

# Onomi: Social Bookmarking on a Corporate Intranet<sup>1</sup>

Laurie Damianos  
The MITRE Corporation  
202 Burlington Rd.  
Bedford, MA 01730  
+1 781 271 7938  
laurie@mitre.org

John Griffith  
The MITRE Corporation  
202 Burlington Rd.  
Bedford, MA 01730  
+1 781 271 7736  
griffith@mitre.org

Donna Cuomo  
The MITRE Corporation  
202 Burlington Rd.  
Bedford, MA 01730  
+1 781 271 7564  
dcuomo@mitre.org

## ABSTRACT

We describe a technology exploration of social bookmarking within a closed, corporate environment. We hypothesize that such a tool would be valuable for information sharing, information management, and social networking in our organization.

In order to assess the value of social software, we have embarked upon a 6-month pilot, or trial period, where we are striving to reach critical mass through marketing strategies and targeting influential figures with large, social networks. Our goal is to demonstrate the utility of social bookmarking within our corporation and to explore some of the social influences and behavioral evolution.

## Categories and Subject Descriptors

H.3.3 [Information Storage and Retrieval]: Information Search and Retrieval – *information filtering*; H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces – *asynchronous interaction, collaborative computing, evaluation/methodology, web-based interaction*; H.3.5 [Information Storage and Retrieval]: Online Information Services – *data sharing, web-based services*

## General Terms

Management, Measurement, Design, Experimentation, Human Factors

## Keywords

Social bookmarking, folksonomy, tagging

## 1. INTRODUCTION

We describe a technology exploration of social bookmarking within a closed, corporate environment. We hypothesize that such a tool would be valuable for information sharing, information management, and social networking in our organization. We performed a market survey of social bookmarking tools available on the web [7, 14], randomly interviewed colleagues currently using social bookmarking tools (e.g., *Connotea* [1], *del.icio.us* [2] and *Flickr* [5]) and met with selected “early adopters” to discuss possible applications to their communities of interest and to provide us with early feedback during development.

For purposes of experimentation, we were easily able to install and run an open source tool which we adapted and re-named *onomi*. Through iterative sessions with our users, we modified the software for our internal use and extended its capabilities by

adding new features (e.g., email integration, integration with external social bookmarking services, ‘related users by tag,’ and ‘related users by bookmark’) to help promote the sense of community, feed expert finding, integrate new tools with existing work practices, and to leverage external expertise to enrich internal knowledge discovery.

In order to assess the value of social software at our organization, we have embarked upon a 6-month pilot, where we are striving to reach critical mass through marketing strategies and targeting influential figures with large, social networks. Our goal is to demonstrate the utility of social bookmarking within our corporation and to explore some of the social influences and behavioral evolution.

## 2. BACKGROUND

Social bookmarking is one of the latest in an increasing trend of “pop-tech,” social software that has been proliferating on the Internet and quickly gaining popularity. Over the years, such social software phenomena have included email, social networking sites, weblogs, and wikis. *del.icio.us* [2] and *Flickr* [5] are two of the more popular, free-use tools for tagging and sharing web resources and photographs, respectively.

Traditionally, people have stored the URLs of, or “bookmarked,” useful web resources locally in a browser client, such as Internet Explorer, Netscape, or Firefox. By default, bookmarks are displayed in a list but can be ordered and filed into a hierarchical folder structure. Retrieving bookmarks involves scanning the lists or searching through nested folders. These bookmarks are accessible only through the browser and computer originally used to store them, and there is no direct way to share bookmarked resources with other people.

Social bookmarking differs from traditional bookmarking in several very critical ways. First, bookmarks can be annotated with identifying tags, or keywords, selected as meaningful by the person bookmarking the resource for easy retrieval later. People can also add their own free-text comments to the bookmark to provide personally significant metadata in addition to the bookmark URL and title. There is no hierarchical organizational structure to social bookmarking. The use of tagging does not impose mutually exclusive categorization schemes that hierarchical structures or faceted metadata do. People can retrieve bookmarks by tag (or title or comment) without having to search down long folder paths. Moreover, since bookmarks are stored in a central repository, bookmark collections are accessible from any browser and any machine.

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<sup>1</sup> Additional authors: David Hirst, The MITRE Corporation, 202 Burlington Rd., Bedford, MA 01730, dhirst@mitre.org, +1 781 271 2494; James Smallwood, The MITRE Corporation, 202 Burlington Rd., Bedford, MA 01730, smallwood@mitre.org, +1 781 271 2185

Lastly, social bookmarking is indeed social. People can share their resources with others, explore the tag space, locate “experts” on particular topics, and discover virtual communities with others interested in the same things.

### 3. MOTIVATION

We are investigating the utility of social bookmarking internally in our closed, corporate environment as a way of sharing information and building communities of practice. According to Business Week [4], “companies are figuring out ways to take advantage of [the social bookmarking] phenomenon.” Indeed, IBM has recently announced its own version of an internal social bookmarking tool, *dogear* [8, 12]. The concept of social software maps well to our overall collaboration and cross-corporate information sharing goals. We currently share corporate knowledge through numerous channels including email lists, technical exchange meetings, and Sharepoint. We wanted to explore whether social bookmarking would complement these channels and expand social networks.

We have several sub-hypotheses under our main objective of showing that social bookmarking will provide value to our company.

- Provides research analysts with a place to share research findings<sup>2</sup>
- Social bookmarking will feed expertise finding & user profiling
- Social bookmarking will help to form and support social networks around interest areas
- Social bookmarking can enhance the value of other information retrieval and aggregation capabilities on our intranet
- The emerging “folksonomy” will influence or augment our corporate subject taxonomy strategy

### 4. DESIGN AND ARCHITECTURE

We looked at several open source tools to use in our environment and chose *scuttle* [15] because of several factors: ease of installation, extensibility, and existing features (similar to those of the more popular – but not freely available – *del.icio.us* [2]). In keeping with the popular trend of naming these tools with “catchy” and somewhat non-sensical terms, we named our system *onomi*, derived appropriately from the suffix of “taxonomy” or “folksonomy.”

The *onomi* system consists of a single Apache Web Server and a single MySQL database server. The open source *scuttle* system relies heavily on MySQL, and for our initial pilot, we chose to keep this dependency rather than work towards a more robust database server. The system also makes use of single sign on features available within the corporate network, allowing us to focus on bookmark and tag management and not on user authentication.

Development of *onomi* revolved around an incremental delivery plan, with user feedback incorporated into each design phase increment. Feedback from users resulted in the addition of new features including the ability to email bookmarks, display related

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<sup>2</sup> Currently, much research done by analysts goes from desktop to desktop. Analysts are often tasked to survey some topic. The result of their work goes to the person who requested it and no one else ever sees it.

users, browse by user, interface with other programs via SOAP, and search by corporate organizational affiliation (via LDAP) and file type. The SOAP interface, the ability to email bookmarks, and the existing RSS feed capability have allowed us to syndicate content to other information providers within the corporate environment, greatly enhancing the value of social bookmarking within our company.

As development continues, we are seeking to leverage existing search capabilities to enhance the information retrieval experience of the user. The current search features are limited to a custom developed database search which often performs slowly under heavy load. This search feature has been at the core of feature enhancements requested by the user community.

#### 4.1 Bookmark Structure

Bookmarks in *onomi* have several parts, as illustrated in figure 1. The title of the bookmarked web page is on the top line, and it is linked to the actual web page. The second line is a short, free text description of the web page. The third line is a list of tags. The tags are keywords or phrases that the bookmarker assigns to categorize the web page. Each tag in the third line is a link to a page listing all of the bookmarks with the tag. Tags are just strings and are not interpreted further in any way by *onomi*. The fourth line contains the date that the bookmark was created, the name of the bookmarker (linked to the bookmarker’s bookmarks), the number of other users who bookmarked the web page (linked to the list of all bookmarks for the URL, i.e., Wikipedia.org in this case), and a number of controls for editing, deleting, copying and emailing bookmarks.

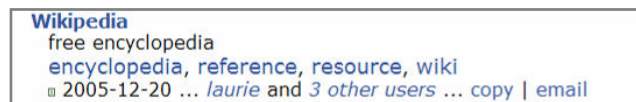


Figure 1: An onomi bookmark

#### 4.2 Search Capabilities & Possible Extensions

There are several ways to find bookmarks of interest in *onomi*. One can search by user, by tag, or by words in the short, free text description field. Conjunctions of tags can also be used, for instance, to find bookmarks that are tagged with both ‘wiki’ and ‘reference’. Tag searches can be restricted to a particular user, for instance to find just Laurie’s ‘wiki’ bookmarks. As mentioned, organizational affiliation such as department and file types can be used for searching as well.

While these search mechanisms are useful, we have identified a number of missing capabilities that would greatly increase search power. Full Boolean combinations (*and*, *or*, *not*) of tags and users is an obvious gap. For instance, it would be nice to be able to list all the bookmarks that two users have in common. Stemming or wildcards would help consolidate searches over slightly different tags like ‘wiki’ and ‘wikis’. We are exploring adding these capabilities to *onomi* in the near future.

Integration of bookmark search and full document text search seems particularly fruitful. Social bookmarking systems generally do not know anything about the content of the web pages that are bookmarked. Constructing queries of tags and document text could allow for more complete and relevant search results. Tagging can also be used to train models for text classification. This could be used for automatically tagging new documents, or as a tag recommender system. Tags can also be used to enhance text searching. Tags can be used to refine, rank and cluster search

results. Besides helping organize search results, tag clusters can also be used for expanding a search to other relevant documents that might not match a particular full text query.

There are numerous social bookmarking systems on the Internet. We wanted to be able to leverage these in order to bring relevant documents not in *onomi* to the attention of the users. When viewing the list of bookmarks for some tag in *onomi*, users can also show the bookmarks for the same tag in *del.icio.us*. This works well in some cases, but causes problems in the places when the tag syntax differs. In *del.icio.us*, spaces are not allowed in tags, but in *scuttle*, from which *onomi* was derived, spaces are allowed. In *del.icio.us*, one might use the tag ‘socialbookmark’, while in *onomi* one is might use ‘social bookmark’. This is problematic for the *del.icio.us* integration feature since some *onomi* tags are not *del.icio.us*. A potential modification to *onomi* may be to attempt to take *onomi* tags that are invalid in *del.icio.us* and “translate” them into valid *del.icio.us* tags.

### 4.3 Tag Semantics & Possible Extensions

Beyond extensions to searching, there are several ways in which the tag language could be enhanced to give tags more expressive power. In *onomi*, as in other social bookmarking systems, tags are *atomic*. Adding a notion of tag *type* would help clarify the meaning of tags and allow deeper system interpretation. For instance, one may wish to tag documents with geospatial or temporal information. If one could specify that a particular tag was a geographic coordinate or a time, this would facilitate geotemporal visualization of the document space.

Types could be used to integrate social bookmarking tags with tags or categories of other sorts. For instance, documents can be automatically tagged via named entity extraction or topic detection systems. Types could also be used to distinguish social bookmarking tags from those added by experts from some controlled taxonomy. The ability to see these different kinds of tags in the same user interface with social bookmarking tags would reduce the need to use multiple tools and could expose patterns that would otherwise be difficult to observe. It has been suggested that social tagging can be used to create controlled vocabularies in a bottom up manner with statistical filters to select the most agreed upon tags as candidates for controlled terms [11]. In this case, having both social and controlled tags in the same interface would be crucial.

Some have suggested introducing some notion of hierarchy into social bookmarking tags (e.g., [6]). This would allow a search for documents about trees to return documents tagged with ‘maple’, but not explicitly tagged with ‘tree’.

All of these possible extensions would add power to social bookmarking, but would also add complexity for the users. An important concern is how to create user interfaces for novice users. For example, in the case of specifying that a particular tag is a geographic coordinate, there could be a drop down menu that lists common tag types. One could select the geographic type from the menu rather than, say, string. Alternatively, one could add a geospatial tag by interacting with a map display.

## 5. ADOPTION

One of the difficulties of fielding a social software system is that it requires critical mass to be useful. The shared repository of a social bookmarking tool is limited in use and not truly social until it is well populated with bookmarks and tags contributed by a variety of users across social communities. Achieving critical

mass in every topic area within a closed corporate environment will continue to be a challenge.

The *onomi* pilot was initially supported through early feedback and buy-in from several communities. We specifically targeted groups of potential early adopters, including librarians who agreed to help populate the system with tagged resources. We also talked to project teams in the practice of collaboratively collecting and sharing resources and persuaded them to use our system. We guaranteed preservation of all bookmarks stored in our repository, whether or not the system lived beyond its pilot status.

Since email and email lists are the primary means of communication and collaboration within our organization, we integrated an emailing capability into *onomi* so that users could distribute their resources simultaneously when bookmarking them. The system automatically drafts an email message which includes the bookmark title and user’s comments, tags associated with the bookmark, a hyperlink to the actual bookmark in the system, and a hyperlink to the actual resource. This was done partly as a means for advertising *onomi* and partly as a way of allowing people to use *onomi* without having to make major changes in their work practices. We are targeting some of our marketing strategies to influential information-sharing employees (i.e., “mavens”) who have large social networks. Similarly, we have facilitated the use of RSS feeds from *onomi* (both individual user’s bookmark collections as well as tag spaces) into corporate email and collaborative spaces on the intranet.

To herald our official release into the corporate community, we posted “teaser” banner advertisements on our intranet with hyperlinks to a news article describing, in basic terms, what *onomi* is and how to use it. There are about 5000 employees in our company, and they are widely geographically distributed. The first banner alone had 553 unique click-throughs (even during the quiet winter holidays) resulting in about half as many users taking a look at the actual system. Our second banner (posted two weeks later) had close to a 30% success rate of people navigating to the system<sup>3</sup>. Figure 2 shows the growth of users over time.

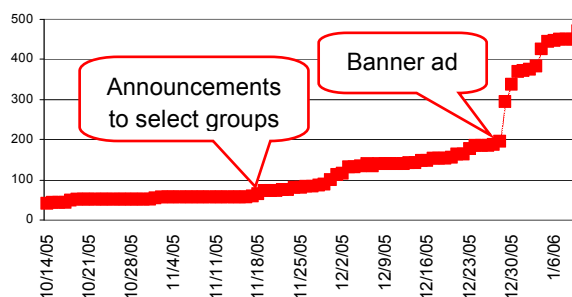


Figure 2: *onomi* User Growth

We are currently developing animated advertisements for 40-inch liquid crystal display screens positioned throughout the company, free-standing floor posters to be used in conjunction with walk-up demonstrations outside of our cafeterias and coffee shops, and real bookmarks and other catchy gimmicks to be distributed. We

<sup>3</sup> We currently do not make a distinction between people who just look once at the system from actual users who do not have bookmarks on the system but use it to explore other people’s resources. We will investigate these differences later in our evaluation.

have also performed demonstrations and given tailored briefings to specific communities and user groups.

We realize that attracting potential users to *onomi* is only half of the problem; educating people on how and why they might use the system is the next and more difficult step. In addition to our planned, informal demonstrations, we are developing a set of use cases that we will highlight on our home page along with testimonials from some of our power users and project teams.

As part of the 6-month evaluation plan, we will monitor not just the adoption rate of *onomi* but also its continued use over time.

## 6. EVALUATION

Our main objective is to determine whether *onomi* or other social bookmarking tools can be useful to our employees. We would like to understand in which ways the tool is being used, e.g., simply as a personal bookmarking tool, for information discovery, as a mechanism for sharing and disseminating information, as a repository for project-related resources, and/or for expert finding.

We are also interested in the social influences and evolution. Will virtual communities develop? Are people more likely to copy or view the most popular bookmarks (hence making them more popular)? How will use and behaviors (both individual and community) change over time? Are people more likely to use tags others have already adopted [13]? Will tags begin to converge [9]? Will new tags be introduced as “communicative tools” [10] and will they be adopted by others? What other innovative or unanticipated uses will emerge?

Throughout the 6-month pilot duration, we will be collecting both quantitative and qualitative data. We will use the statistical metrics from *onomi*'s database and from the weblogs to look at usage patterns and community trends. We will complement this data with interviews and surveys to help us understand motivations and cognitive processes.

Examples of data we are collecting include # users, # bookmarks (total and unique), # tags (total and unique), and distribution of tags. We are examining these data over time for trend changes, convergence, or divergence. We are also continuing to monitor system adoption by our employees and understand how various marketing techniques might influence this.

We have feedback and help channels for our users and are collecting responses, comments, and requests for new features. We intend to use this feedback, interviews, and other question & answer sessions to inform future surveys for collecting additional user data on usage, preferences, satisfaction, and specific features such as better integration with other tools on the intranet.

Some preliminary observations are shown in figures 3 and 4. Figure 3 shows the growth of bookmarks, total tags and unique different tags. The graph shows that while all are increasing, the number of unique tags is growing much slower than the total number of tags, which suggests that users are collectively converging on some common tags. Figure 4 depicts the percentage of resources within our organization that are being bookmarked over time out of the total number of bookmarked resources. The graph shows that this percentage is fairly stable at about 17%. We will be watching to see if that trend continues as the pilot progresses.

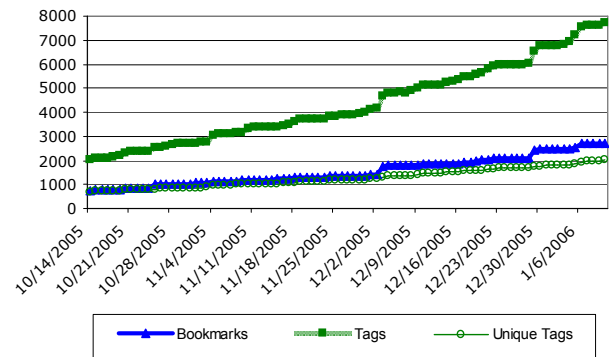


Figure 3: Growth of Bookmarks and Tags

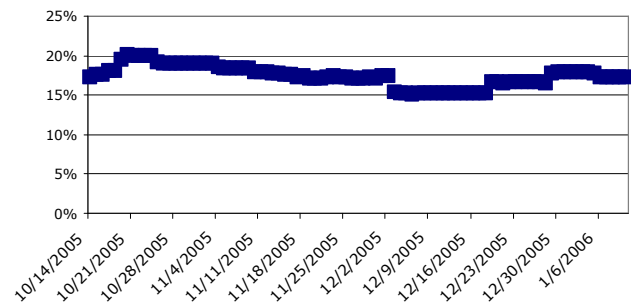


Figure 4: Percentage of Internal Bookmarked Resources

## 7. CONCLUSIONS

Our Social Bookmarking Pilot is a technology exploration with users to assess the value of Social Bookmarks within our organization. If it is successful, the system is likely to be re-implemented as the technology develops in general, and as vendors begin to offer similar functionality. We have functions for importing and exporting bookmarks, so we are prepared to be able to transition to another system while preserving users' bookmarks. A successful pilot will lead to potential integration with other knowledge management efforts within our organization including subjects taxonomies, Semantic Web systems and enterprise search tools.

## 8. ACKNOWLEDGMENTS

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