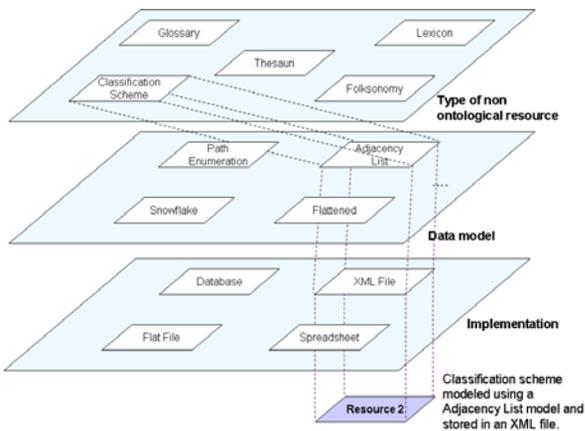


Motivation

When ontology developers create an ontology from a classification scheme, thesaurus, etc., they normally use *ad-hoc* algorithms for the transformation. In the NeOn project we propose the use of Re-engineering Patterns for transforming such resources into ontologies. .

Non-Ontological Resource

A Non-Ontological Resource (NOR) is a knowledge-aware resource (glossary, lexicon, thesaurus, classification scheme, or folksonomy) whose semantics has not yet been formalized by an ontology. NORs are highly heterogeneous in their data model and contents: they encode different types of knowledge and can be modeled and implemented in different ways. Data models for classification schemes are the following: adjacency list, path enumeration, snowflake and flat. Data models for thesaurus are record-based and relation-based. The figure shows how a given type of Classification Scheme can be modeled following one or more data models, each of which could be implemented in different ways at the implementation layer. In the example, a classification scheme is modeled following an adjacency list model and is implemented in an XML file.



Patterns for Re-engineering Non-Ontological Resources into Ontologies (PR-NOR)

The patterns for re-engineering non-ontological resources (PR-NOR) define a procedure that transforms knowledge-aware resources into ontologies, taking into account the resource type (thesaurus, classification scheme, etc.) and their underlying resource data model. For every type of resource and data model, the NeOn method defines a pattern with a well-defined sequence of activities. 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.

What is Non-Ontological Resource Re-engineering?

Non-Ontological Resource Re-engineering

Definition

Non-Ontological Resource Re-engineering refers to the process of taking a non-ontological resource and transforming it into an ontology.

Goal

Creating an ontology from a non-ontological resource.

Input

One or more non-ontological resources selected by the reuse process.

Output

An ontology.

Who

Domain experts, software developers and ontology practitioners.

When

After the non-ontological resource reuse process and before the conceptualization activity.

Re-engineering Non-Ontological Resources



Where can I find the Patterns for Re-engineering Non-Ontological Resources into Ontologies ?

The NeOn ontology design patterns library (<http://ontologydesignpatterns.org>) includes 12 patterns for re-engineering non-ontological resources into ontologies. You can identify them quickly just by glancing over the PR-NOR acronym.

Advantages of the PR-NORs

- Improving the efficiency of the re-engineering process.
- Making the transformation process easier for both ontology engineers and domain experts.
- Improving the reusability of NORs.

Example

ID	CSI_Name	Parent
20000	Water area	
21000	Environmental area	20000
24020	Jurisdiction area	20000
22000	Fishing Statistical area	20000
21001	Inland/marine	21000
21002	Ocean	21000
21003	North/South/Equatorial	21000
22001	FAO statistical area	22000
22002	Areal grid system	22000

Water Area Classification



Pattern for re-engineering a classification scheme modelled with an Adjacency List Data Model



Water Area Ontology

Which process should be followed to use a re-engineering pattern?

Activity 1. Non-Ontological Resource Reverse Engineering.

We have to analyze the non-ontological resource to identify its underlying components and create representations of the resource at the different levels of abstraction (design, requirements and conceptual). To this end, we must search and compile all the available data and documentation on the non-ontological resource. Then, we have to identify the schema and data model of the resource.

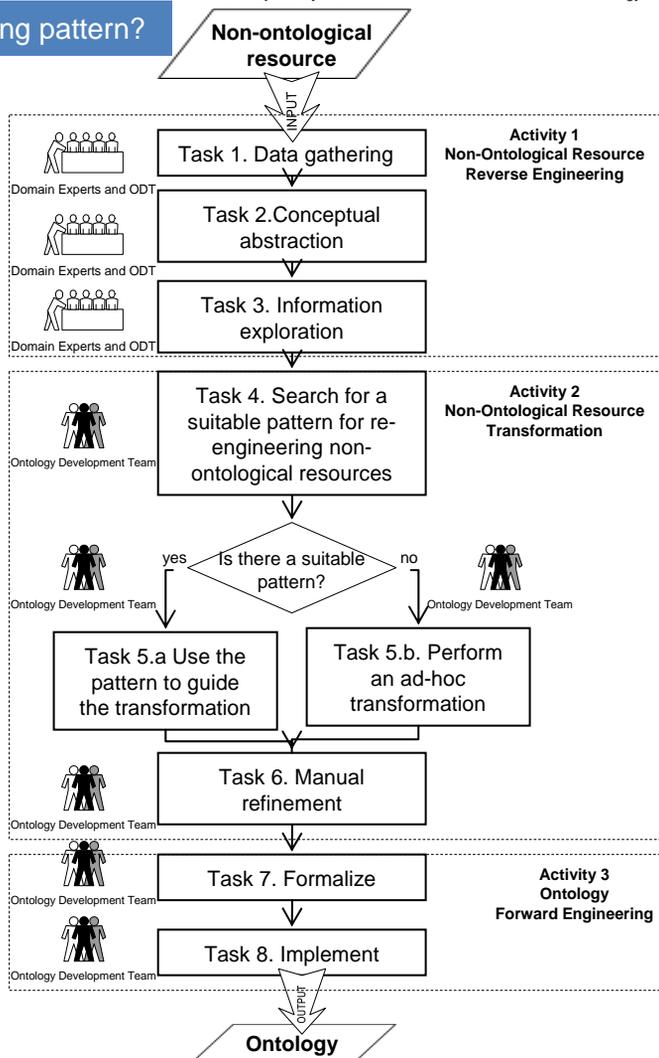
Activity 2. Non-Ontological Resource Transformation.

We need to generate a conceptual model from the non-ontological resource. To this end, we have to find out if there is any re-engineering pattern applicable, within the NeOn PR-NOR library to transform the resource into a conceptual model. The search criteria has to be the following:

- the non-ontological resource type
- the data model of the resource
- the transformation approach

If a pattern suitable for re-engineering non-ontological resource is found, then the conceptual model is created from the non-ontological resource following the procedure established in the pattern for re-engineering. Otherwise, we have to set up an *ad-hoc* procedure to transform the non-ontological resource into a conceptual model. This *ad-hoc* procedure may be generalized to create a new pattern for re-engineering non-ontological resource.

Activity 3. Ontology Forward Engineering, whose goal is to generate the ontology. We use the ontology levels of abstraction to depict this activity because they are directly related to the ontology development process.



Additional Information

Contact person: bvillazon@fi.upm.es

- D2.2.2 Methods and Tools Supporting Re-engineering (http://www.neon-project.org/web-content/images/Publications/neon_2008_d2.2.2.pdf)
- D2.2.4 Final Version of Methods for Re-engineering and Evaluation (http://www.neon-project.org/web-content/images/Publications/neon_2009_d2.2.4.pdf)
- García-Silva, A., Gómez-Pérez, A., Suárez-Figueroa, M. C., and Villazón-Terrazas, B. 2008. A Pattern Based Approach for Re-engineering Non-Ontological Resources into Ontologies. In Proceedings of the 3rd Asian Semantic Web Conference on the Semantic Web (Bangkok, Thailand)