITREpedia or Wikipedia.
5. **I-SPI**—This project will create a Web-enabled social patrolling instrument. A virtual world capability and research platform will be made available for sponsors to create fast and easy virtual (Second Life-like) collaboration spaces.



In a more general sense, MITRE will work in 2009 to see how all of the unstructured data flowing through its social networking and expertise location tools can be systematically searched and navigated. It is incorporating data, such as the project data detailed in Figure 14, into its corporate taxonomy to see where connections lie.



At a higher level, MITRE plans to examine how to tailor networking and expertise location tools to drive value within its corporate culture. It anticipates social networking and expertise location efforts to involve more data security issues than technology issues. The organization plans to cultivate adoption of its knowledge-sharing tools by creating user demand for improved project knowledge and situational awareness.

“Culture changes slowly, so we’re just putting these tools out there to see how people find and adopt them in different ways,” said Colbert. “In terms of social networking, this really is a paradigm shift in terms of accessibility. It’s not about acquiring information; it’s about finding it.”