



Ontology Localization

**Mauricio Espinoza, Elena Montiel-Ponsoda,
Guadalupe Aguado de Cea, and Asunción Gómez-Pérez**
Ontology Engineering Group – Dpto. de Inteligencia Artificial
Facultad de Informática
Universidad Politécnica de Madrid
Campus de Montegancedo s/n
28660 Boadilla del Monte, Madrid, Spain
<http://www.oeg-upm.net>

{jespinoza, emontiel, lupe, asun}@fi.upm.es
Phone: 34.91.3363670
Fax: 34.91.3524819

Speaker: Elena Montiel-Ponsoda

Event: EVERIS

Place: UPM

Date: January 12th, 2010

The need for multilingual ontologies

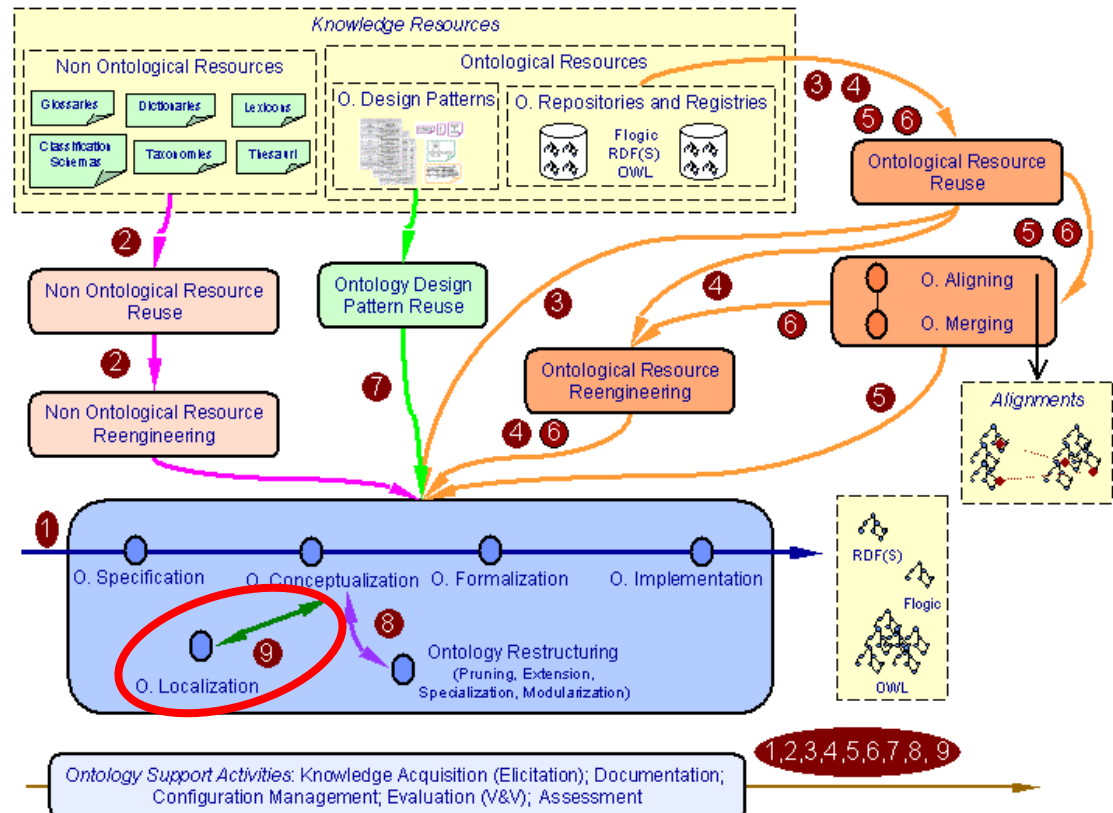
- Most of the ontologies build so far have **English** or another natural language as the basis
- Multilinguality is nowadays demanded by international organizations that have to **manage** information in **several natural languages**
- Ontology-based systems have to be build for different **multilingual applications**, such as: indexing, information retrieval, question answering, knowledge management...
- **HOWEVER**, multilingual ontology building is time consuming and cost intensive

**NEED FOR METHODS AND TOOLS
TO LOCALIZE ONTOLOGIES!!**



- **Ontology Localization:** activity in the NeOn Methodology* for building ontology networks defined as “the adaptation of an ontology to a particular language and culture” (inspired by Software Localization).

Express ontology labels in a natural language different from the one in which the ontology has been conceived



*NeOn Project. Deliverable 5.4.1 (2008). In <http://www.neon-project.org>

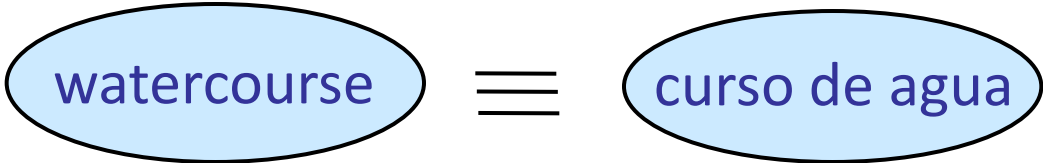
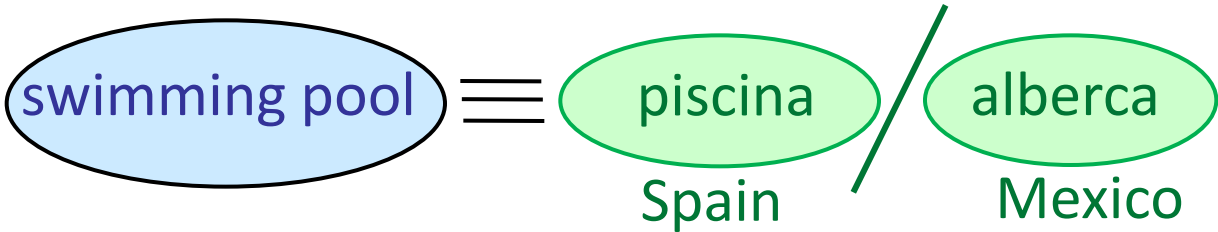
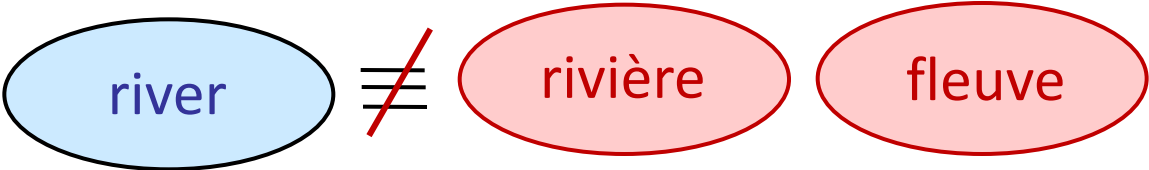


Characterization of the Ontology Localization Problem



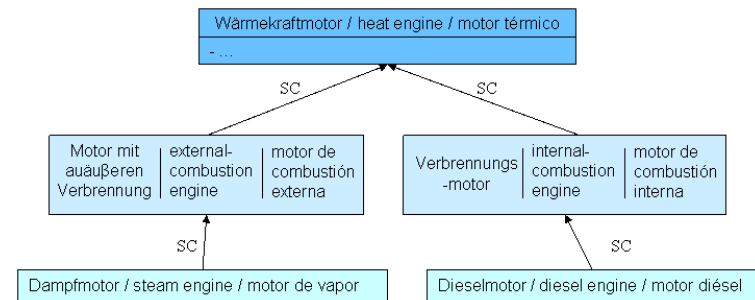
Translation
Problem

Multilinguality
Representation
Problem

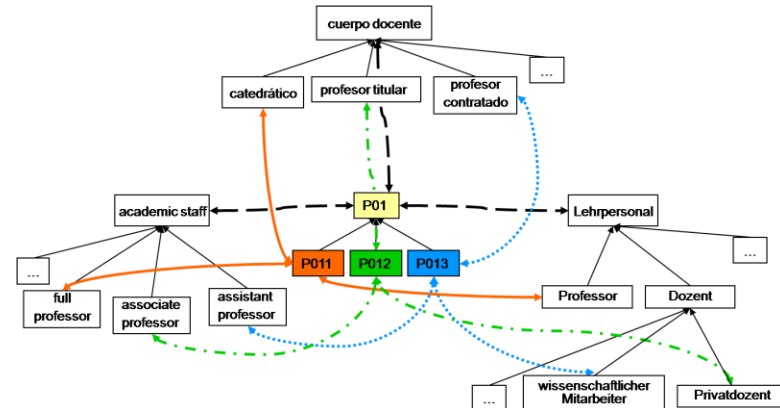
Translation Problem	
Existence of an exact equivalent	
Existence of several context-dependent equivalents	
Existence of a conceptualization mismatch	

Multilinguality Representation Problem

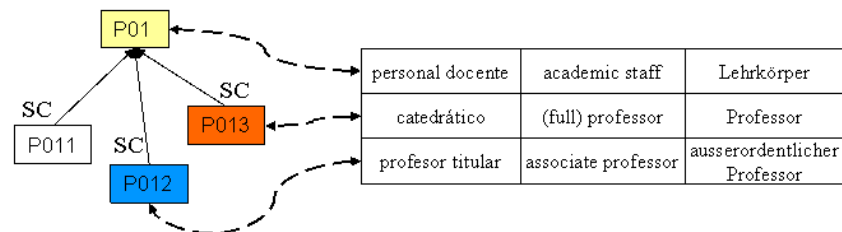
Inclusion of multilingual information in the ontology (`rdfs:label` and `rdfs:comment` properties) – **Model 1**



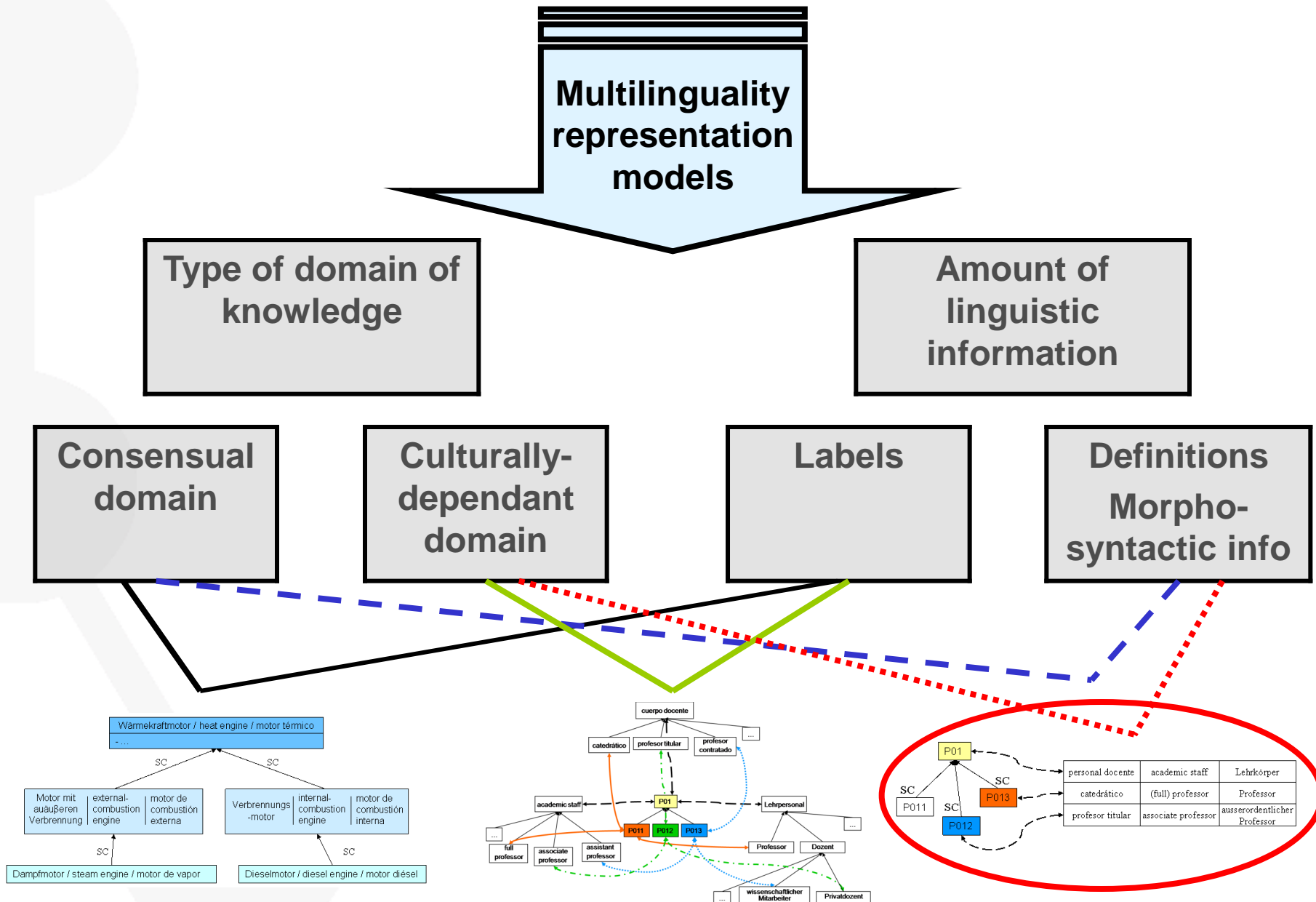
One conceptualization per culture and language involved, and mappings establishment among conceptualizations – **Model 2**



Association of external multilingual model to the ontology – **Model 3**



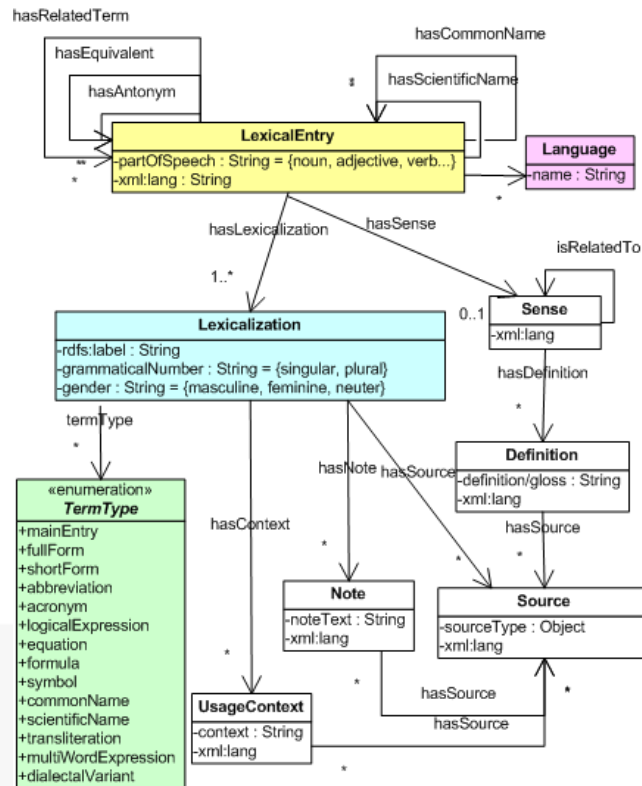
Choosing a multilinguality representation model



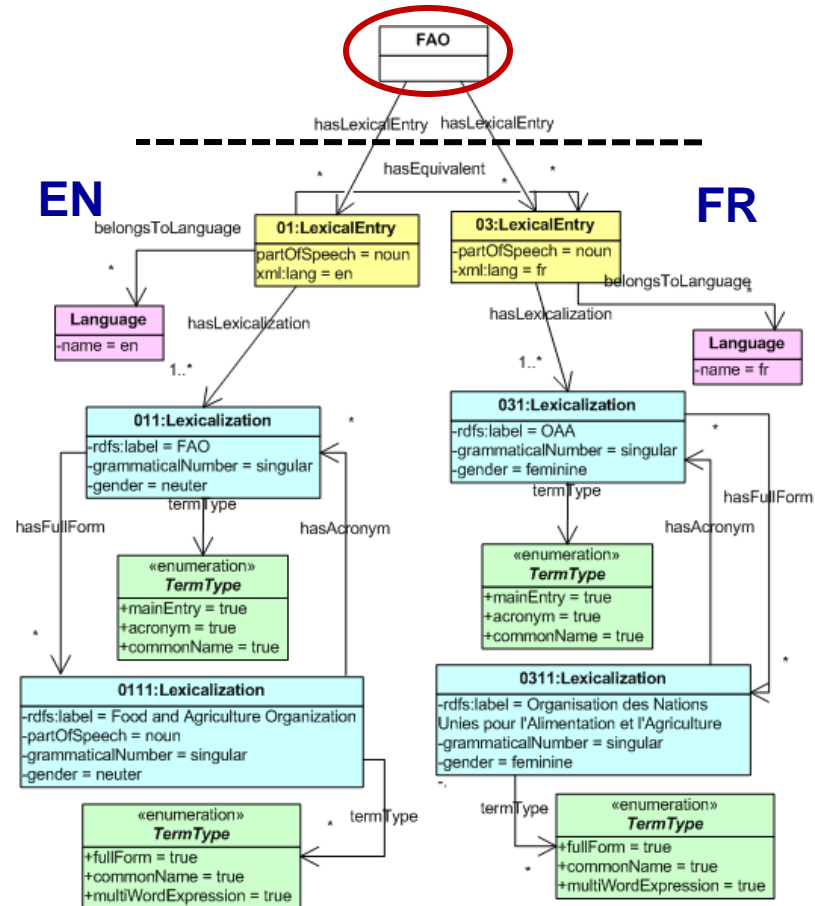
Ontology



LIR model

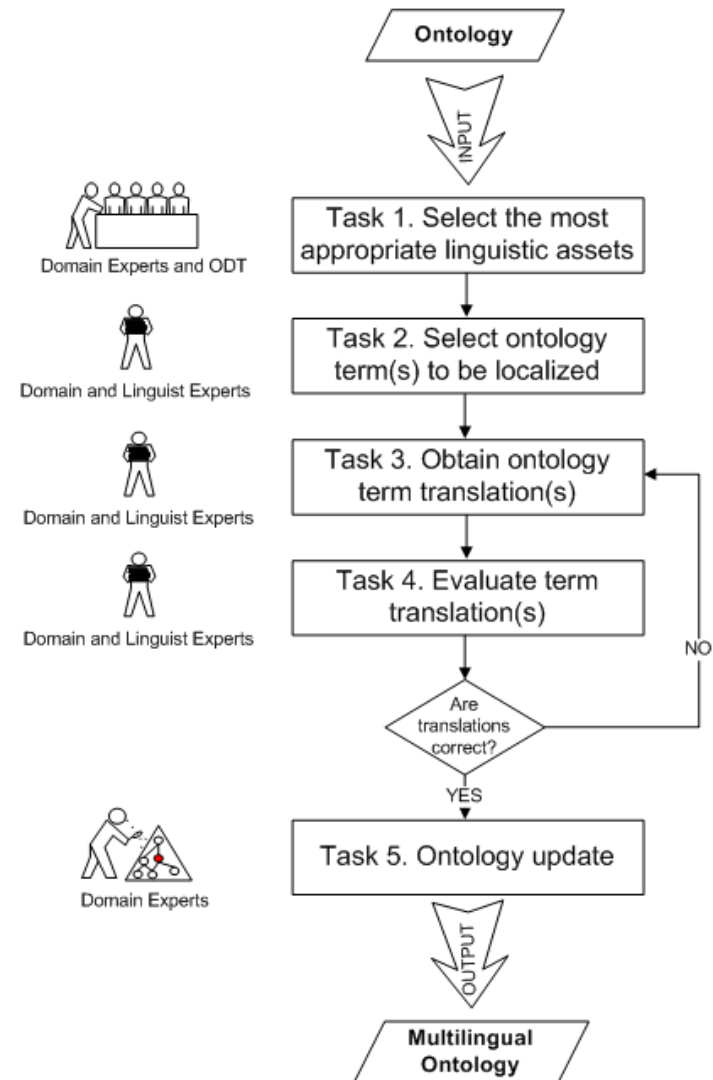


LIR instantiation for ontology class FAO

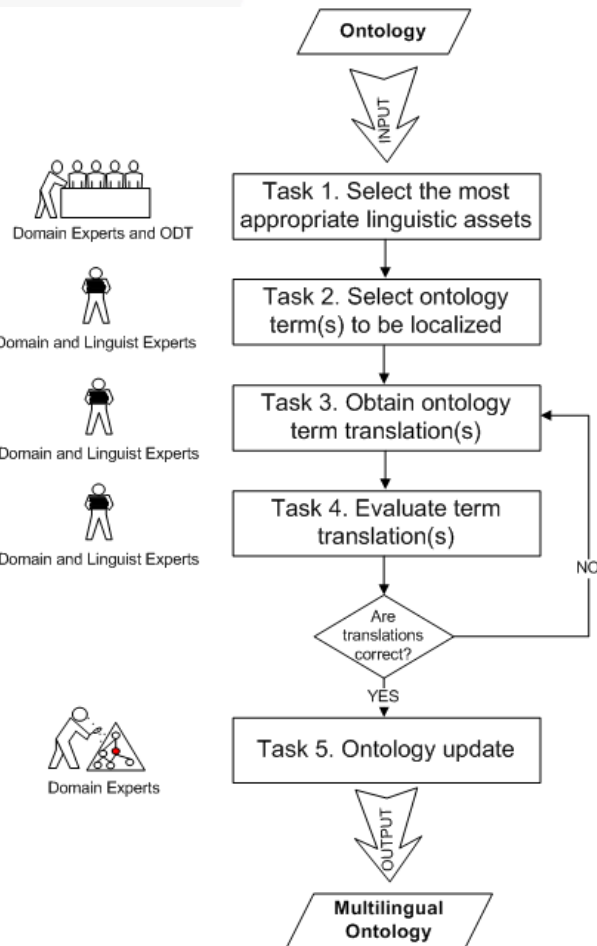


Proposed Guidelines for Ontology Localization

Ontology Localization	
Definition Ontology localization refers to the adaptation of an ontology to particular language and culture	
Goal To translate an ontology expressed in a source natural language into a target natural language.	
Input An ontology whose ontology terms are expressed in one or several natural languages, from which one is selected as source natural language.	Output An ontology whose ontology terms have been translated to the target natural language. The resulting translations are added to available labels of the original ontology already in one or several languages.
Who Software developers and ontology practitioners, who form part of the ontology development team, in collaboration with domain and linguistic experts.	
When Once the conceptual model of the ontology is stable, with the aim of avoiding spending time and resources in a model that is not definitive.	



Ontology Localization with LabelTranslator



- **Task 1:** multilingual linguistic resources (EWN, Wiktionary, IATE) and translation web services (GoogleTranslate, BabelFish)
- **Task 2:** selection can be manual or automatic (per default, all ontology labels are selected)
 - *The local context (direct hypernyms, hyponyms, siblings) of each ontology label is retrieved*
- **Task 3:** techniques used by LabelTranslator
 - *Cross-language term extraction* accessing resources to discover translation equivalents
 - *Sense discovery technique* accessing Watson and EWN (of selected and context labels)
 - *Word sense disambiguation*
- **Task 4:** in the current version, manually performed by the user
- **Task 5:** resulting label translators stored in the LIR

LabelTranslator NeOn plugin

The screenshot displays the LabelTranslator NeOn plugin interface, which is divided into several panes. On the left, the 'Ontology Navigator' pane shows a tree structure of ontology elements, including 'Classes' (Project, Network_of_Exc, Organization, Workpackage, Milestone, Event, Person, Documentation) and 'Object Properties', 'Data Properties', 'Annotation Properties', and 'Datatypes'. Below this is the 'Individuals' pane, which is currently empty. The main pane, titled 'Entity Properties', shows the 'Ontology element' 'Project' with its namespace 'webode://knowledgeweb.semanticweb.org/Documentation+Ontology#'. Below this, the 'Lexical Entries' section contains a table with columns 'Identifier', 'Part Of Speech', and 'Language'. The first row shows 'LexicalEntry-1' with 'English' as the language. To the right of this table is a 'Lexical Entry Relationships' section with a table containing 'Synonyms', 'Translations', 'Antonyms', and 'Scientific names'. Below these are sections for 'Lexicalizations', 'Lexical Entry Senses', 'Usage Context', 'Sources', and 'Notes'. At the bottom, a tabbed interface shows 'Class Restrictions', 'Disjoint Classes 2', 'Class Restrictions 2', 'Disjoint Classes', 'Linguistic Information', 'Annotations', and 'Annotations 2'.

Ontology Navigator

- NewOntologyProject71 [OW]
- NewOntologyProject72 [OW]
- >webode://knowledgeweb.semanticweb.org/Documentation+Ontology#
 - Classes
 - Project
 - Network_of_Exc
 - Organization
 - Workpackage
 - Milestone
 - Event
 - Person
 - Documentation
 - Object Properties
 - Data Properties
 - Annotation Properties
 - Datatypes

Entity Properties

Ontology element

Name: Project

Namespace: webode://knowledgeweb.semanticweb.org/Documentation+Ontology#

Lexical Entries

Identifier	Part Of Speech	Language
LexicalEntry-1		English

Lexical Entry Relationships

Identifier
+ Synonyms
+ Translations
+ Antonyms
+ Scientific names

Lexicalizations

Lexical Entry Senses

Usage Context

Sources [Lexical Entry](#) [Lexicalization](#) [Usage Context](#)

Notes [Lexical Entry](#) [Lexicalization](#) [Usage Context](#)

Class Restrictions **Disjoint Classes 2** **Class Restrictions 2** **Disjoint Classes** **Linguistic Information** **Annotations** **Annotations 2**