Introduction to the NeOn Methodology

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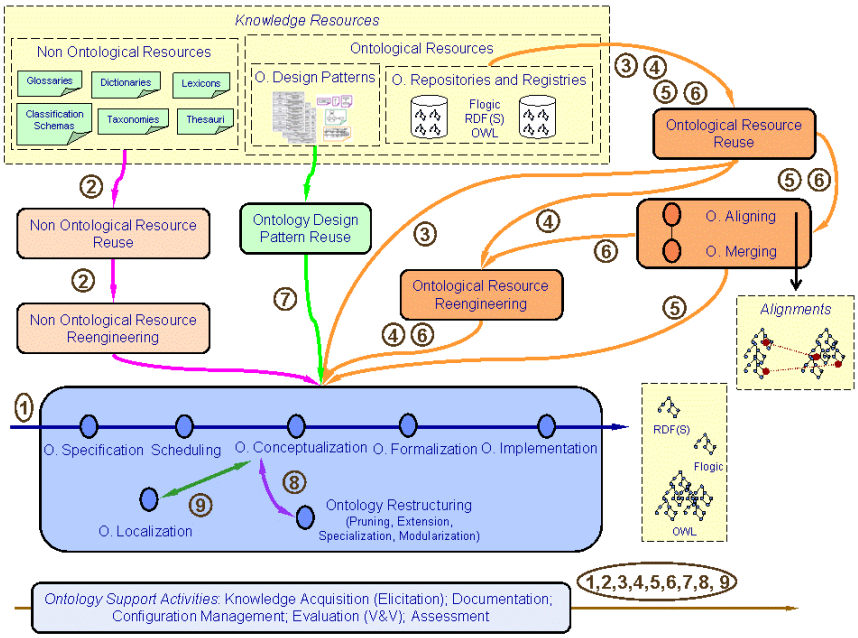
Motivation

As ontology engineering enters the mainstream and expert ontology engineers are scarce, there is now a strong need for practical methodologies, which can assist a variety of user types with ontology design tasks. To address this need NeOn proposes a scenario-based methodology ("The NeOn Methodology"), which provides guidance for all key aspects of the ontology engineering process, that is, collaborative ontology development, reuse of ontological and non-ontological resources, and the evolution and maintenance of networked ontologies. The NeOn Toolkit includes several plug-ins to support specifically the various activities that characterize the ontology engineering process.

A Scenario based Methodology

In contrast to other approaches that provide methodological guidance for ontology engineering, the NeOn Methodology does not prescribe a rigid workflow, but instead it suggests pathways and activities for a variety of scenarios. The **nine scenarios** cover commonly occurring situations, e.g., when existing ontologies need to be reengineered, aligned, modularised, localized to support different languages and cultures, and integrated with non-ontological resources, such as folksonomies, or thesauri.

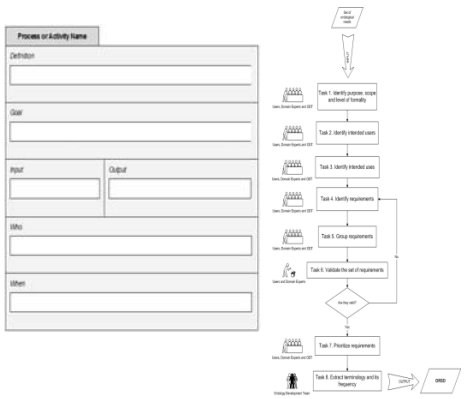


- ***Scenario 1***: From specification to implementation.
- ***Scenario 2***: Reusing and re-engineering non-ontological resources.
- ***Scenario 3***: Reusing ontological resources.
- ***Scenario 4***: Reusing and re-engineering ontological resources.
- ***Scenario 5***: Reusing and merging ontological resources.
- ***Scenario 6***: Reusing, merging and re-engineering ontological resources.
- ***Scenario 7***: Reusing ontology design patterns (ODPs).
- ***Scenario 8***: Restructuring ontological resources.
- ***Scenario 9***: Localizing ontological resources.

The NeOn Methodology Framework

The NeOn Methodology Framework for building ontology networks includes

- a set of scenarios,
- a glossary of processes and activities involved in the development of ontologies,
- a collection of ontology life cycle models, and
- a set of methodological guidelines for different processes and activities, which are described (a) functionally, in terms of goals, inputs, outputs and relevant constraints; (b) procedurally, by means of workflow specifications; and (c) empirically, through a set of illustrative examples.



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Ontology Network Life Cycle Models

In NeOn we consider two ontology network life cycle models:

- The ***waterfall model***.

- The ***iterative-incremental model***.

The **Gantt chart** illustrates a particular ontology network lifecycle. It shows the start and finish dates of the processes and activities involved in a project, as well as the dependencies between them. The gOntt plug-in of the NeOn Toolkit is a scheduling tool, which knows about the processes, activities and life cycle models of the NeOn Methodology and is, therefore, able to provide strong guidance for scheduling ontology development projects (Chapter 7).

Phases, Processes and Activities

Initiation Phase:	O. Requirements Specification (Chapter 5) Scheduling (Chapter 7) O. Evaluation (Chapter 14)
Reuse Phase:	NOR Reuse (Chapter 8) O. Search (Chapter 6) O. Reuse (Chapter 9 and 10) O. Statements Reuse (Chapter 11) O. Evaluation (Chapter 14)
Merging Phase:	O. Aligning (Chapter 17) O. Evaluation (Chapter 14)
Reengineering Phase:	NOR Reengineering (Chapter 8) O. Modularization (Chapter 15) O. Evaluation (Chapter 14)
Design Phase:	O. Conceptualization (Chapter 12) O. Evolution (Chapter 16) O. Localization (Chapter 13) O. Evaluation (Chapter 14)
Implementation Phase:	O. Evaluation (Chapter 14)
Maintenance Phase:	O. Evaluation (Chapter 14)

Ontology Design Patterns (ODPs)

Another important aspect of the NeOn Methodology is its provision of a library of ontology design patterns (http://ontologydesignpatterns.org/) and associated tool-supported methodological guidance (named eXtreme Design) to assist in ontology development. Ontology design patterns provide modelling solutions which can be applied to solve recurrent ontology design problems. The availability of a library of ontology design patterns is an important step towards achieving the ultimate goal of turning ontology design into a structured and reproducible engineering process.

Patterns for Re-engineering Non-Ontological Resources (NORs) into Ontologies

The patterns library also includes a library for re-engineering NORs (thesauri, classification scheme, etc.) into ontologies. These patterns provide a well-defined sequence of activities for transforming these resources into ontologies, taking into account the resource type and their underlying resource data model. Our patterns perform the following transformations:

- TBox transformation: for transforming the resource content into an ontology schema.
- ABox transformation: for transforming the resource schema into an ontology schema, and the resource content into ontology instances.

Ontology Networks developed with the NeOn Methodology

In addition to applying the methodology to the development of the ontologies associated with the NeOn internal use cases (Invoicing Management and Semantic Nomenclator), the methodology is being tested in several other scenarios, namely, developing a network of ontologies to support information-sharing among pilgrims visiting The Way of St. James in Spain; context ontologies in miO!; human resource ontologies in SEEMP; IPR ontologies in Autores 3.0; ontologies about patient safety (“Falls” and “Pressure Ulcer” subdomains) in the International Classification for Patient Safety Project (ICPS) for the World Health Organization (WHO); and multimedia ontologies in BuscaMedia.

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