

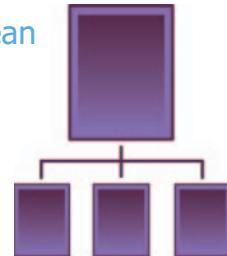
Lifecycle Support for Networked Ontologies

Annual Report 2006

Lifecycle Support for Networked Ontologies

NeOn addresses the complete R&D cycle of the emerging new generation of semantically enriched applications, which exist and operate in an open environment of highly contextualized, evolving and networked ontologies. NeOn aims to achieve and facilitate the move from feasibility in principle to a concrete solution focusing on cost efficiency and effectiveness of knowledge acquisition for, and design, development and maintenance of large-scale, heterogeneous semantic-based applications. This way, NeOn aims to extend the state of the art with economically viable solutions.

NeOn is a 14.7 million Euros project involving 14 European partners and co-funded by the European Commission's Sixth Framework Programme by grant no. IST-2005-027595. 14 partners from 6 European countries are involved in the project. NeOn started in March 2006 and has a duration of 4 years.



Our ambitions

As the complexity of software applications increases, they are becoming more semantically aware. That means more and more knowledge is drawn from a wide variety of sources and is embedded in these applications. This new generation of knowledge processing applications is based on ontologies as its cornerstone. Application design needs to reflect the fact that (i) any newly developed ontologies are typically related to a network of already existing ones, and (ii) ontologies and metadata evolve and have to be kept up-to-date within the changing application environments.

Therefore, to support design and development of such semantically enriched applications, new methods, techniques and tools are needed. The challenges that these tools face include managing evolution, contextual adaptation and the collaborative nature of ontologies, while still guaranteeing their "local consistency". NeOn aims to provide more efficient and scalable support for the entire lifecycle of networked ontologies. In particular, the project investigates methods and tools for managing the dynamics, for supporting collaborative development, and for using and reasoning with contextualized networked ontologies, as well as ensuring that these methods are cost-effective.

NeOn aims to become the standard reference infrastructure for large-scale semantic web application development.

The project is on track to achieve its year 1 milestones which are to conclude the foundations for network ontology models and the analysis of requirements for the use cases.



Important areas of our work

Ontology dynamics

- Formally developing the notion of networked ontologies
- Developing methods for managing the evolution of networked ontologies
- Identifying methodologies for support of the construction of networked ontologies in distributed environments

Collaborative aspects

- Investigating community-centred ontology design, ontology design patterns, and design rationale capture and management
- Effectively selecting and integrating ontologies and their modules

Context awareness

- Taking into account local consistency & context in ontology mappings
- Introducing the notion of context into semantic applications

Human-ontology interaction

- Investigating and understanding user needs
- Customising, personalising & adapting networked ontologies to different user needs
- Supporting multilingual user interaction Use Cases (Testbeds)
- Managing fishery knowledge to support experts decision-making and fish stock depletion early alerts, in the context of the Food and Agriculture Organisation of the United Nations (FAO)
- Supporting E-Invoice exchange and management in the pharmaceutical sector in the context of the AECE/PharmaInnova Cluster
- Integrating and sharing information about pharmaceutical products in the context of Atos Origin's nomenclature applications.

Our main innovations

NeOn sees as its main innovation exploring how ontologies can develop further through uncovering new methods and technologies to support this advance. Software development has progressed from closed, relatively data-poor applications, to applications for accessing, integrating and re-using the vast amounts of information already available, e.g. on the Web, or on corporate intranets.

Methodologies and technologies inherited from those data-poor systems, however, are not adequate to support the new generation of knowledge-aware applications. Neither are they able to support the whole application development lifecycle. The new applications at the centre of the NeOn vision will offer new functionalities that will contribute to the emerging Semantic Web, and facilitate the automation of business to business relationships, and their integration with internal company resources.

System-level contributions

NeOn is seeking to create an open, service-centred reference architecture for managing the complete lifecycle of networked ontologies and meta-data. This architecture will be realised through the NeOn ontology-development toolkit and will be complemented by the NeOn methodology for the system development using networked ontologies.

Contributions to foundational research

NeOn is contributing to the body of knowledge in several disciplines e.g. computer science, web science, software and system development. Of particular value are methods and tools for evolving and contextually grounded networked ontologies.

Sector and community-level contributions

NeOn will apply its theoretical outcomes to a number of innovative testbeds in two early adopter sectors, namely, in the pharmaceutical and the agriculture/fishery sectors. In addition, the project aspires to create an active community of users and developers. In order to achieve its ambition to become de-facto standard for developing large-scale semantic applications, NeOn collaborates with key business partners and world leaders in the area of ontology engineering and design applications.

The impact of our work

In this first period of the project, the main objectives have been to define the relevant functionalities and modules of NeOn, to review the state of the art and existing approaches to working with complex ontologies, and to gather the requirements for the creation of initial NeOn frameworks. The Consortium also made contact with other ongoing projects and initiatives in this area.

Through its test beds and case studies NeOn will be showcasing the practical value of networked ontologies and large-scale networked applications in the pharmaceutical and agriculture/fisheries sectors. These sectors were selected because they work with large-volume data sets which are not manageable using today's technology and hence this is where a mid-term impact of NeOn's technologies can be expected. The potential impact on the two sectors is as follows:

- pharmaceutical domain - by locating and combining the relevant but widely distributed semantic tags describing a particular medicine, medical knowledge or medical regulation, a solution based on the NeOn's innovative architecture, methodology and toolkit, will make it possible to automate the process of collecting, reconciling and integrating the information provided by complex distributed networks involving suppliers, distributors, regulators and pharmacists, which are typical for the pharmaceutical domain.
- agriculture and fisheries domain - the Food and Agriculture Organisation of the United Nations, on the other hand, will use the NeOn technology to implement an ontology-based fish stock depletion alert system, enhancing knowledge exchange about fisheries and fish stocks, and integrating textual and numerical data from existing distributed databases, repositories and geographic information systems.

User involvement, promotion and awareness

NeOn aims to become a focal point for the European Semantic Web community, so the project's dissemination activities are being managed in a way to keep both the partners and the wider public informed about the achievements of NeOn as well as to stimulate the creation of a user community.

In order to support the above goal, NeOn's industrial partners - who include leaders in semantic technologies iSOCO and Ontoprise, as well as major IT companies ATOS and Software AG - are strongly committed to the dissemination and the exploitation of the project outcomes. In addition, the different work areas are encouraged to collaborate on specific tasks in order to take advantage of the generated synergies in demonstration activities, training activities and exploitation activities.



The initial short-term objective in the first three months of NeOn dissemination activity was preparing to set up the appropriate dissemination channels, and to identify the most relevant events and dissemination targets. After establishing NeOn website www.neon-project.org and producing the initial set of dissemination tools (posters, flyers), the focus was formulating the dissemination strategy and planning. This involved defining the internal and external dissemination strategy and operational responsibilities and procedures. In the third quarter work has focussed on production of the Dissemination Plan and on the planning for the annual events planning and project presentations.

Papers are and will be published in connection with scientific conferences and lectures and sent to relevant online and printed scientific and academic journals and magazines. A peer review and quality assessment mechanism has been put into place to ensure rich content and consistently high standard of presentation.

In order to increase visibility, the Consortium partners participate in key local and international events aimed at different target audiences during the project lifecycle. A mechanism is in place to enable partners to provide information about the forthcoming events that could be of interest to NeOn.

Contributions to external events

- Invited talk and Ontology Evaluation Workshop at WWW 2006, May 2006, Edinburgh
- Invited talk and contributions to LREC 2006 Conference, May 2006, Genoa, Italy.
- Invited talk at the 4th Summer School on Ontology Engineering and the Semantic Web, July 2006, Cercedilla, Spain.
- Invited talks, tutorials and several workshops at 5th International Semantic Web Conference (ISWC), November 2006, Athens, USA
- Participation in the "Building semantic knowledge applications" Workshop at IST2006 Conference, November 2006, Helsinki, Finland.

Contribution to outreach and standardisation

- Participation in W3C Semantic Web Education & Outreach Interest Group

Sponsorships

- 5th International Semantic Web Conference (ISWC), November 2006, Athens, USA - as a silver sponsor
- 15th International Conference on Knowledge Engineering and Knowledge Management (EKAW), October 2006 - as a sponsor of 5 student bursaries.

Exploitation prospects

NeOn is a flagship EU project integrating a vision for exploiting large scale semantics, cutting edge work on advanced research issues, a concrete development and exploitation strategy and challenging test cases. The project has started well and has already produced some interesting results and generated massive interest.

The market intelligence for NeOn and Neon-like tools has been gathered in order to produce an initial market assessment and intelligence for NeOn. This task involved devising and carrying out a market study on ontology and ontology tool usage and carrying out an analysis of the competitor situation and potentials for new markets where NeOn might act as enabler. Presently, the activities address the economic viability of NeOn approach and technology in order to create a compelling basis for further exploitation activities and, more

concretely, to find the appropriate way to approach the industry. We will take advantage of the generated synergies in demonstration activities, training activities, exploitation and dissemination activities.

Further information

Coordinating partner:

- The Open University (United Kingdom)

Partners:

- Universität Karlsruhe - TH (Germany)
- Universidad Politécnica de Madrid (Spain)
- Software AG (Germany)
- Intelligent Software Components SA (Spain)
- Institute 'Jožef Stefan' (Slovenia)
- University of Sheffield (United Kingdom)
- Institut National de Recherche en Informatique et en Automatique (France)
- Universität Koblenz-Landau (Germany)
- Ontoprise GmbH (Germany)
- Consiglio Nazionale delle Ricerche (Italy)
- Food and Agriculture Organization of the United Nations (Italy)
- Asociación Española de Comercio Electrónico - PharmaInnova Cluster (Spain)
- Atos Origin SAE (Spain)

For more information

- Email Project Administrator: contact@neon-project.org
- Visit project web site: www.neon-project.org

