

## Toolkit & Demonstrator Final Report Template (Cut-Down Version)

This template is very loosely based on the JISC Final Report Template available from the [JISC Project Management Guidelines](#) web page.

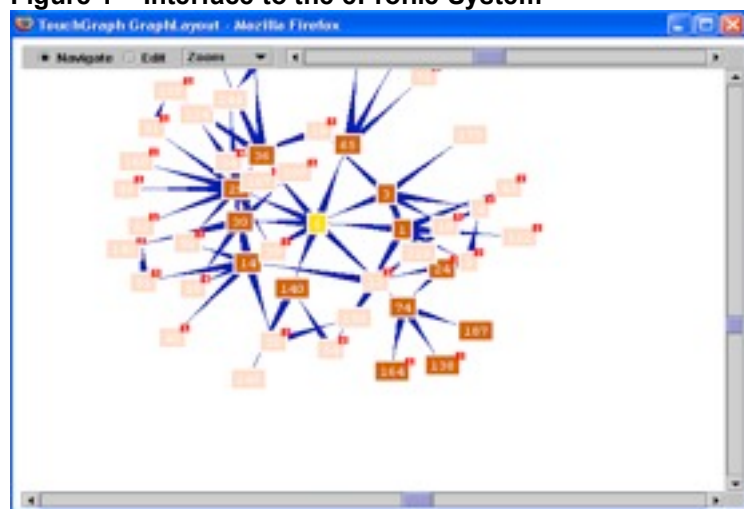
<b>Project name/acronym:</b>	eProfile
<b>Project website/blog address:</b>	<a href="http://www.essex.ac.uk/chimera/projects/eProfile.html">http://www.essex.ac.uk/chimera/projects/eProfile.html</a> <a href="http://eprofilechimera.blogspot.com/">http://eprofilechimera.blogspot.com/</a>
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<b>Date:</b>	11/09/2006

### Methodology

The methodology we used was to use the friend-of-a-friend vocabulary (FOAF)<sup>1</sup>, as the basis for the creation of a toolkit for the discovery and formation of new research communities.

Underlying the system was the concept of social networks that represent both users and existing learning communities/resources. Two types of relationships were emphasized: user to user, and user to community/resource. Discovery of people and resources is possible by traversing these social networks. Figure 1 illustrates a touch graph interface to the system. Users can enter keywords describing the relevant learning areas sought, e.g. 'Bluetooth positioning'. The system will then return the relevant results as a clickable social network containing nodes that represent individual users. Navigating over a node will display a user's profile together with any links to the relevant information space. Clicking on an individual node will expand the node's social network hence allowing additional nodes to be discovered. This approach will potentially allow extremely large numbers of users and communities to be visualized in a manner where users are not overwhelmed with irrelevant results, together with allowing users to narrow down discovery by clicking through the various parts of a social network they find relevant.

**Figure 1 – Interface to the eProfile System**



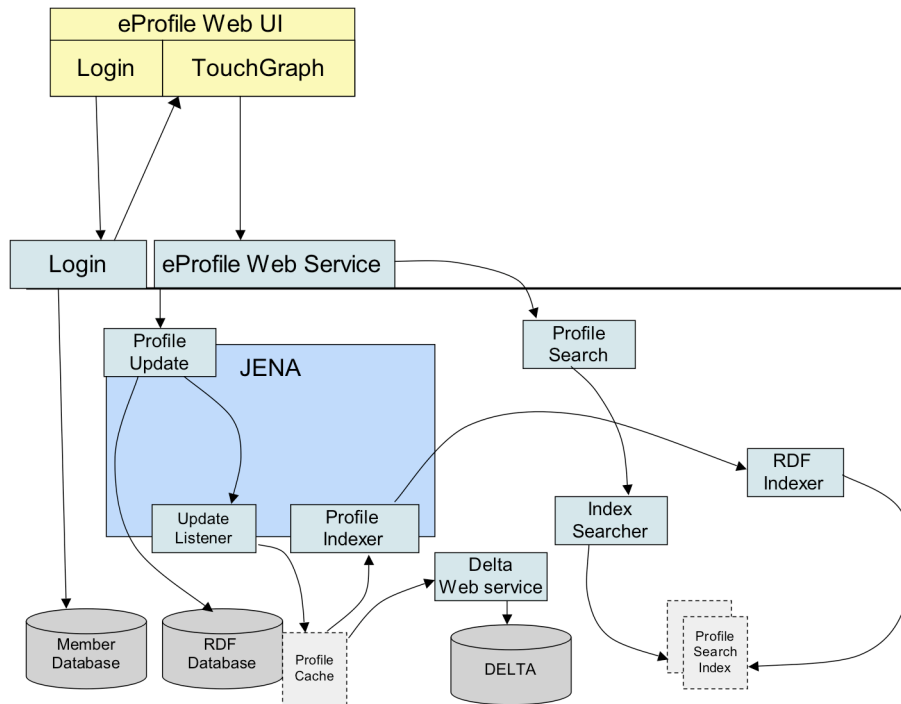
We also built a single centralised web service (ELF Producer) which manages the storage of online user identities and information spaces. The representation of the user identities was based on the FOAF (friend-of-a-friend) protocol. This is a vocabulary that 'allows machine readable pages for people, groups, companies and other kinds of thing'. Essentially, FOAF provides a useful building block for creating information systems that support online communities. Underlying FOAF is the concept of social network theory, together with open technologies based on the semantic web – FOAF

<sup>1</sup> Brickley, D & Miller, L. (2004) *FOAF vocabulary specification* <http://xmlns.com/foaf/0.1/>

is a type of semantic web ontology. FOAF profiles can easily be linked into existing semantic web ontologies/vocabularies, since RDF is the underlying knowledge representation language.

Figure 2 illustrates a high-level architecture for the eProfile system. The system is comprised of a centralised repository containing RDF FOAF profiles identifying its various users and learning communities, together with links to relevant information spaces.

**Figure 2 – Overall Architecture**



In terms of demonstrating the use of the eProfile server, we also developed a TouchGraph based user interface (ELF Consumer) that allows users to maintain their own profile and information spaces and to carry out searches for other learners and information spaces. This is displayed as a clickable graph as described above. In this first version, users can manually construct and manage their FOAF profiles using the client interface. This includes defining their social networks and personal information spaces.

We also planned to allow users to link to other repositories (ELF Producers) to populate their information space. For example, we planned to link to the DELTA repository (current eTools project). However, this additional feature had to be dropped in order for us to complete the overall eProfile development in the time available to the project.

The project had the following critical success factors, which were all achieved:

- The eProfile server is lightweight and can easily be integrated within the E-learning Framework – based on a web service (SOA) approach
- It provides a simple API based on a web service interface - WDSL web service API
- It allows users to create, update and delete their profile - completed
- It allows users to search for other users using key-words and to browse their social network groupings - completed
- The service is robust – all code has been unit tested (JUNIT) and version controlled in an SVS repository. Functional testing has been completed.
- The service is demonstrated with a graphical browser (Touchgraph) - completed

## Implementation

Due to the relatively short timescales, the programming development/implementation was based on a rapid-prototyping and iterative development approach with a short life-cycle between review points.

At the project start, the first phase of activity was to complete the overall requirements specification for the eProfile system. This was achieved through a series of project meetings where the functionality for the proposed system was discussed and agreed. Also rough sketches of the storyboard were carried out to explore how the system would be presented to the user, and a high-level technical architecture was agreed. The main output from this was the creation of a formal requirements specification which contained a description of the problem domain and high-level user-needs, followed by 14 detailed use-case descriptions, and a visual storyboard for the eProfile user-interface. This was accompanied by a meta-data specification which described the Resource Description Framework (RDF) schema that was used to describe the people profiles within eProfile.

The next phase was to complete the high-level design activity for the eProfile system, which included the overall eProfile architecture, the class-diagram, and WSDL web service API specification.

The project development/deployment infrastructure was then created. On the development side this was mainly based around the use of the following open source tools: Eclipse, Maven, SVS and Junit. On the deployment side, a server was created with the main open source implementation tools used by the project (Apache, Tomcat, MySQL, Jena, Lucene).

The project then entered the main development phase. This was carried out in a phased approach. The first activity was to build the user-registration interface based around a web-interface and JSP. This was followed by a short feasibility exercise into the use of Touchgraph for the visual display of social networks. The client side Java interface (based around Touchgraph) was then constructed and unit tested, followed by the server-side database and web-service development (and unit testing). Finally an integration test of the system was carried out, and a functional test against the original requirements specification.

The final activity was to complete all the project development documentation, the user guide and installation guide, and upload the eProfile tool to the SourceForge repository.

The only technical feature that was not implemented was the proposed custom interface to the DELTA toolkit. This was due to lack of time and the fact that the project has been technically challenging, particularly considering that our main project developer had to learn how to use many of the tools from scratch (eg. Eclipse, JUNIT, Maven, etc). Also, the database component of eProfile is fairly complex, making use of JENA and a database indexing (Lucene) component. Overall we feel that the overall technical approach taken by the project was correct and the proof of concept that has been produced can now be used by the JISC e-framework.

In summary, the implementation was based on the following approach:

- All software modules was unit tested using JUNIT.
- All code was commented to JAVADOC guidelines.
- Inter-operability and integration testing was carried out at the end of the project.
- Regular project team meetings were held to review and discuss the technical progress.
- An issue-log was created to log all problems/faults and to review/manage their resolution.
- All code was stored on the eProfile project folder which was backed-up on a daily basis.
- SVN (v 1.3) was used to manage the version control of all software produced
- All technical design documentation was based on the Unified Modelling Language (UML) standard.
- All programming was based on the use of open source toolkits and the Java 1.5 programming language.
- Poseidon (v4.0) was used for UML design documentation.

## **Outputs and Results**

The project has had the following (tangible) formal deliverables:

- Source code will be available on Sourceforge for both the eProfile tool (Producer) and the demonstrator user interface (Consumer). Final version to be uploaded by 30/9/06
- Installation and user guide for the above
- High-level requirements document and meta-data schema
- Design documentation (eg. architecture, class and sequence diagrams)
- System testing documentation (usability and functional testing)

The project web site can be found here:

<http://www.essex.ac.uk/chimera/projects/eProfile.html>

The project blog can be found here:

<http://eprofilechimera.blogspot.com/>

The project development site can be found here:

<http://chimera70.essex.ac.uk/eprofile/>

The Sourceforge project site can be found here:

<http://sourceforge.net/projects/jisc-eprofile>

The project will setup a demonstrator version of eProfile at a University of Essex hosted website that will be publicly accessible, and will enable users to register and access a trial version of eProfile. This will be setup by 30/9/06

### **Implications**

A number of issues have arisen from the eprofile project which have implications for any further investigation or future development work by JISC:

- Now that the tool has been built, the next natural stage would be to trial it to fully assess the usefulness of this approach to support community formation and resource sharing
- A useful enhancement to eProfile would be to investigate linking it's profiles with resources on other digital repositories eg. JORUM, Delta. This would also have implications for distributed authentication and authorisation systems, such as Shibboleth
- The eProfile component (web service) could naturally be used to augment other tools within the JISC eFramework and the Open Source community (eg. Chandler).
- The team have produced a proposal to integrate and use eProfile as a means of sharing desktop resources amongst user communities (D-DESKTOP proposal). This has implications for privacy and security issues arising from the sharing of personal desktop resources.