BEHIND THE MAGIC OF LINKED DATA

#FOSS4G-NOR

September 2014, Oslo

Antonio Armas Díaz
antonio.armas.diaz@norkart.no

Wikipedia defines Linked Data as "a term used to describe a recommended best practice for exposing, sharing, and connecting pieces of **data**, **information**, and **knowledge** on the Semantic Web using URIs and RDF.“

http://linkeddata.org/home

http:// URIs | **RDF** | **OWL** | **SPARQL**

Ontologies

Vocabularies

Triples stores

Raw data!

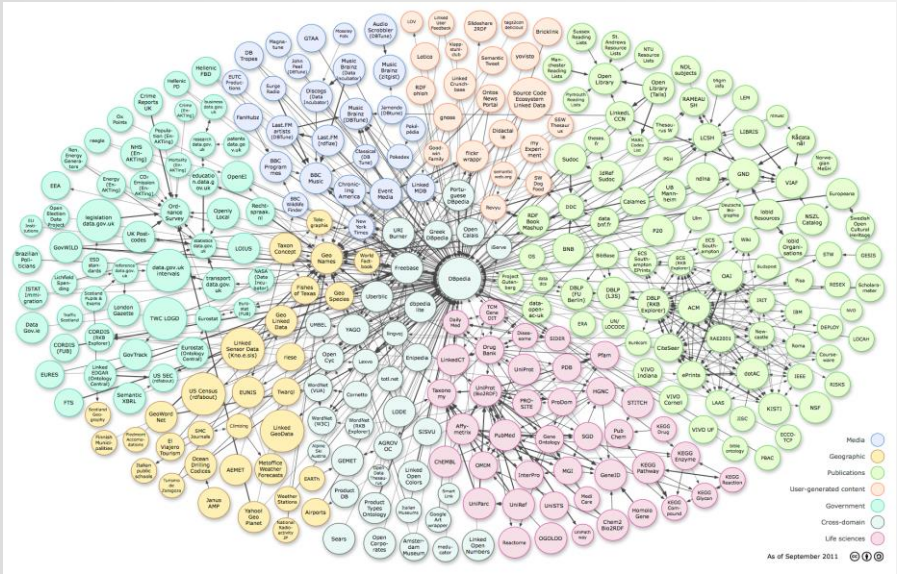
Leading the track

Ordnance Survey

Cadastral Data

- Basis for land tributes
- Importance of geographical aspects (Annex I INSPIRE)
- Geographical unit under homogeneous real property rights and unique ownership
- Semantic integration efforts, connecting cadastral data with:

Public services, demographic statistics, planning...



Linked Open Data cloud diagram
from linkeddata.org

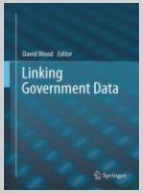
”Unlinked” data

Cadastral Parcel Specification

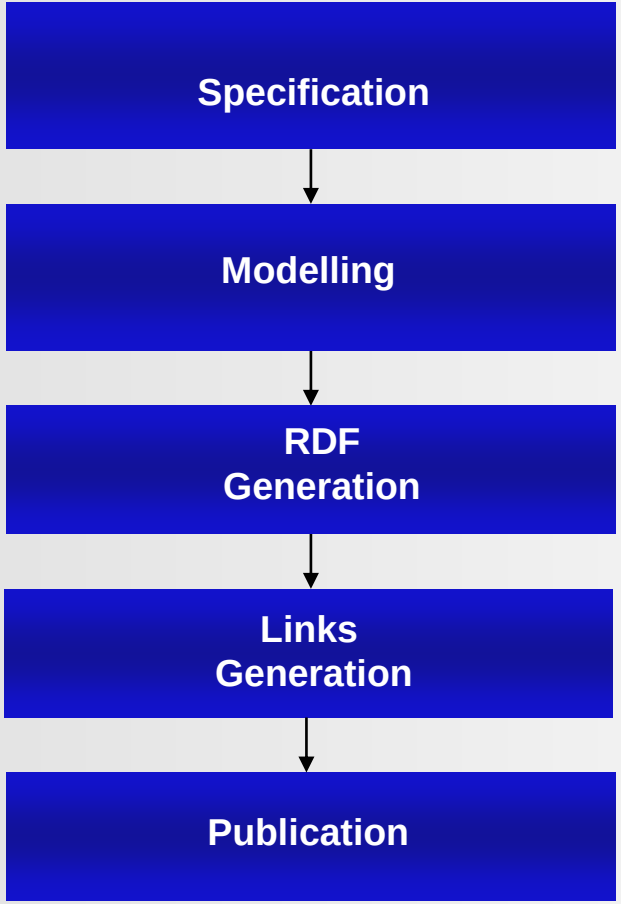
Linked Data

NORKART

Steps:



Integrating geographical information in the Linked Digital Earth.
International Journal of Digital Earth
Volume 7, Issue 7, 2014. Special Issue:
Digital Earth Applications:
Technological design and Organizational Strategies



Specification

Modelling

RDF Generation

Links Generation

Publication

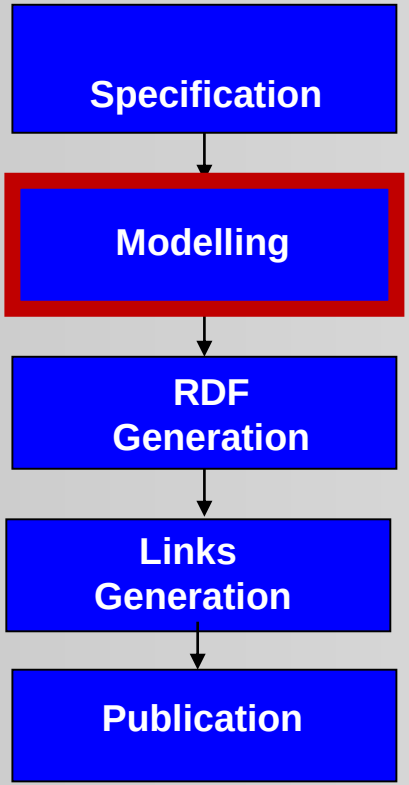
Geospatial information

Source: INSPIRE format GML files and the SHPs provided by Sede Electrónica del Catastro
https://www.sedecatastro.gob.es/

Geometry

"Simple features" GM_Surface (recommended by INSPIRE)

Data Specifications: INSPIRE_DataSpecification_CP_v3.0



Models Reused:

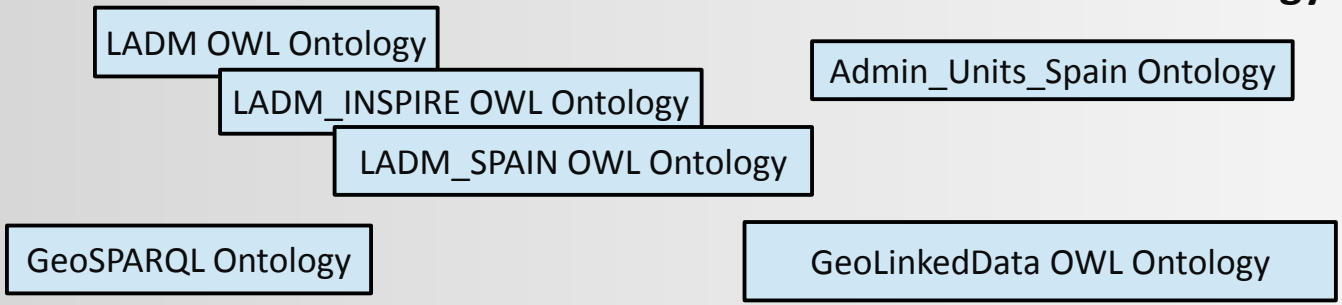
- LADM OWL Ontology provided by the University of DELFT (Peter Van Oosterom)
- FAO (Foods and Agriculture Organization) OWL Geopolitical Ontology
- GeoSPARQL Ontology
- GeoLinkedData Ontology
- WGS84 Vocabulary

Models built:

- LADM_INSPIRE OWL Ontology from INSPIRE Data Models
- Admin_Units_Spain Ontology

protégé

NeOn methodology



Specification

Modelling

RDF Generation

Links Generation

Publication

RDF Generation Generation of geospatial RDF

From SHP to RDF Using shp2RDF library and geometry2RDF library

```
- <rdf:Description rdf:about="http://otalex.linkeddata.es/resource/                    50c83829c0432                    e3">
    <rdf:type rdf:resource="http://phenomenontology.linkeddata.e                    ontology/Curva" />
    <phenomenontology:gml>LINESTRING (-5.994659779559449 38.4                    1211731319554, -5.99
      38.41183795657525)</phenomenontology:gml>
    <phenomenontology:formadoPor rdf:resource="http://otalex.linkeddata.es/resource/wg                    5_-
      5.995014660678481" />
    <phenomenontology:formadoPor rdf:resource="http://otalex.linkeddata.es/resource/wg                    4_-
      5.994659779559449" />
  </rdf:Description>
- <rdf:Description rdf:about="http://otalex.linkeddata.es/resource/wgs84/38.923714329                    566985">
    <rdf:type rdf:resource="http://www.w3.org/2003/01/geo/wgs84_pos#Point" />
    <geo:lat rdf:datatype="http://www.w3.org/2001/XMLSchema#double">38.923714329103966</geo:lat>
    <geo:long rdf:datatype="http://www.w3.org/2001/XMLSchema#double">-7.1812617589666985</geo:long>
    <phenomenontology:order rdf:datatype="http://www.w3.org/2001/XMLSchema#integer">0</phenomenontology:order>
    <phenomenontology:order rdf:datatype="http://www.w3.org/2001/XMLSchema#integer">1</phenomenontology:order>
  </rdf:Description>
- <rdf:Description rdf:about="http://otalex.linkeddata.es/resource/cf43df05de92d269c200884e3be263c6cd9e8f1d">
    <rdf:type rdf:resource="http://phenomenontology.linkeddata.es/ontology/Curva" />
    <phenomenontology:gml>LINESTRING (-6.245810637230872 38.78873472680004, -6.246509340284598
```

NORKART

Specification

Modelling

RDF Generation

Links Generation

Publication

Link Generation with:

- Silk
- GIS tools

http://dbpedia.org/

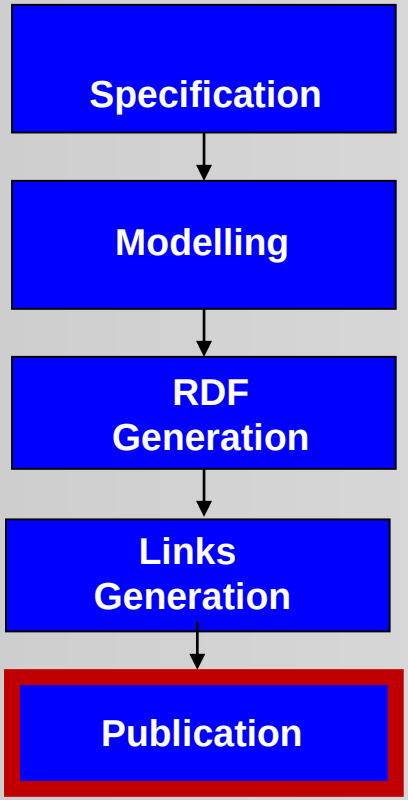
SameAs

SameAs

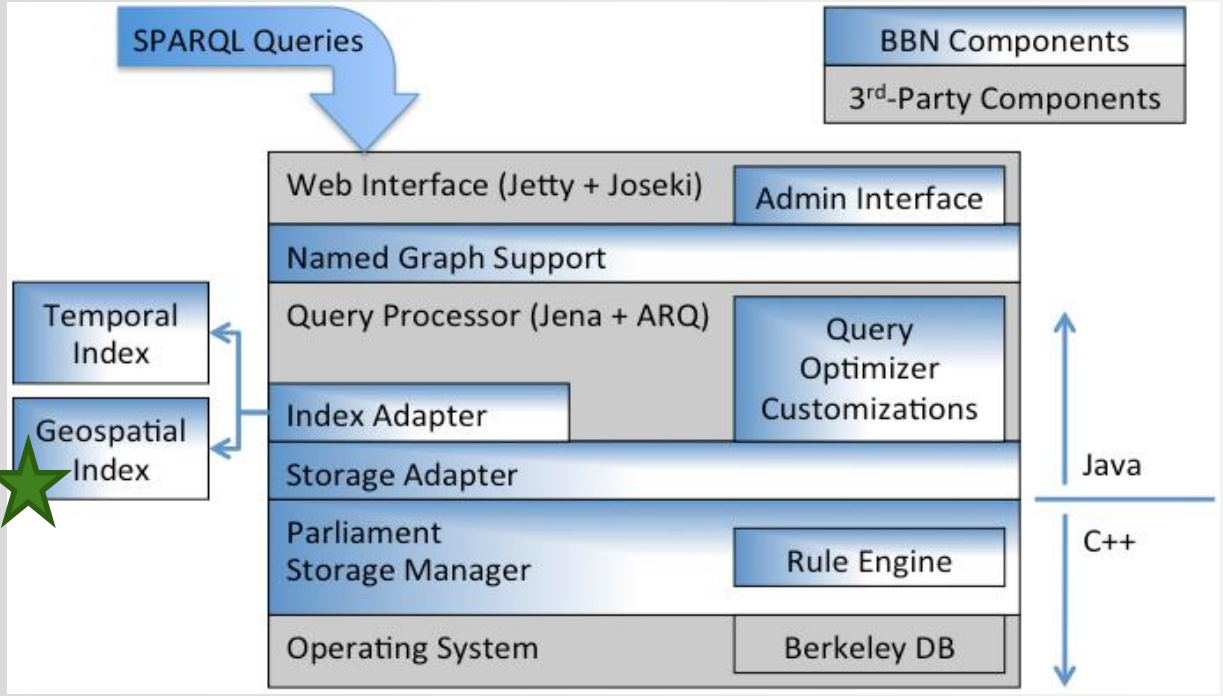
RDF catastro

URI: http://catastroLinkedData/8813801VK6881S

NORKART



- **Parliament supports GeoSPARQL**



http://parliament.semwebcentral.org/

Main results

- An ontology network related to the LADM ISO19152 and INSPIRE Cadastral Parcel Specifications

- From unstructured cadastral data to Linked Open Data Enriching Cadastral Data with Dbpedia

Objectives

- Enriching Cadastral data with more datasets (Statistics and most relevant INSPIRE themes)

Thank you for your attention!

antonio.armas.diaz@norkart.no