



# Multilingual Representation in Ontologies

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<http://www.oeg-upm.net>

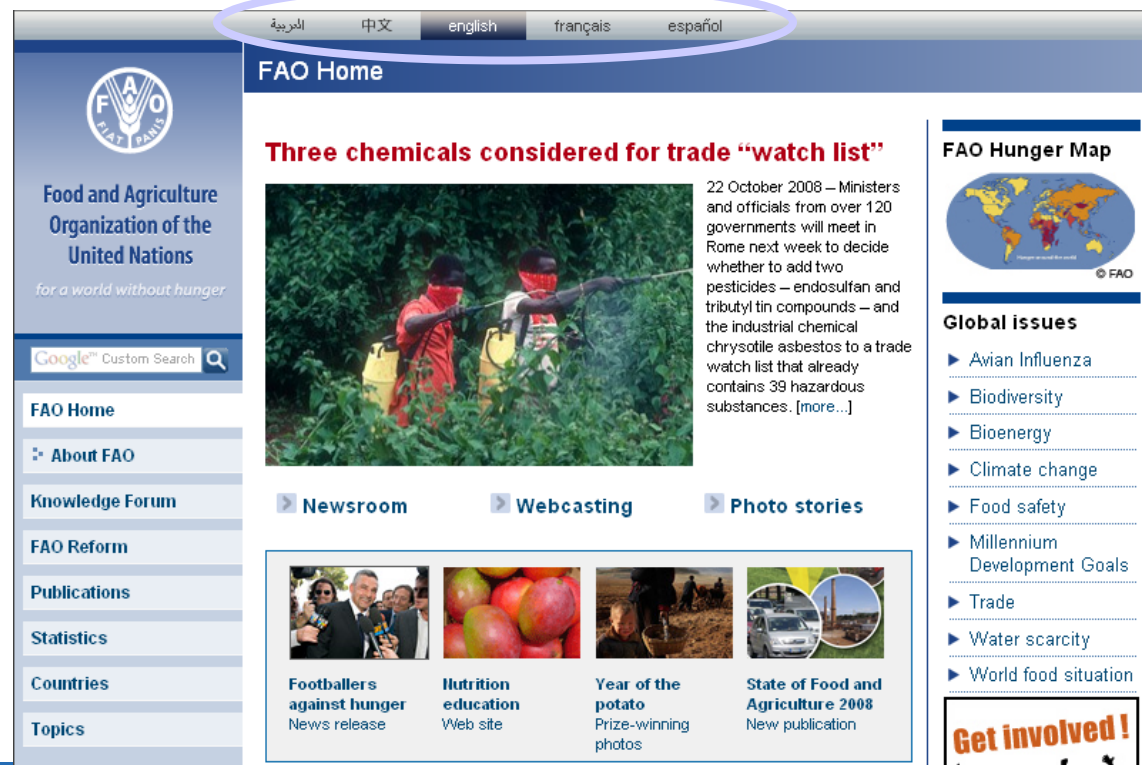
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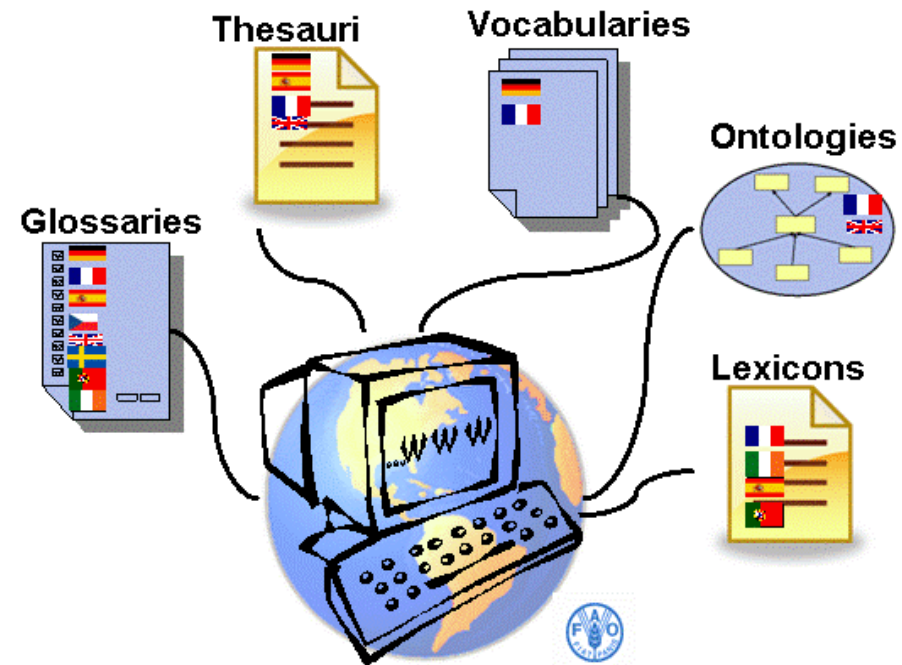
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Event: ATHENS 2010

- Institutions and organizations worldwide have to **manage** information in different natural languages
- Their **sources of information are multilingual**
- Information results have to be **customized** for different users in different languages



- Linguistic resources have different **granularity** levels (some contain semantically related terms, others lists of terms and definitions, etc.)
- Some are more **complete** in certain languages than in others
- Changes in certain modules of a resource in a specific language are **not propagated** to the rest of languages or resources containing similar information



# How could ontologies help?

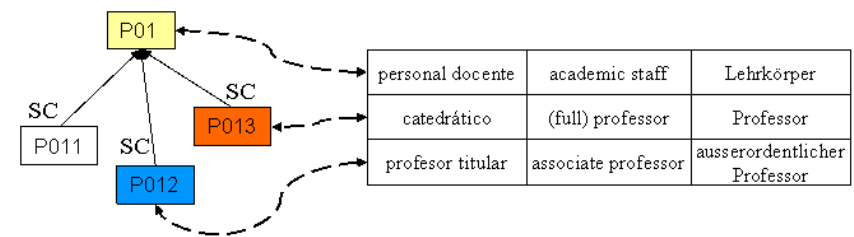
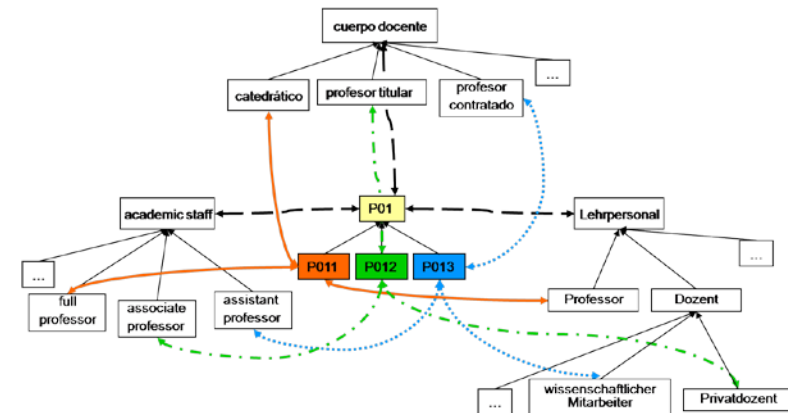
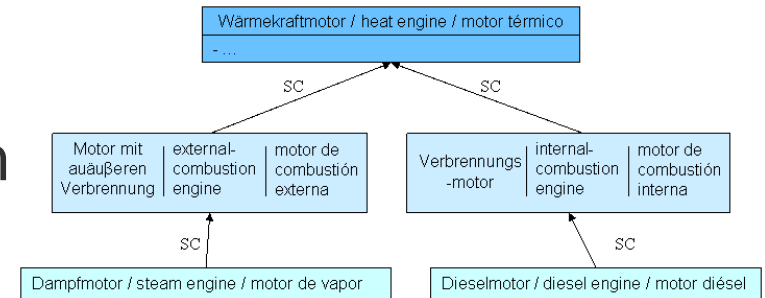


- How could ontologies help?
- Providing the necessary “glue” among the different resources by capturing knowledge and facilitating the alignment of heterogeneous resources in multiple languages
- BUT...
- How to deal with the cultural and subjective discrepancies in the representation of agricultural information?

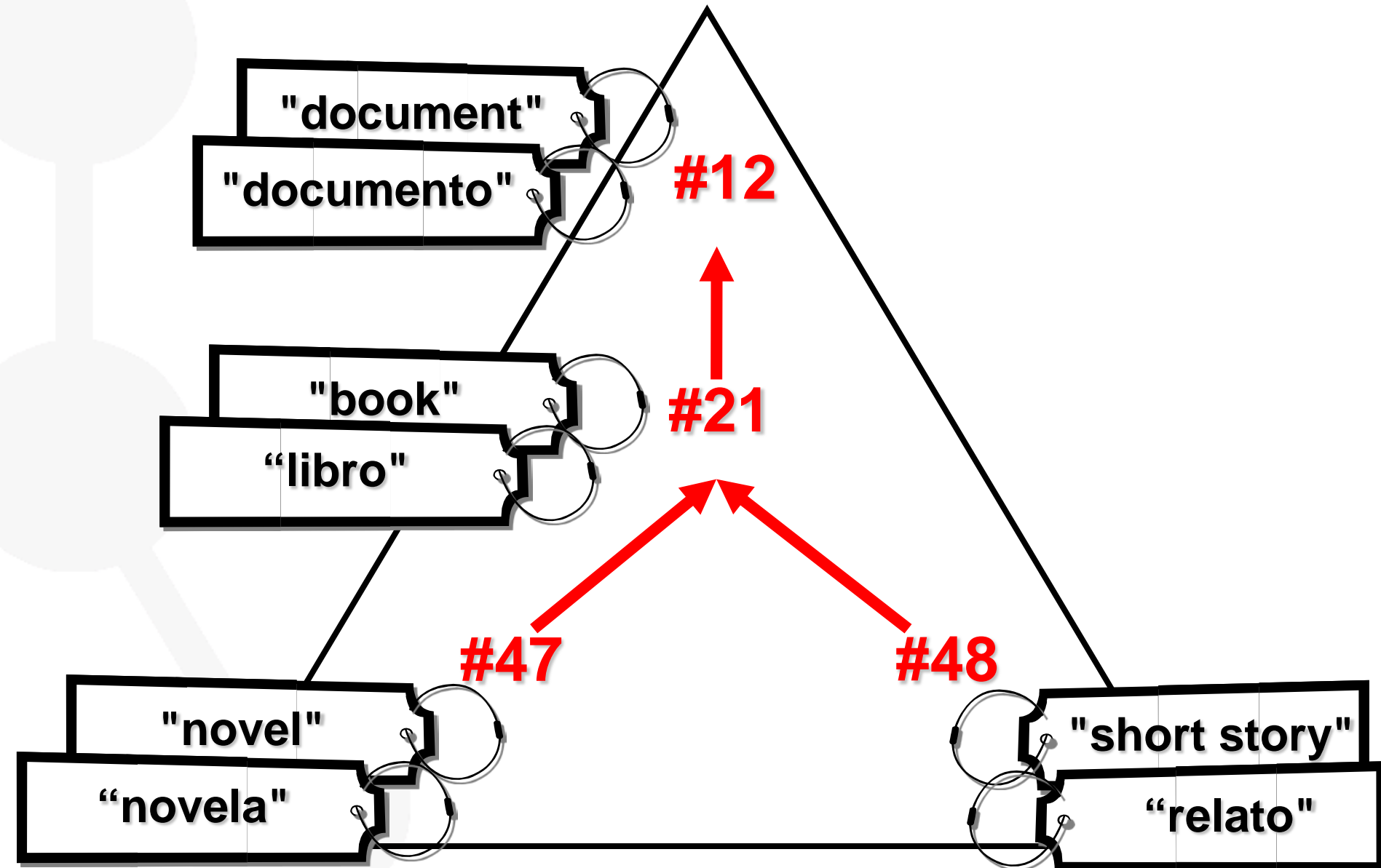


How to represent  
multilinguality  
in ontologies??

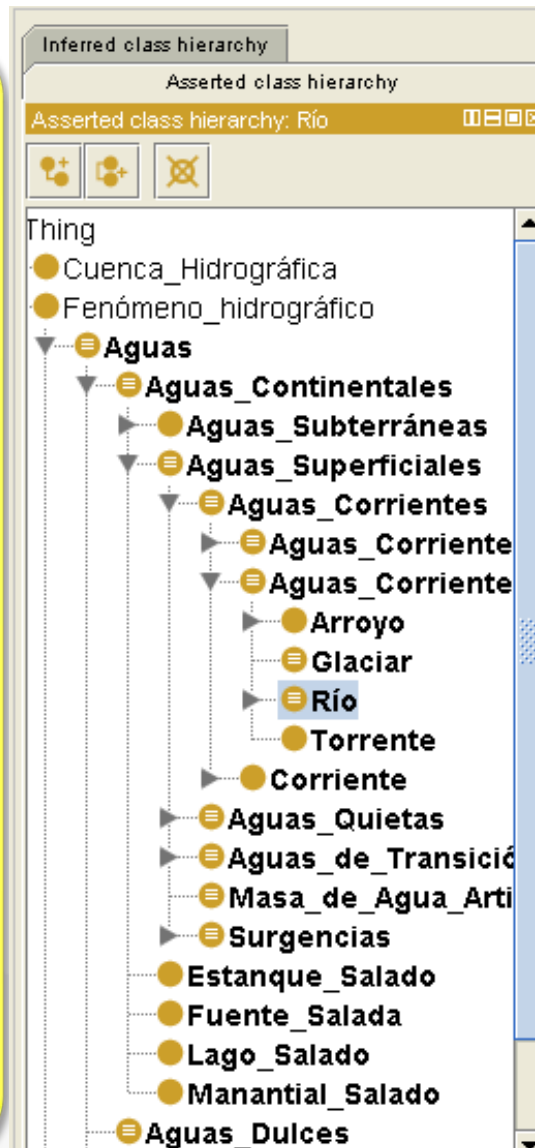
- RDF(S) and OWL labeling system
- Mapping approaches
  - Interlingual approach
- Association of external model to ontology meta-model
  - LingInfo, LexOnto, LexInfo
  - Linguistic Watermark
  - LIR



# RDF(S) and OWL labeling system



- Originally in ES (URI local names)
- *rdfs:labels* in ES and EN
- Definitions or glosses in ES and EN by means of *rdfs:comment*
- Dublin Core metadata:
  - provenance
  - source
- RDF(S) language tagging (@en)



Class Annotations

Class Usage

Annotations: Río

Annotations +

**source**

"Water Framework Directive. European Union"@en

**provenance**

"River - Water Framework Directive. European Union"@en

**provenance**

"Curso de agua principal - Catalogo de fenomenos. Proyecto GEOALEX"@es

**provenance**

"Río - Directiva Marco del Agua. Union Europea"@es

**comment**

"A body of inland water flowing for the most part on the surface of the land but which may flow underground for part of its course."@en

**comment**

"Masa de agua continental que fluye en su mayor parte sobre la superficie del suelo, pero que puede fluir bajo tierra en parte de su curso"@es

**label**

"River"@en

**label**

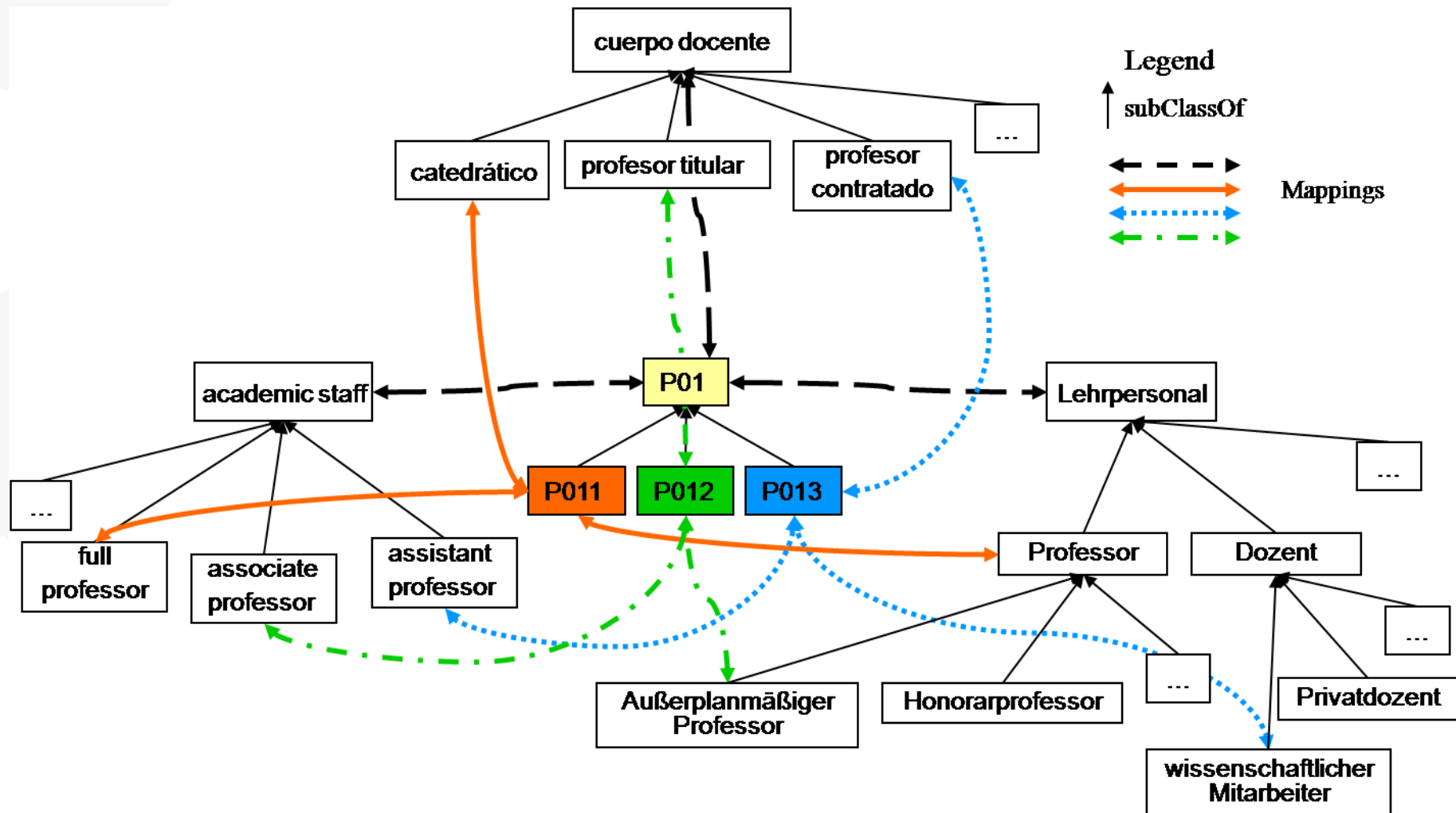
"Curso de agua principal"@es

**label**

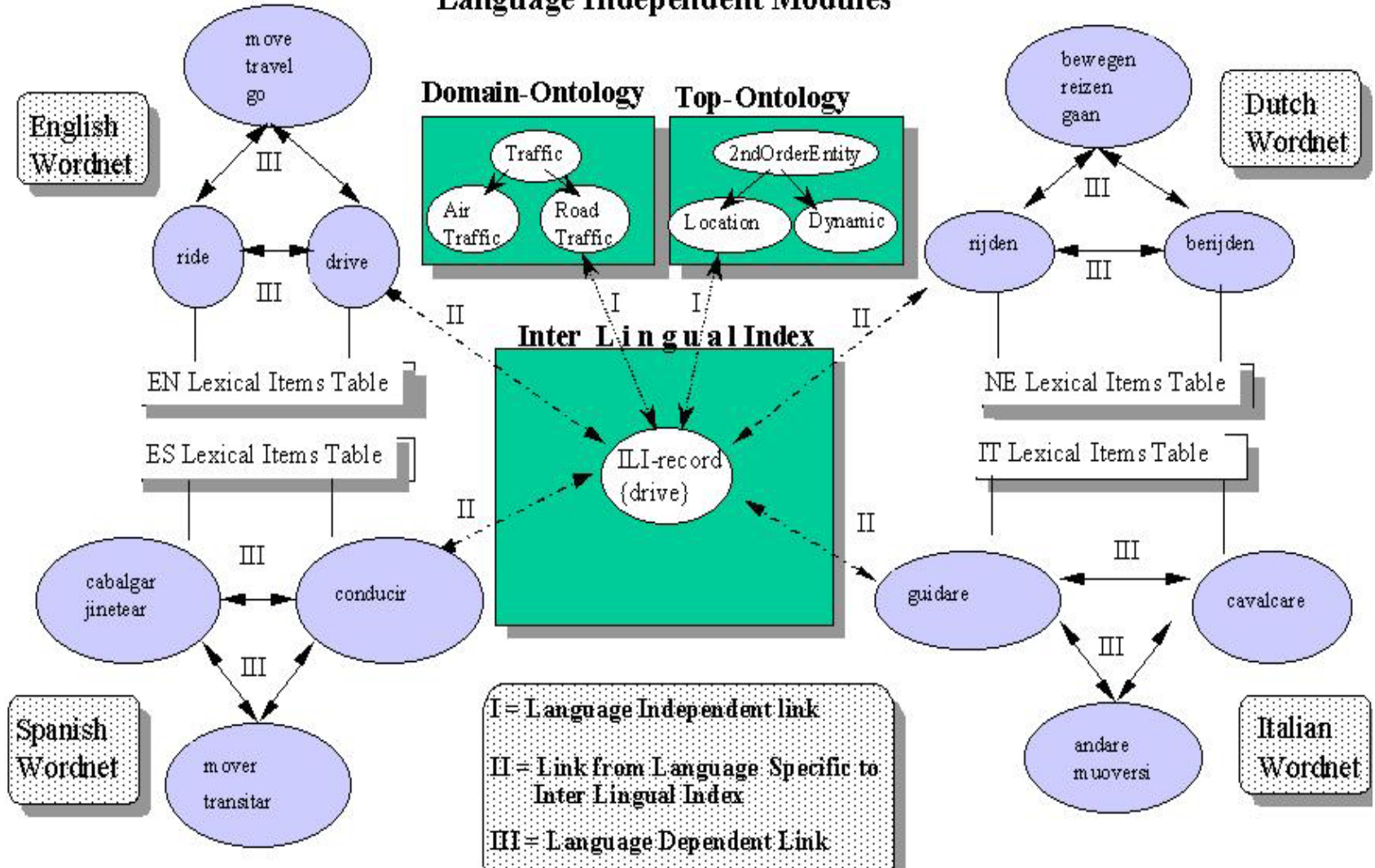
"Curso fluvial"@es



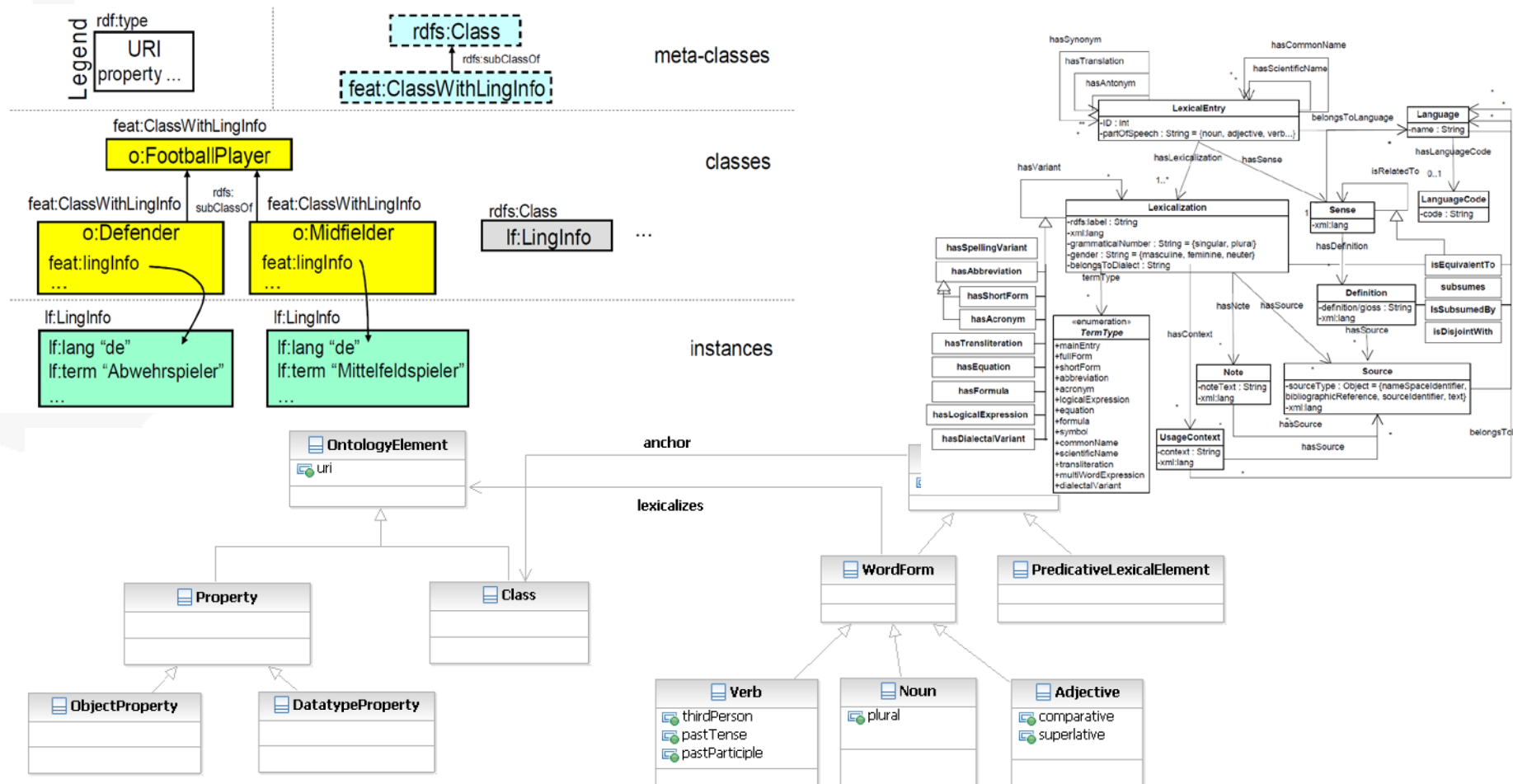
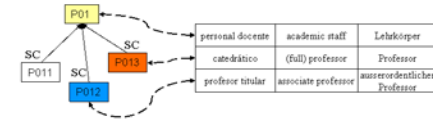
# Mapping Approach



## Language Independent Modules



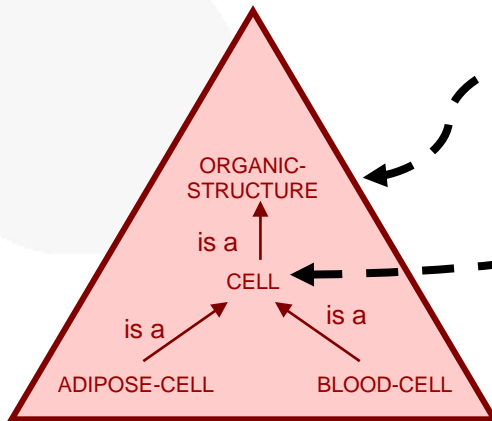
- Association of external model to ontology meta-model
  - LingInfo, LexOnto, LIR



# Ontologías para traductores y terminólogos



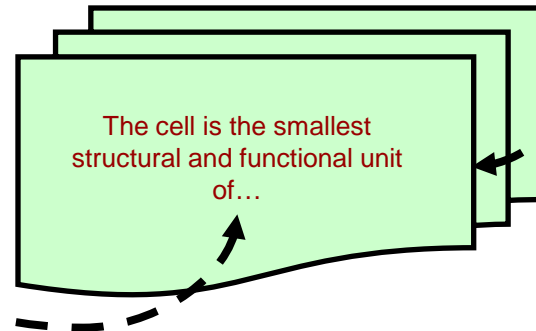
Ontology



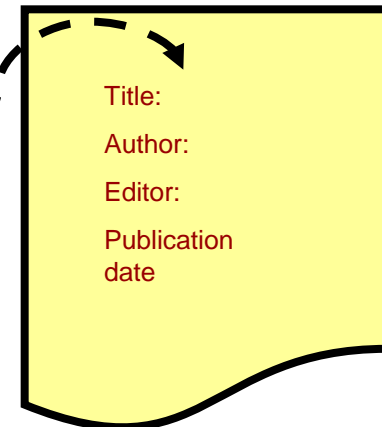
Term base


EN	ES	CAT
organic structure	estructura orgánica	estructura orgànica
cell	célula	cèl·lula
blood-cell	célula sanguínea	cèl·lula sanguínia

Corpus



Entities base









**Genoma**

Banco de Conocimiento sobre el Genoma Humano

**BT** banco terminológico

[Sugerencias](#) | [Mapa](#) | [Ayuda](#)










[Nueva búsqueda](#)

Términos de búsqueda: **célula (Español)** Condición de búsqueda: **Lema exacto**

## Resultado de la Búsqueda

**Términos encontrados (1)**

**célula (CELL)**

### Información terminológica

**Término:** célula

**Concepto:** CELL

**Idioma:** Español

**Definición:** Unidad fundamental, estructural y funcional de los seres vivos, algunos de los cuales, como las bacteria, son unicelulares. [Ref .1](#)

**Categoría gramatical:** nombre

**Género:** femenino

**Contextos:** La célula es la unidad vital, en el sentido de que cada una de ellas tiene todas las propiedades de los seres vivos, incluida la posibilidad de reproducción y de autorregulación. [Ref .2](#)

Todos los organismos están formados por células, las células están delimitadas por una envoltura externa, cada célula es una unidad viva y, al mismo tiempo, integrada en la vida del organismo y toda célula procede de otra célula. [Ref .3](#)

La célula es la unidad estructural y funcional más pequeña de los organismos vivos. [Ref](#)

LexicalEntries in  
ES, EN, FR,  
and CAT

The screenshot displays the hydrOntology interface. On the left, the 'Ontology Navigator' shows a hierarchical tree of hydrological phenomena. The 'Aguas' (Water) category is expanded, showing sub-categories like 'Aguas\_Continentales', 'Aguas\_Subterráneas', 'Aguas\_Superficiales', and 'Aguas\_Corrientes'. Under 'Aguas\_Corrientes', 'Aguas\_Corrientes\_Naturales' is expanded, showing 'Arroyo', 'Río', and 'Torrente'. The 'Río' entry is selected. Below the tree, the 'Individuals' panel is visible. On the right, the 'Entity Properties' panel shows the URI for the selected entity: '<http://www.owl-ontologies.com/Ontology1'. Below this, the 'Lexical Entries' section displays a table of lexical entries. The table has three columns: 'Identifier', 'Part Of Speech', and 'Language'. The entries are listed as follows:

Identifier	Part Of Speech	Language
LexicalEntry-3	noun	Spanish
LexicalEntry-2	noun	Spanish
LexicalEntry-4	noun	English
LexicalEntry-6	noun	French
LexicalEntry-1	noun	Spanish
LexicalEntry-5	noun	French
LexicalEntry-7	noun	Catalan

Below the table, three blue buttons are shown: 'Rivière', 'Fleuve', and 'Riu'. Arrows point from these buttons to the 'LexicalEntry-6' row in the table, indicating that this entry corresponds to the French word 'Fleuve' and the Catalan word 'Riu'.

Below the table, there are several expandable sections:

- Lexicalizations
- Lexical Entry Senses
- Usage Context
- Sources
- Notes

- The LIR is supported by the **LabelTranslator** plugin
- LexicalEntries in ES, EN, FR, and CAT
- Sense relations
- Definitions, Sources, Notes and UsageContext

Identifier

URI:
<http://www.owl-ontologies.com/Ontology1175677975.owl#Río>

LexicalEntry-6	noun	French	✗		
LexicalEntry-1	noun	Spanish	✗		
LexicalEntry-5	noun	French	✗		
LexicalEntry-7	noun	Catalan	✗		

Lexicalizations

Entries

Label	G. Number	Gender	Dialect	Language	
Rivière	Singular	Feminini		French	✗

Lexical Entry Senses

Entries

Identifier	Language			
Sense-1	French	✗		

Definitions

Definition	Language
Cours d'eau moyennement abondant qui se jette dans un fleuve, dans la mer ...	French