

GeoBuddies: Anotación semántica colaborativa con dispositivos móviles en el Camino de Santiago

WP2

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WP.2 Ontology-based multilingual information integration

- Objective 3. **semantic accessibility to IGN resources and other data available in the Web**
 - harmonised views of IGN databases → OntoBCN
 - Multilingual content (Spanish, Galician and Basque)
 - Information integration techniques
- Main Steps and results
 1. Domain Ontology
 2. Onto-BD mapping definition (R_2O is not enough)
 3. Onto-BD mapping discovery algorithm
 4. Mapping execution (ODEMapster is not enough)
 5. Information integration with external data
 6. Composition procedural and declarative mappings
 7. Multilinguality
- Strong cooperation IGN-UPM (2007,2008)

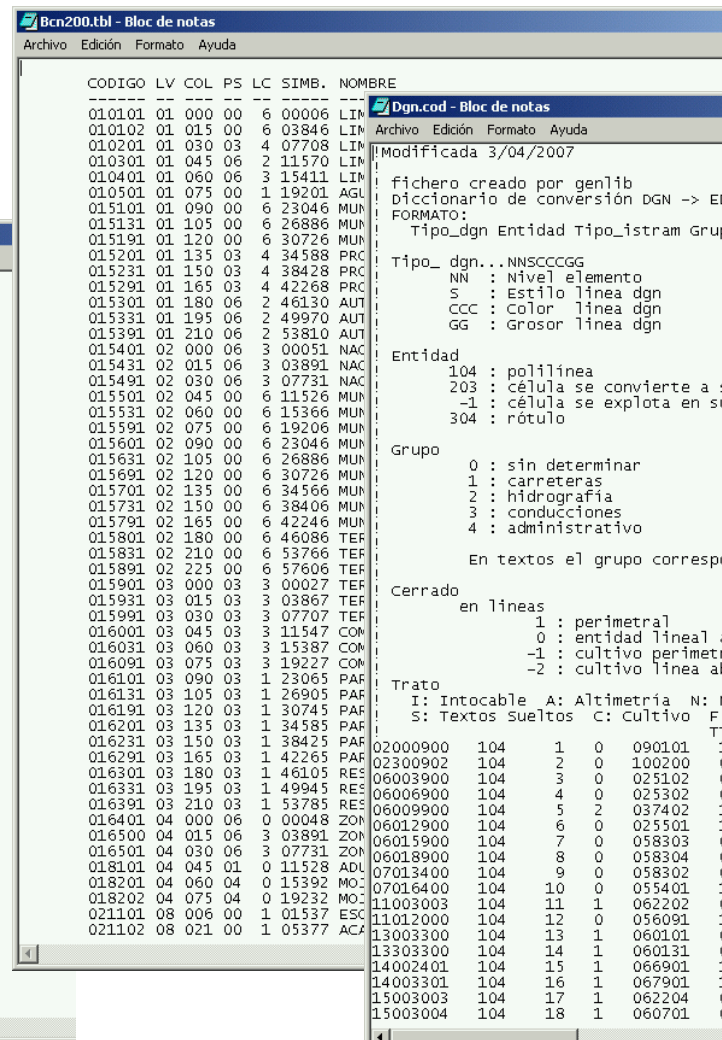
Starting point

- Monolingual **Knowledge bases** of **IGN** (spanish): **NC** (Nomenclátor Conciso), **NGN** (Nomenclátor Geográfico Nacional), **BCN200** (Base Cartográfica Nacional escala 1:200.000), **BCN25** (Base Cartográfica Nacional escala 1:25.000)
- Monolingual **Knowledge bases** of **CC.AA.** (spanish, basque, galician): Castilla y León, Cataluña, Euskadi, Extremadura, Galicia, La Rioja, Madrid, Murcia, Navarra.
- Creation of an **ontology** mapped with knowledge bases

Knowledge Bases

Nomenclátor Conciso (NC)

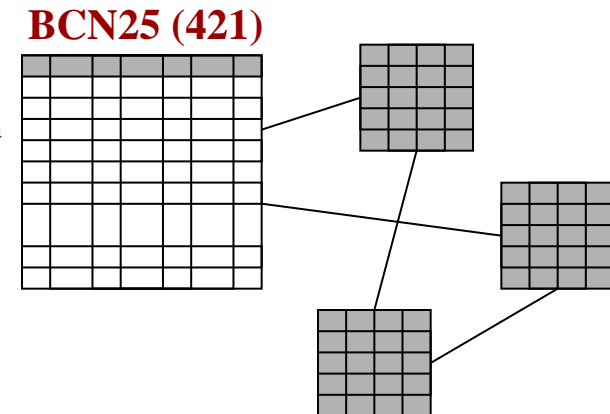
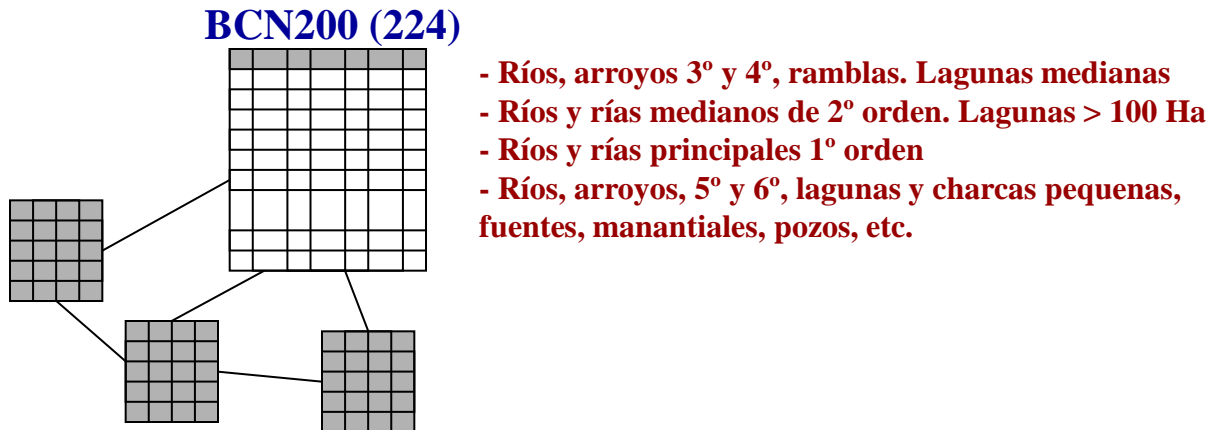
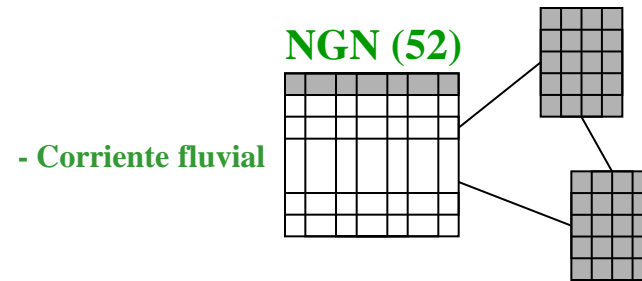
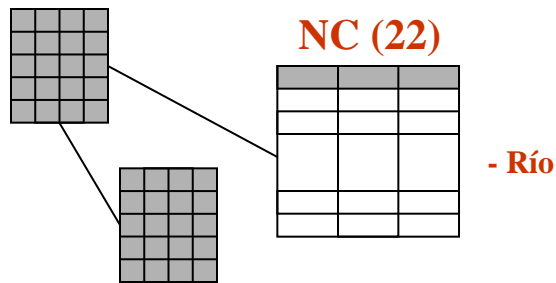
Base Cartográfica N. (BCN200)



N. Geográfico Nacional (NGN)

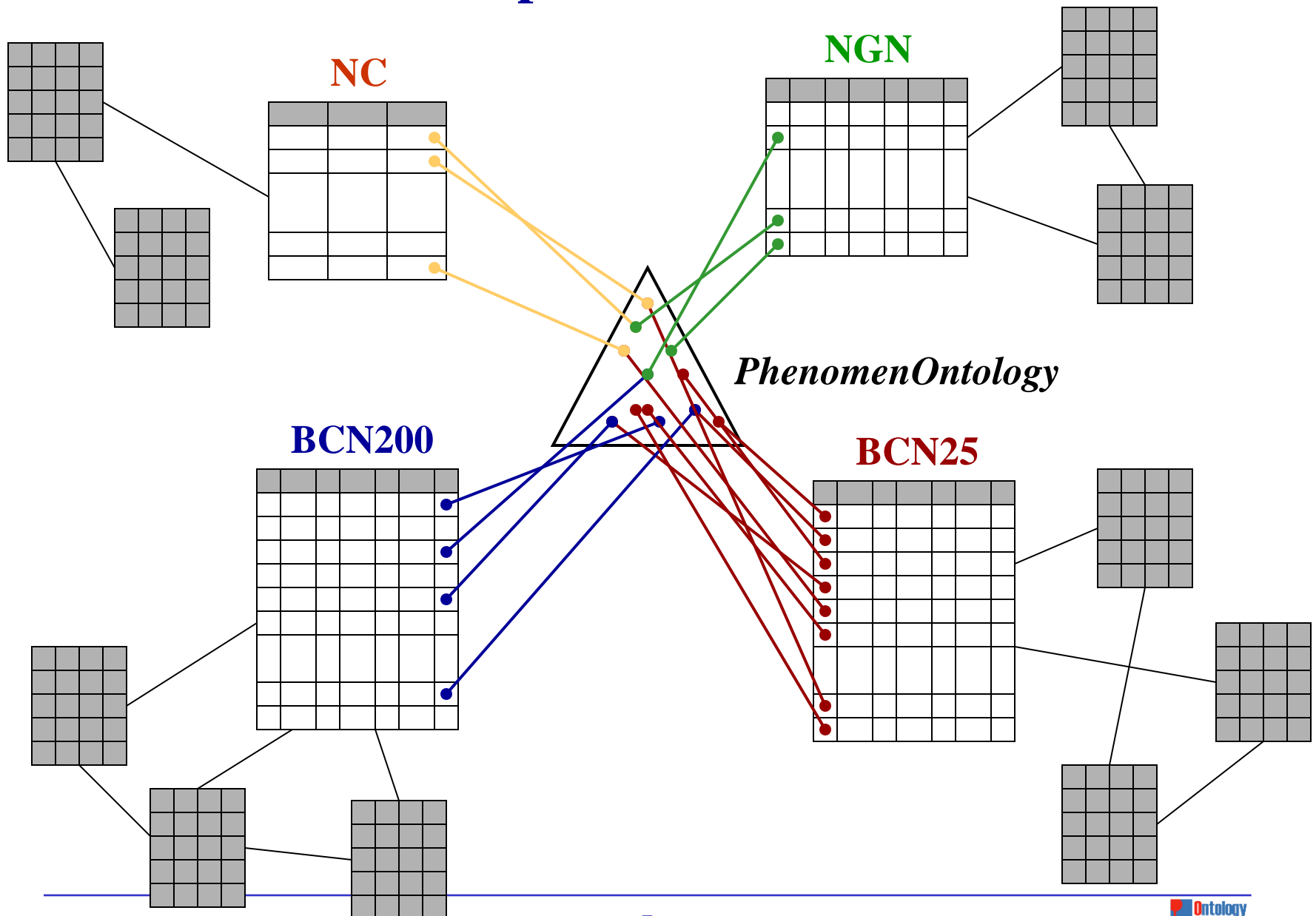
Base Cartográfica N. (BCN25)

Initial Knowledge Bases (IGN)



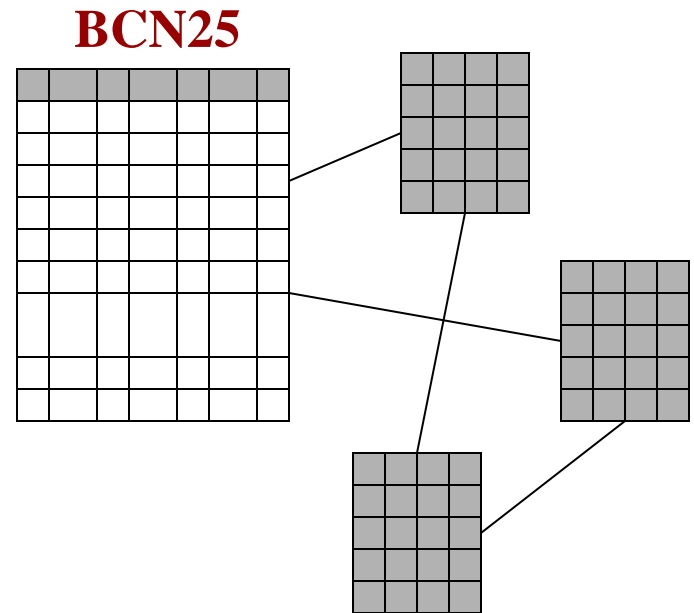
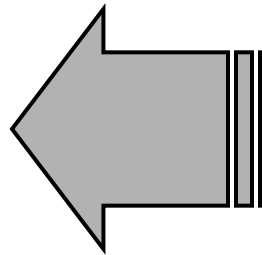
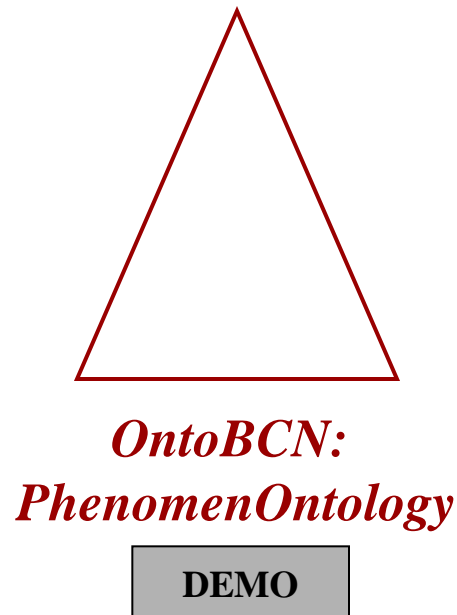
- 4 Knowledge Bases: NC, NGN, BCN200, BCN25
- Heterogeneity and granularity example
- Vocabulary differences: “*Autovia*”, “*Autovías*”, “*AUTOVIA*.”

Proposed Solution



Step 1: Automatic Ontology Building: PhenomenOntology

- Generación automática de la ontología a partir de BCN25 (*ontobcn*)
→ criterios de depuración de niveles.



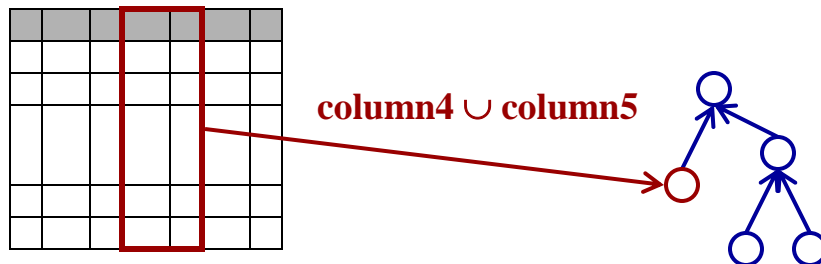
- Detección automática de diferencias lingüísticas (*linsearch*): plurales, tildes, diéresis, signos de puntuación, mayúsculas.
- Evaluándose en el IGN

Step 2: Onto-BD Mapping (R_2O)

R_2O is a language for expliciting **procedural** mappings between relational models and ontologies. (**model – model**)

ODEMapster is a compiler that cans execute mappings for:

- carrying out ontology population (**DB \rightarrow ontology**)
- responding queries to ontology with DB information
(**ontology \rightarrow DB \rightarrow ontology**)

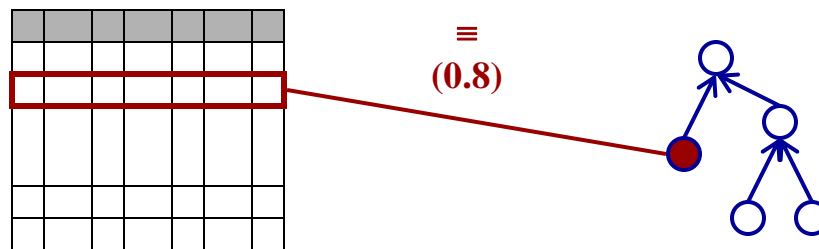


```
conceptmap-def
  name Cliente
  identified-by Usuarios.ID
  uri-as
    <transformation>
  applies-if
    <cond-expr>
  joins-via
    <cond-expr>
  documentation "Correspondence description"
```

Step 2: Onto-BD Mapping (IGN case)

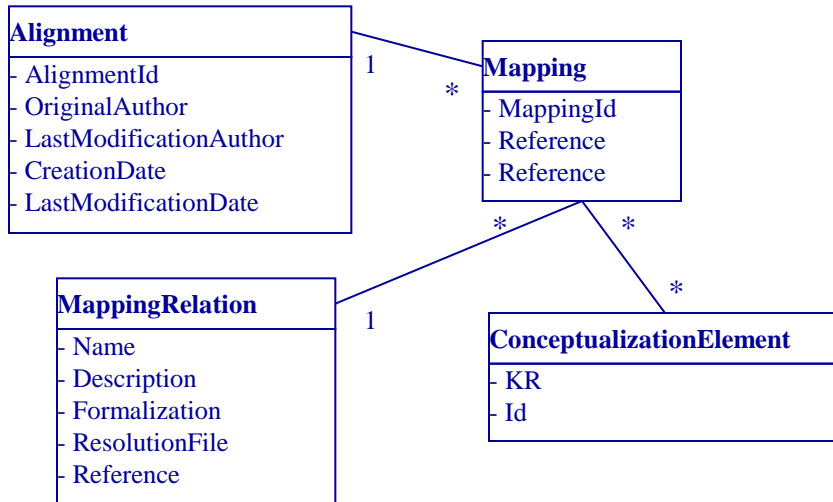
Ontology **concepts** are expressed as **instances** of relational model. (**model – individuals**)

Mappings does not express **procedural** relation (actions condicionated to events), express **declarative** relation (facts with certainty).



Step 2: Mapping Model Definition

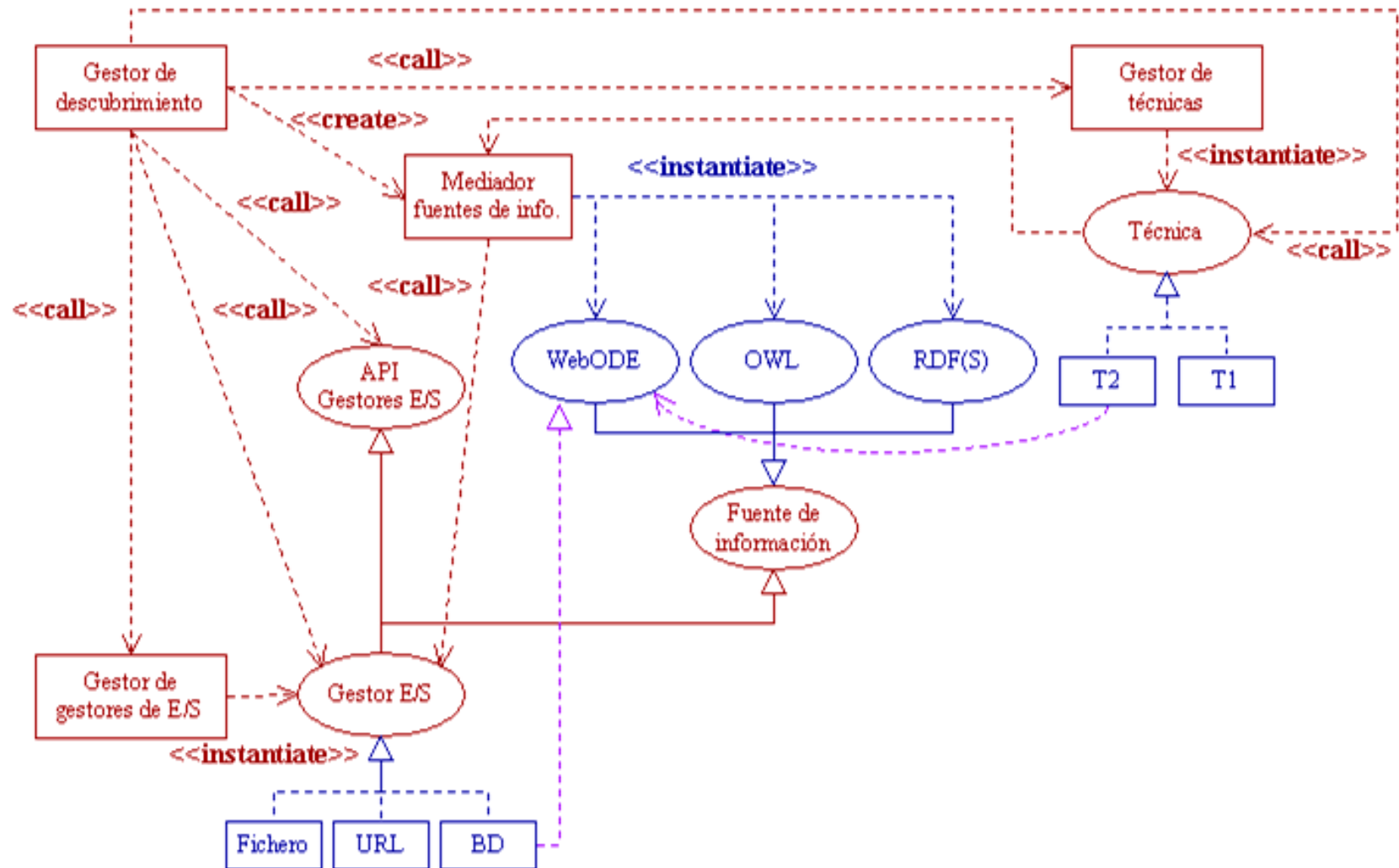
- Model of **declarative** mappings and XML example



```
<Mapping>
  <MappingId>BCN1_Fenomenos.Phenomens.030701-Phenontology.Castillo</MappingId>
  <Certainty>1.0</Certainty>
  <Reference>Manual Mapping by JARG</Reference>
  <MappingRelation>
    <Name>Igualdad</Name>
    <Description>All elements are semantically equivalents.</Description>
    <Formalization>A=B=C=...</Formalization>
    <ResolutionFile>--None--</ResolutionFile>
    <Reference>OEG Mapping Relations</Reference>
  </MappingRelation>
  <ConceptualizationElement>
    <KR>DB</KR>
    <Id>BCN1_Fenomenos.Phenomens.030701</Id>
  </ConceptualizationElement>
  <ConceptualizationElement>
    <KR>Ontology</KR>
    <Id>Phenontology.Castillo</Id>
  </ConceptualizationElement>
</Mapping>
```

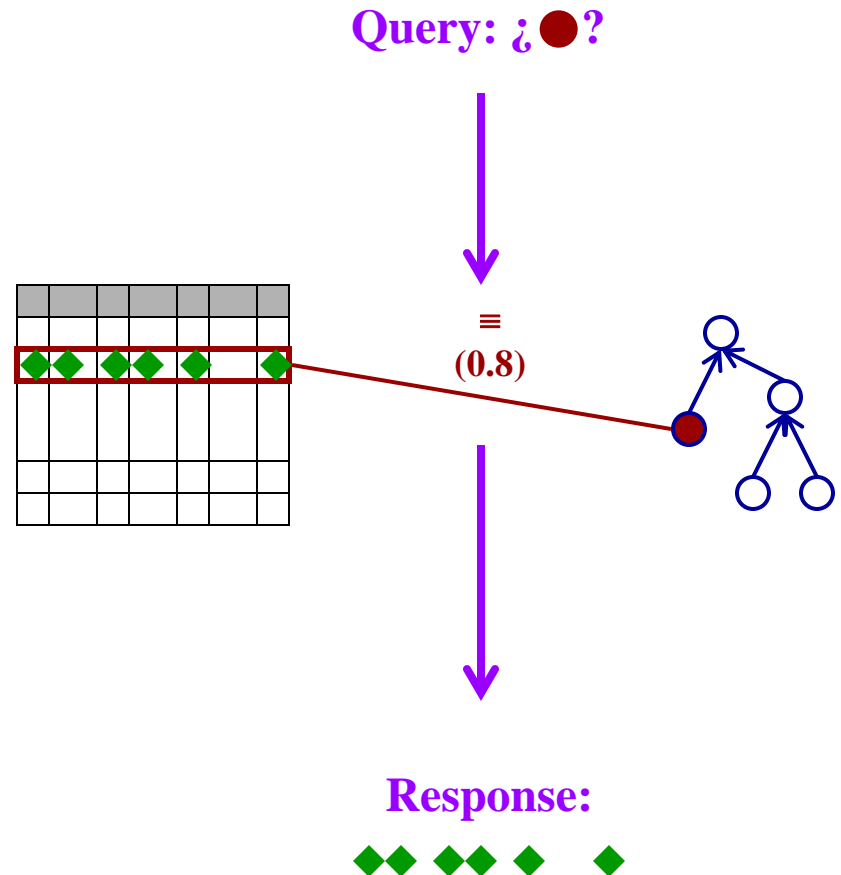
- Storage Systems
 - XML file (XSD defined yet)
 - WebODE now
 - To be decided new storage system

Step 3: Mapping discovery (in progress)

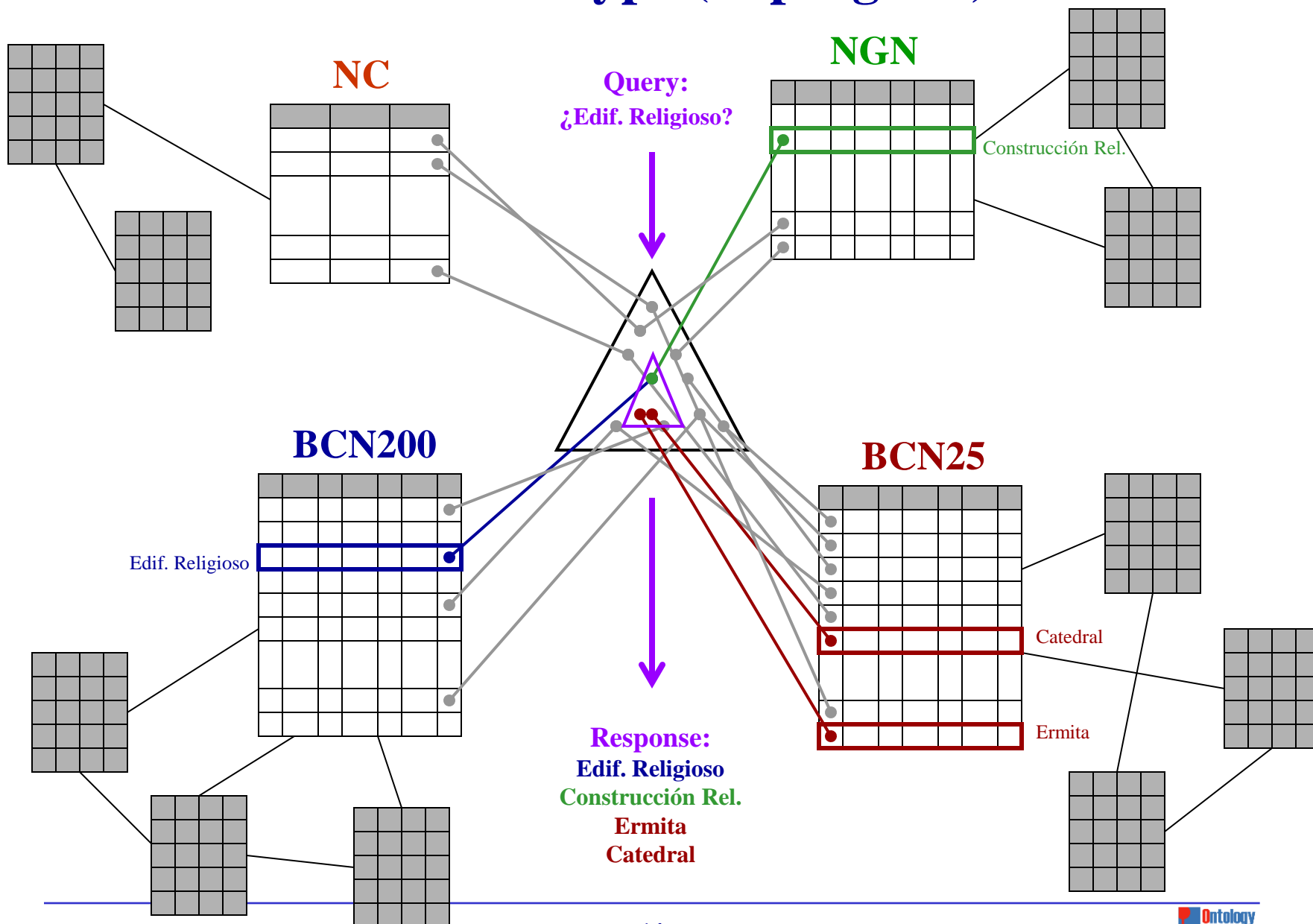


Step 4: Onto –BD Mapping interpretation (in progress)

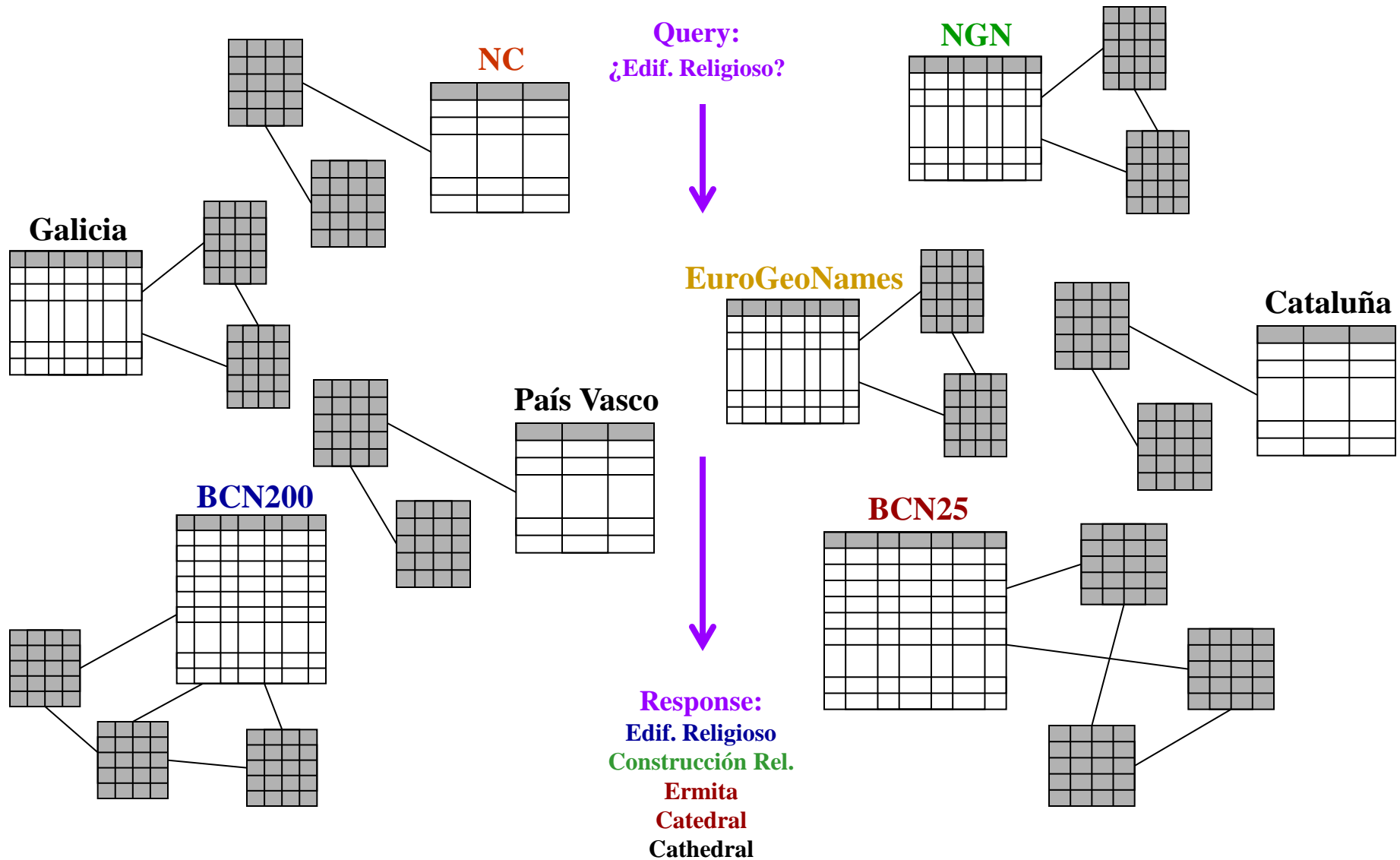
Mapping interpreter permits
response queries using DB
information **transparently**
through declarative mappings



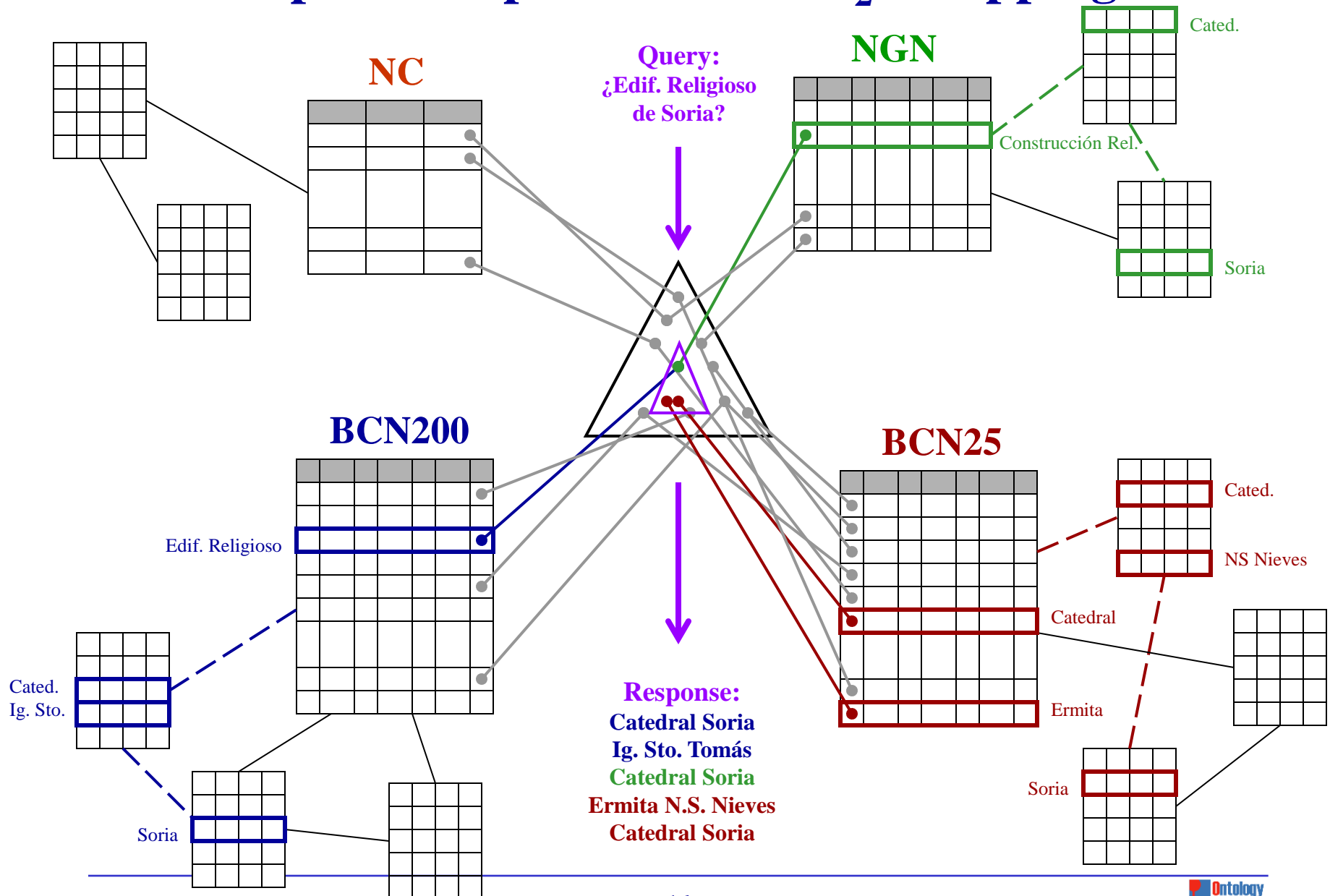
First Prototype (in progress)



Step 5: Integration of IGN+CCAA+European



Step 6: Composition with R₂O mappings



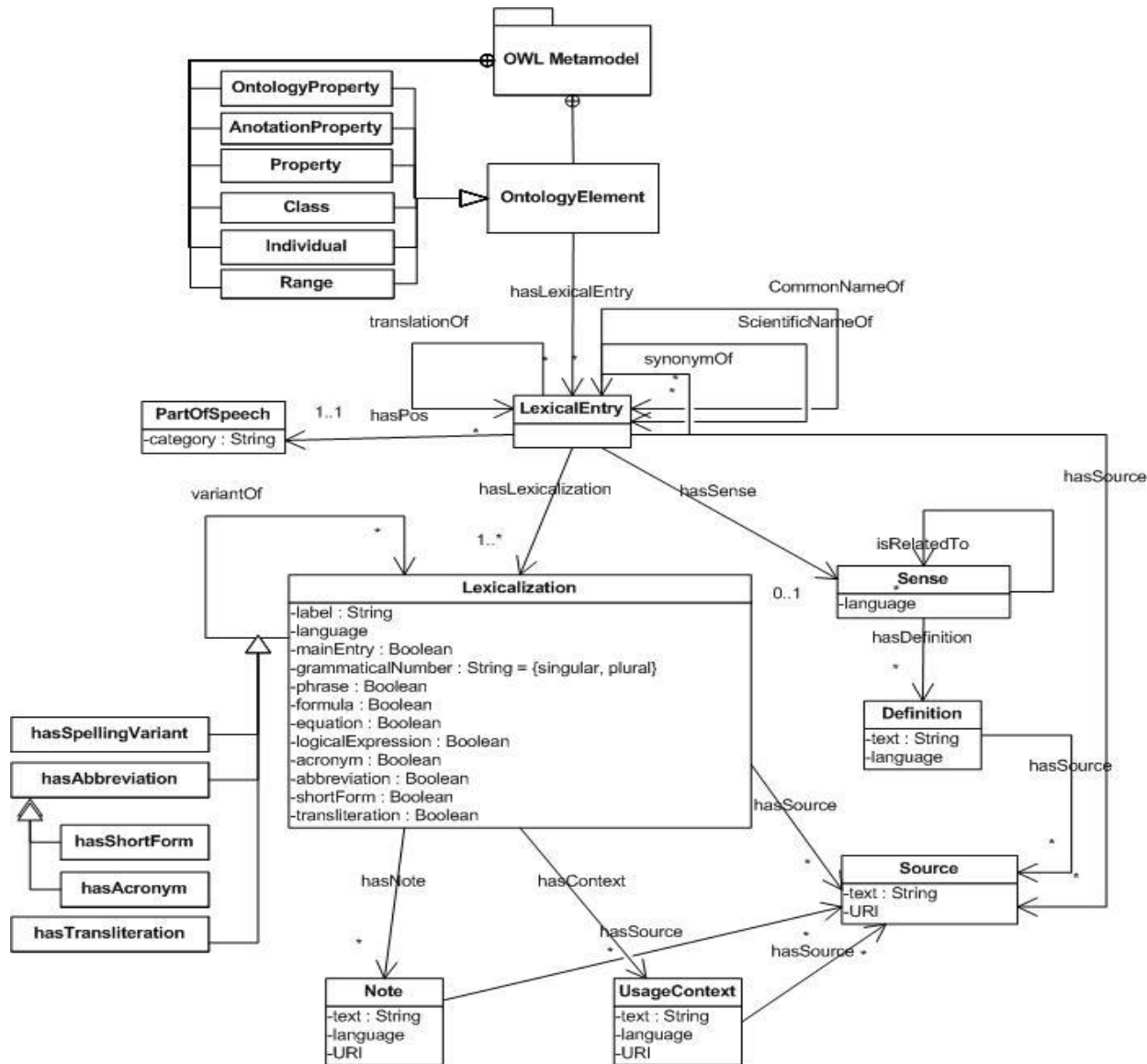
Step 7: Multilinguality

- ¿Quién va a interactuar con la ontología?
 - Un programa -> la multilingualidad no es necesaria
 - Un usuario -> interesa que la ontología sea multilingüe
- Si interesa que sea multilingüe aunque no hay necesidad,
 - ¿Cómo se va a proporcionar?
 - ¿En qué nivel ha de estar la multilingualidad?

Possible solutions

- Solution 1
 - NeonMultilingual Model
 - Label Translator
- Solution 2
 - Neon Multilingual Meta-model
 - Add linguistic information → elements are part of an ontology
 - classes, properties or relations
 - LabelTranslator plugin
 - Used sources
 - EWN databases
 - Web Translation resources
 - Linguistic information
 - Translated labels
 - Gloss or definition
 - Supported languages
 - English, German and Spanish

NeonMultilingual Model



Work to be done until Dec. 08

- OntoBCN
- Mapping Model def.

