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# The Boardscape: Creating a Super Social Network of Message Boards

John G. Breslin
Digital Enterprise Research Institute
National University of Ireland, Galway
Galway, Ireland
+353-91-495134
john.breslin@deri.org

Ron Kass
Pidgin Technologies Ltd.
Shderot Chen 39/1
Tel Aviv, Israel 64166
+972-544930650
ron@pidgintech.com

Uldis Bojārs
Digital Enterprise Research Institute
National University of Ireland, Galway
Galway, Ireland
+353-91-495079
uldis.bojars@deri.org

## Abstract

A Web-based message board or forum is an online area where discussions are held by many Internet users on a variety of subjects. More recently, online social networks have been created for various purposes: job searching, dating, band promotion, etc. Many social networking sites have also incorporated community discussion features such as message boards. Rather than add a message board to a social network, this paper proposes to take advantage of the large number of message boards and implicit virtual communities that are already available to automatically create a "super" social network. The Boardscape is this network: an interconnected set of bulletin board users, message boards and topic threads with semantic definitions linking the various pieces together. We will discuss our approaches to realize the vision of the Boardscape, including Klostu and the SIOC project[1].

## 1. Introduction

One of the easiest ways of creating an online community is via the creation of a message board. On a Web-based message board or forum, users post threads on a particular topic, and other users can then reply to these threads, forming a virtual community. Single message boards and multi-forum sites primarily exist as islands that are not connected together. Apart from some multi-function content management systems such as Drupal that offer a unified login, there have been few efforts towards connecting various message boards together despite the potential benefits that this may offer. There are a number of limitations that exist due to this lack of interconnection:

- A major limitation with message boards at present is the repeated requirement to register an account on each new board site that you wish to post on.
- Another issue is in relation to the post content that a user creates across various sites. At the moment, without some links between the various user accounts that a person owns, it is almost impossible to obtain a complete set of posts that a person has created on all the sites that they are registered on.
- There are many sites discussing complementary topics, where the same information is being repeated on different sites, and/or relevant parts of information are distributed across a number of sites. Therefore, when searching for information on a particular topic using a traditional search engine, one will often have to traverse quite a few sites to find a complete solution to a certain query.
- Finally, there is at present no way to create and view "distributed conversations" across a number of message board sites. Blogs use the trackback system to create links between blog posts, but there is no standard method of doing the same on message boards.

Online social networks have grown in popularity recently networking both social acquaintances and professional associates. Many social networking sites have incorporated community discussion features such as message boards. In this paper, we propose to use the implicit and explicit social networking information that can be obtained from message board sites to create a social network in reverse [1]: a *Boardscape* with semantic elements that spans across all message boards, linking users, forums and posts. The concept of the Boardscape can be thought of as the world of boards. It is the collection of all message boards and the potential aggregated power of all board communities and their member collectives. Having such a structure enables us to provide solutions to the aforementioned limitations with message board islands. A unified login, or links between various user accounts and the person who owns them, can be provided via the Boardscape - this has the associated advantage of being able to connect all of a person's post content together (and that of their friends). Related topics can be also linked by topic tag, hierarchical category or directly by distributed reply-type hyperlinks (similar to trackbacks).

In the following sections, we will begin by describing some characteristics of the Boardscape. We will then outline two related approaches to realizing the Boardscape: the first being Klostu[2], a super social network application for accessing the content of multiple message board sites through a single service, and the second being Semantically-Interlinked Online Communities (SIOC)[3] [2], a project which aims to interconnect message boards and other discussion methods together using Semantic Web technologies. We will then detail how Klostu and SIOC can work together, and present some ideas for future work.

[1] The SIOC project is funded by Science Foundation Ireland under grant number SFI/02/CE1/I131.

[2] http://www.klostu.com/

[3] http://sioc-project.org/

## 2. The Boardscape and some characteristics

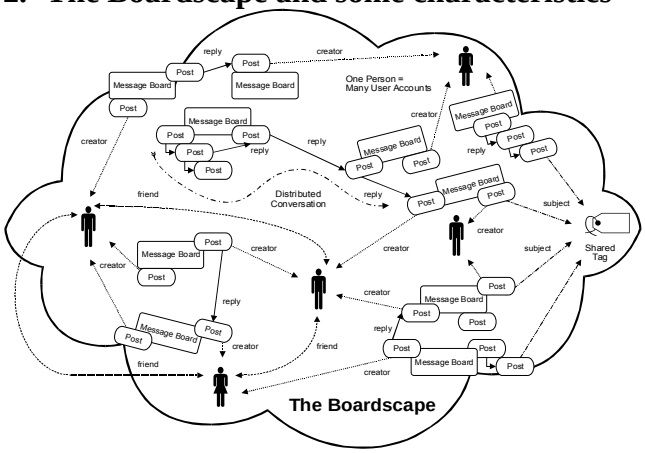


**Fig. 1:** *Sample of the Boardscape and the interconnected nature of its users and posts*

The Boardscape can be thought of as the world of message boards: millions of users creating billions of posts across thousands of multi-forum sites on the Internet. Figure 1 shows a partial view of the Boardscape, and some of the connections that are contained therein. A person holds many user accounts on different sites, and content is created about similar topics across various message boards. Users will know other users in their social network, either on the same site or across a number of sites. A conversation may begin on one message board site, but eventually lead to and end up on a different message board elsewhere. By creating explicit connections between the users and posts on boards, we enable a number of interesting possibilities which we will describe in Sections 3 to 5. Message boards have long been recognized as a place where the majority of discussions between people on the Web take place. However, it has not been detailed how much discussion actually takes place in the Boardscape and what are its characteristics.

### 2.1 Statistics of the Boardscape

Estimates of the total number of message board members show the true multinational dimension of message boards. Altogether, it is estimated that over 300 million people are registered members to message boards in the Boardscape. Figure 2 shows a summary of some geographical statistics gathered by BoardTracker[4].

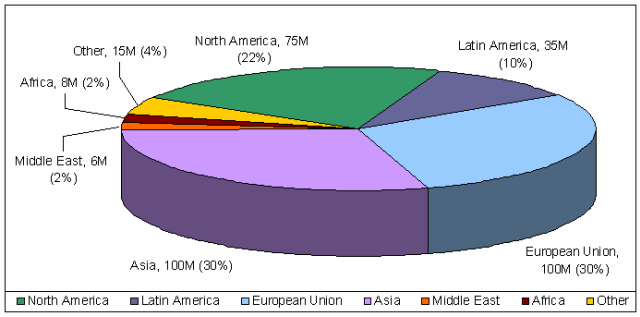


**Fig. 2:** *Board members distribution worldwide*

[4] http://www.boardtracker.com/

The total number of discussions accumulated in the Boardscape is estimated to be over 3 billion discussions and over 50 billion posts. As of December 2006, BoardTracker had indexed over 45 million threads (approximately 700 million posts) across about 40,000 forums and sub-forums worldwide. In a single month, the number of threads increased by about 2 million threads, corresponding to a yearly increase of over 25 million threads and about 400 million posts (note that the current coverage of BoardTracker is estimated at about 2.5-3% of the total Boardscape).

### 2.2 Discussions and replies on threads

One key factor for a discussion is its length, i.e. how many exchanges are made in a thread. A single person starts a thread in a forum, and others in the forum will reply to that thread (in most cases). Some threads get no replies, and others generate hundreds or thousands of replies. There are even extreme cases where the number of replies made by members of the forum exceeds 100,000.

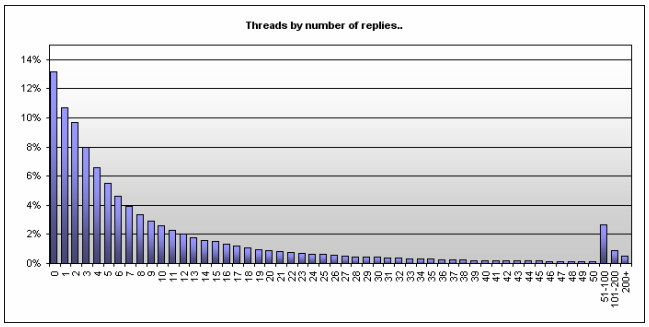


**Fig. 3:** *Percentage of threads ordered by number of replies*

Figure 3 shows a histogram of threads with specific numbers of replies. As can be seen, the biggest group in this histogram is the set of threads (13%) without replies. However, this means that over 85% of threads on message boards get at least one reply. It is obvious then that message boards are not a lonely place like other Internet mediums. To emphasize this, a thread in the Boardscape receives about 16 replies on average. About 2.5% of the threads get between 51 to 100 replies, less than 1% get between 101 to 200, and about 0.5% receive more than 200 replies.

## 3. The Klostu super social network

A great degree of isolation and control over the flow of outbound traffic from various message boards is commonplace. Linking and quoting discussions (or parts of them) from other boards is uncommon. Communication with members of other boards is often impossible. This aspect of the Boardscape is what we refer to as the 'island mentality'. Due to such characteristics, message boards lack both hype and media coverage that some other Internet communication mediums enjoy. This also directly affects the level of innovation and new technology implementations in message boards. In order to make the vision of the Boardscape stronger, and to turn the Boardscape itself into the biggest social "network" on the Web, such limiting factors have to be addressed. Klostu aims to address these issues through a centralized social platform with a trust base and aggregation, and by doing so, attempts to facilitate growth in activity, to increase flows of traffic and information (via discussions) across the Boardscape, and to bring the latest innovations to boards though a fully

integrated service model. We will now describe some of the properties and features of Klostu, along with the semantic connections that become available through this service.

### 3.1 Unified signup, login and profile

The core of Klostu is the members' unified identity. The purpose of the unified identity is to aggregate all the separate local identities a person has across different boards in the Boardscape. Klostu offers unified signup and unified login implementation via a single-click process which allows a person to join or log into a board community without the need to re-enter any personal or identification or profile information. Both unified login and signup eliminate a barrier to participation and serve to increase the volume and magnitude of discussions across the Boardscape. By tying separate board accounts into the same identity, all content that a specific member generates or is interested in across the Boardscape is aggregated around the unified identity, further promoting the Boardscape's vision. An integral part of the unified identity is a fully-integrated unified profile which is shared between all the boards that a person is a member of. Supplying shared avatars (an image representation of a user) and board signatures helps with the visual identification of a person across the Boardscape. The unified profile also serves as a self-expression tool for board members as the profile is highly customizable and flexible, bringing boards to a competitive level with other social mediums.

### 3.2 Content and services integration

Through a simple service model and API, Klostu's unified identity allows integration of third party services and content into member profiles and board activities. A wide range of profile 'widgets' aims to allow members to bring all their favorite content and services into their profile, thus enriching both their profile and the board itself. Such a profile also facilitates the creation of new and original content (textual, visual, audible or other) directly into the profile and board. Such a model of integrating third party services and content, instead of attempting to develop services independently, creates a higher level of innovation and flexibility and helps progress the Boardscape at a faster rate.

### 3.3 Social tools

By connecting all the boards into one network, Klostu allows the creation of direct social relations between communities and members across different boards. Being able to maintain a friends list (even though these friends may not be members of the same boards) brings the vision of the Boardscape a big step closer. Social tools are now able to break the boundaries of a single board, facilitating a flow of members across boards and easing a member's ability to locate new communities relevant to them.

### 3.4 Activity and content aggregation

Through the unified identity, Klostu is able for the first time to associate different posts across different boards created by the same person, thus enabling the semantic connection between people and posts. Utilizing both social and personal identity data from Klostu and thread data from BoardTracker, Klostu is also able to aggregate all the posts of a specific person into their unified identity and profile. Furthermore, the service is able to aggregate all the threads of a person's friends, or all the threads of a specific board community (members of a specific board or contributors to a specific forum) created outside the community or on other forums. By aggregating content that exists outside the boards, such as linked or syndicated content detection through a posts analysis process, as well as content and activity that is generated through the unified profile, it is now possible to associate conversations and people in the Boardscape with external sources and information.

## 4. Semantically-interlinked online communities approach

The Semantically-Interlinked Online Communities project (SIOC) is a semantic framework for the connection and interchange of information from Internet-based discussions and community portals. Such communities are primarily made up of users, the posts that they create, and the discussion forums that they subscribe to across a multitude of sites and discussion platforms. As well as message boards, SIOC can be used to link information between blogs, mailing lists, newsgroups, and other online discussions.

### 4.1 What is the SIOC ontology?

The basis for SIOC is a Semantic Web ontology[5], an RDF-based[6] schema which describes the main concepts found in online communities [2]. The SIOC ontology definitions are written using the RDF/OWL language that makes it easy for software to process some basic facts about the terms in the ontology, and consequently about the things described in SIOC documents. A SIOC document, unlike a traditional Web page, can be combined with other Semantic Web documents to create a unified database of information. While there are many classes and properties in SIOC, the main idea (Figure 4) is that sioc:Users create Posts that are contained in Forums that are hosted on Sites. sioc:Posts can have reply Posts, and Forums can be parents of other Forums.

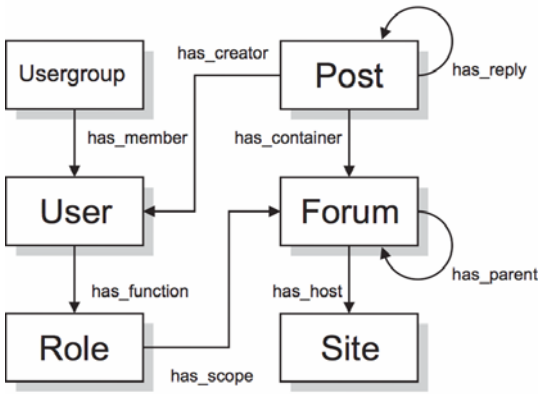


**Fig. 4:** *Main classes and properties in SIOC*

More SIOC properties can be used to provide semantically-rich information on message board posts (e.g. if it has replies, related posts, who wrote it, etc.). Using properties such as the sioc:topic or the sioc:creator_of an item post, content can be collected across many discussion platforms based on what is being talked about and who is saying it.

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[5] http://rdfs.org/sioc/spec/

[6] http://www.w3.org/RDF/

## 4.2 How SIOC is applied to message boards

PHP-based SIOC modules (and a reusable SIOC library for PHP[7]) have been created for a number of popular discussion platforms, including Drupal (message boards and blogs) and WordPress (blogs). A module is also currently being developed for the PHP-based bulletin board system phpBB. There are many potential uses for SIOC message board exporters. Firstly, SIOC data can be used in message board publish / subscribe mechanisms, without loss of important associated metadata about authors, replies and related links. Secondly, SIOC can provide a transport mechanism between boards, or between boards and other discussion methods such as blogs (since these share many of the same concepts as message boards, but differ in the sense of ownership). Thirdly, SIOC metadata can be detected on message boards using auto-discovery mechanisms, either by metadata crawlers or using browser plugins (e.g. the Semantic Radar plugin for Firefox[8]). Fourthly, SIOC can be used to get the most active user or other current states of activity for a set of message boards.

## 4.3 Distributed conversations and channels

SIOC makes a number of interesting connections possible, including what we term "virtual forums" and "distributed conversations". Virtual forums may be a gathering of posts or threads which are distributed across boards, for example, where a user has found posts from boards that can be associated with a particular category of interest, or an agent identifies relevant posts across a certain timeframe. From the user side, this could be achieved by creating an RDFa[9] link for sioc:has_container (or by using the equivalent rel-directory microformat) to allow linking to such virtual forums from the post creator side, i.e. from the post content (e.g., using a BBCode that would insert such a typed link). Trackbacks are commonly used to link blog posts to previous posts on a related topic, but are absent from boards. By creating links in both directions across all types of internet discussions, distributed conversations can be followed regardless of what point or URI fragment a browser enters at. Since the data to create these connections may be absent in current board platforms, these may also be created through the use of supplemental RDFa tags (sioc:has_reply, reply_of) or microformats (rel-reply, rev-reply) in the HTML of the post.

# 5. Combination of the two methods: Klostu and SIOC

Klostu and SIOC can play a number of important roles together in strengthening the connections between the member islands of the Boardscape. Using the properties of the Semantic Web, SIOC data about message board posts can be combined with other data created by the same people in software projects (using the DOAP vocabulary), social networks (using FOAF) or digital libraries (using Dublin Core). Since SIOC is an open data format and can be used by a number of third party applications, providing data from Klostu in SIOC format provides a means to leverage the discovered connections formed via Klostu for aggregation with other data sources.

[7] http://sioc-project.org/phpapi/

[8] http://sioc-project.org/firefox/

[9] http://www.w3.org/TR/xhtml-rdfa-primer/

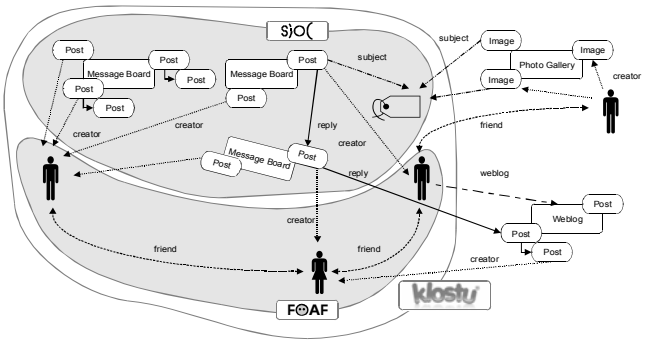


**Fig. 5:** *Combining Klostu content with SIOC and other Semantic Web formats*

One view of Klostu data that can be expressed in SIOC is the entire set of message threads created by a particular person using their Klostu account on a number of message boards. This could be thought of as virtual forum as previously mentioned. Similarly, a list of threads by that person and their community of friends could also be provided. SIOC data on threads for a particular topic or tag is also of interest; this could be combined with content from other sources matching that topic tag (e.g. corresponding Flickr photos or events from Upcoming.org). Through searches performed via Klostu and its sister site BoardTracker, the lists of results for a particular keyword search could also be returned with a complementary set of SIOC metadata. Figure 5 shows a scenario of how Klostu content can be combined with other Semantic Web-enabled content using SIOC and FOAF. Using a Klostu metadata export of a user's social network and the posts created by members of that social network (along with metadata for any third party service content integrated in Klostu), this can be combined with other content from those users' blogs, photo galleries, projects, and extended social networks outside the Boardscape.

# 6. Conclusions

In this paper, we have described systems and standards to realize the vision of the Boardscape: a super social network of interconnected message board sites. We began by describing message boards, some current limitations and how an interconnected Boardscape can provide solutions to these limitations. We described some features of the Boardscape, and then detailed two separate but complementary methods to create more links between people and the content they create: Klostu, a super social network of message board users and sites, and SIOC, a Semantic Web project that aims to link all internet-based discussions. Finally, we outlined how these two approaches can work together.

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