



About us – a major European initiative shaping the future infrastructures for semantic applications

NeOn is a joint project of 14 European partners co-funded by the European Commission's **Sixth Framework Programme** with an expected starting date **March-April 2006** and duration 4 years.

NeOn consortium includes: **The Open University** (UK, co-ordinator), *Universitaet Karlsruhe* (Germany), *Universidad Politecnica Madrid* (Spain), *Software AG* (Germany), *iSOCO* (Spain), *Jozef Stefan Institute* (Slovenia), *INRIA* (France), *ontoprise GmbH* (Germany), *Universitaet Koblenz-Landau* (Germany), *University of Sheffield* (UK), *Consiglio Nazionale delle Ricerche* (Italy), *United Nations Food & Agriculture Organization* (Italy), *pharmaInnova* (Spain), and *Atos Origin* (Spain)

NeOn is advancing the state of the art in using ontologies for **large-scale** semantic applications in the distributed organizations. Particularly, we aim at significantly improving the capability to handle multiple **networked ontologies** that exist in a particular **context**, are created **collaboratively**, and might be highly dynamic and constantly **evolving**.

Ontologies – key technology to enable semantic interoperability and integration of data and processes

Ontologies have been so successful in recent years that Gartner ranks them third in their list of the top 10 technologies for 2005. We are now entering a phase of knowledge system development, in which ontologies are being produced in *larger numbers* and exhibit *greater complexity* than ever before.

Emerging opportunity – build systems exhibiting a level of complexity qualitatively superior to the current generation of semantic systems, by integrating large, reusable semantic resources

Challenge – current methodologies and technologies are simply not sophisticated enough

Major gaps are in supporting the cost-effective integration of heterogeneous semantic components in large, semantic (web) applications, whether 'closed', within corporate intranets, or in the open.

Shortcomings of the state of the art – de-contextualized semantics and 'one-size-fits-all' approach

The development of semantic applications is currently based on a single or a few related ontologies, which is commercially not competitive. Semantic applications assume differentiation and customization for a narrow niche rather than one offering for a broad market. Aspects of contexts allowing for related, yet partially inconsistent ontologies, aspects of networked ontologies in a changing environment, and aspects of tailoring the human-ontology interaction to users' profiles have not yet been addressed.

In spite of the many initiatives, the construction and maintenance of ontologies and their use in knowledge-intensive applications still require *craftsmanship* and is too removed for the domain experts and other people working with the networked, distributed and multi-contextual information in small and large companies, as well as public bodies and academia.

Core task for NeOn – advance the state of the art in several ways

NeOn contributes to *Networked ontologies*, *Context*, *Collaboration*, *Scalability* and *Human Factors*. Concerning aspects like *Multiple ontologies*, *Dynamic ontologies* and *Lifecycle*, it builds on technologies developed in other initiatives. NeOn is the natural next step forward, building on the strength of European R&D in the area, which is where Europe is ahead of US and Asia.

NeOn aims to further improve a number of leading-edge technologies developed in Europe, and achieve scale, integration and usability of these technologies in the environment of today's distributed and networked organizations whose knowledge and expertise is constantly and rapidly evolving.

NeOn's goal – carry out foundational research on a *methodology for managing the complete lifecycle of contextualized networked ontologies, related distributed metadata, and for developing large scale semantic web applications*. More specific top-level objectives include:

- **Open, robust, flexible, scalable and service-centred reference architecture** that will enable the integration and interoperability of lifecycle support components.
- **Reference implementation** of the NeOn architecture – **the NeOn toolkit** as a concrete resource for engineering contextualized networked ontologies and for building large semantic applications.
- Evaluation of the NeOn technology in **three case studies** addressing two different sectors with early adopter business – **pharmaceuticals** and **agriculture/fisheries**.
- Preparation of industry-strength documentation, methodological and reference material suitable for a range of stakeholders: **open source** developers, **large and small companies**, **researchers** and **academics**.

Breaking down the goals – several intertwined levels, each embodied in a specific work package:

- *methods and tools for managing the dynamics of contextualised networked ontologies ... work package WP1*
- *methods and tools enabling collaborative development and use of contextualised networked ontologies in user communities ... work package WP2*
- *methods and tools for developing and reasoning with contextualised networks of ontologies (incl. local consistency, mapping discovery) ... work package WP3*
- *methods and tools for improving the human-ontology interaction (e.g. ontology customization, filtering, navigation, richer access rights) ... work package WP4*

Positioning NeOn – so as to achieve impact in three contexts:

- **foundational research** – by developing sound methodologies and technique libraries supporting design and deployment of networked ontologies,
- **system-level research and development** - by providing an open, robust, flexible, scalable and service-centred infrastructure, and
- **sector-level development and innovation** – by applying semantic technologies in early adopter sectors to facilitate knowledge sharing, re-use and thus contribute to the economies of learning.

Exploitable outcomes – *make NeOn tools and developed infrastructure the de-facto standard in networked ontology management both in Europe and beyond*

This can be achieved in a multi-tiered exploitation structure, where each tier is exploiting a particular aspect of the project:

- a) Foundation and (Open Source) developers community ... to maintain reference standards, core architecture, and to assure compliance and compatibility of third-party NeOn extensions.
- b) Commercial partnerships and individual enterprises ... taking care of the commercial deployment of NeOn infrastructure products that are enhanced by using specific modules from NeOn infrastructure/architecture/toolkit.

In a nutshell...

In a nutshell, we have now reached a stage in the lifecycle of semantic technologies, where a major integrative effort is needed, so as to achieve the methodological and tool infrastructure that the community requires. What is needed is a large-scale effort, which can tackle the 'holistic' problem of how to integrate effectively technologies and methods. This effort in turn would make it cost-effective for organizations to tackle the acquisition, design, development and maintenance of the large, heterogeneous semantic applications, which are now, in principle, feasible thanks to the increased sophistication of semantic technologies.