



Annotation

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28660 Boadilla del Monte, Madrid, Spain

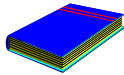
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Main References



Gómez-Pérez, A.; Fernández-López, M.; Corcho, O. **Ontological Engineering**. Springer Verlag. 2003

Chapter 5: Ontology tools



Corcho, O.

Ontology-based document annotation: trends and open research problems

International Journal of Metadata, Semantics and Ontologies 1(1):47-57. 2006



Handschuh S, Staab S (2003)

Annotation for the Semantic Web. IOS Press

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1. Ontology-based Annotation	30'
2. Web Page Annotation	60'
3. Database Annotation	90'
3.1 Approaches for database annotation	
3.2 R2O and ODEMapster	
3.3 Practical Example: NeOn Toolkit	

What is the metadata of this HTML fragment?

Based on Dublin Core

The *contributor* and *creator* is the flight booking service “www.flightbookings.com”.

The *date* would be January 1st, 2003, in case that the HTML page has been generated on that specific date.

The *description* would be something like “flight details for a travel between Madrid and Seattle via Chicago on February 8th, 2004”.

The document *format* is “HTML”.

The document *language* is “en”, which stands for English

Flight details

Outbound

Leaving from **Madrid** - Barajas - Spain

on Saturday 08 February 2003 at **11:50**

Arriving in **Chicago** - O'Hare International - United States of America
same day at **14:10**

Airline: American Airlines

Flight No. AA 7615

Type of aircraft: Airbus Industrie A340 All Series PAX/H

Leaving from **Chicago** - O'Hare International - United States of America

on Saturday 08 February 2003 at **16:48**

Arriving in **Seattle** - Seattle/Tacoma International - United States of America
same day at **19:23**

Airline: American Airlines

Flight No. AA 1605

Type of aircraft: non referenced/B

Based on thesauri

Madrid is a reference to the term with ID 7010413 in the thesaurus, which refers to the city of Madrid in Spain.

Spain is a reference to the term with ID 1000095, which refers to the kingdom of Spain in Europe.

Chicago is a reference to the term with ID 7013596, which refers to the city of Chicago in Illinois, US.

United States of America is a reference to the term “United States” with ID 7012149, which refers to the US nation.

Seattle is a reference to the term with ID 7014494, which refers to the city of Seattle in Washington, US.

Based on ontologies

Concept instances relate a part of the document to one or several concepts in an ontology. For example, “Flight details” may represent an instance of the concept `Flight`, and can be named as `AA7615_Feb08_2003`, although concept instances do not necessarily have a name.

Attribute values relate a concept instance with part of the document, which is the value of one of its attributes. For example, “American Airlines” can be the value of the attribute `companyName`.

Relation instances that relate two concept instances by some domain-specific relation. For example, the flight `AA7615_Feb08_2003` and the location `Madrid` can be connected by the relation `departurePlace`

Annotation

assert facts using terms (*metadata in RDF*)
Represent terms and their relationships (*ontology in RDFS/OWL*)

The screenshot shows the Schizophrenia Research Forum website. Yellow boxes with arrows point to specific features: 'News' points to the 'Research News' section; 'Videocast' points to the 'Live NIH Videocasts' section; 'Grant Application' points to the 'Preparing for Electronic Grant Application' link; 'Research' points to the 'Current Papers—Show Us the Nuggets!' link; 'Events' points to the 'SRF CALENDAR' section; 'Gene Database' points to the 'Schizophrenia Gene' logo; and 'Organisation' points to the 'SRF COMMUNITY' section.

SCHIZOPHRENIA RESEARCH FORUM
A CATALYST FOR CREATIVE THINKING

Home | Your Profile | Become a Member | Contact Us | Get Newsletter

POWERED BY Google

SEARCH SITE: GO

SEARCH PAPERS > | SEARCH INDEX >

WHAT'S NEW

Recent Updates

SRF PAPERS

Current Papers
SRF Recommends
Search All Papers
Search Comments

NEWS

Research News

FORUMS

Current Hypotheses
Idea Lab
Online Discussions
Interviews

RESOURCES

Research Tools
Jobs
Conferences
Journals
General Information

SRF COMMUNITY

Member Directory
R
In
A

Mission
History
SRF Team
Advisory Board
Support Us
How to Cite

Research News

November 26, 2006

- [New Human Genome Map Shows Extensive Copy Number Variation](#)
23 November 2006. Having more, or fewer, than the normal number of gene copies may be a major factor in human disease ...
- [Playing on Without AKT1: Subtle Cortical Deficits Suggest Vulnerabilities](#)
21 November 2006. The enzyme AKT1 has been implicated in both schizophrenia and bipolar disorder. A new study in the November 7 issue of PNAS finds that...
- [SfN Atlanta: Working Both Sides of the Synapse in Mood Disorders](#)
14 November 2006. In the second of her meeting missives from the Neurosciences 2006 meeting in Atlanta, Susannah F. Locke of the University of Pennsylvania reports on...

GO TO ALL RESEARCH NEWS

Spotlight

- [Current Papers—Show Us the Nuggets!](#)
Our search of PubMed pulled in 72 papers related to schizophrenia or related basic science. But where are the nuggets of new information that will move the field a step forward? Only you can help us identify the important findings in your subspecialty.

Please help us create an online discussion community by picking a paper from the past three, or even six months, that really deserves a comment, and then writing that comment today. If you have time to sketch out your impressions in a few paragraphs, that would be valuable ... If you only have time for the 3 sentence "bottom line," that also transfers knowledge within the community. On to [the papers](#) ...

Live NIH Videocasts

- [NIH Director Advisory Committee](#)
Friday, December 01, 2006, 8:30 AM
- [Orienting Attention in the Human Brain](#)
Monday, December 04, 2006, 12:00 PM
- [Preparing for Electronic Grant Application](#)
Tuesday, December 05, 2006, 9:00 AM

SRF CALENDAR

To be announced.

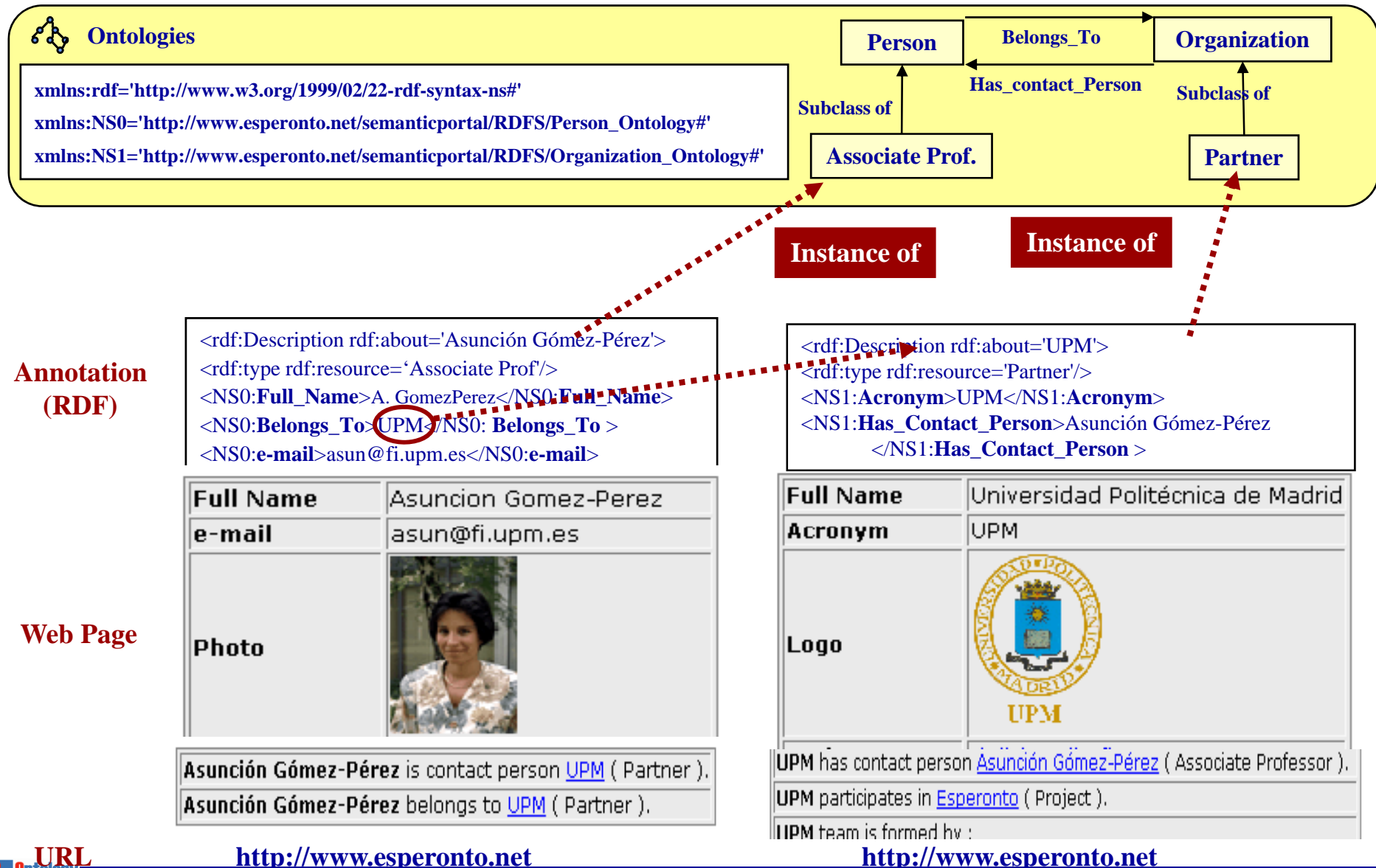
DESPERATELY SEEKING

- [Antibodies](#)
- [Collaborators](#)

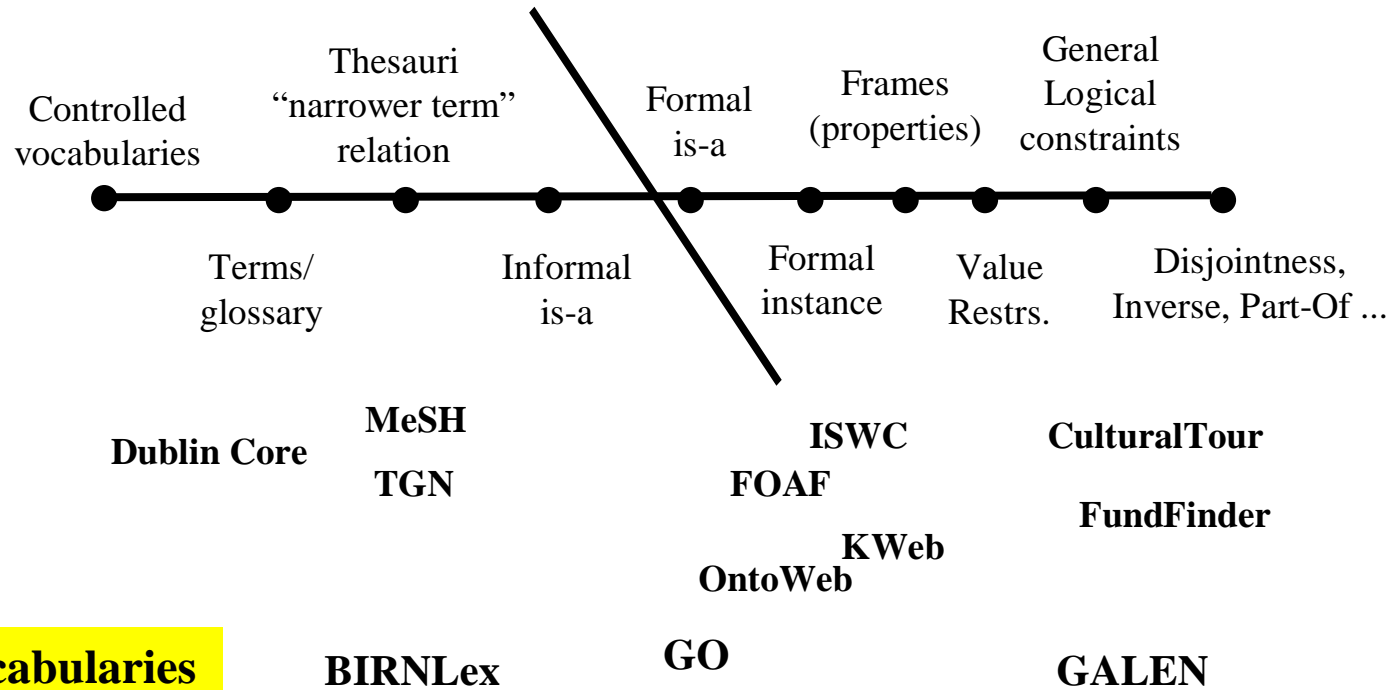
Schizophrenia Gene

O. Corcho, B. Villazón, A. Gómez-Pérez

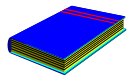
Ontologies and Metadata



Types of vocabularies. Formality



Add your vocabularies here →



Lassila O, McGuinness D. The Role of Frame-Based Representation on the Semantic Web. Technical Report. Knowledge Systems Laboratory. Stanford University. KSL-01-02. 2001.

The early days of annotation in the Web

- The main objective in the early days was the agreement on how to include **annotations on the Web**

- (KA)²
- SHOE (Simple HTML Ontology Extension)

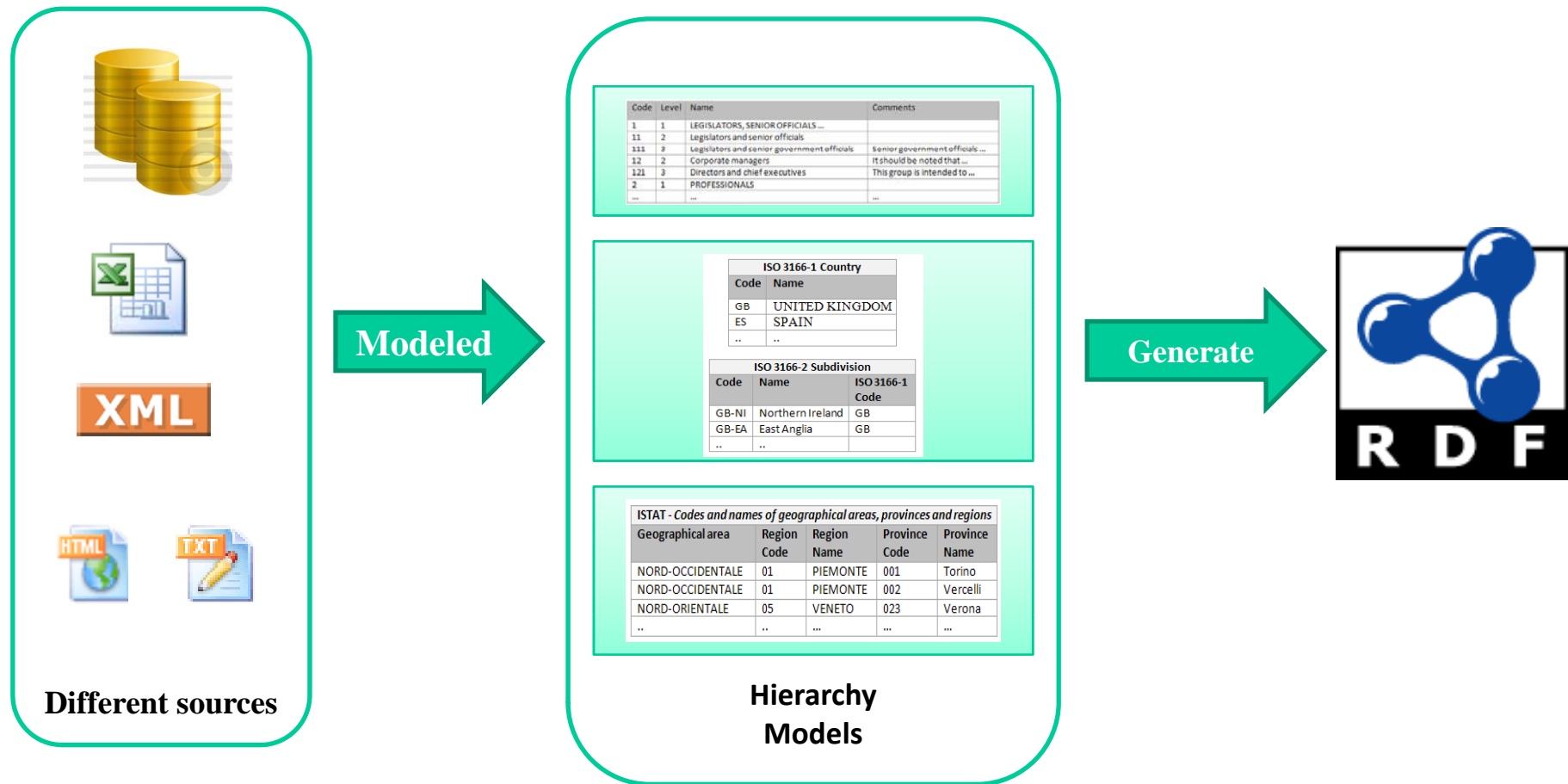
– ...

```
<html>
<head><TITLE> Richard Benjamins </TITLE>
<a ONTO="page:Researcher"> </a>
</head>

<H1> <A HREF="pictures/id-rich.gif">
<IMG align=middle SRC="pictures/richard.gif"></A>
<a ONTO="page[photo=href]"
HREF="http://www.iiia.csic.es/~richard/pictures/richard.gif" ></a>
<a ONTO="page[firstName=body]">Richard</a>
<a ONTO="page[lastName=body]">Benjamins </a>
</h1> <p>

<A ONTO="page[affiliation=body]" HREF="#card">
Artificial Intelligence Research Institute (IIIA)</A> -
<a href="http://www.csic.es/">CSIC</a>, Barcelona, Spain <br>
and <br>
<A ONTO="page[affiliation=body]" HREF="http://www.swi.psy.uva.nl/">
Dept. of Social Science Informatics (SWI)</A>
-
<A HREF="http://www.uva.nl/uva/english/">UvA</A>, Amsterdam, the
Netherlands
```


Motivation



Annotation tools

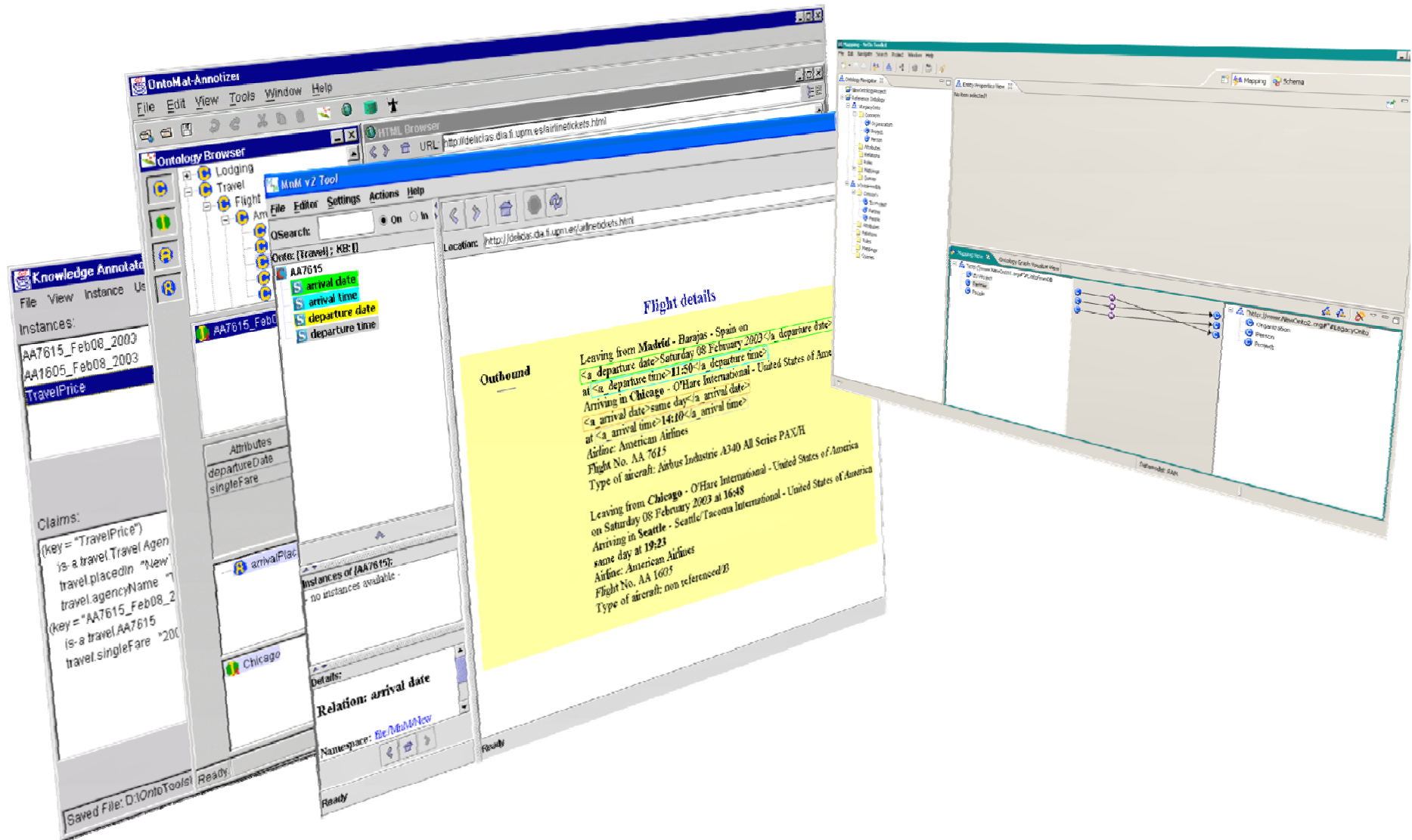


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1. **Ontology-based Annotation**
2. **Web Page Annotation**
3. **Database Annotation**
 - 3.1 **Approaches for database annotation**
 - 3.2 **R2O and ODEMapster**
 - 3.3 **Practical Example: NeOn Toolkit**

Web Page Annotation. Dimensions

- **Sources**

- Source type
 - Text: HTML, XML, PDF, etc.
 - Multimedia: images, video, audio, etc.
 - Web Services
- Origin
 - Static: files
 - Dynamic: databases and forms

- **Used technologies**

- Knowledge extraction
 - NLP, IE, Layout
- Wrapper generation
 - Toolkits, ML, Browsing

- **Annotation Process**

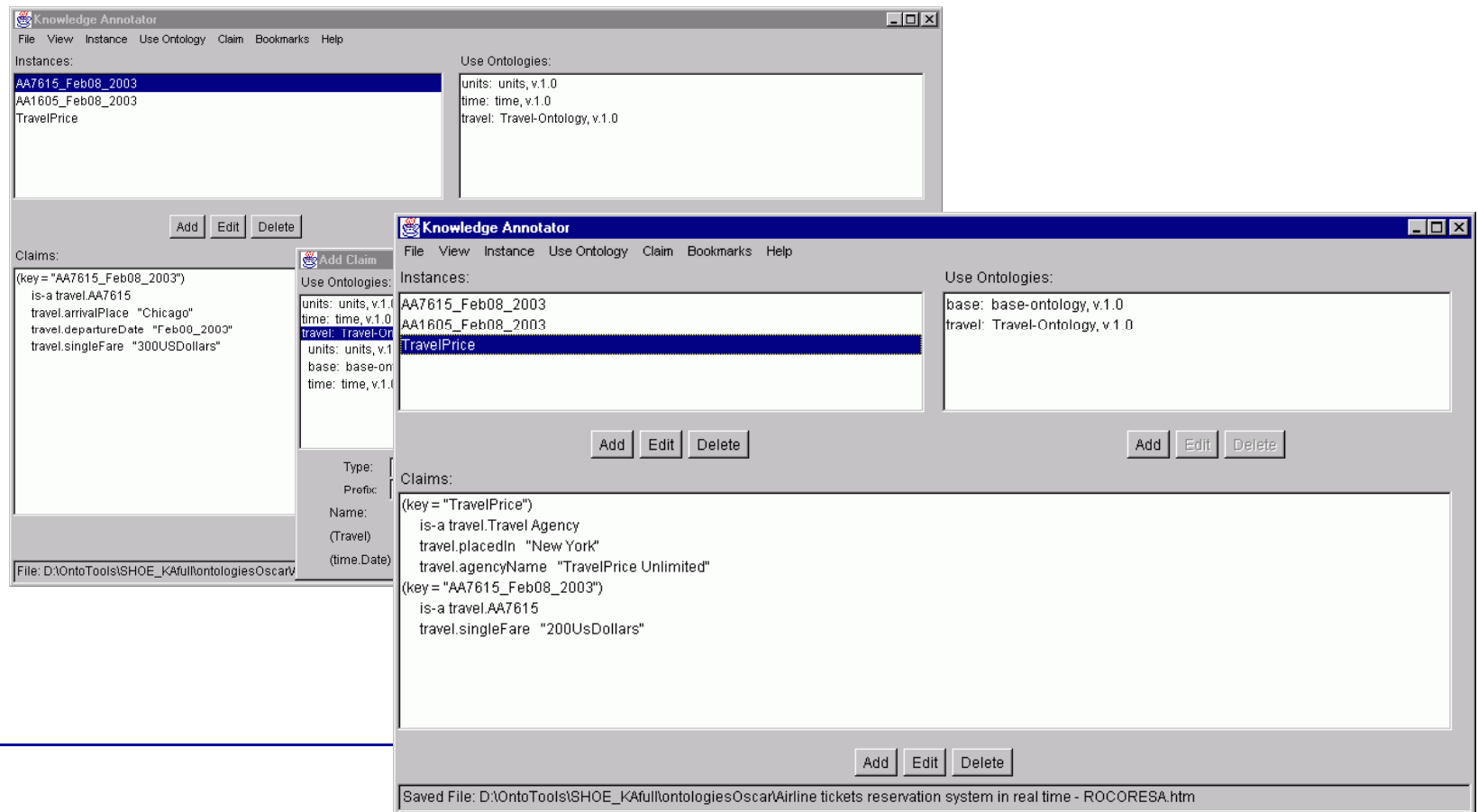
- Maintenance (adaptivity to changes in the sources)
 - Verification
 - Robustness
 - Auto-adaptivity
- Annotation Supervision
 - Manual
 - Supervised (semi-automatic)
 - Unsupervised (automatic)

- **Degree of formality**

- Web 2.0 tagging
- Ontology-based

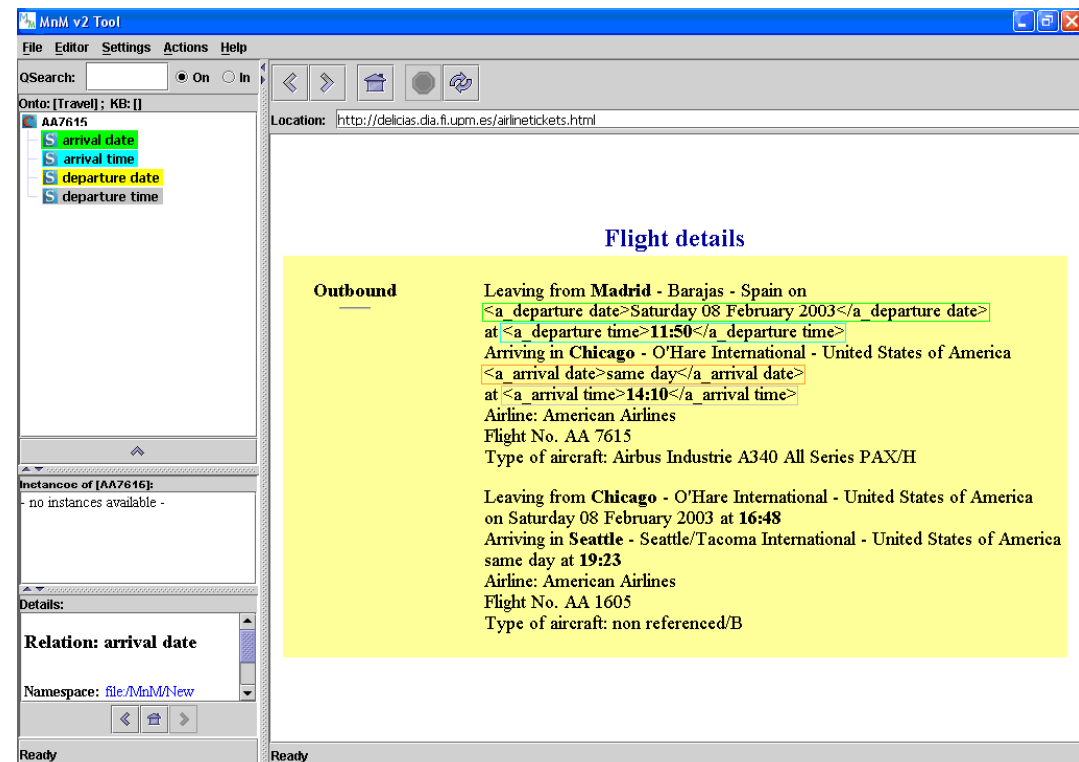
Annotation tools. SHOE Knowledge Annotator

- Standalone application with no Web browser
- Manual annotation
- SHOE



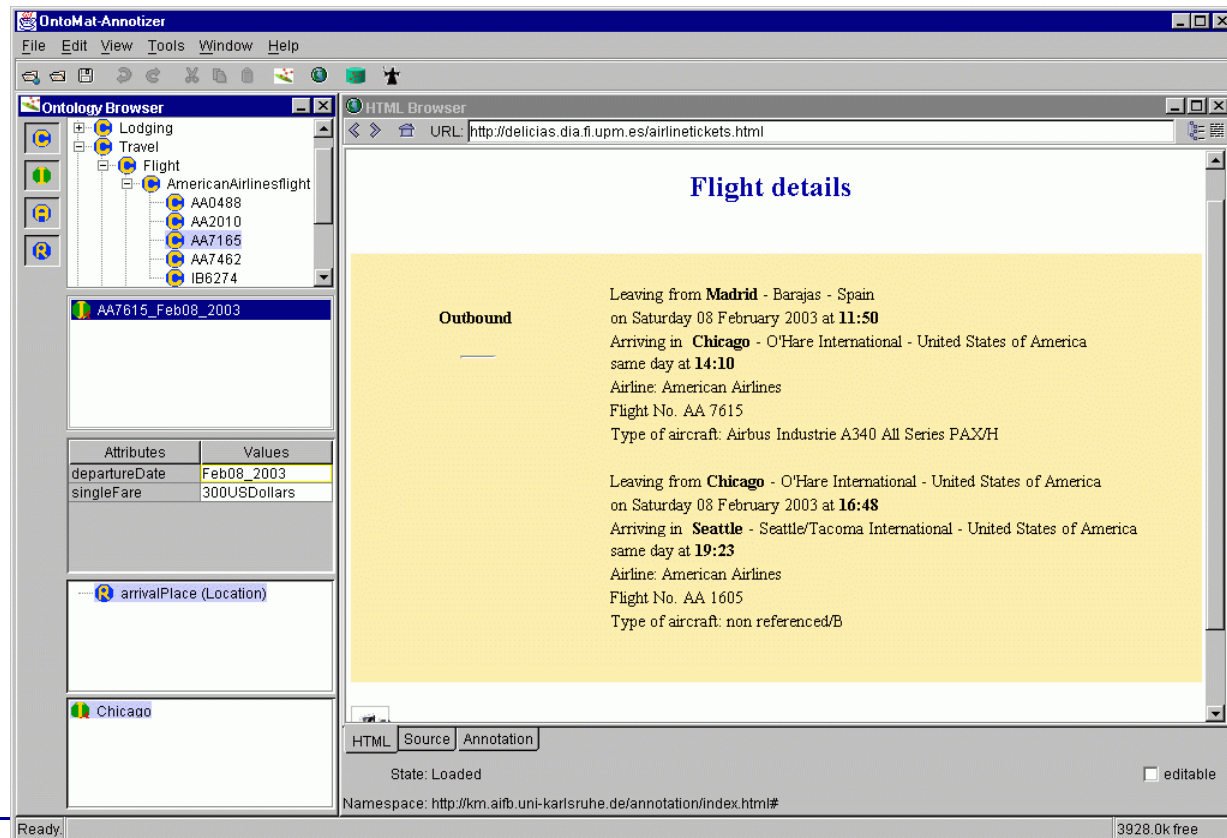
Annotation tools. MnM

- Standalone application
- Manual annotation with drag&drop
- Semi-automatic annotation with information extraction tools (Amilcare)
- OCML, RDF and XML



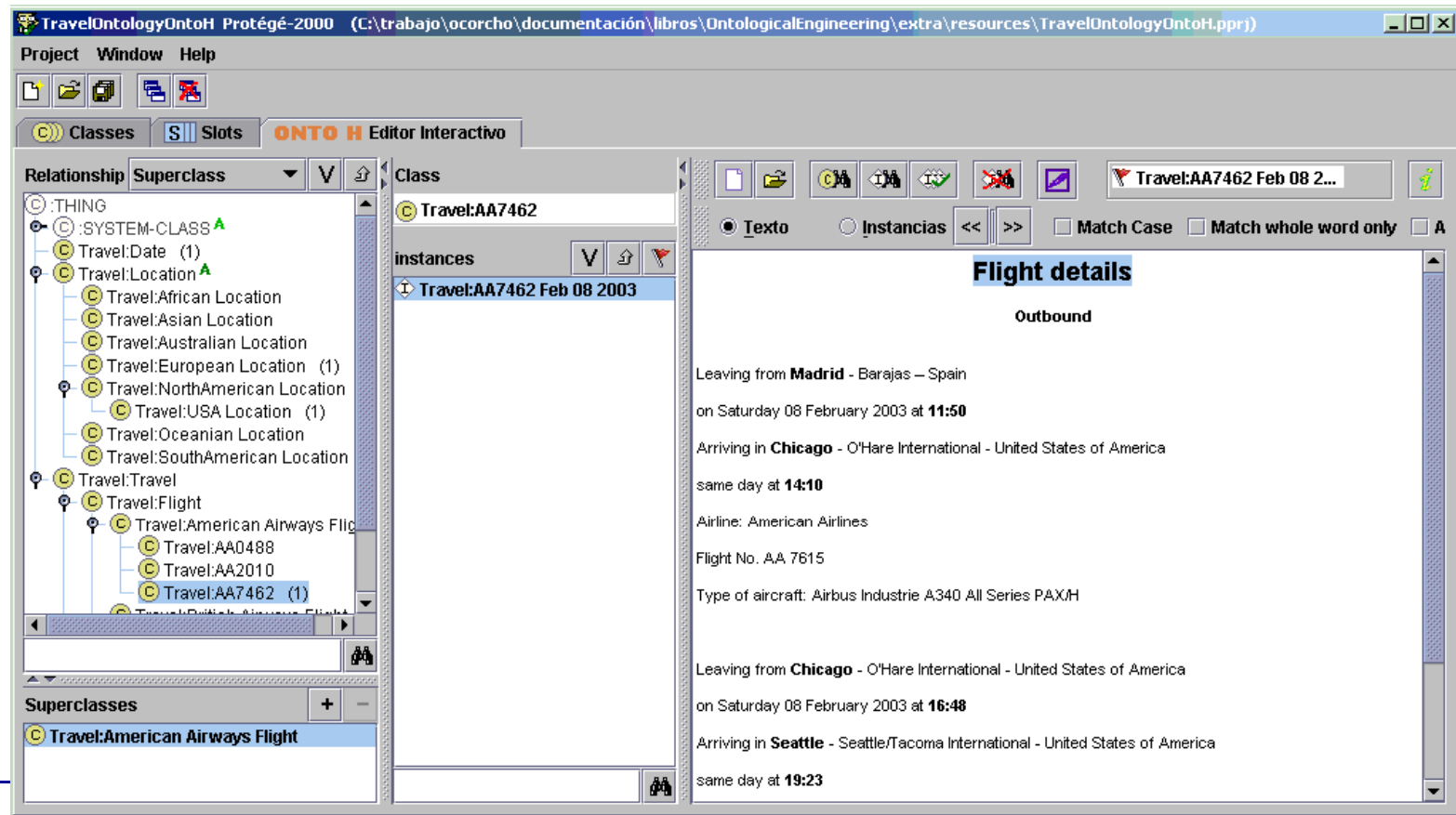
Annotation tools. OntoMat

- Standalone application
- Manual annotation with drag&drop
- RDF and OWL



Annotation tools. ONTO-H

- Protégé plug-in
- Manual annotation with drag&drop
- On cascade annotation, with annotation rules



Annotation tools. AeroSWARM

- Web server for any Web document
- Automatic annotation with predefined ontologies: OpenCyc, SUMO and AeroSWARM
- RDF

LOCKHEED MARTIN

SPACE SYSTEMS > MANAGEMENT & DATA SYSTEMS
DAML UBOT Project

Team Members

Papers



AeroSWARM is a [web service](#) that takes a web page as an input and generates OWL markup. The service analyzes the text of the document and extracts generic information such as: people, places, organization, time, nationality, etc. You can select an ontology for markup from the list of popular ontologies shown below. (This capability will be available as soon as appropriate general purpose OWL ontologies are available.)

If you wish to use an ontology for markup other than the ontologies listed below, this [utility](#) can help you create a translation ontology that maps the terms from one ontology to another. The [AeroSWARM Markup Converter](#) takes a pre-existing markup and the translation ontology that you created by the ontology mapping utility and converts it to your preferred ontology.

Try generating your own OWL markup with AeroSWARM!

Enter the URL: [view sample webpage](#)

Multi-page option ([What is this?](#))

☒ Mark up only this webpage [View AeroSWARM Markup](#)

☐ Mark up this page and linked pages [View Consolidated Entries](#)

☐ Mark up this page and all linked pages

☐ Check consistency of markup ([W](#))

Ontology selection:

☐ custom

☒ [OpenCyc Ontology](#)

☐ [Sumo Ontology](#)

☐ [AeroSWARM Ontology](#)

Persons:

[PAX](#)

Organizations:

[HareInternational](#)

[TacomaInternational](#)

[AirbusIndustrie](#)

[AmericanAirlines](#)

Time Values:

[08February2003](#)

[1605](#)

[Saturday](#)

[14:10](#)

[16:48](#)

[19:23](#)

[11:50](#)

Organization: HareInternational

Also Known As: [Hare International \(source\)](#)

Located In: [UnitedStatesofAmerica \(source\)](#)

Flight details

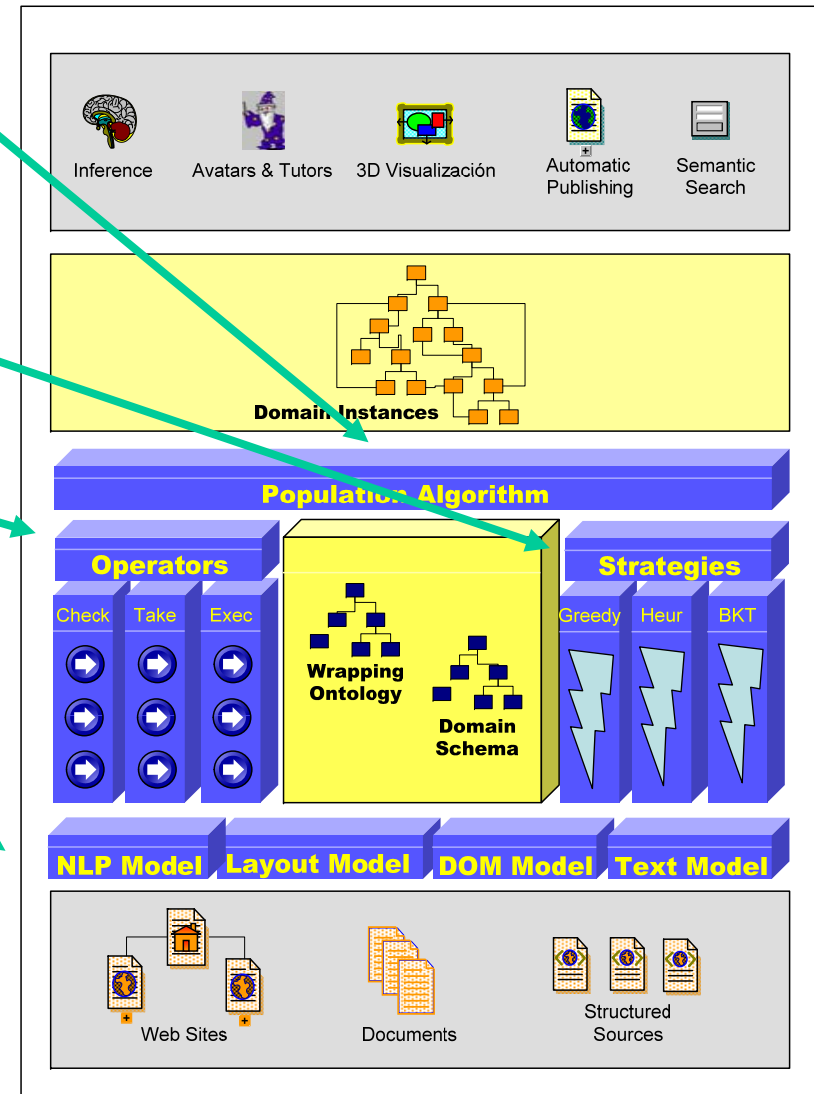
Outbound

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Type of aircraft: Airbus Industrie A340 All Series PAX/H

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on Saturday 08 February 2003 at **16:48**
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same day at **19:23**

Annotation tools. Knowledge Parser

- **Semantic-based population**
 - Explicit wrapping knowledge
 - Bootstrapping
- **Strategies**
 - Heuristic
 - Backtracking
 - etc.
- **Operators**
 - In-Row
 - Is-Propor-Name
 - Is-Integer-Greater-Than, etc.
- **Pre-processing**
 - Natural language
 - Layout
 - XML/DOM
 - Plain text





4.2.1) Documentación administrativa:

- a) Original o fotocopia compulsada del documento acreditativo de la personalidad de la entidad solicitante.
- b) Poder notarial bastante del representante de dicha entidad, o documentación acreditativa de dicha cualidad.
- c) **Fotocopia compulsada de la tarjeta de identificación fiscal de la Entidad.**
- d) Original o copia con el carácter de auténtica o fotocopia compulsada de los Estatutos debidamente legalizados.
- e) **Original o fotocopia compulsada de la siguiente documentación acreditativa del cumplimiento de Obligaciones Tributarias y de Seguridad Social:**

Recibo del año anterior a la convocatoria del Impuesto sobre actividades económicas, o en su caso, exención concedida por el órgano competente. Certificaciones administrativas expedidas por las Administraciones correspondientes de la Administración Tributaria y de la Tesorería Territorial de la Seguridad Social, de conformidad con lo establecido en el artículo 81 de la Ley General Presupuestaria y en su caso, exenciones del Impuesto del Valor Añadido y del Impuesto de Sociedades.

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    anterior a la convocatoria del Impuesto sobre actividades económicas, o en su caso, exención
    concedida por el órgano competente. Certificaciones administrativas expedidas por las Administraciones correspondientes de la Agencia Estatal de Administración
    Tributaria y de la Tesorería Territorial de la Seguridad Social, de conformidad con lo establecido en
    el artículo 81 de la Ley General Presupuestaria y en su caso, exenciones del Impuesto del Valor
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Wikis semánticos

Presentación de RDF
Rhizome
Edición de páginas HTML + RDF
IkeWiki
SemanticMediaWiki
SemPerWiki
SweetWiki
WikSAR
Inclusión de instancias de ontologías
OntoWiki
COW
Anotación atributo-valor no basada en ontologías
DiamondWiki

article discussion edit history

Oscar Corcho

This person attended ESWC2006. This person attended ISWC2006.

Oscar Corcho

Affiliation: University of Manchester

Homepage: homepages.cs.manchester.ac.uk/~ocorcho/

PC member of: ESWC2006, ISWC2006, SEBIZ2006

No known OC memberships.

See also: [FOAF](#)

Facts about Oscar Corcho — Click + to find similar pages.

Relations to other articles

Member of: University of Manchester +

Affiliation: University of Manchester +

Participant of: ESWC2006 +, and ISWC2006 +

Attribute values

Name: [Oops! No type defined for attribute]

Homepage: <http://homepages.cs.manchester.ac.uk/~ocorcho/> +

See also: <http://homepages.cs.manchester.ac.uk/~ocorcho/foaf.rdf> +

Category: Person

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Semantic Wikipedia

Escritorios semánticos (incluyendo e-mail semántico)

*Haystack
Gnowsif
D-Bin
OpenIris*

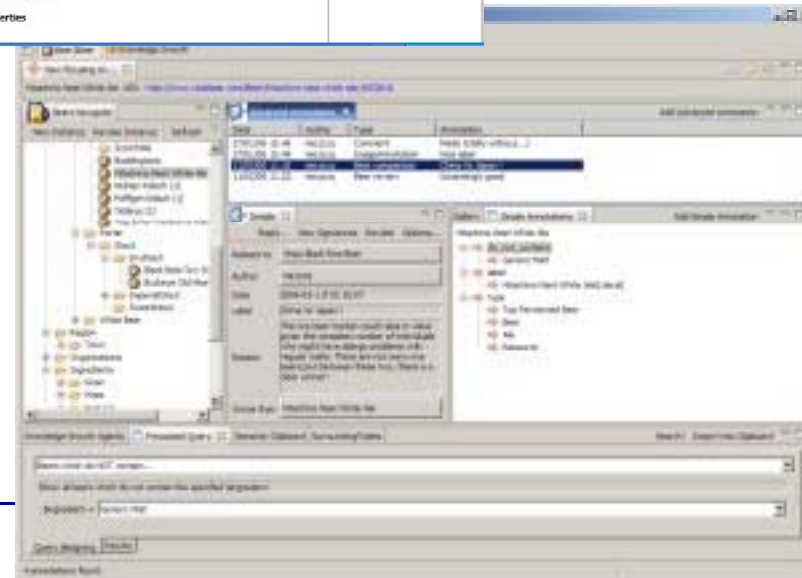
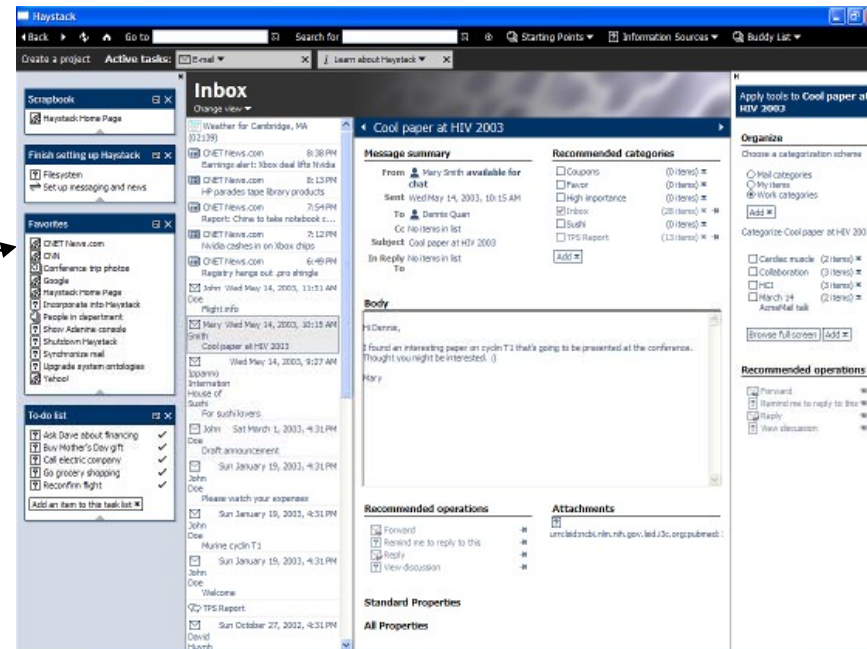
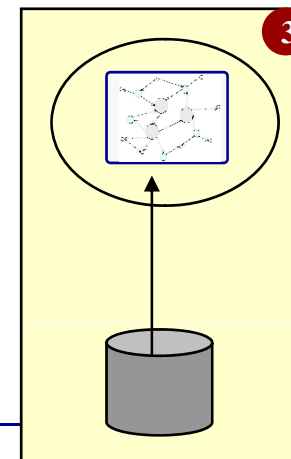
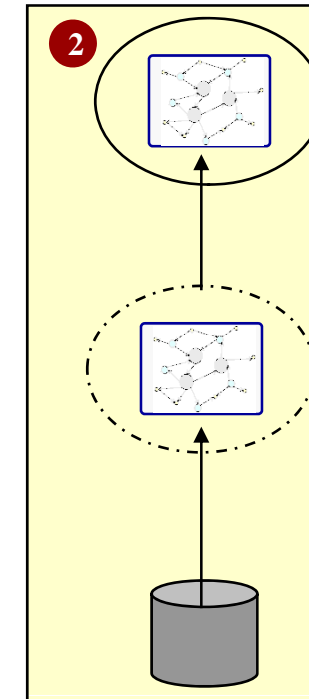
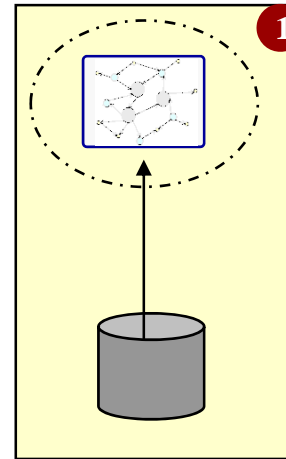




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Existing approaches

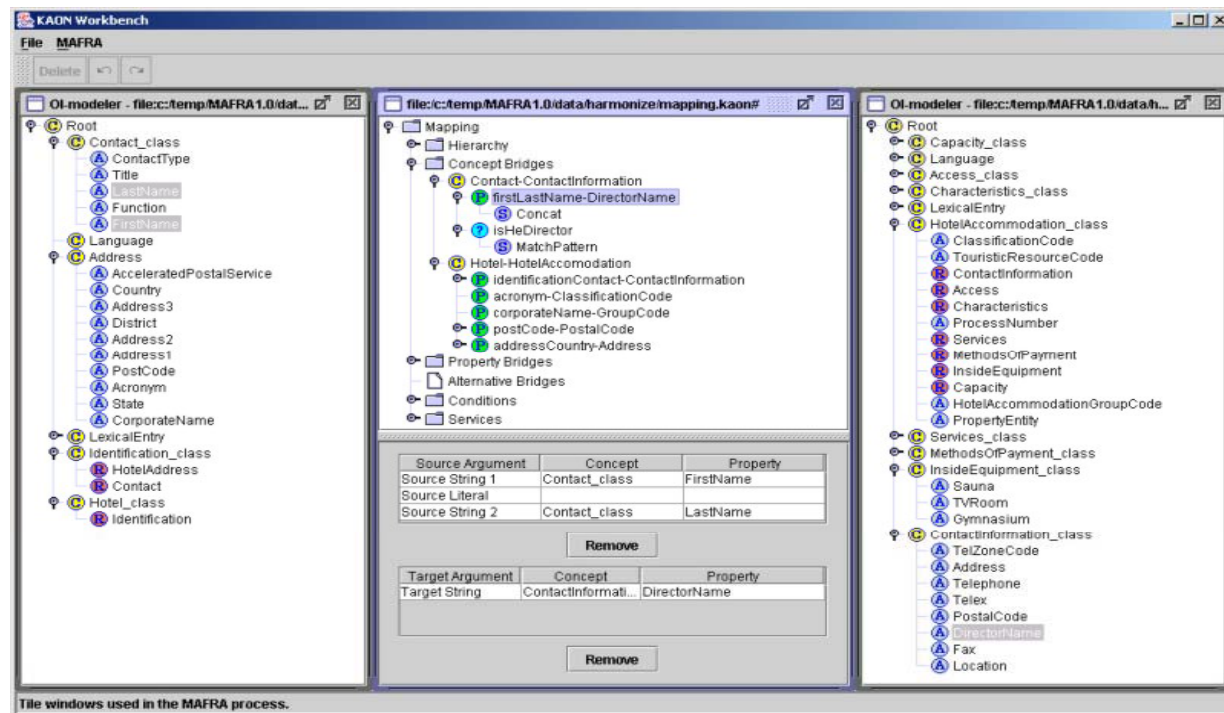
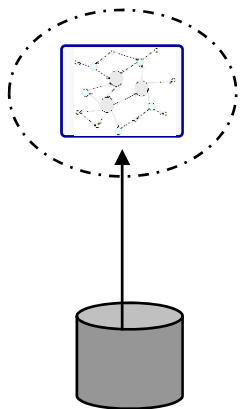
1. Construir una **nueva ontología** a partir de 1 esquema y datos de 1 BD (OntoStudio, KaOn Reverse)
2. Mapear la Onto construida en el enfoque 1, con una **ontología de legado** (NeOn toolkit UKARL)
3. Mapear BD existente a una **ontología de legado** (NeOn Toolkit UPM)
 - a) Volcado masivo
 - b) Dirigido por las consultas



 new ontology
 existing ontology

Existing approaches

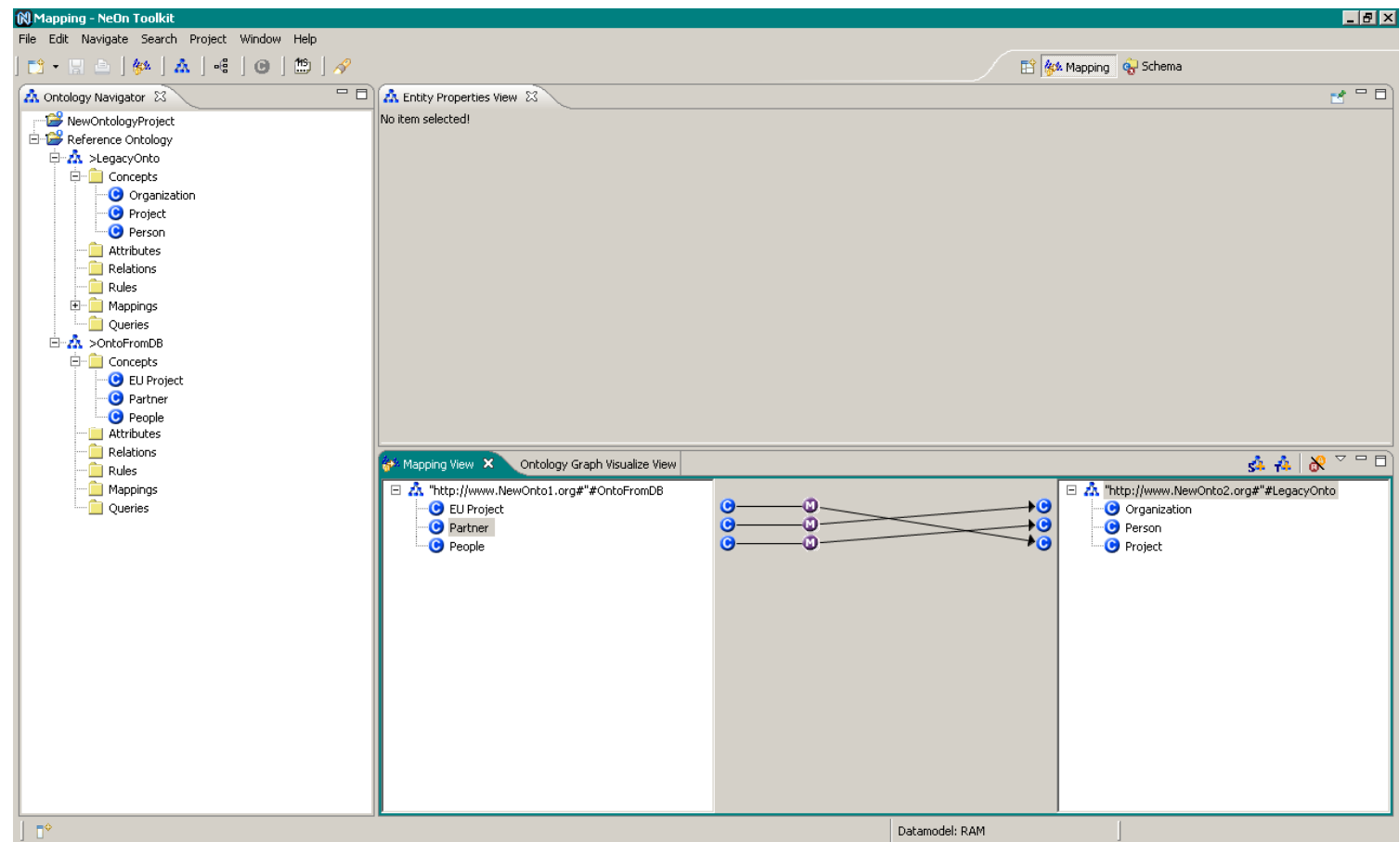
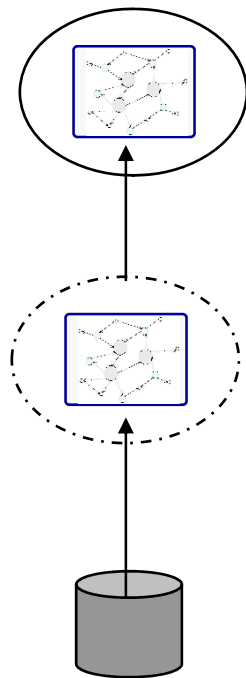
1. Construir 1 Ontología a partir de 1 esquema y datos de 1 BD (OntoStudio, KaOn Reverse)





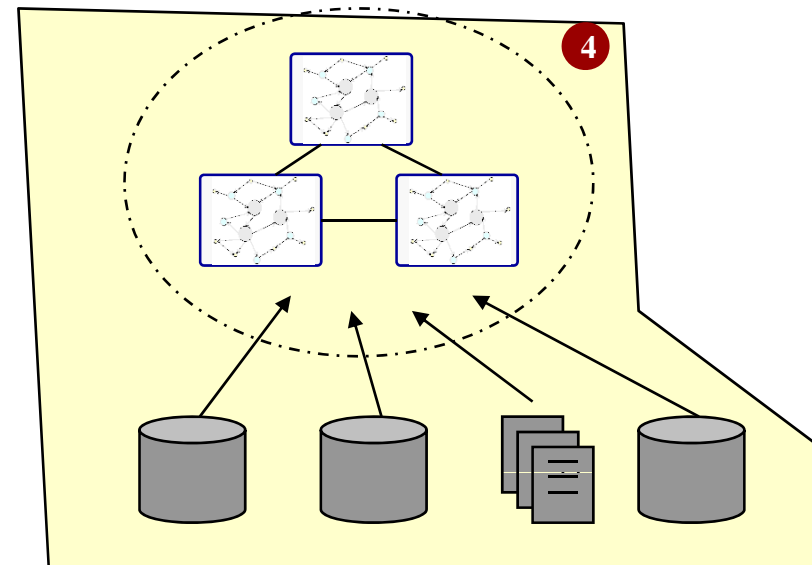
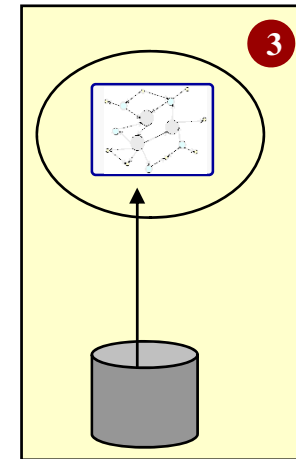
Existing Approaches

2. Mapear la onto construida en el enfoque 1, con una ontologia de legado (NeOn toolkit UKARL)

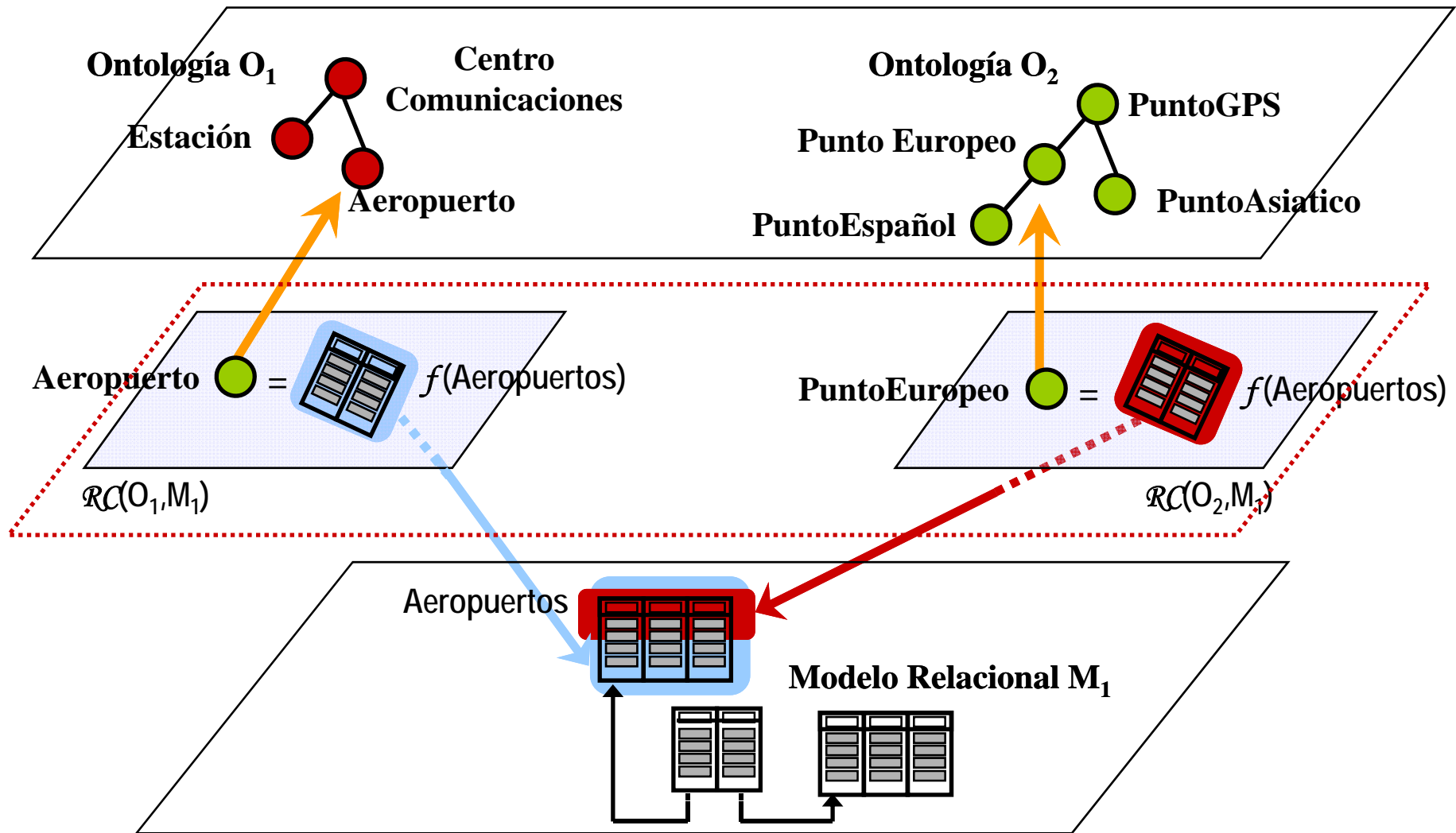


Existing approaches

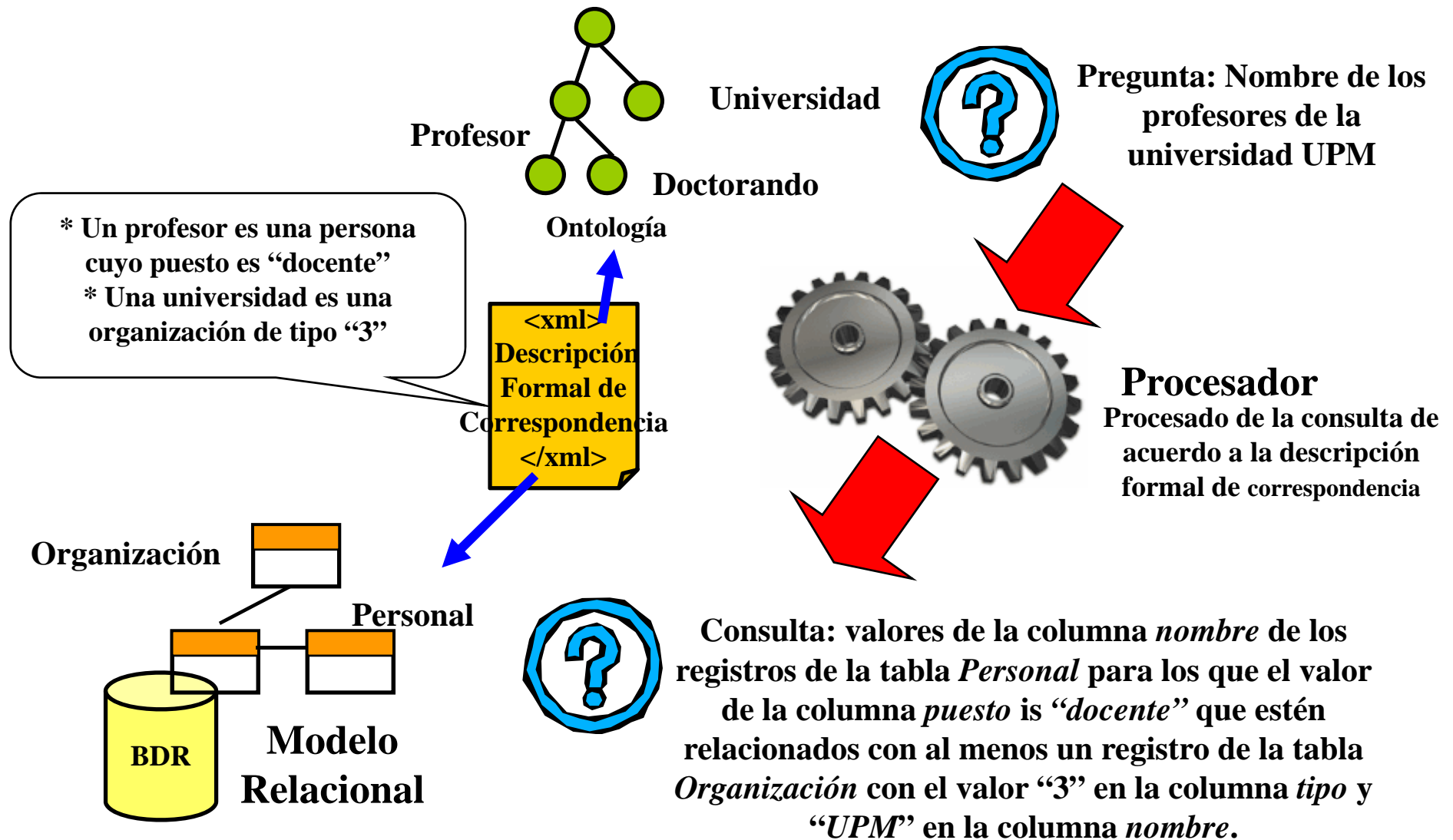
- **Acceso a contenido de BD usando ontologías de legado (NeOn toolkit at UPM)**
 - R20 y ODEMapster
 - Vocado Masivo
 - No migrado masivo
 - Fundfinder Case study
 - FAO case study
- **4. Construcción de redes de ontologías mediante la reutilización y reingeniería de recursos no ontológicos y ontológicos**
 - Seemp case study



Ontology-based view over a relational model (I)



Ontology-based view over a relational model (II)

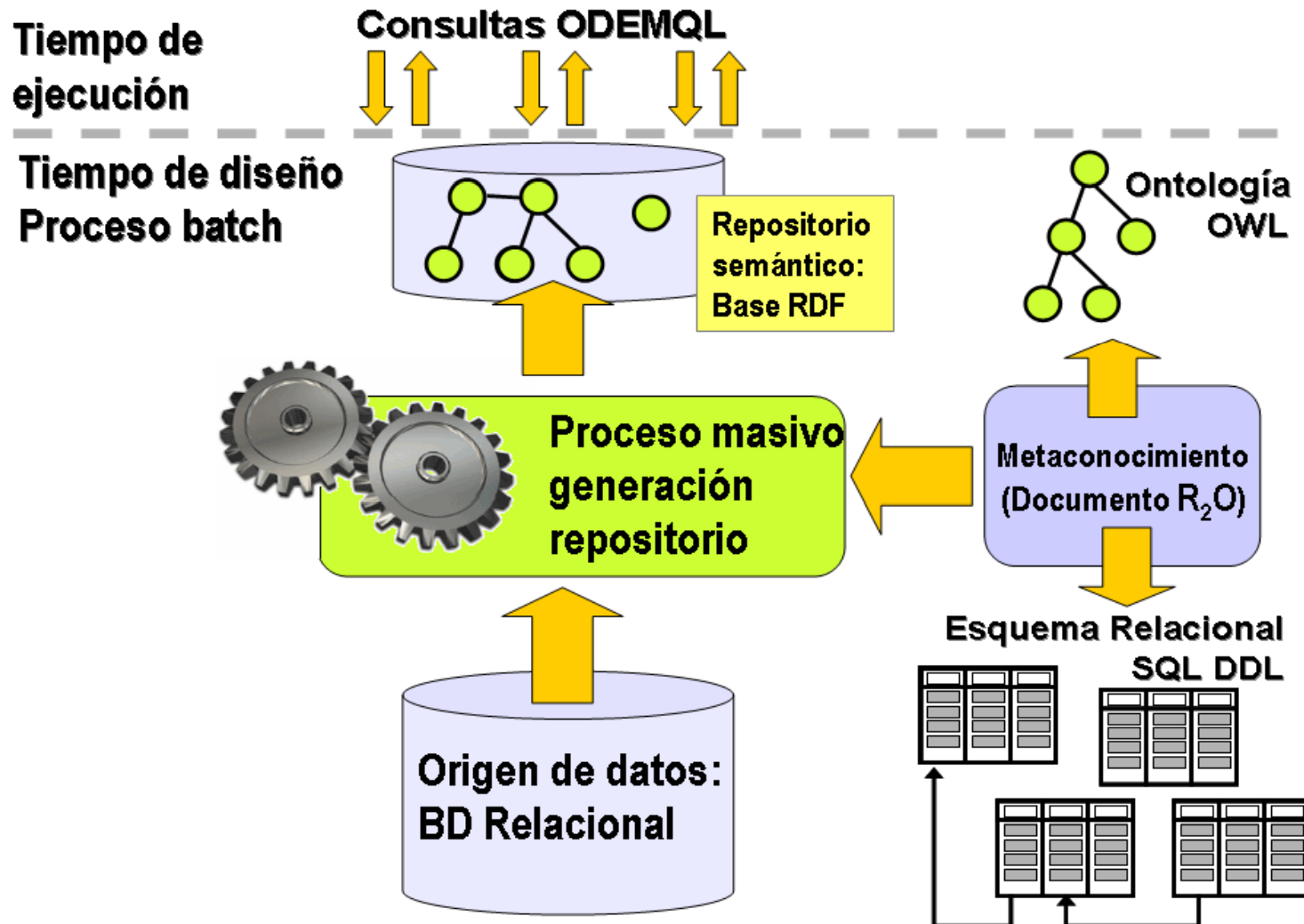


Upgrading Database content to the semantic Web

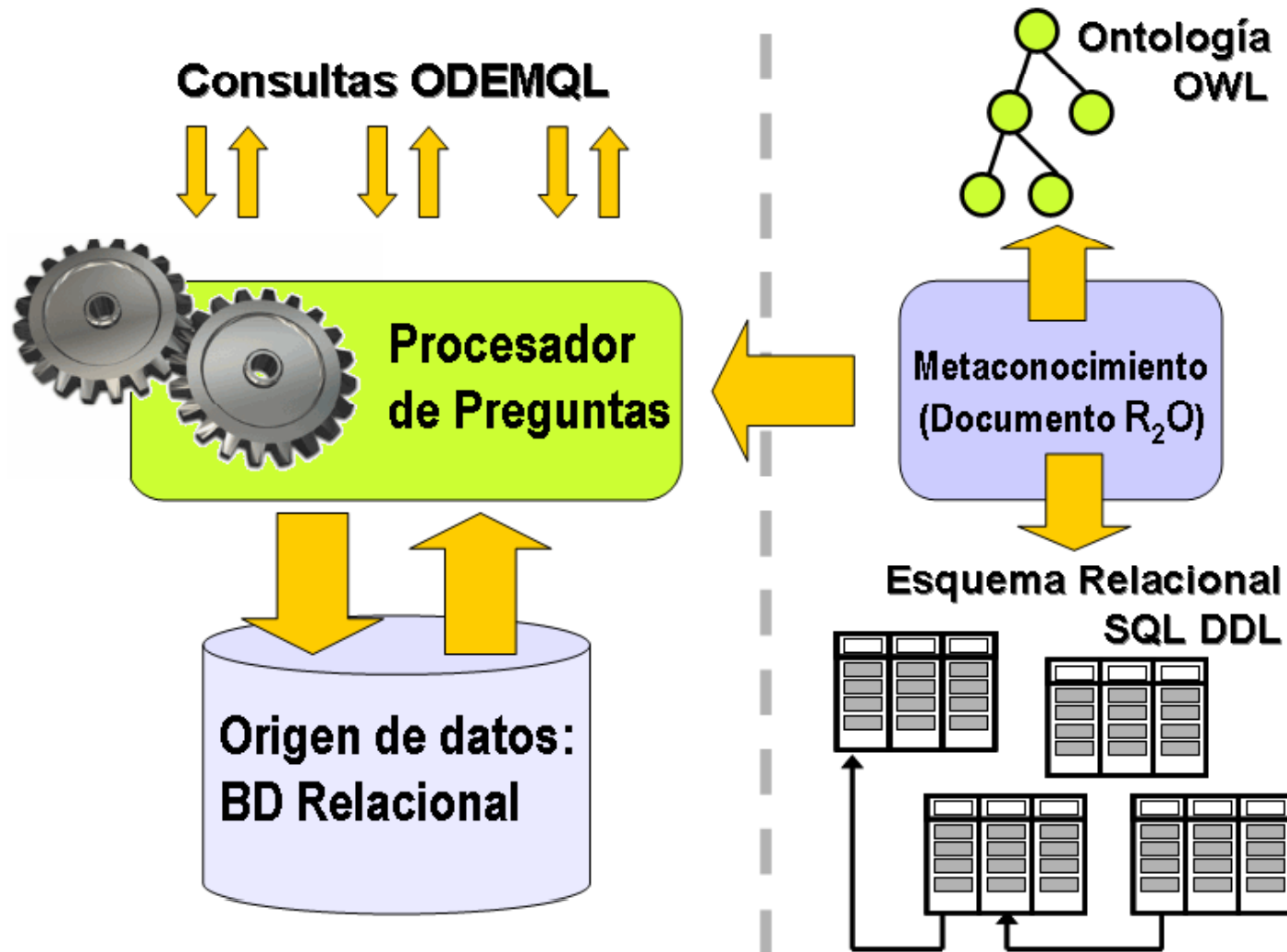
- **Integrating information from different DB sources**
- **Reuse of legacy DBs and legacy ontologies**
- **R2O: Declarative Mapping description language**
- **ODEMapster: Generic query processor.**
 - asking queries to a relational database using ontology terms
 - On demand query answering
 - Batch ontology population
- **A well defined method for upgrading and integrating content from heterogeneous sources.**

ODEMapster: Volcado masivo

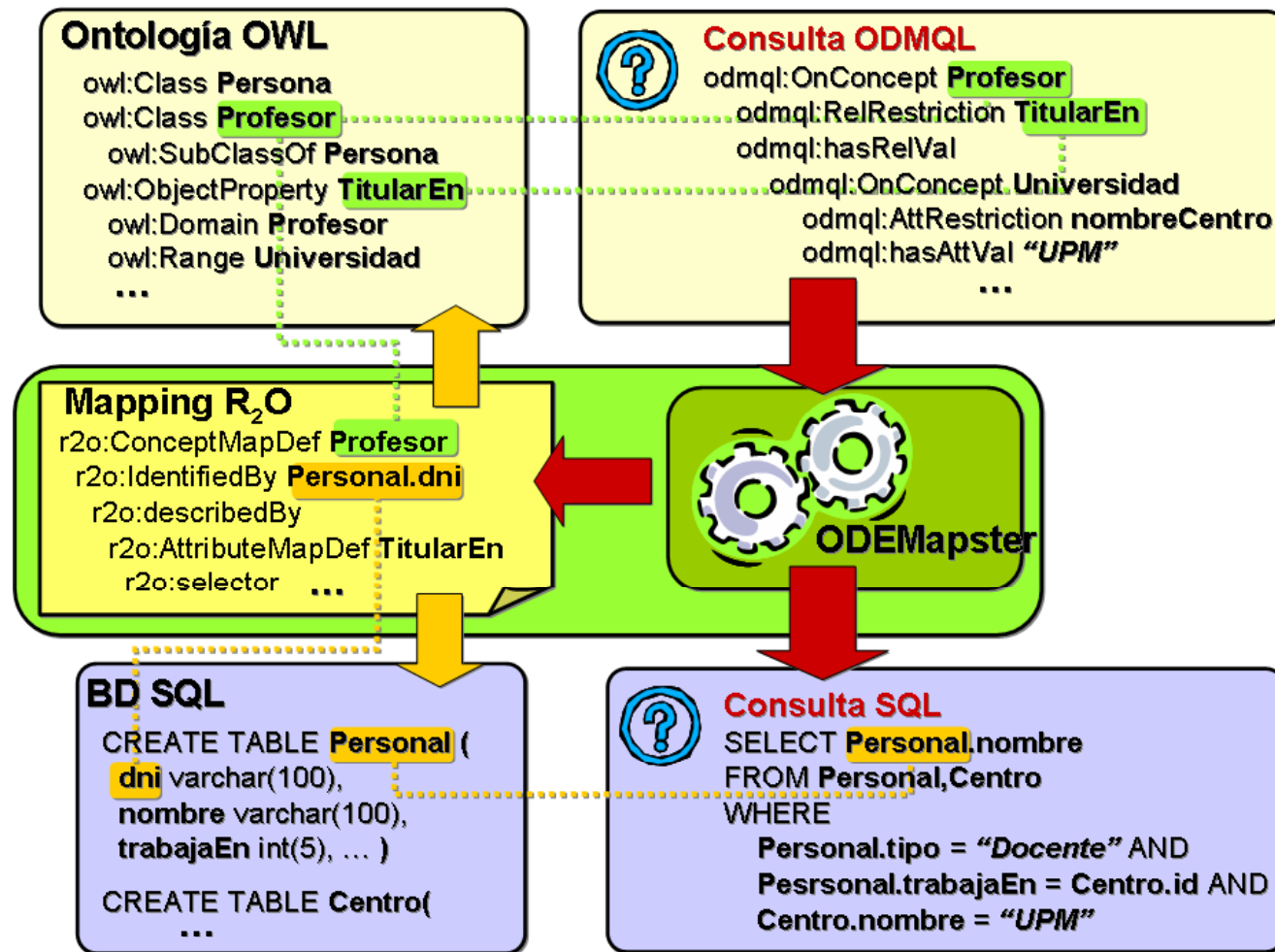
Creación de un repositorio semántico en RDF



ODEMapster: Dirigido por las consultas

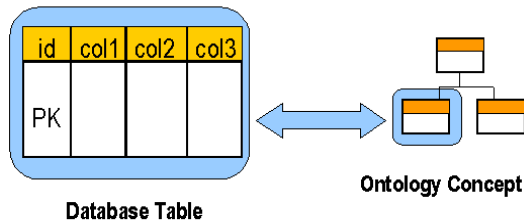


Lenguajes utilizados por ODEMapster

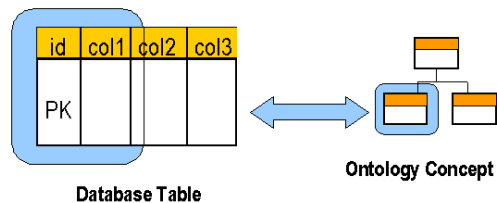


R2O (Relational-to-Ontology) Language

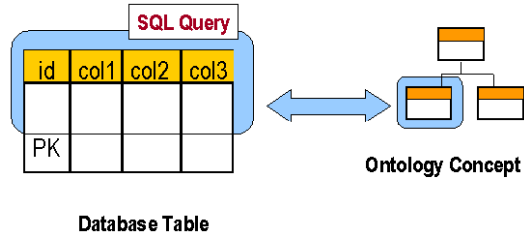
para conceptos...



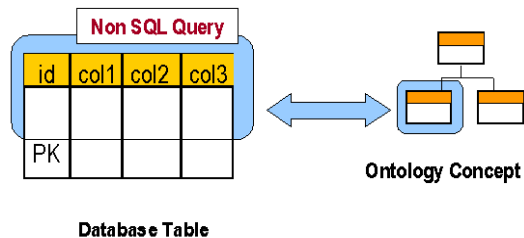
A view maps exactly one concept in the ontology.



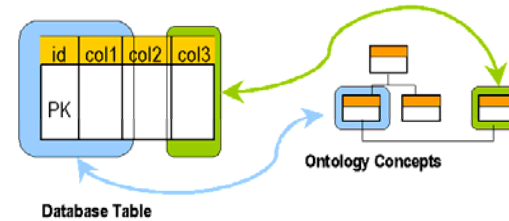
A subset of the columns in the view map a concept in the ontology.



A subset (selection) of the records of a database view map a concept in the ontology.

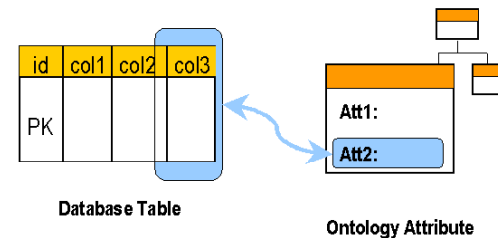


A subset of the records of a database view map a concept in the onto. but the selection cannot be made using SQL.

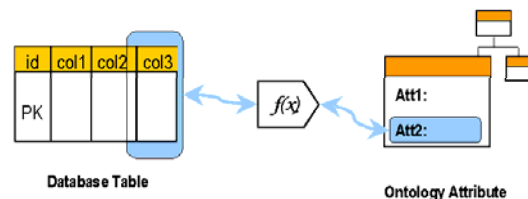


One or more concepts can be extracted from a single data field (not in 1NF).

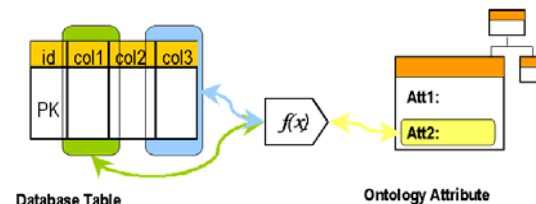
para atributos...



A column in a database view maps directly an attribute or a relation.



A column in a database view maps an attribute or a relation after some transformation.



A set of columns in a database view map an attribute or a relation.

Main sections of a R₂O document

- A set of URI instances to be added to the instance set extracted from the DB (import?),
- a description of the DB schema (dbschema-description*)
- one or more URI ontologies for which instances will be generated when executing the R2O mapping (ontology+)
- and the list of mapping definitions (conceptmapping-definition+) between the components of the DB schema and the ontology

```
import http://www.instancesets.net/instance1
import http://www.instancesets.net/instance2
dbschema-desc <dbschema-description>
dbschema-desc <dbschema-description>
ontology http://www.ontologies.net/onto1#
ontology http://www.ontologies.net/onto2#
```

ConceptMap definition

$$\mathcal{E}_M(C) = [f_C^{Id}, e_C^{Cond}, e_C^{Reun}]$$



BNF

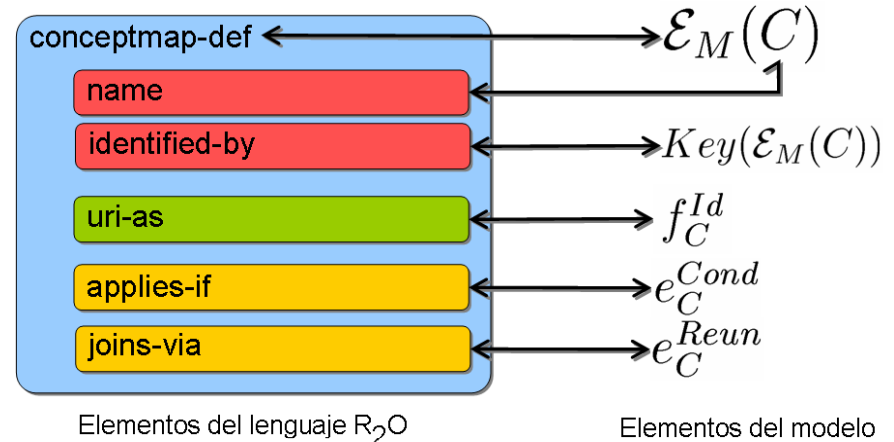
```

conceptmapping-definition::= conceptmap-def name
                             identified-by+
                             (uri-as selector)?
                             (applies-if cond-expr)?
                             (joins-via concept-join-expr)?
                             documentation?
                             (described-by propertymap-def)*

identified-by::= identified-by literal

concept-join-expr::= (join-expr conceptJoinOps cond-expr)?

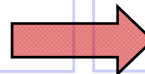
conceptJoinOps::= join | union | difference
    
```



Example:

```

<conceptmap-def  name="Customer">
  <identified-by> Table key </identified-by>
  <uri-as> operation </uri-as>
  <applies-if> condition </applies-if>
  <joins-via> expression </joins-via>
  <documentation>description ...</documentation>
  <described-by>attributes,relations</described-by>
</conceptmap-def>
    
```



AttributeMap definition

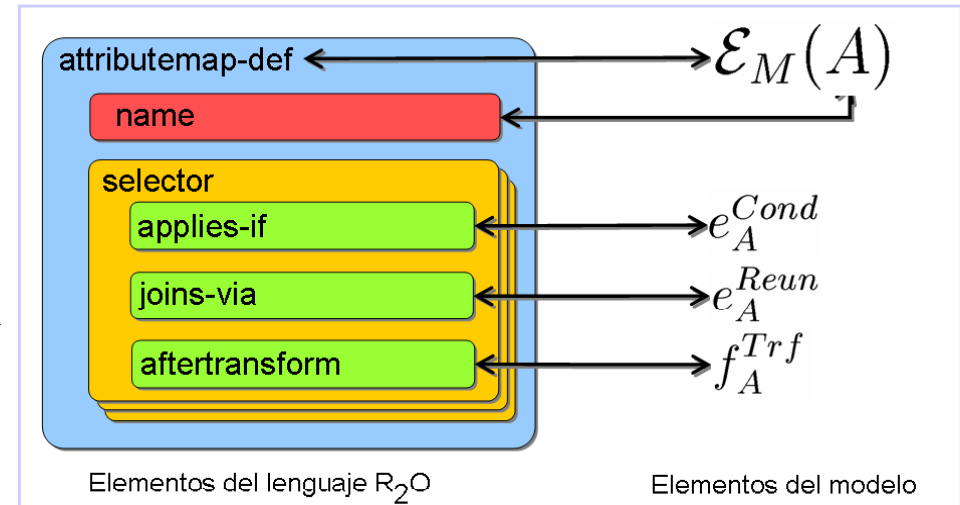
$$\mathcal{E}_M(A) = [C, e_A^{Cond}, e_A^{Reun}, f_A^{Trf}]$$



BNF

```

attributemap-def ::= attributemap-def name
                    (selector* | use-dbcoll)
                    documentation?
use-dbcoll ::= use-dbcoll literal
selector ::= selector (applies-if cond-expr)?
              (aftertransform transformation)?
newobj-type ::= newobject-type literal
to-concept ::= to-concept literal
    
```



Example:

```

<attributemap-def name="http://esperonto/ff#Title">
  <aftertransform>
    <operation oper-id="constant">
      <arg-restriction on-param="const-val">
        <has-column>fsb_ajut.titol</has-column>
      </arg-restriction>
    </operation>
  </aftertransform>
</attributemap-def>
    
```

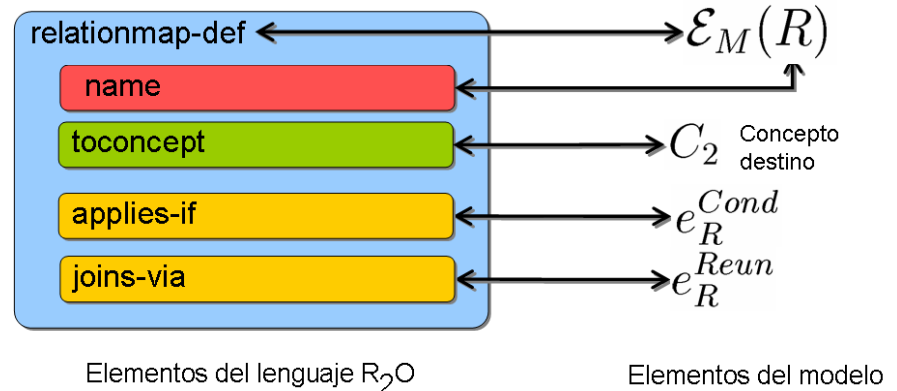
RelationMap definition

$$\mathcal{E}_M(R) = [C_O, C_D, e_R^{Cond}, e_R^{Reun}]$$

BNF

```

relationmap-def ::= relationmap-def to-concept
                    (applies-if cond-expr)?
                    (joins-via relation-join-expr)?
relation-join-expr ::= join (join-expr cond-expr)?
to-concept ::= to-concept literal
    
```

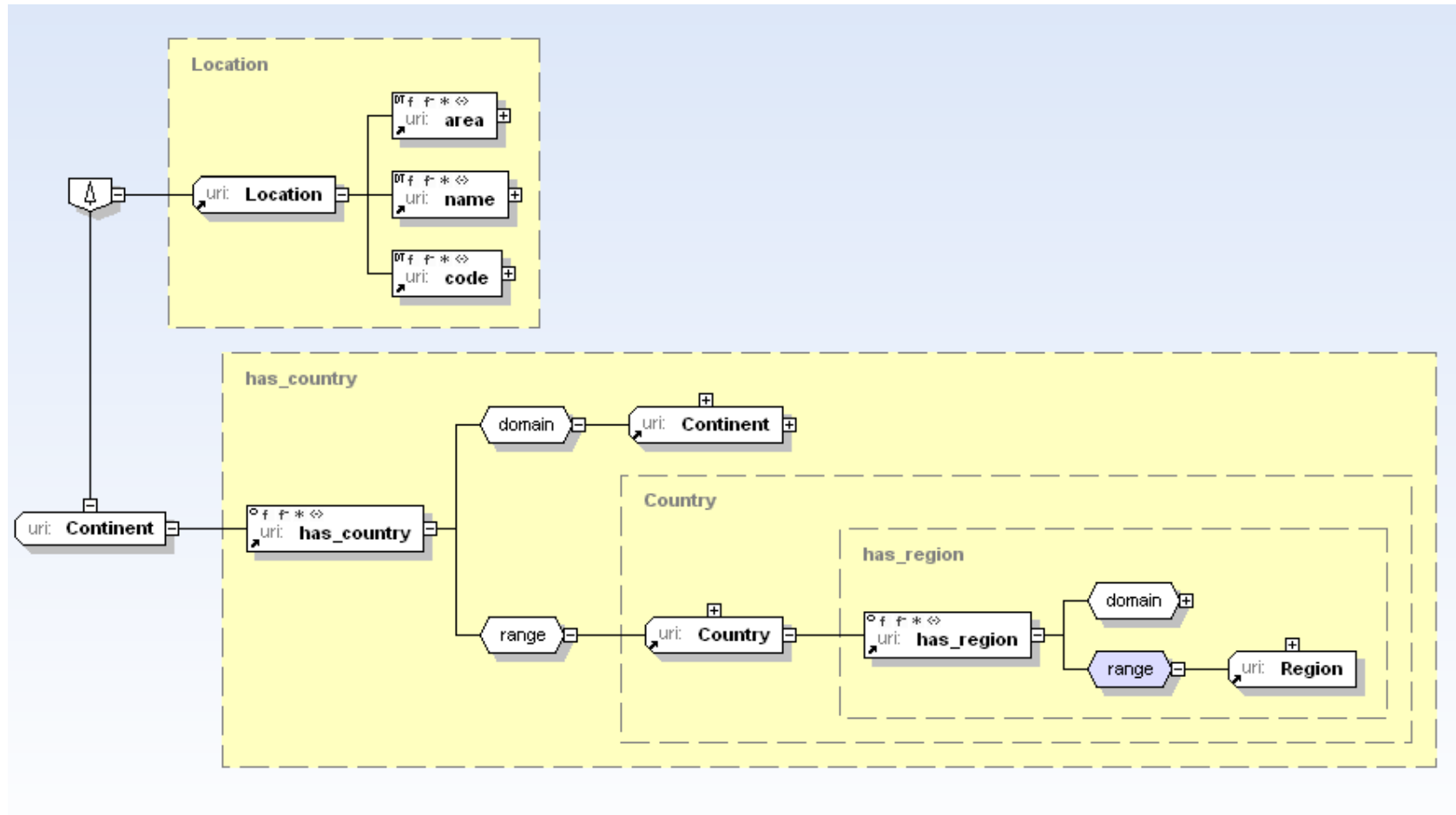


Example:

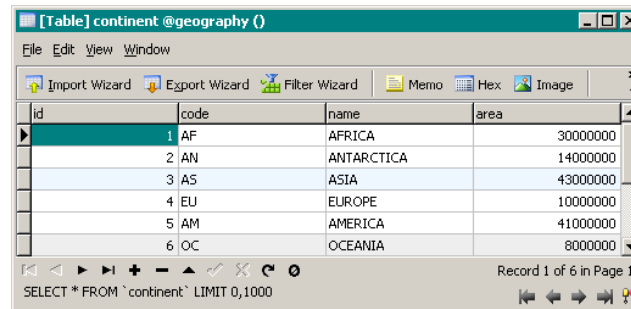
```

<relationmap-def name="http://esperonto/ff#isCandidateFor">
  <to-concept name="http://esperonto/ff#FundOpp">
    <joins-via>
      <operation oper-id="equals">
        <arg-restriction on-param="value1">
          <has-column>fsb_ajut.id</has-column>
        </arg-restriction>
        <arg-restriction on-param="value2">
          <has-column>fsb_candidate.forFund</has-column>
        </arg-restriction>
      </operation>
    </joins-via>
  </to-concept>
</relationmap-def>
    
```

Example: Geography Ontology



Geography Database

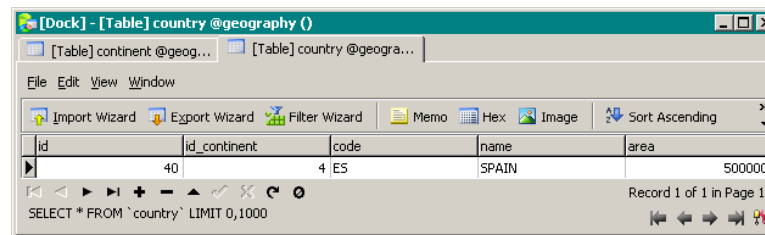


The screenshot shows a database application window titled "[Table] continent @geography ()". It contains a table with the following data:

id	code	name	area
1	AF	AFRICA	30000000
2	AN	ANTARCTICA	14000000
3	AS	ASIA	43000000
4	EU	EUROPE	10000000
5	AM	AMERICA	41000000
6	OC	OCEANIA	8000000

The application interface includes a menu bar (File, Edit, View, Window), a toolbar with icons for Import Wizard, Export Wizard, Filter Wizard, Memo, Hex, and Image, and a status bar at the bottom showing the SQL query "SELECT * FROM `continent` LIMIT 0,1000" and "Record 1 of 6 in Page 1".

Continent Table

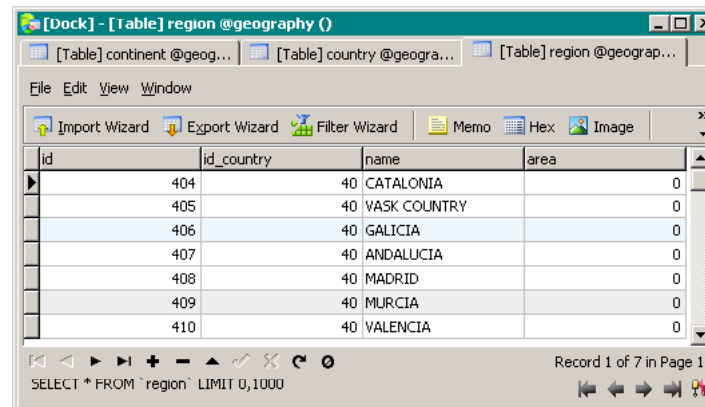


The screenshot shows a database application window titled "[Dock] - [Table] country @geography ()". It contains a table with the following data:

id	id_continent	code	name	area
40	4	ES	SPAIN	500000

The application interface includes a menu bar (File, Edit, View, Window), a toolbar with icons for Import Wizard, Export Wizard, Filter Wizard, Memo, Hex, Image, and Sort Ascending, and a status bar at the bottom showing the SQL query "SELECT * FROM `country` LIMIT 0,1000" and "Record 1 of 1 in Page 1".

Country Table



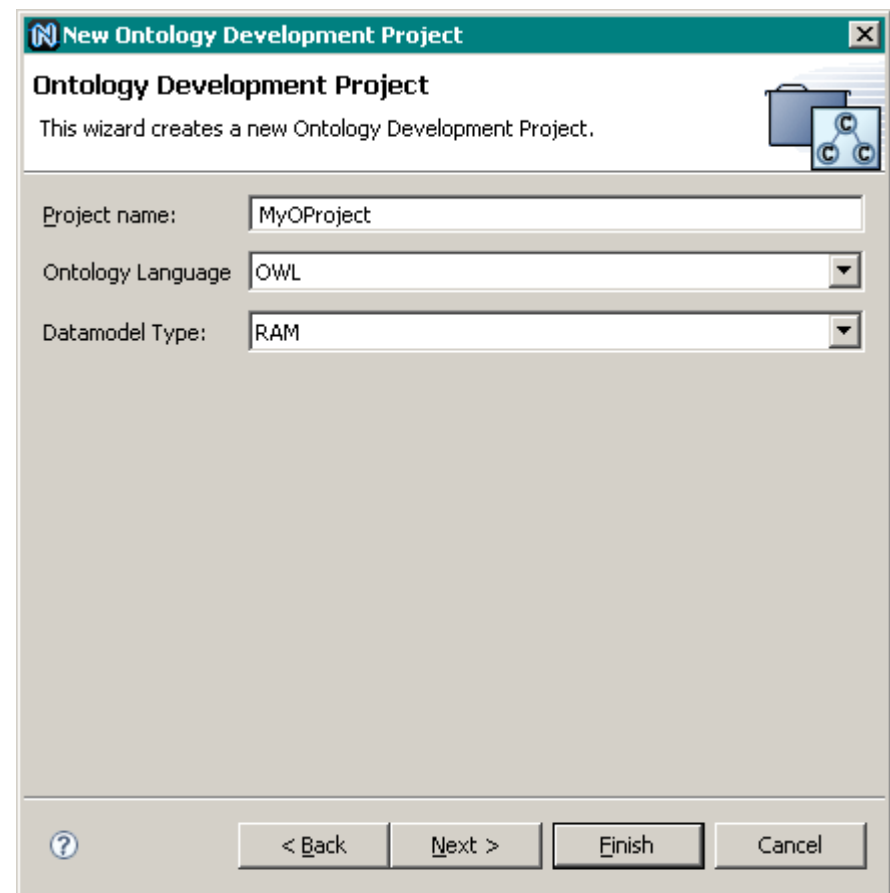
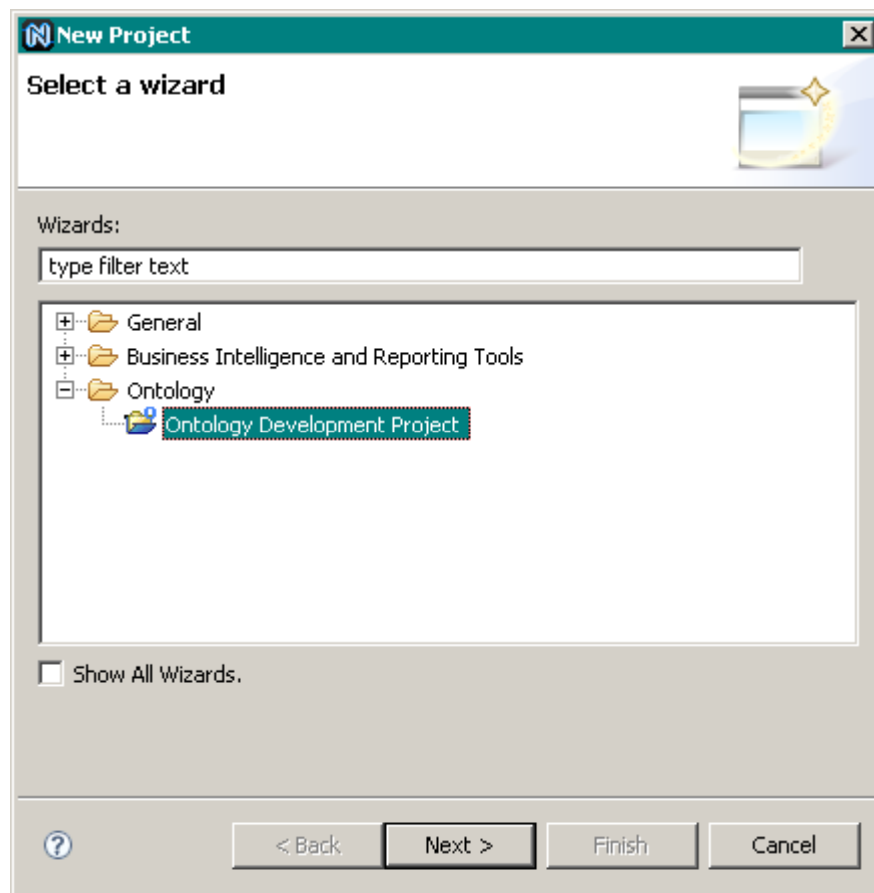
The screenshot shows a database application window titled "[Dock] - [Table] region @geography ()". It contains a table with the following data:

id	id_country	name	area
404	40	CATALONIA	0
405	40	VASK COUNTRY	0
406	40	GALICIA	0
407	40	ANDALUCIA	0
408	40	MADRID	0
409	40	MURCIA	0
410	40	VALENCIA	0

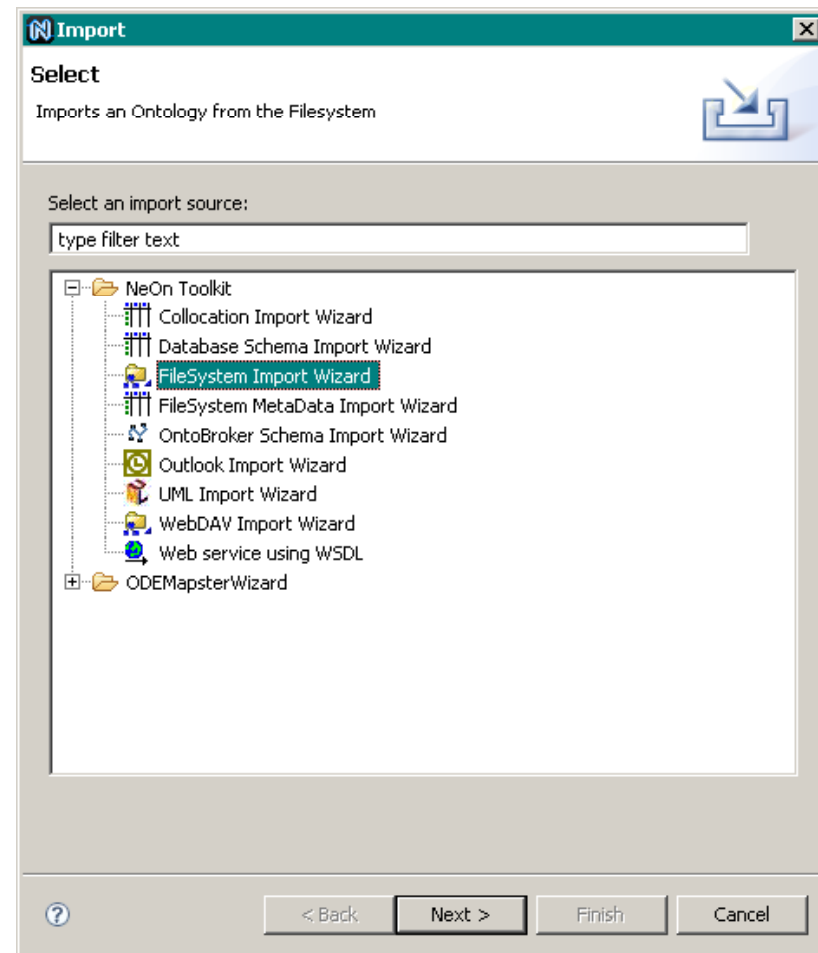
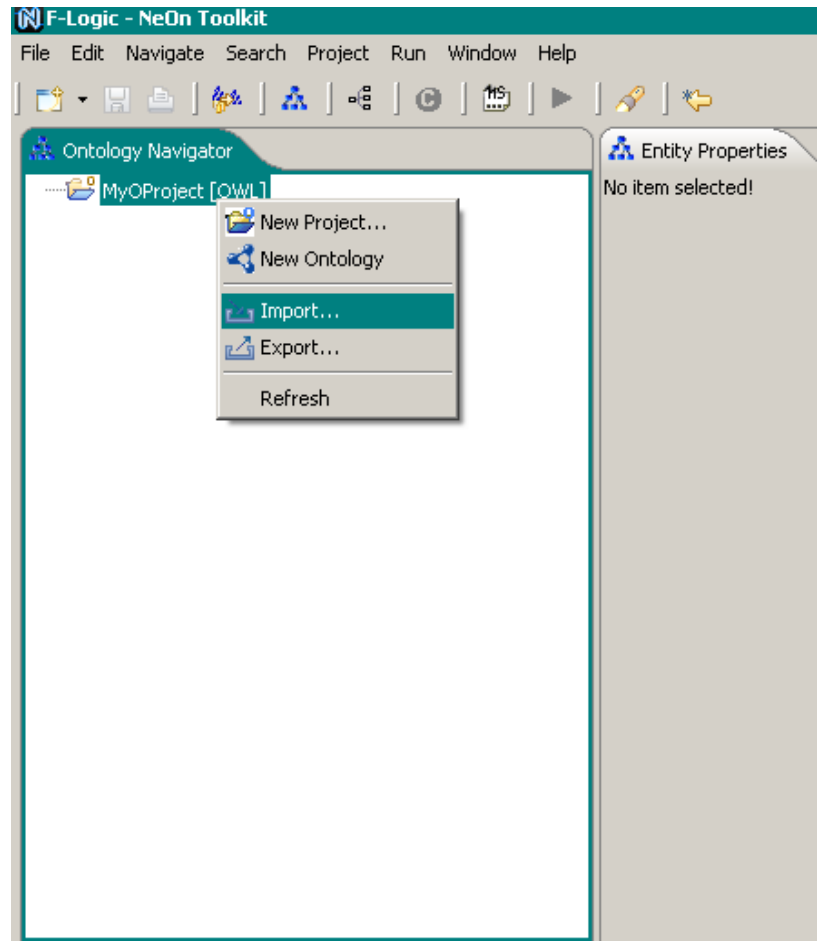
The application interface includes a menu bar (File, Edit, View, Window), a toolbar with icons for Import Wizard, Export Wizard, Filter Wizard, Memo, Hex, Image, and Sort Ascending, and a status bar at the bottom showing the SQL query "SELECT * FROM `region` LIMIT 0,1000" and "Record 1 of 7 in Page 1".

Region Table

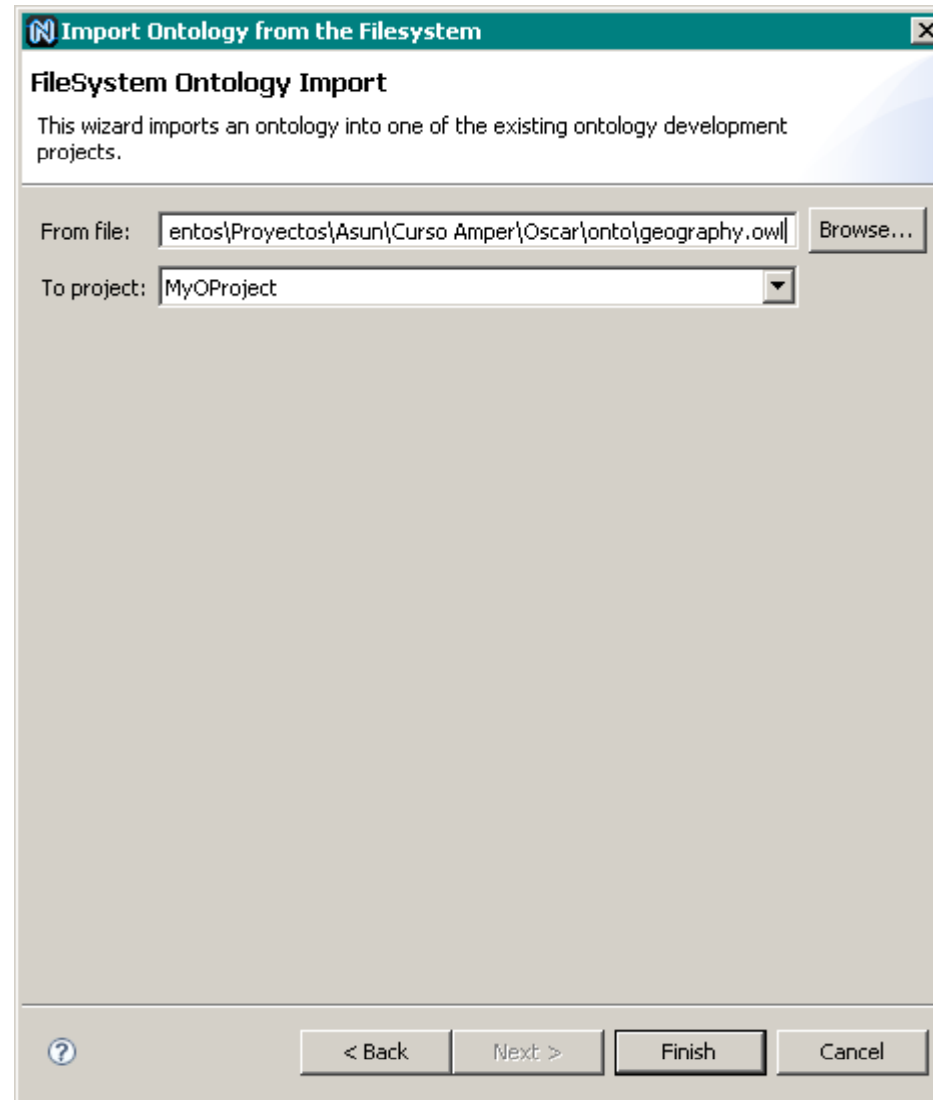
NeOn Toolkit – New Ontology Project



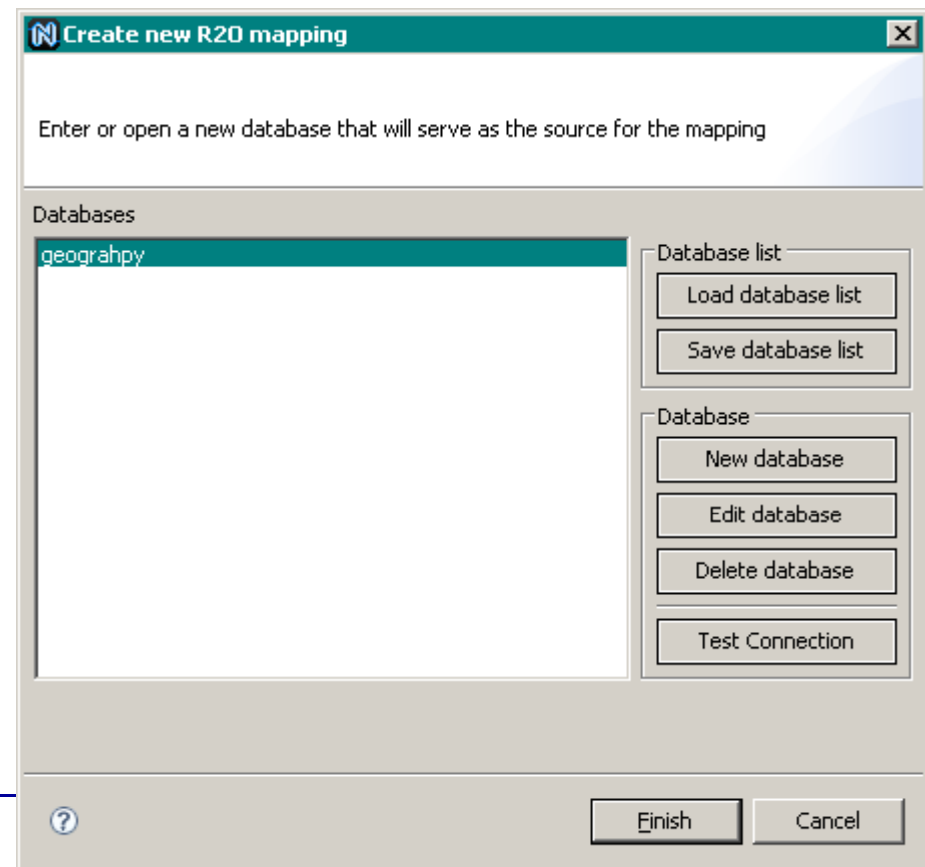
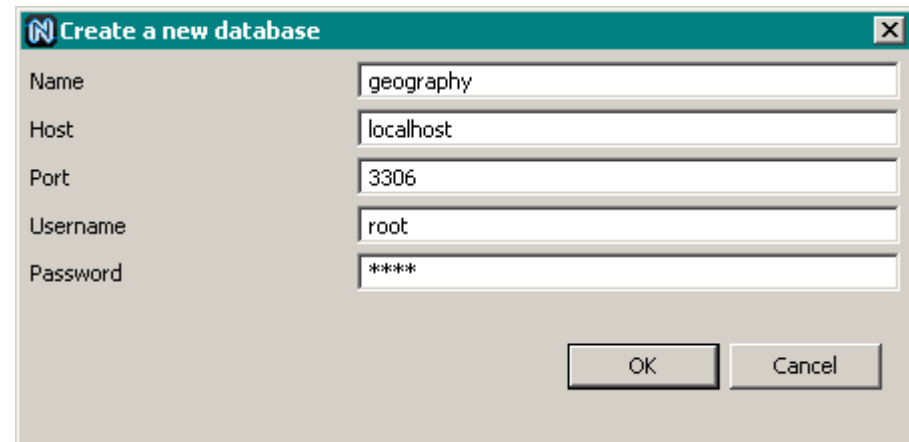
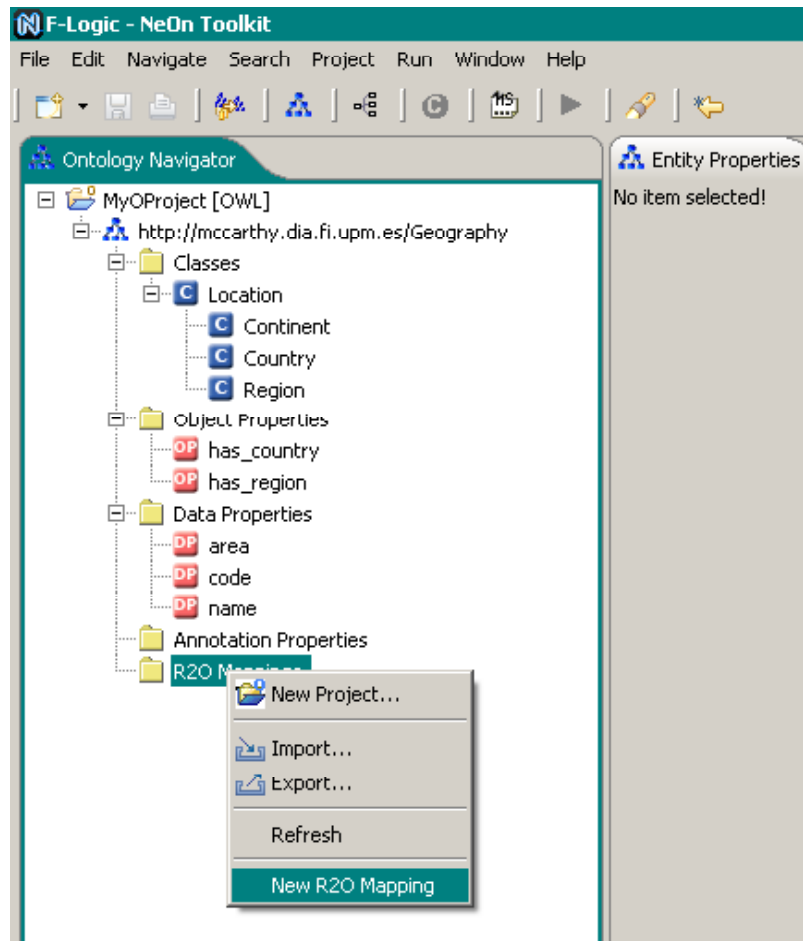
Import Ontology



Import Ontology



New R₂O Mapping – Database



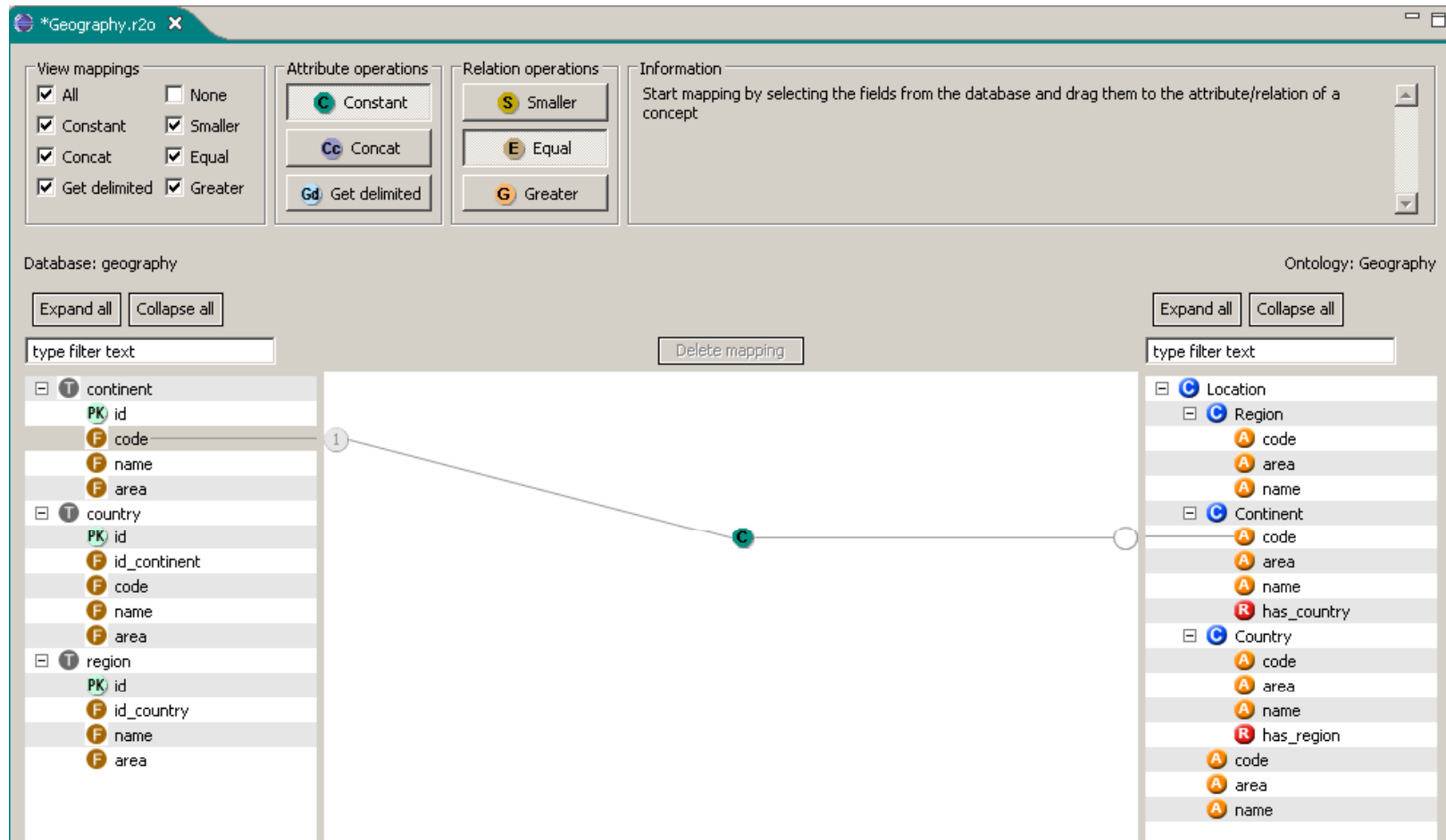
R₂O Mapping Perspective

The screenshot displays the 'R2O Mapping Perspective - Geography.r2o - NeOn Toolkit' window. The interface is divided into several panels:

- Ontology Navigator:** A tree view on the left showing the project structure. It includes 'MyOProject [OWL]', a URI, 'Classes' (Location, Continent, Country, Region), 'Object Properties' (has_country, has_region), 'Data Properties' (area, code, name), 'Annotation Properties', and 'R2O Mappings' (Geography.r2o).
- Geography.r2o:** The main workspace for creating mappings. It features:
 - View mappings:** Checkboxes for 'All', 'None', 'Constant', 'Smaller', 'Concat', 'Equal', 'Get delimited', and 'Greater'.
 - Attribute operations:** Buttons for 'Constant', 'Concat', and 'Get delimited'.
 - Relation operations:** Buttons for 'Smaller', 'Equal', and 'Greater'.
 - Information:** A text area with the instruction: 'Start mapping by selecting the fields from the database and drag them to the attribute/relation of a concept'.
- Database: geography:** A list of database tables and their attributes. It includes a 'type filter text' input and an 'Expand all' button.
 - continent:** id (PK), code, name, area.
 - country:** id (PK), id_continent, code, name, area.
 - region:** id (PK), id_country, name, area.
- Ontology: Geography:** A list of ontology classes and their properties. It includes an 'Expand all' button and a 'Collapse all' button.
 - Location:** Region, code, area, name.
 - Continent:** code, area, name, has_country.
 - Country:** code, area, name, has_region.

The central area is a large workspace for defining the mappings between the database attributes and the ontology properties.

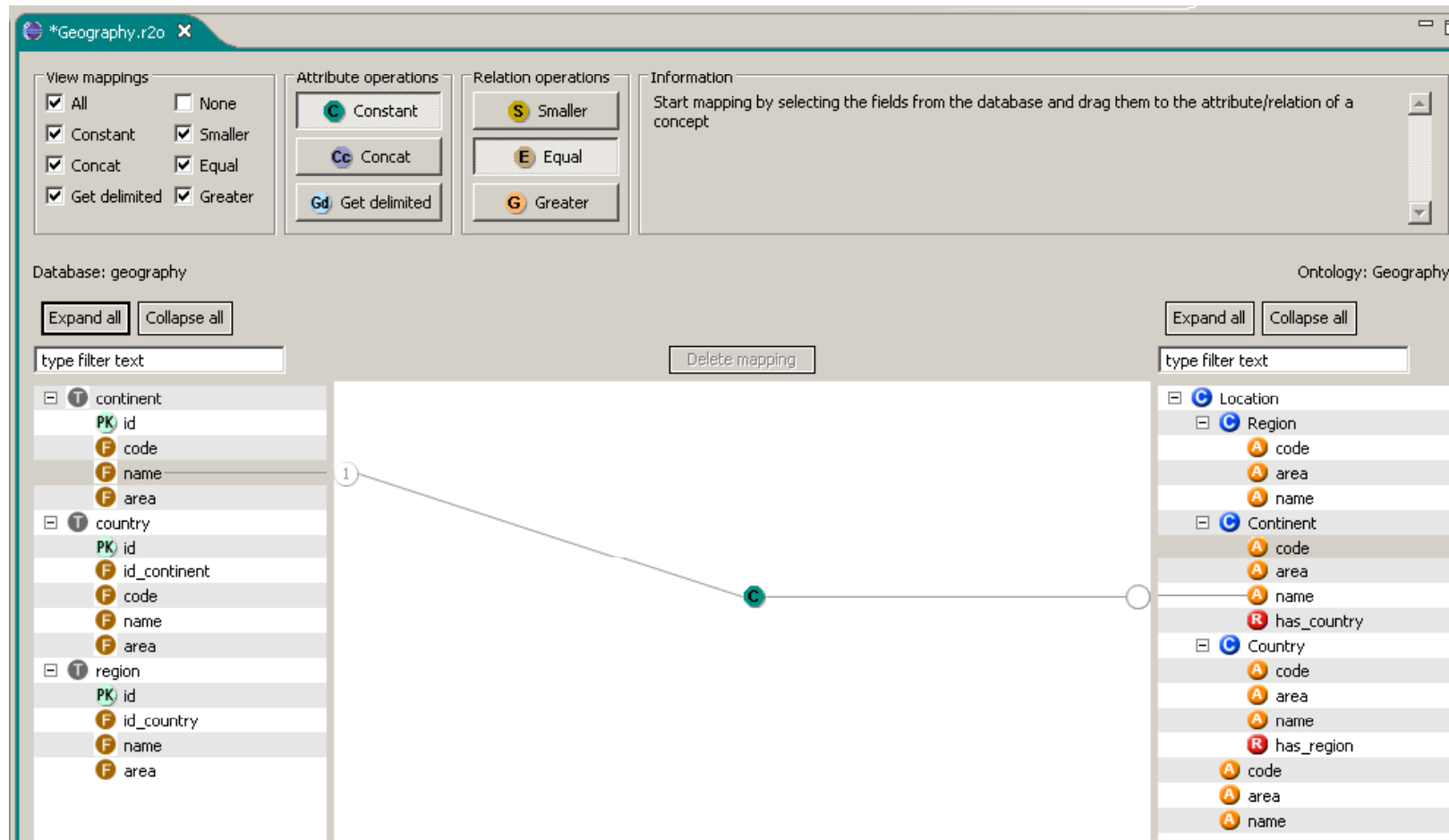
An attribute mapping example



An attribute mapping example – R₂O Code

```
<attributemap-def name="http://mccarthy.dia.fi.upm.es/Geography#code">
  <selector>
    <aftertransform>
      <operation oper-id="constant">
        <arg-restriction on-param="const-val">
          <has-column>continent.code</has-column>
        </arg-restriction>
      </operation>
    </aftertransform>
  </selector>
</attributemap-def>
```

An attribute mapping example



An attribute mapping example – R₂O Code

```
<attributemap-def name="http://mccarthy.dia.fi.upm.es/Geography#name">
  <selector>
    <aftertransform>
      <operation oper-id="constant">
        <arg-restriction on-param="const-val">
          <has-column>continent.name</has-column>
        </arg-restriction>
      </operation>
    </aftertransform>
  </selector>
</attributemap-def>
```


An attribute mapping example

The screenshot displays the *Geography.r2o application window. At the top, there are three main sections: 'View mappings' with checkboxes for 'All', 'None', 'Constant', 'Smaller', 'Concat', 'Equal', 'Get delimited', and 'Greater'; 'Attribute operations' with buttons for 'Constant', 'Concat', and 'Get delimited'; and 'Relation operations' with buttons for 'Smaller', 'Equal', and 'Greater'. An 'Information' box on the right provides instructions: 'Start mapping by selecting the fields from the database and drag them to the attribute/relation of a concept'.

Below these sections, the interface is divided into two panes. The left pane, labeled 'Database: geography', contains a tree view of database tables and their attributes. The right pane, labeled 'Ontology: Geography', contains a tree view of ontology classes and their attributes. Both panes have 'Expand all' and 'Collapse all' buttons and a 'type filter text' input field.

In the center, a mapping diagram shows a line connecting a node labeled '1' (representing the 'area' attribute of the 'continent' table) to a green circle labeled 'C' (representing the 'Constant' operation). This operation is then connected to a grey circle (representing the 'Location' class in the ontology).

The 'Database: geography' tree structure is as follows:

- continent
 - PK id
 - F code
 - F name
 - F area
- country
 - PK id
 - F id_continent
 - F code
 - F name
 - F area
- region
 - PK id
 - F id_country
 - F name
 - F area

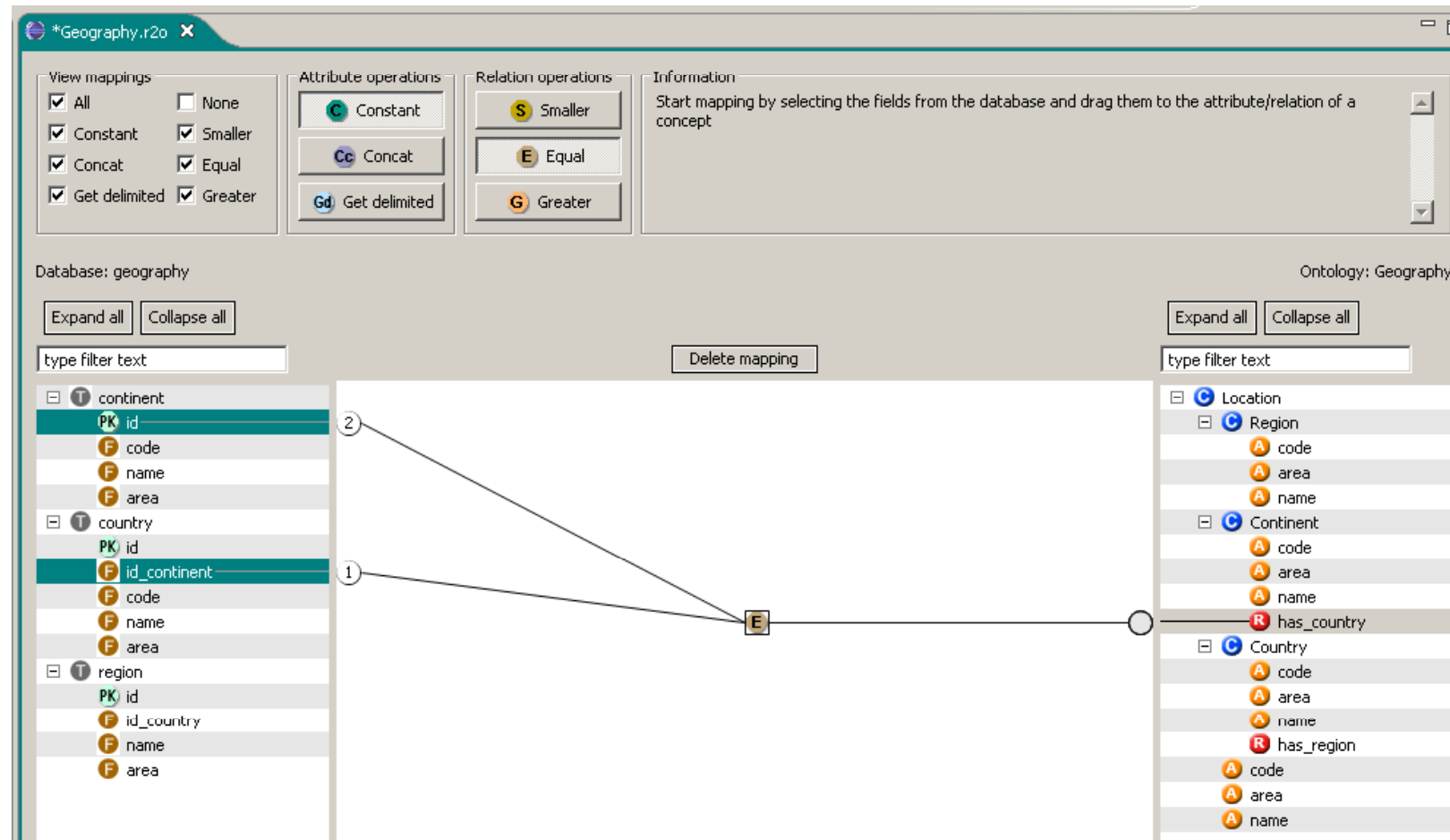
The 'Ontology: Geography' tree structure is as follows:

- Location
 - Region
 - A code
 - A area
 - A name
 - Continent
 - A code
 - A area
 - A name
 - has_country (relation)
 - Country
 - A code
 - A area
 - A name
 - has_region (relation)
 - A code
 - A area
 - A name

An attribute mapping example – R₂O Code

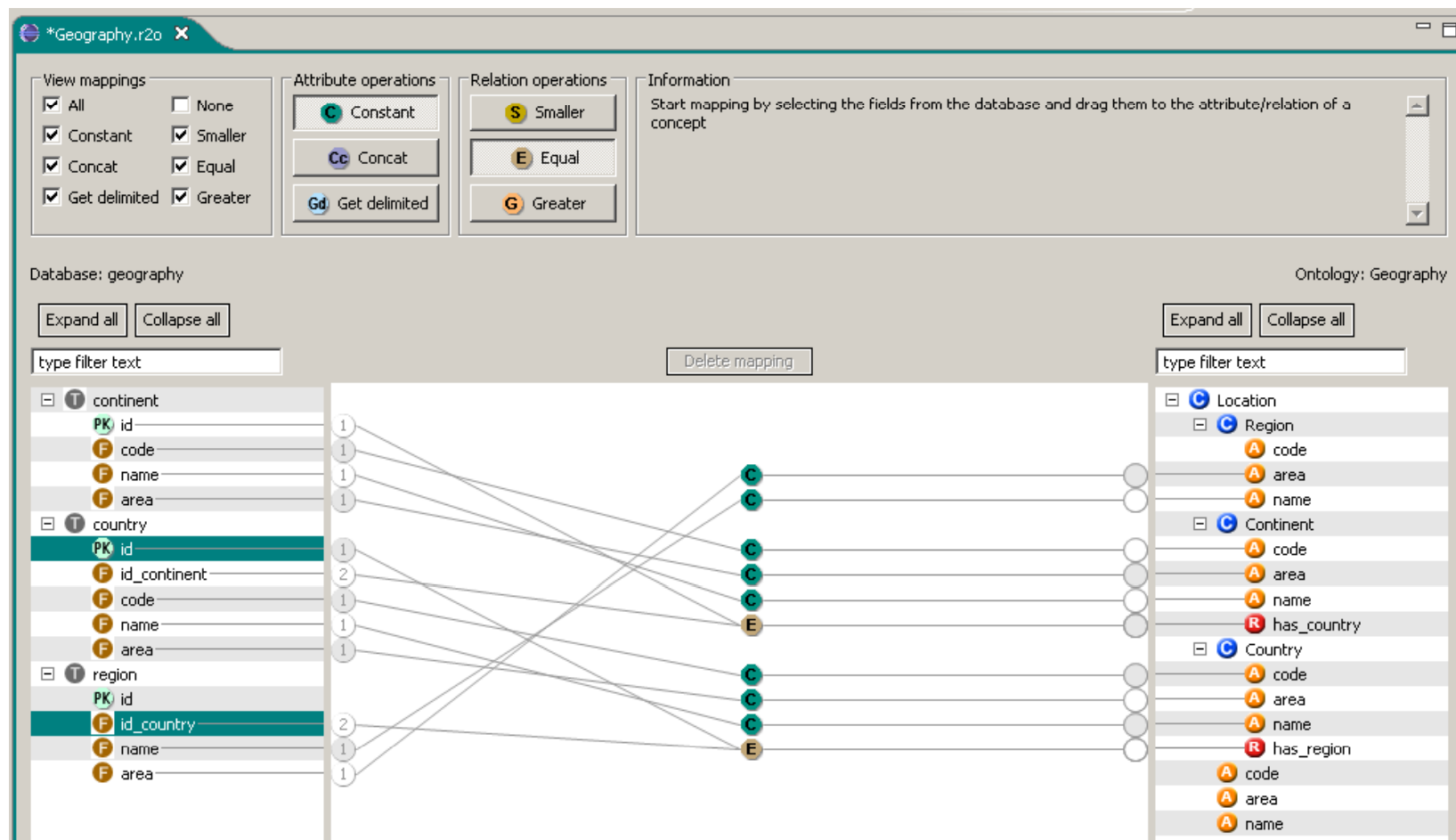
```
<attributemap-def name="http://mccarthy.dia.fi.upm.es/Geography#area">
  <selector>
    <aftertransform>
      <operation oper-id="constant">
        <arg-restriction on-param="const-val">
          <has-column>continent.area</has-column>
        </arg-restriction>
      </operation>
    </aftertransform>
  </selector>
</attributemap-def>
```

A relation mapping example



A relation mapping example – R₂O Code

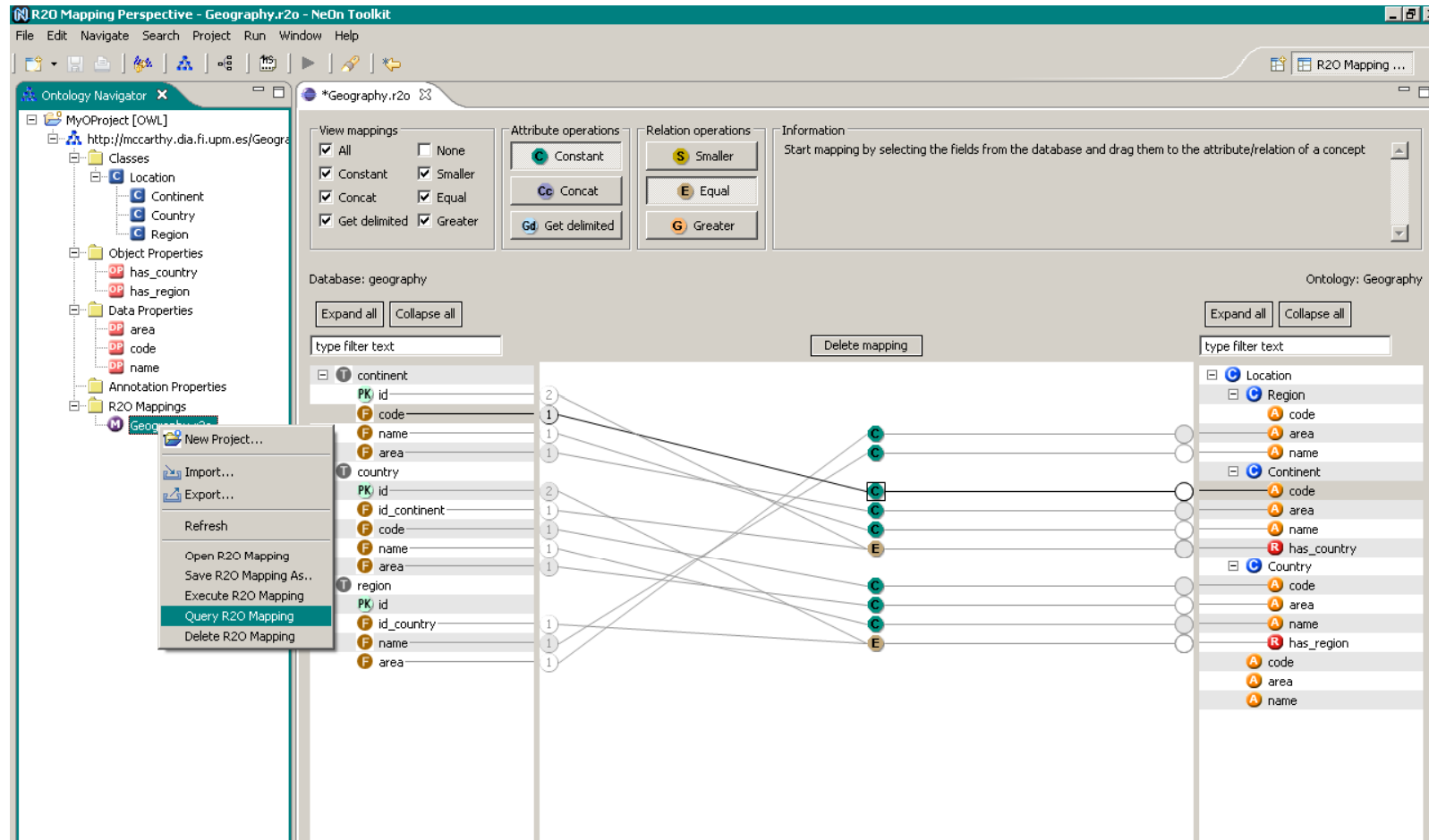
```
<dbrelationmap-def name="http://mccarthy.dia.fi.upm.es/Geography#has_country" toConcept="http://mccarthy.dia.fi.upm.es/Geography#Country">
  <joins-via>
    <condition oper-id="equals">
      <arg-restriction on-param="value1">
        <has-column>continent.id</has-column>
      </arg-restriction>
      <arg-restriction on-param="value2">
        <has-column>country.id_continent</has-column>
      </arg-restriction>
    </condition>
  </joins-via>
</dbrelationmap-def>
```



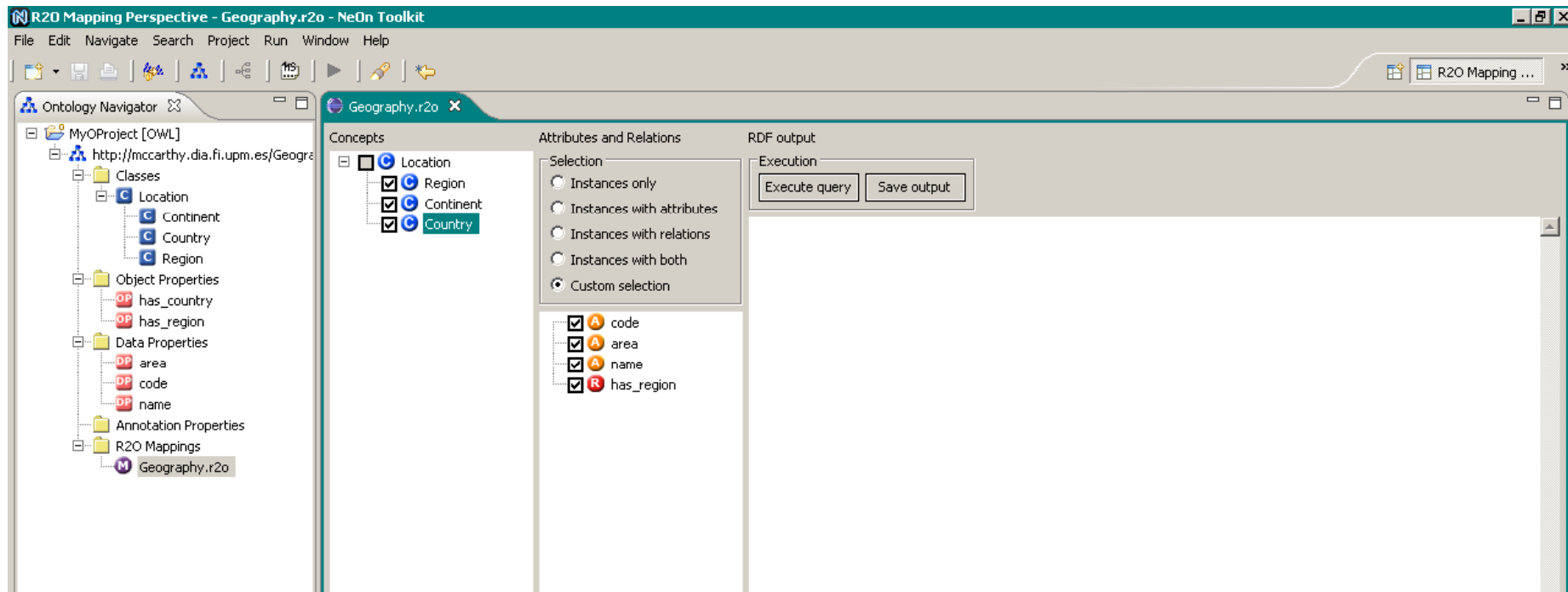
Concept mapping example – uri-as

```
<conceptmap-def name="http://mccarthy.dia.fi.upm.es/Geography#Region">
  <uri-as>
    <operation oper-id="concat">
      <arg-restriction on-param="string1">
        <has-value>http://mccarthy.dia.fi.upm.es/Geography#Region</has-value>
      </arg-restriction>
      <arg-restriction on-param="string2">
        <has-column>region.id</has-column>
      </arg-restriction>
    </operation>
  </uri-as>
  <described-by>
</conceptmap-def>
```

Querying the Ontology Instances



Querying the Ontology Instances



Querying the Ontology Instances – ODQML code

```
<onConcept conceptUri="http://mccarthy.dia.fi.upm.es/Geography#Country">
  <attSelect>
    | <onAtt attName="http://mccarthy.dia.fi.upm.es/Geography#code"/>
  </attSelect>
  <attSelect>
    | <onAtt attName="http://mccarthy.dia.fi.upm.es/Geography#area"/>
  </attSelect>
  <attSelect>
    | <onAtt attName="http://mccarthy.dia.fi.upm.es/Geography#name"/>
  </attSelect>
  <relSelect>
    | <onRel relName="http://mccarthy.dia.fi.upm.es/Geography#has_region"/>
  </relSelect>
</onConcept>
```

Retrieving the instances

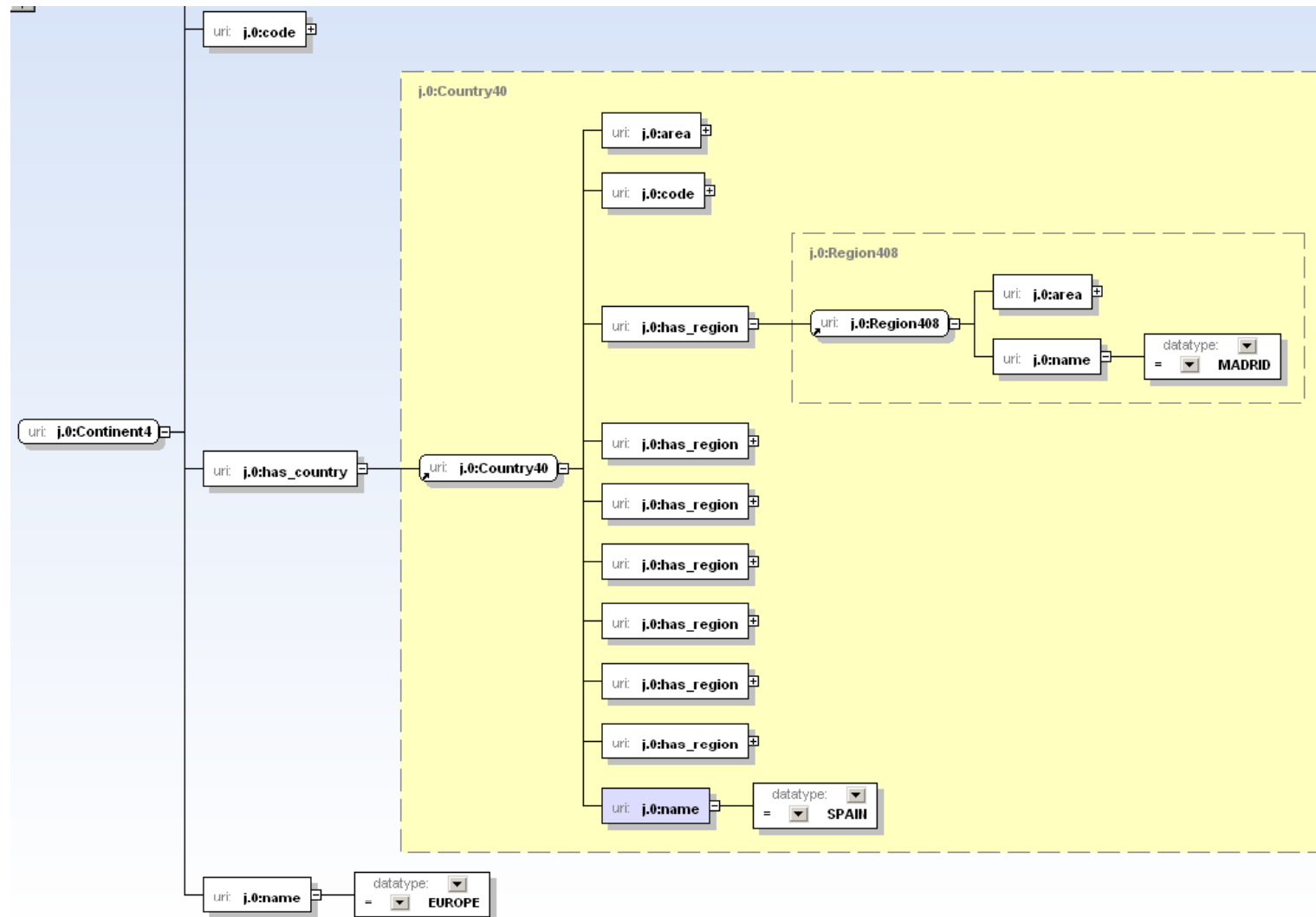
The screenshot shows the Geography.r2o application interface. It is divided into three main panels: Concepts, Attributes and Relations, and RDF output.

Concepts: A tree view showing the hierarchy of concepts. The 'Location' concept is selected, and its sub-concepts 'Region', 'Continent', and 'Country' are also selected.

Attributes and Relations: This panel contains two sections. The 'Selection' section has radio buttons for 'Instances only', 'Instances with attributes', 'Instances with relations', 'Instances with both', and 'Custom selection'. The 'Custom selection' option is selected. Below this, there is a list of attributes with checkboxes: 'code' (checked), 'area' (checked), 'name' (checked), and 'has_region' (checked).

RDF output: This panel displays the RDF output of the query. It includes an 'Execution' section with 'Execute query' and 'Save output' buttons. The RDF output is a list of instances, each represented by an RDF description. The instances are: 'ANTARCTICA' (Region), 'MURCIA' (Region), 'AMERICA' (Continent), 'EUROPE' (Continent), 'GALICIA' (Region), 'ANDALUCIA' (Region), and 'SPAIN' (Country). Each instance has its own set of attributes (code, area, name) and a 'has_region' property pointing to a specific region.

Instance example



How to embed the ODEMapster Processor

```
public void testFunction() throws Exception
{
    Properties props = new Properties();

    props.setProperty(MapsterConnector.DATABASE_DRIVER, "com.mysql.jdbc.Driver");
    props.setProperty(MapsterConnector.DATABASE_URL, "jdbc:mysql://rtms_figis");
    props.setProperty(MapsterConnector.DATABASE_USER, "root");
    props.setProperty(MapsterConnector.DATABASE_PWD, "root");
    props.setProperty(MapsterConnector.OUTPUT_FILE_PATH, "c:/develop/space/mapster/examples/jan/output.rdf");
    props.setProperty(MapsterConnector.ONTO_FILE_PATH, "c:/develop/space/mapster/examples/jan/onto.owl");
    props.setProperty(MapsterConnector.R2O_FILE_PATH, "c:/develop/space/mapster/examples/jan/f1.r2o");
    props.setProperty(MapsterConnector.QUERY_FILE_PATH, "c:/develop/space/mapster/examples/jan/fq1.xml");

    MapsterConnector mp = new MapsterConnector();
    mp.setProperties(props);
    mp.process();
}
```