NeOn-project.org

NeOn: Lifecycle Support for Networked Ontologies

Integrated Project (IST-2005-027595)

Priority: IST-2004-2.4.7 – “Semantic-based knowledge and content systems”

D3.2.2 Reasoning with context: Collaborative editing

Deliverable Co-ordinator: **Marko Grobelnik**

Deliverable Co-ordinating Institution: **J. Stefan Institute (JSI)**

Other Authors: **Boštjan Pajntar (JSI), Dunja Mladenić (JSI)**

This deliverable provides software prototype cONTOext for collaborative editing of networked ontologies enabling contextualization of the edited knowledge. The context is defined through the mappings between the ontologies other users have created. This deliverable is based on the OntoLight software prototype for contextualization of light weight ontologies (NeOn D3.2.1). Within the software package proposed in this deliverable there are several software modules enabling server side storage and client side editing and collaboration. The prototype is implemented as a Flash application integrated within the Facebook plug-in architecture providing collaboration aspect of the system.

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NeOn Consortium

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Open University (OU) – Coordinator Knowledge Media Institute – KMi Berrill Building, Walton Hall Milton Keynes, MK7 6AA United Kingdom Contact person: Martin Dzbor, Enrico Motta E-mail address: {m.dzbor, e.motta} @open.ac.uk	**Universität Karlsruhe – TH (UKARL)** Institut für Angewandte Informatik und Formale Beschreibungsverfahren – AIFB Englerstrasse 28 D-76128 Karlsruhe, Germany Contact person: Peter Haase E-mail address: pha@aifb.uni-karlsruhe.de
Universidad Politécnica de Madrid (UPM) Campus de Montegancedo 28660 Boadilla del Monte Spain Contact person: Asunción Gómez Pérez E-mail address: asun@fi.upm.es	**Software AG (SAG)** Uhlandstrasse 12 64297 Darmstadt Germany Contact person: Walter Waterfeld E-mail address: walter.waterfeld@softwareag.com
Intelligent Software Components S.A. (ISOCO) Calle de Pedro de Valdivia 10 28006 Madrid Spain Contact person: Jesús Contreras E-mail address: jcontreras@isoco.com	**Institut 'Jožef Stefan' (JSI)** Jamova 39 SI-1000 Ljubljana Slovenia Contact person: Marko Grobelnik E-mail address: marko.grobelnik@ijs.si
Institut National de Recherche en Informatique et en Automatique (INRIA) ZIRST – 655 avenue de l'Europe Montbonnot Saint Martin 38334 Saint-Ismier France Contact person: Jérôme Euzenat E-mail address: jerome.euzenat@inrialpes.fr	**University of Sheffield (USFD)** Dept. of Computer Science Regent Court 211 Portobello street S14DP Sheffield United Kingdom Contact person: Hamish Cunningham E-mail address: hamish@dcs.shef.ac.uk
Universität Koblenz-Landau (UKO-LD) Universitätsstrasse 1 56070 Koblenz Germany Contact person: Steffen Staab E-mail address: staab@uni-koblenz.de	**Consiglio Nazionale delle Ricerche (CNR)** Institute of cognitive sciences and technologies Via S. Martino della Battaglia, 44 - 00185 Roma-Lazio, Italy Contact person: Aldo Gangemi E-mail address: aldo.gangemi@istc.cnr.it
Ontoprise GmbH. (ONTO) Amalienbadstr. 36 (Raumfabrik 29) 76227 Karlsruhe Germany Contact person: Jürgen Angele E-mail address: angele@ontoprise.de	**Food and Agriculture Organization of the United Nations (FAO)** Viale delle Terme di Caracalla 1 00100 Rome Italy Contact person: Marta Iglesias E-mail address: marta.iglesias@fao.org
Atos Origin S.A. (ATOS) Calle de Albarracín, 25 28037 Madrid Spain Contact person: Tomás Pariente Lobo E-mail address: tomas.parientelobo@atosorigin.com	**Laboratorios KIN, S.A. (KIN)** C/Ciudad de Granada, 123 08018 Barcelona Spain Contact person: Antonio López E-mail address: alopez@kin.es

Work package participants

The following partners have taken an active part in the work leading to the elaboration of this document, even if they might not have directly contributed to the writing of this document or its parts:

J. Stefan Institute

Change Log

Version	Date	Amended by	Changes
0.1	01-02-2008	Dunja Mladenic	Overall structure of the report, abstract
0.2	11-02-2008	Marko Grobelnik	Refining structure
0.3	15-02-2008	Bostjan Pajntar	Description of the Facebook.com application
0.4	20-02-2008	Marko Grobelnik	Executive summary
0.5	25-02-2008	Hamish Cunningham	Review
0.6	28-02-2008	Dunja Mladenic	Overall revision based on the review

Executive Summary

The developed prototype cONTOext allows collaborative editing of network ontologies thus enabling knowledge sharing and contextualization of the edited ontologies. The main idea is to leverage efforts of multiple individuals editing similar domains (in the form of ontologies) at the same time via sharing knowledge by introducing mappings between ontologies. The obvious practical benefit is in the situation when other user provides context through the ontologies they have created.

cONTOext is implemented as a classical serve client architecture. Server side includes database, application server and web server, while the client side is written as a Flash application integrated within the Facebook plug-in architecture providing collaborative environment. The Facebook application is available via

http://www.facebook.com/add.php?api_key=57ad990b5e6cd4095553ce25c3c76bab&ref=pr

cONTOext is based on OntoLight proposed for representation of light weight ontologies in D3.2.1. The prototype provides a basis for further integration with other NeOn software deliverables such as Alignment server (providing library of methods for mapping between ontologies) and finally as a plug-in for NeOn Toolkit (providing contextualization functionality within NeOn).

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1. Introduction

This deliverable presents the system cONTOext for collaborative and contextual ontology editing. The concept of collaboration when sharing knowledge is one of the key aspects when dealing with networked ontologies – furthermore, by contextualization of this process the intention was to increase the efficiency and quality of ontology editing. The goal of this deliverable is to provide a platform where creating and interlinking of ontologies would be done in a most natural way by using today's popular social computing platforms (such as Facebook) and by using automatic and semi-automatic tools developed within the NeOn project for contextualization of ontologies.

The system is using a client-server architecture allowing collaboration of multiple users on the same collection of ontologies and mappings. Server side is using standard architecture consisting of relational database for storing data and web server for communication to the external world. For the client side (front-end) we are using Facebook portal using its open plug-in architecture where we developed an application accessible through the Facebook's "*Add application*" function. Facebook has several advantages over other solutions. The main is providing access to the wide community of users and at the same time enabling inexpensive deployment of the solution to the wider audience.

The system cONTOext is using at the back-end side the OntoLight system (developed by Jozef Stefan Institute for dealing with light weight ontologies) developed within NeOn project in D3.2.1. This allows dealing with very large ontologies and provides functionality for generation of soft mappings between grounded ontologies. In the next version (D3.2.3) we plan to integrate the cONTOext system with the Ontology alignment server (developed by INRIA Grenoble) which includes library of methods for ontology alignment.

2. System Architecture

The cONTOext system consists of two main groups of components: server side and client side. Figure 1 shows the main functional components of the system and how they fit together.

2.1 Server side

Server side includes classical architecture consisting of:

- Relational database (Microsoft SQL Server) for storing ontologies and mappings
- OntoLight module for manipulating large light weight ontologies and creation of mappings between ontologies (result of D3.2.1)
- Application server exposing an API for communication with clients
- Web server (Microsoft IIS) for actual communication with the external web

2.2 Client side

Client side is designed as a rich client communicating with the server side over API for high level, mainly infrastructural functions. Majority of the functionality happens within the client itself. In particular, the client side includes several functions for interactive manipulation with ontologies and mappings. Current version of the client is written in the FLASH technology allowing portability over all major platforms. Client is integrated within the Facebook portal as a standard plug-in which allows easy access to the community of users. Main components of the client are:

- Graphical ontology editor
- Graphical Mappings editor
- Ontology visualizer
- Infrastructural functions (mainly communication with the server side)

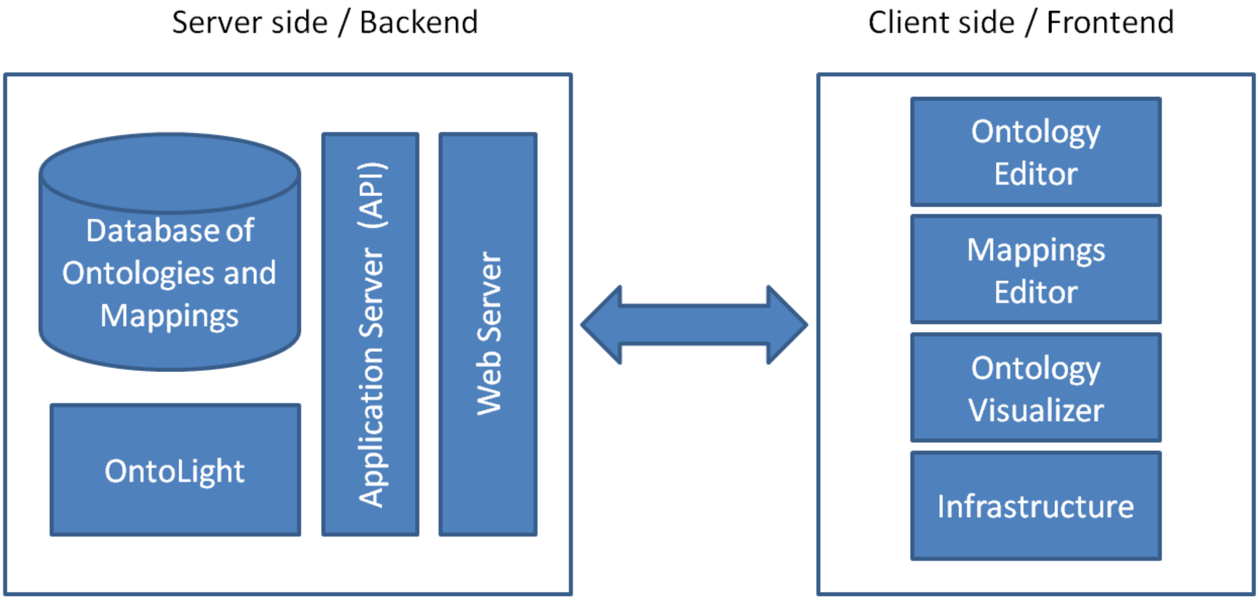
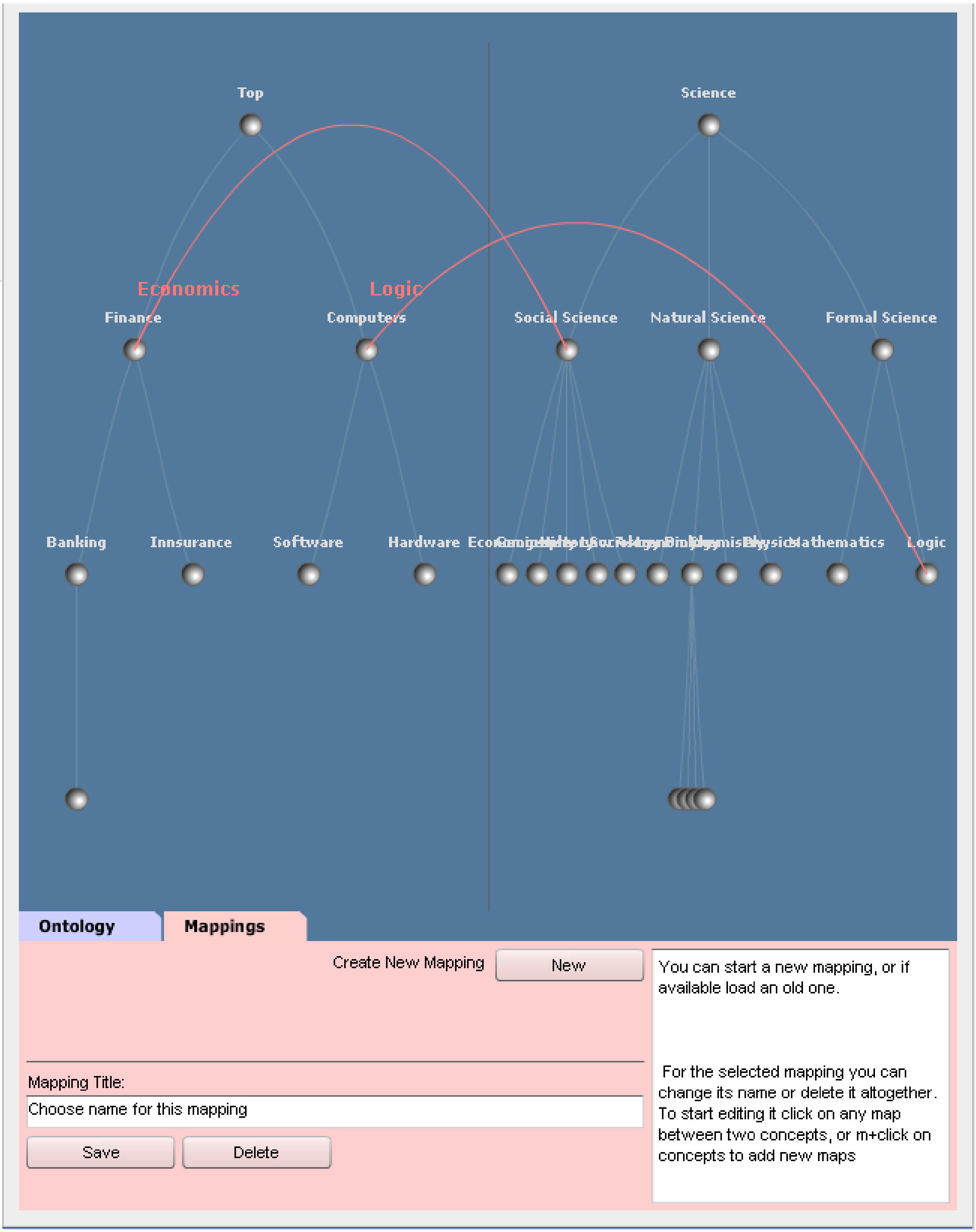


Figure 2: cONTOtext architecture diagram

2.3 Facebook application and further integration

cONTOext application front-end is written in FLASH ActionScript and integrated into Facebook as standard application using Facebook plug-in architecture. Figure 2 shows typical Web browser screen when editing two ontologies and their contextual mappings (explained more in detail in section 3). The main advantage of having application written in FLASH is client portability over all major Web browsers and relatively inexpensive design of the user interface.

The architecture of the system is designed in a way which will enable integration with other collaborative platforms (such as Wiki or Google OpenSocial) and with NeOn Toolkit (D3.3.4 – NeOn contextualisation plug-in). In particular, the goal is to merge the current version of the cONTOext system with the Alignment Server (D3.3.2 Reasoning with context – prototype interpreter) resulting in a fully functional system integrated with NeOn Toolkit



You can start a new mapping, or if available load an old one.

For the selected mapping you can change its name or delete it altogether. To start editing it click on any map between two concepts, or m+click on concepts to add new maps

Mapping Title:

Choose name for this mapping

Figure 2: Sample screen of cONTOext Facebook application with two ontologies and mappings

3. Example usage of the system

In the following example we will show typical run through the system cONTOext.

The first step is installation of the application within the Facebook portal. cONTOext application is available via following URL:

http://www.facebook.com/add.php?api_key=57ad990b5e6cd4095553ce25c3c76bab&ref=pr

After installation, we activate the application by clicking its name on the left side of the Facebook screen by selecting it within the list of applications. Figure 3 shows the empty screen appearing immediately after activation of the application.

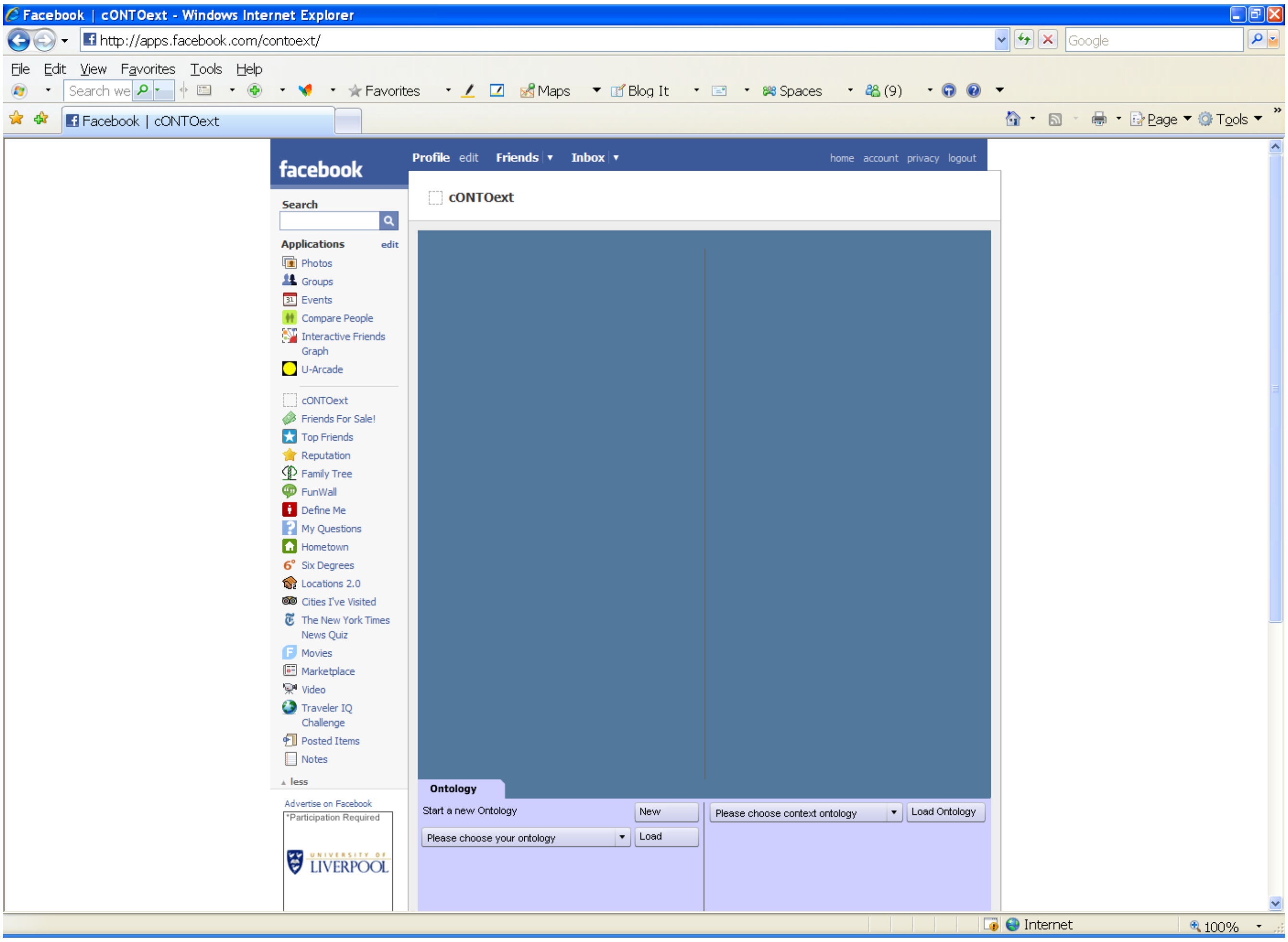
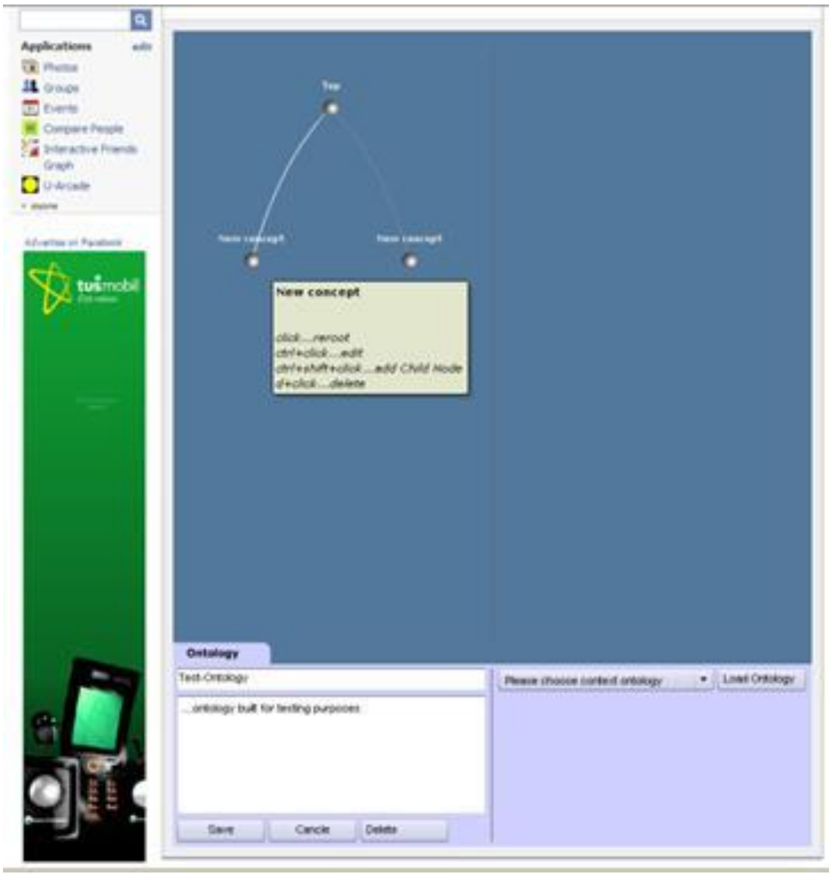


Figure 3: Opening the cONTOext application

Next, we need to decide either to start editing a new ontology or to edit an existing ontology. By pressing appropriate buttons on the bottom of the screen we start either of the actions. Figure 4 shows editing of a new ontology by adding nodes and relationships.



New concept

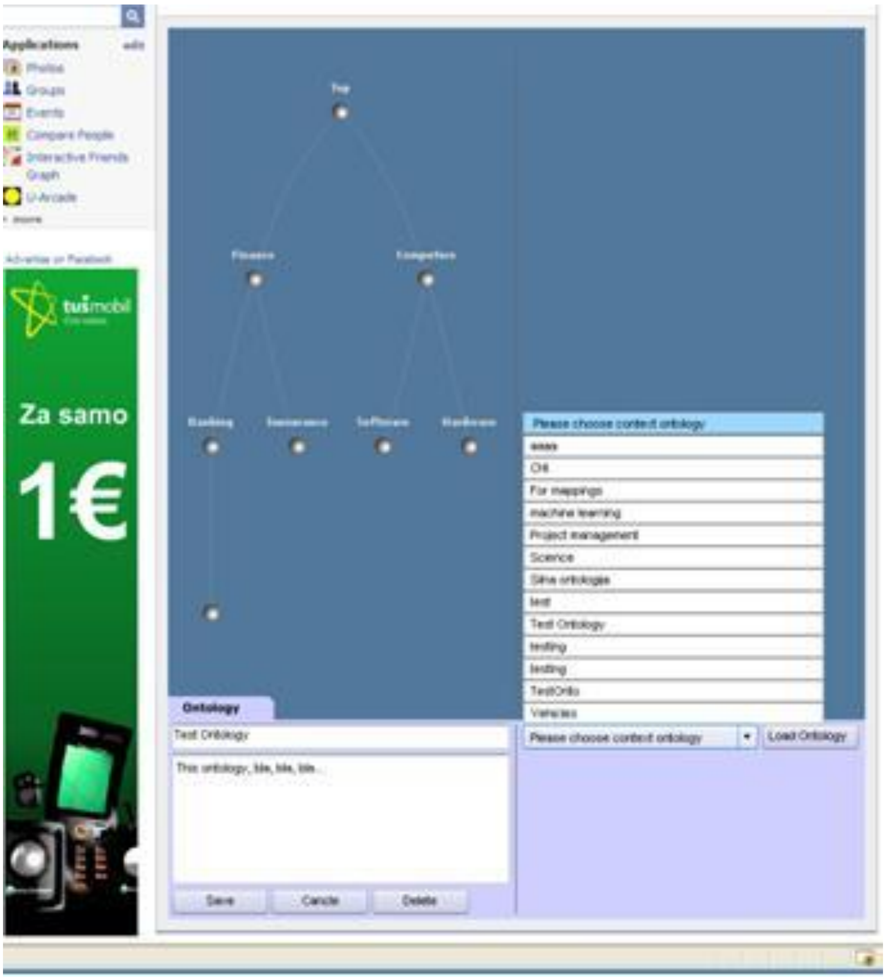
click....reroot
ctrl+click....edit
ctrl+shift+click....add Child Node
d+click....delete

Test-Ontology

...ontology built for testing purposes

Figure 4: Editing new ontology

During the editing phase or after the target ontology is finished we can load “contextual ontology” which possibly includes some of the concepts related to our target ontology. On the right bottom of the screen we select an existing ontology from the database and press the button for loading the ontology (see Figure 5).

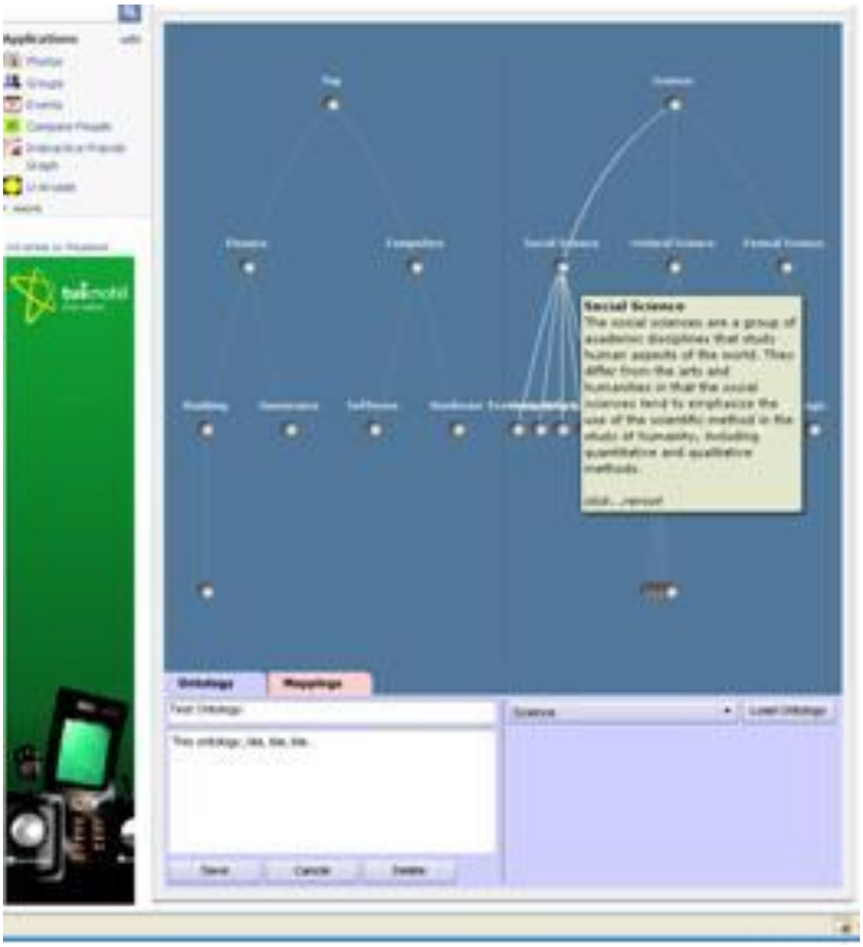


Test Ontology

This ontology, bla, bla, bla...

Figure 5: Loading of contextual ontology

After editing the target ontology and loading the contextual ontology we have simultaneous view of both ontologies next to each-other. Ontology viewer enables browsing both ontologies using hyperbolic view and hides larger parts of ontologies enabling browsing large structures which wouldn’t fit on the screen otherwise. Figure 6 shows simultaneous view of both ontologies.



Social Science
The social sciences are a group of academic disciplines that study human aspects of the world. They differ from the arts and humanities in that the social sciences tend to emphasize the use of the scientific method in the study of humanity, including quantitative and qualitative methods.

click...more

Test Ontology

This ontology, bla, bla, bla..

Science

Figure 6: Simultaneous view of the target and the contextual ontologies

Once having both ontologies loaded we can connect them via mapping editor by introducing mappings between concepts in both ontologies. Each mapping can be additionally qualified by the name of the relationship and additional information (e.g. function). Mappings are jointly saved in the database and can be retrieved with the “Load” function. Figure 7 shows establishing two links between both ontologies.

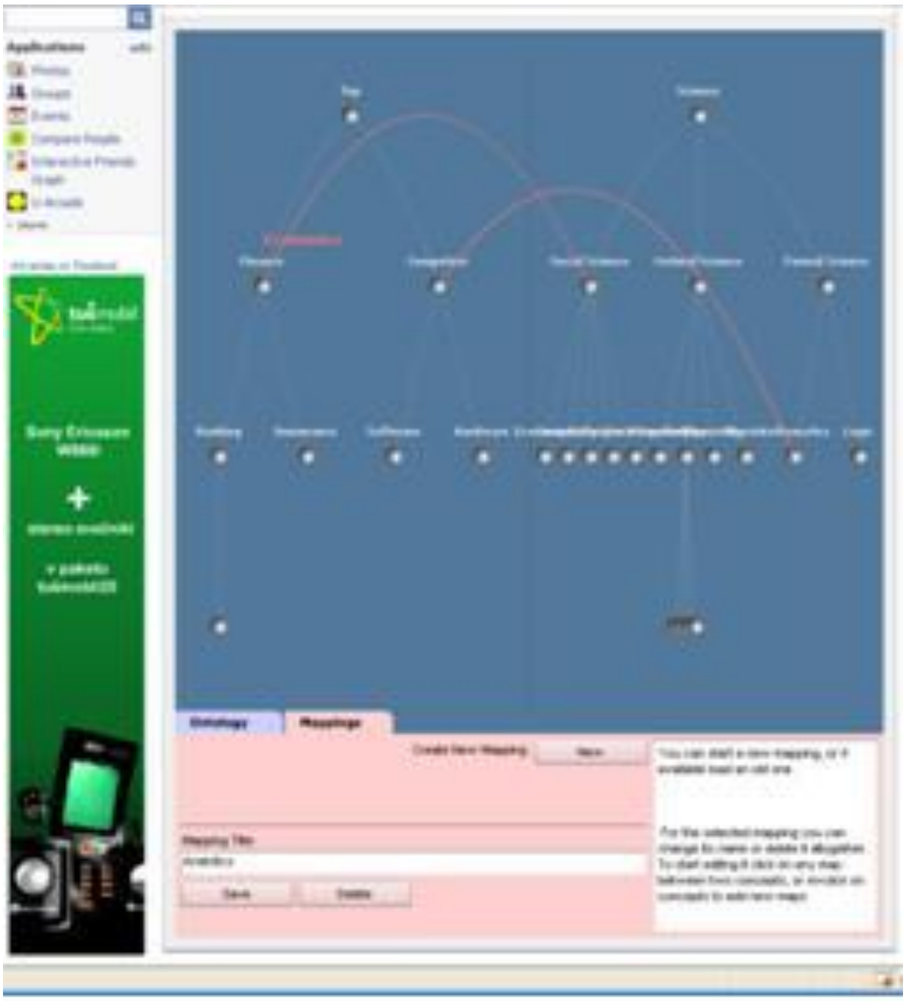


Figure 7: Adding mappings between ontologies

4. Conclusion

The system cONTOext represent a basis for further deliverables leading to NeOn Toolkit plug-in covering functionality for mapping and reasoning between networked ontologies. Mappings represent contextualization of involved ontologies. In particular, the presented software prototype focuses collaborative editing of the ontologies and their mappings – the application is installed on the popular social computing portal Facebook which provides collaboration aspect of the application. The rest of the application is written in an independent way which will enable integration with Alignment Server and NeOn Toolkit packages.