Introduction to Ontological Engineering: Tutorial for ifcOWL

María Poveda-Villalón, Universidad Politécnica de Madrid
Pieter Pauwels, Ghent University

As semantic web technologies and linked data techniques are of increasing importance for the domain of architecture, engineering and construction (AEC), also the ontologies that are used by these technologies gain in importance and relevance. An ontology is generally defined as "*a formal, explicit specification of a shared conceptualization*", after Studer et al. [1]. Because not only people, but also technologies rely on these ontologies, it is important that they are well conceived and well developed. In this tutorial session, we will therefore give an overview of the main principles behind *ontological engineering*. We will hereby rely on the principles that are developed as part of the NeOn methodology for ontology engineering [2]. A schema of this methodology is provided in Figure 1.

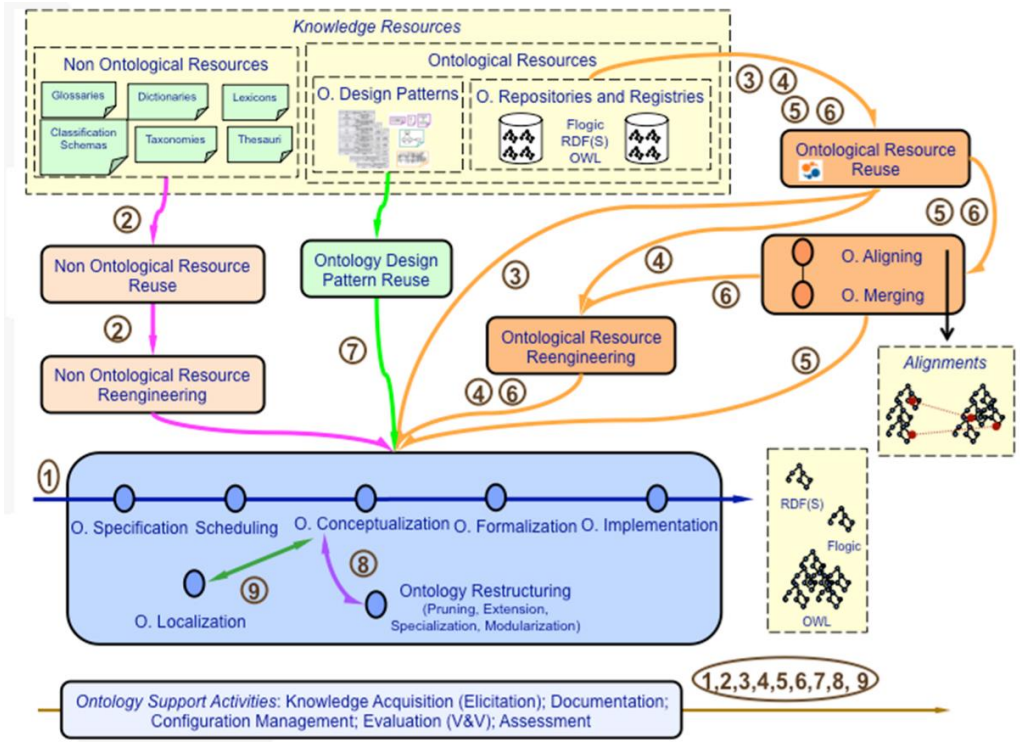

Figure 1: NeOn ontology development scenarios (original image by Suárez-Figueroa [2]).

Our tutorial session will go through all steps in the NeOn methodology. We will hereby look into the following phases:

1. Requirements definition
2. Terms extraction
3. Ontology conceptualization
    a. Initial model drafting
    b. Model detailing
4. Ontology implementation
    a. Non ontological resource transformation
5. Ontology evaluation

In presenting these phases, we will use the ifcOWL ontology as a reference example and point out where it is useful to make which kind of decisions. This is of particular relevance in the ontology implementation phase. For example, we indicate the relevance of using smaller ontologies (ifcOWL

core, ifcOWL standard), as proposed by Nam Vu Hoang [3], and importing these as subsets in more expressive ontologies (i.e. ifcOWL Extended); we outline a number of guidelines and recommendations regarding the creation of persistent URIs; we summarize best practices regarding the inclusion of metadata, as for example license information; and so forth. This on-topic and tutorial-like overview should improve the ontological engineering skills of the audience present at this LDAC presentation.

References

[1] Rudi Studer, V. Richard Benjamins, Dieter Fensel. Knowledge Engineering: Principles and Methods. Data and Knowledge Engineering. 25 (1998) 161-197

[2] Mari Carmen Suárez-Figueroa, NeOn Methodology for Building Ontology Networks: Specification, Scheduling and Reuse. PhD Thesis, Universidad Politécnica de Madrid, June 2010.

[3] N. V. Hoang, IFC-to-Linked Data Conversion: Multilayering Approach, in: the Third International Workshop on Linked Data in Architecture and Construction, Eindhoven, Netherlands, 2015.