

Handshake: A Case Study for Exploring Business Networking for the Enterprise, Inside and Out

Laurie E. Damianos, Donna L. Cuomo, and Stan Drozdetski

The MITRE Corporation, 202 Burlington Road, Bedford, MA 01730, USA
{laurie, dcuomo, drozdetski}@mitre.org

Abstract. MITRE has developed and launched Handshake, a social networking platform for business networking use. We took a unique approach in providing a single MITRE-hosted platform for connecting, collaborating, and networking with internal employees and external partners. The business networking prototype also serves as a research platform for building and deploying other social capabilities and exploring the value of social media for the enterprise. Since its initial release, Handshake has grown to support over 4300 users (~1000 are external participants) and 450 groups. Feedback from our early adopters has been very positive, with compelling stories on how they are able to engage our sponsors, mission users, and other partners in ways not possible with previous tools. We discuss the initial results of our study here and provide examples of how Handshake is able to meet our corporate objective of bringing the larger community to bear on problems of national importance.

Keywords: social networking, business networking, social software, social computing, web 2.0, social media, collaboration, collaborative environments, collaborative computing, computer-supported cooperative work, evaluation, business value, web-based interaction, group and organization interfaces, Elgg

1 Introduction

Social networking tools (e.g., Twitter, Linked-In, Facebook, Ning, MySpace) have been proliferating on the internet. We describe a social networking tool as a web-based service which allows users to construct a profile, explicitly declare a connection with other users, view and browse their connections and those of others [1]. Many of these tools can also be used for personal publications, status updates, broadcasting, and direct messaging. Because of the social nature of the tools, they can provide situation awareness of one's personal network as long as people frequent these sites and make contributions. Statistics indicate that many people visit these sites at least monthly, with frequent users visiting several times a day. According to [2], there are almost 600 million Facebook users worldwide.

Most social networking sites primarily support pre-existing social relations [3]; in fact, Facebook users search for people they already know more than they browse for people to meet [1], [3]. While humans can recognize up to 2000 connections [5], they can maintain only 150 [5], [6]. Indeed, the average number of Facebook friends is 130 [7], [8]. On average, people have 10-15 strong ties [5] (e.g., close confidantes, people

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who can be relied upon in an emergency, and people with multiple shared interests [9]), and those networks tend to reinforce beliefs rather than introduce new ideas. Weak tie networks provide access to a variety of ideas and experiences and expand the scale and the scope of a given network [9]. Both strong ties and weak ties can be sustained on social networking tools [3], [10], and latent ties (not socially activated) can be converted to weak ties on these sites [3], [11].

Individuals can use their social capital to gain access to resources from other members of their network [3]. Having connections to individuals outside one's immediate network can introduce non-redundant information, new perspectives, and other benefits (e.g., employment connections), and therefore weak ties help build social capital [12], [13], [14], [15], [16]. In fact, a MITRE-Babson study on the impacts of technology-mediated networks showed a positive relationship between the number of *diverse* connections in someone's network and their innovative behavior [17].

Indeed, social software has become "crucial in supporting and strengthening collaboration and nonroutine work in businesses" [18]. As early as November 2006, approximately 22,000 organizations had Facebook directories [19]. Gartner explains that "The demand from workers is escalating, and they can and are turning to the consumer Internet if their corporate technology provider isn't offering a solution" [18]. To meet this demand, some organizations have started deploying social networking capabilities, but many are still in the proof-of-concept or early stages [20]. Those sites that have been instantiated are primarily for internal enterprise use only [21], [22], and the Burton Group reports that these organizations are faced with many non-technical issues such as "business case, metrics, policies and controls, roles and responsibilities, employee participation models, and cultural dynamics" [20].

In this paper, we describe our own unique approach of designing and deploying a single social networking platform for the enterprise that supports both internal and cross-organizational business networking.

2 Case Study

The MITRE Corporation [23] is a not-for-profit organization with expertise in systems engineering, information technology, operational concepts, and enterprise modernization. In addition to managing several Federally Funded Research and Development Centers (FFRDCs), MITRE supports its own independent technology research and application development for solving sponsors' near-term and future problems. MITRE has approximately 7000 scientists, engineers, and support specialists distributed across many locations and working on hundreds of different projects for various sponsors in numerous domains.

MITRE employees have traditionally relied on email, telephone, and face-to-face meetings to communicate and collaborate with external partners. Artifacts distributed via email get lost or conflicts occur when different copies of materials are edited. Telephone conversations are ephemeral, and face-to-face meetings involve travel and scheduling issues. The company also uses an external Microsoft SharePoint site as a secure document repository, but the strict authentication requirements, the lack of

lightweight functionality, and the limited social aspects of the tool make it difficult for users to connect socially and collaborate. Forming ad hoc group workspaces around topical areas is also difficult with existing tools.

In addition to these problems, individuals want to be able to establish relationships with external parties and manage those contacts as people move from job to job. The recent popularity of tools like LinkedIn and Facebook make connecting and tracking possible, but they are not trusted environments for conducting business and are fraught with overwhelming amounts of personal and extraneous information [24]. As a result, it is currently difficult to capture the business networks and relationships that MITRE staff have with people from other organizations.

To address these and other collaboration issues, a research team at MITRE embarked upon building a trusted environment for MITRE and its partners to connect, collaborate, and share new information. Our goals were to improve MITRE's ability to establish and maintain relationships, form groups and facilitate multi-organizational collaboration around topics, leverage expertise from industry, and bring broader segments of the community to bear on important sponsor problems. In addition, we wanted to enhance the individual – and enterprise – situational awareness around relationships, activities, topics, and communities.

A specific focus of this project was how to address and mitigate the risks of this new capability. We needed to ensure that the social networking platform – supporting both internal and external access – and its data-level access model were both secure and usable. From a research perspective, we were also interested in exploring and assessing the value of an enterprise networking tool for business use as well as identifying and evaluating emerging business models enabled by social networking tools. Could the enterprise move away from supporting teams to leveraging networks and make the enterprise, as a whole, more efficient?

3 Approach

Before selecting and deploying a social networking tool, we started by gathering requirements and identifying business need use cases. We conducted work practice studies by interviewing and observing 18 MITRE employees who were engaged in cross-organizational projects and teams with sponsors, vendors, contractors, consultants, academia, and other FFRDCs. We documented work practices, assessed needs that were not being met, identified breakdowns and ineffective use of existing technology, and collected additional requirements for our prototype tool.

The team also explored existing social networking tools and products – including commercial technology, open source tools, and hosted platforms – to understand what functionality and options existed. We used this data, along with extensive criteria, to select an appropriate tool that would support a broad spectrum of research efforts.

Once we had a research platform selected, we built upon it and deployed it outside our firewall. We identified teams and partners to support as we piloted the tool and used their feedback to make improvements. We leveraged these pilots to study risks and costs, deployment mechanics, use and usage issues, integration, and cultural and political dynamics. Throughout this process, we worked with several teams to create a

framework for evaluating social media and a multi-fold plan for assessing the value of business networking for the enterprise and for the individual.

4 Research Platform

4.1 Tool Selection and Implementation

We wanted to create a trusted environment with fine-grained access control and a secure, yet easy, invitation model, all of which had to meet our information and operational security requirements. We required a single platform to allow our employees to engage with each other internally but also to connect and collaborate externally without having to go to another site. The latter proved far more difficult, as no commercial tool supported the single-platform approach to span a firewall. For user adoption, the tool had to be easy to use and require little to no training. Ideally, we wanted it to be similar to popular social tools like Facebook that many of our employees were already familiar with. We were also looking for a low cost solution: an inexpensive tool with no licensing costs to accommodate an unknown and unlimited number of external participants. Finally, in order to support our experiments and allow us to use the tool as a research platform, the tool had to be fully customizable, extensible, measurable, and easy to integrate with other applications.

After an extensive market survey, we selected the open source Elgg [25] platform as the basis for our prototype. Elgg's fine-grained access control model suited our unique requirements for sharing both inside the company and outside, and the ability to host it on our own servers helped meet our information security requirements. Elgg also provided enough out-of-the-box functionality and many of the key features that we wanted. In addition, Elgg was flexible enough to customize to our environment and our needs; its plug-in model allowed for extensibility without modifying the core, and its social graph API made it easy to integrate with other applications and services.

An advantage of using open source software for research was that it gave us access to the community of developers; we were able to leverage the contributions of others and share our own plug-ins and enhancements. Through this exchange, we developed a good working relationship with core Elgg developers who were responsive to our needs and concerns. Finally, using an open source platform required no software purchase and no licensing costs, resulting in a solution with no initial investment.

Using an agile method of iterative and incremental development, we designed and implemented a working prototype. We focused on creating a trusted environment: we tightened but simplified the permissions model, added new access control levels, encrypted communication via HTTPS, removed public access, and made the invitation mechanism more secure. We also worked on enterprise enhancements: improving the usability and integrating with single sign-on, active directory, email, our intranet portal, and other prototypes. Lastly, we wrote an event listener to log activity for evaluation and research.

Our business networking research platform, named Handshake, was first pre-released internally to the corporation and then later made available outside the firewall. Initially, we invited and nurtured several pilot teams to build their

communities on Handshake and then used them to drive our early requirements, but our user base grew rapidly through word-of-mouth. We encouraged feedback from our users and were able to address concerns quickly. Our agile development methodology allowed us to implement, test, and deploy new features rapidly.

4.2 Handshake Overview and MITRE Customizations

Handshake [26] is open to all MITRE employees and invited external participants for connecting, communicating, and collaborating in a trusted environment. Handshake members can form explicit relationships with other Handshake members, create their own profile, and establish groups. MITRE staff must explicitly invite external participants to join Handshake, and these external partners can in turn establish connections with other Handshake members and join groups. All content in Handshake has its own access control settings, so that content owners can regulate access. Awareness of activity on Handshake is provided through activity streams and customizable email or site alerts. The rest of this section describes some of the MITRE-built features and specific customizations for our environment.

Access. MITRE employees access Handshake by single sign-on and MITREid (based on OpenID) from inside or outside the firewall. Handshake is closed to the general public, but MITRE employees may invite external partners into Handshake via an authenticated email-based invitation model. External members currently may not invite others into Handshake.

Security Features & Permissions. Handshake utilizes a MITRE identity model to distinguish MITRE employees from other Handshake members. MITRE members are labeled as such and visually distinctive. All content in Handshake – groups, profile fields, files, wiki pages, discussion topics, blog posts, bookmarks, and images – has its own access control settings. Content owners may choose to make content accessible to all Handshake members, their connections, members of a specific group, MITRE only, or MITRE members of a specific group. Members may also create their own customized access control lists. To help prevent sharing of information to the wrong audience, all content is clearly marked with an appropriate padlock icon, either open or locked. This icon is colored to indicate the access level. Our model for group permissions restricts content within a specific group to that group's permission level, ensuring that material is not inadvertently exposed beyond the membership of the group. As an added precaution, MITRE members see a banner as a reminder to share information appropriate to that audience.

Profiles. Handshake automatically populates profiles of MITRE employees with their name, email address, and phone number; external participants are required to provide their name and organizational affiliation. All Handshake members may optionally upload a profile picture and add their job title, website, hyperlinked professional and personal interests, education, and a bio. Each profile field is access-controlled so that members can choose what to share with whom.

Groups. MITRE employees are able to create their own groups around a project, topic, community of practice or interest, affiliation, hosted conference or recurring meeting, etc. Groups can be open or moderated and can be made private or accessible to larger communities. Elgg's out-of-the-box group capability includes tools such as discussion forums, file repositories, wiki-like pages, blogs, photo albums, and a message board. We added our own generic HTML widget so that users can post announcements, provide links to resources and contacts, or create hyperlinked lists. We have also added a group activity feed, a group tag cloud, and a group wiki tag cloud. A simple customization feature allows owners to disable group tools that are not needed. To allow for more flexibility in group management, we have implemented a multiple co-owner feature, the ability to invite members into Handshake and a specific group simultaneously, sub-group functionality, and a group restore feature (for accidental group deletion).

Browsing & Searching. MITRE developers improved the metadata and tag search capability across all content, groups, and users. This enhanced search was incorporated and released to the community in Elgg version 1.7. An autocomplete feature in the search box saves users time by allowing them to select from their established connections or group memberships. Further enhancements allow for browsing of groups by membership level, recent activity, recent visits, alphabet, and creation date. We also dynamically sort users' groups so that they can quickly access those they visit most often. Finally, we have implemented tag clouds for personal content, group content, and group wiki pages to assist in browsing and navigation.

Awareness. Handshake provides widgets on each user's home page that display recent activity – status updates, file uploads, blog postings, comments on content, new group creation, etc. Members can choose to view their own activity feed, the activity of their connections, activity of all Handshake members, and activity across their groups. Each Handshake group also has its own activity feed to keep members up to date and bring new members up to speed quickly (this MITRE plug-in has been released back to the Elgg open source community). Users can view items in the activity feed only if they are permitted access to the actual content.

By default, Handshake users also receive customized email alerts to activity that occurs within their groups. The alerts contain textual content and hyperlinks to both the user who performed the action and to the group where the activity occurred. Users may elect to receive their alerts as a single daily digest, turn off notifications from specific groups, or not receive alerts at all. The email alerts provide users with lightweight access to activity occurring in Handshake. In the near future, users will be able to respond to discussion topics directly from their email.

Integration & App Development. In addition to our current work of integrating Handshake with email, we have been coordinating with other teams at MITRE who are building plug-ins, applications, and services for Handshake. Recently, work has been done to integrate status updates and activity feeds with our enterprise intranet. Other teams at MITRE are working on mobile applications to Handshake, a contact recommender system for automatically suggesting connections based on users' digital

footprints [27], and an “introduction” tool allowing users to introduce people to each other. Another research group is investigating automatic profile generation.

Future Customizations. We would like to improve the user experience within Handshake by enhancing navigation, browsing, searching and filtering for users, groups, and content. We would also like to implement the ability for group owners to customize groups and create their own widgets. In order to entice people to visit Handshake frequently, we are building a “Pulse of Handshake” feature where visitors can view dynamically updated content and learn what is happening, what is new, and what is getting a lot of attention. We are designing an extended permissions model around the concept of affiliated partner organizations and trusted partners; external participants belonging to an organization with a contractual relationship with MITRE will have special rights and permissions in Handshake. We are also working on implementing a lifecycle model for user management as users move from organization to organization and want to stay connected to Handshake. Finally, we will continue to explore integration with other socially enabled services and applications in the enterprise.

5 Evaluation

Since the initial release in August 2009, Handshake has grown to support over 4300 users (~1000 are external participants) and 450 groups and communities. We are in the formative stages of a follow-on research project that will allow us to study adoption, motivation, incentives, and facilitation in a longitudinal evaluation of socially-enabled business models. Social media follows a long-tail model where contributions from each individual are small, but there are many individuals. Long-tail effects grow rapidly with population size, and impacts are seen in large populations [28]. To conduct a proper assessment, we need time for the technology to be adopted, understood, and work practices adapted.

To that extent, we have instrumented Handshake with an event logging functionality and are looking at the relationships and interactions among Handshake users, their contributions, group activity, and “silent” participation (often involving sharing Handshake content outside the tool).

We are planning to employ a “use case” evaluation methodology where individual users and groups will start by stating their business goals. We will provide an orientation to the group members, and we will follow up at a later time to assess which factors facilitated or hindered the attainment of their goals. We will also extract lessons learned as a way of identifying techniques to speed adoption, remove barriers to achieving value, and institutionalize the best practices.

In the meantime, we have, however, been impressed with the creativity of the MITRE staff in adopting these new ways of working. We have collected anecdotal stories of business value achieved via new socially enabled collaboration techniques from our early adopter groups. For example, a chief scientist was approached by the head of a newly formed association which brings together organizations from across the country. The two needed an easy way to share and comment on policy and related

issues affecting their centers nationwide. Today, Handshake is one of their primary means of communication and collaboration: "Handshake is very simple and intuitive, and it's helping people to connect in ways they've found difficult to do using traditional methods."

Other staff members are turning to Handshake for some novel problem-solving activities. For example, a MITRE senior principal scientist is helping to envision the company's workforce of the future and how it can best be supported. Using a Handshake group called "MITRE 3.0", he reached out to over 1,000 employees to engage them in envisioning their future needs and work practices. "A social networking platform is uniquely suited to engaging a larger swath of users on various problems. The degree of engagement is high and the interactions cut across users working in various locations and domain areas," noted the group owner.

Because of low barrier to entry and wide participation, discussions on Handshake are flattening the traditional notions of company hierarchy. In one discussion thread, a user lamented that MITRE was no longer hosting show-and-tell exhibits for internal research projects. Other members from across the company contributed ideas and later decided to host a science fair. This idea arose spontaneously as a grassroots effort without any corporate encouragement. However, managers tracking the discussion offered funding and communications assistance. The science fair was well-attended, and provided an opportunity for participants to meet face-to-face.

In a similar vein, the corporate communications group created the MITRE Alumni group to help identify MITRE employees in historical photograph archives, from as far back as the 1950s and 1960s. Monthly, photographs are shared in Handshake where alumni and current employees identify the subjects and the event.

Handshake groups are also proving valuable for supporting technical exchange meetings, multi-organizational working groups, MITRE-sponsor project teams, self-help groups, new employees, and other virtual communities such as the teleworker community. For many of these Handshake communities, user profiles provide a unique way of helping members who do not have face-to-face access get to know each other better. Finally, the activity rivers for network and group activities provide a unique situational awareness view not available in our other collaboration tools. One of our users noted that Handshake was an "ecosystem" for collaboration that is leading people to discover information they were unaware of.

6 Lessons Learned

Handshake provides a trusted way to connect and collaborate across organizations, geographical locations, and time. By maintaining control over the information exchanges and the membership model, MITRE can support a safe environment for its employees while inviting selected outside partners. The flexible but extensive permissions model allows users to choose what information they want to share with whom, bringing just the right subset of members to bear on the issue being discussed or the artifact being created.

In creating Handshake and watching it grow, we have learned – and continue to learn – several valuable lessons. It is important not to "reinvent the wheel." We did

not want to build our own “Facebook for the enterprise” but instead focused on how we could utilize this new technology to extend the ways MITRE works and to leverage the broader community to provide better recommendations and products to our customers. We realized we would have to deal with both the early adopters and those reluctant to change their ways. The early adopters quickly grasped the power of the new platform, eagerly adopted it so they could reach a broader swath of users and partners, and pushed us to provide more capabilities quickly. We also had to market, educate and explain the new paradigm to staff who were reluctant to change their existing work practices. We spent a significant amount of time working with our internal corporation communications department to capture and publish the early success stories so these new ways of collaborating could be more easily understood and emulated.

We also recognized that our users were not going to abandon their existing tool suites, so we integrated the new capabilities with tools they were already using. We observed, for example, that near-real-time notification via email alerts was one of the major contributions to the adoption of Handshake. Letting users employ channels they were most familiar with to access their business network and communities was a plus for everyone. We made sure that the tools were lightweight and required no training to use, but we did provide education (such as webinars) for new concepts. We understood the implications of culture and tried to design for the digital natives, the digital immigrants, and the digital tourists. We developed a policy for both content and user behavior. Since security was important, we built the security features early and made the permissions model easy to understand.

Lastly, we learned that measuring the value of social media in the enterprise cannot be done in isolation with a handful of pilot users. The long-tail effect of establishing connections and maintaining peripheral awareness may only be realized over an extended period of time with many cross-organizational members.

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