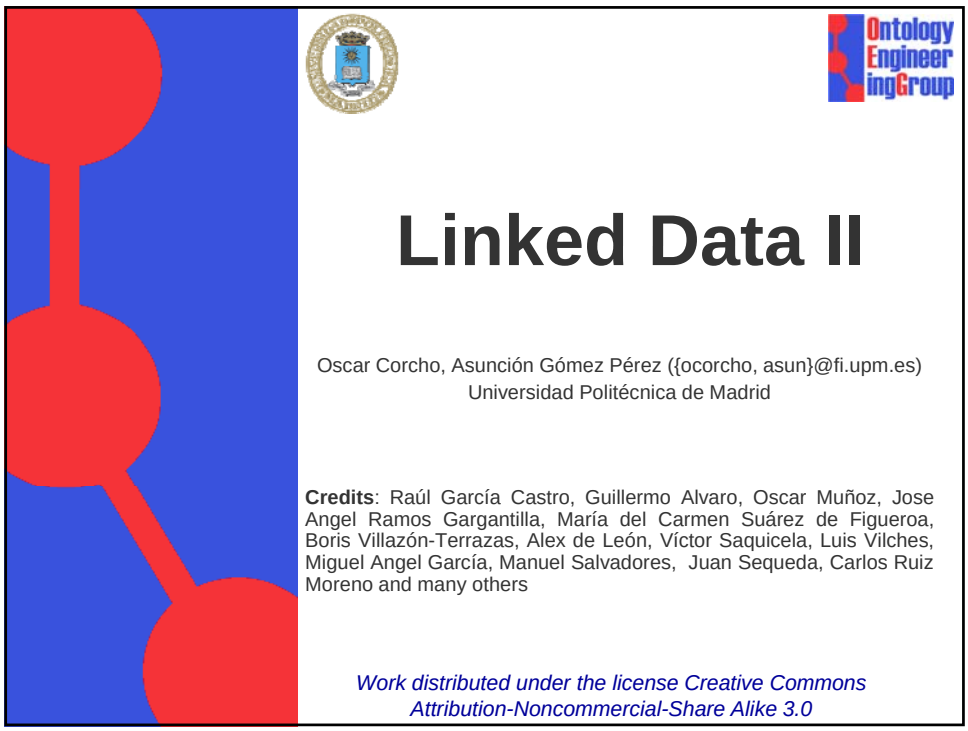


Linked Data II

Oscar Corcho, Asunción Gómez Pérez ({ocorcho, asun}@fi.upm.es)
Universidad Politécnica de Madrid

Credits: Raúl García Castro, Guillermo Alvaro, Oscar Muñoz, Jose Angel Ramos Gargantilla, María del Carmen Suárez de Figueroa, Boris Villazón-Terrazas, Alex de León, Víctor Saquicela, Luis Vilches, Miguel Angel García, Manuel Salvadores, Juan Sequeda, Carlos Ruiz Moreno and many others

Contents

- Review of last class
  - Linked Data Principles
  - LOD Cloud
- Methodological guidelines for Linked Data Publication
- Technical aspects of Linked Data publication

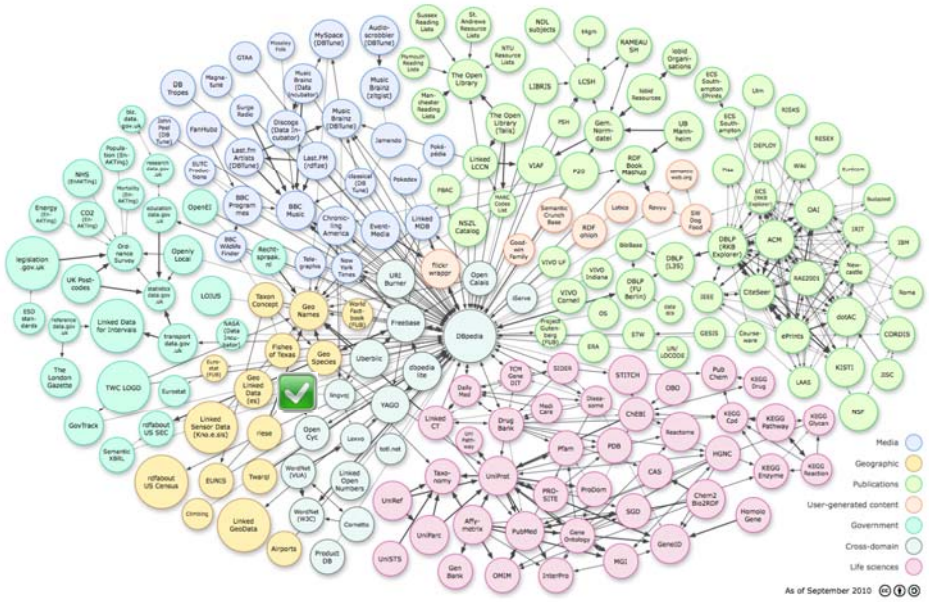
The four principles (Tim Berners Lee, 2006)

1. Use URIs as names for things
2. Use HTTP URIs so that people can look up those names.
3. When someone looks up a URI, provide useful information, using the standards (RDF*, SPARQL)
4. Include links to other URIs, so that they can discover more things.

- http://www.w3.org/DesignIssues/LinkedData.html

http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html

LOD cloud



http://richard.cyganiak.de/2007/10/lod/

Contents

- Review of last class
  - Linked Data Principles
  - LOD Cloud
- Methodological guidelines for Linked Data Publication
- Technical aspects of Linked Data publication

Methodological guidelines for Linked Data publication

- Motivation
- Related Work
- GeoLinkedData
  - Identification of the data sources
  - Vocabulary Development
  - Generation of the RDF data
  - Publication of the RDF data
  - Data cleansing
  - Linking the RDF data
  - Enable effective discovery
- Future Work

GeoLinkedData

- It is an open initiative whose aim is to enrich the Web of Data with Spanish geospatial data.
- This initiative has started off by publishing diverse information sources, such as National Geographic Institute of Spain (IGN-E) and National Statistics Institute (INE)

GeoLinked Data

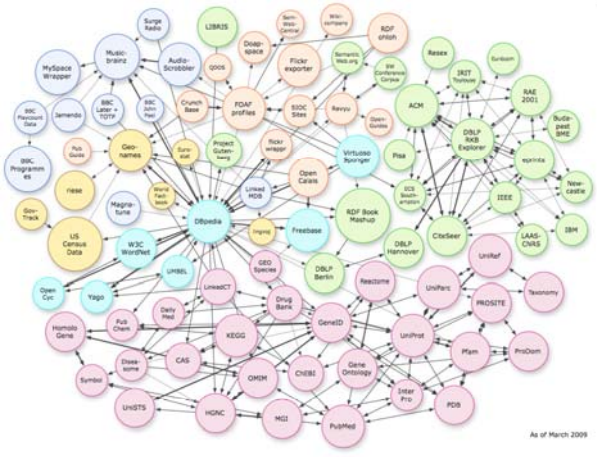
- http://geo.linkeddata.es

Motivation

The Web of Data is mainly for English speakers

Poor presence of Spanish

Total	3182428709
Non-literals	1494635231
Literals	1687793478
Literals without Lang tag	1282062417
Literals - en	99.171%
Literals - ja	0.463 %
Literals - fr	0.054 %
Literals - de	0.034 %
Literals - pl	0.025 %
Literals - it	0.021 %
Literals - es	0.019 %
Literals - ru	0.018 %
Literals - nl	0.018 %

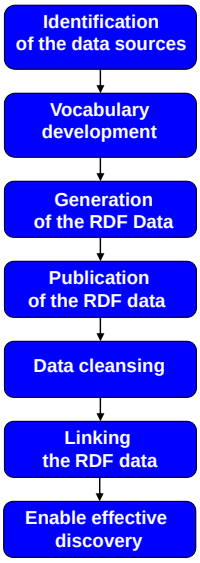


» 99.171 % English

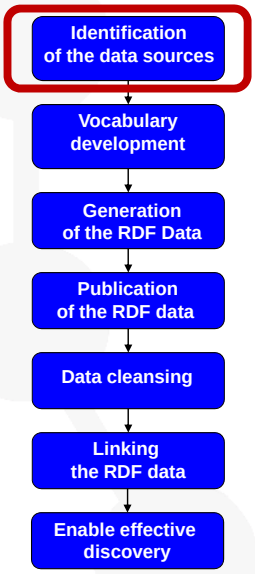
» 0.019 % Spanish

Source:Billion Triples dataset at http://km.aifb.kit.edu/projects/btc-2010/
Thanks to Aidan, Richard, Andreas

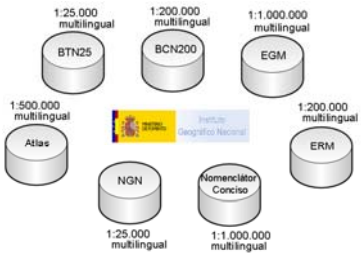
Process for Publishing Linked Data on the Web



1. Identification and selection of the data sources

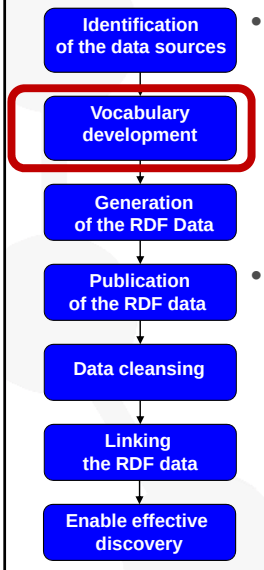


Instituto Geográfico Nacional



Instituto Nacional de Estadística

2. Vocabulary development



- Features
  - Lightweight :
    - Taxonomies and a few properties
  - Consensuated vocabularies
    - To avoid the mapping problems
  - Multilingual
    - Linked data are multilingual
- The NeOn methodology can help to
  - Re-engineer Non ontological resources into ontologies
    - Pros: use domain terminology already consensuated by domain experts
  - Withdraw in heavyweight ontologies those features that you don't need
  - Reuse existing vocabularies

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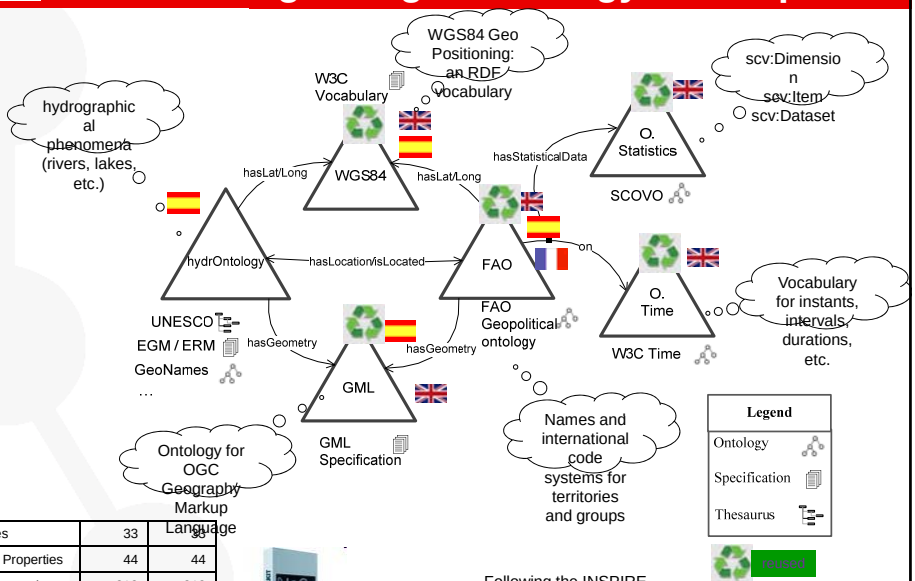
2. Lightweight Ontology Development



Classes	33	33
Object Properties	44	44
Data Properties	318	318

Following the INSPIRE (INfrastructure for SPatial InfoRmation in Europe) recommendation. hydrOntology,SCOVO, FAO Geopolitcal, WGS84, GML, and Time

URI of the ontology

http://geo.linkeddata.es/ontology

Examples:

Concept
http://geo.linkeddata.es/ontology/Provincia

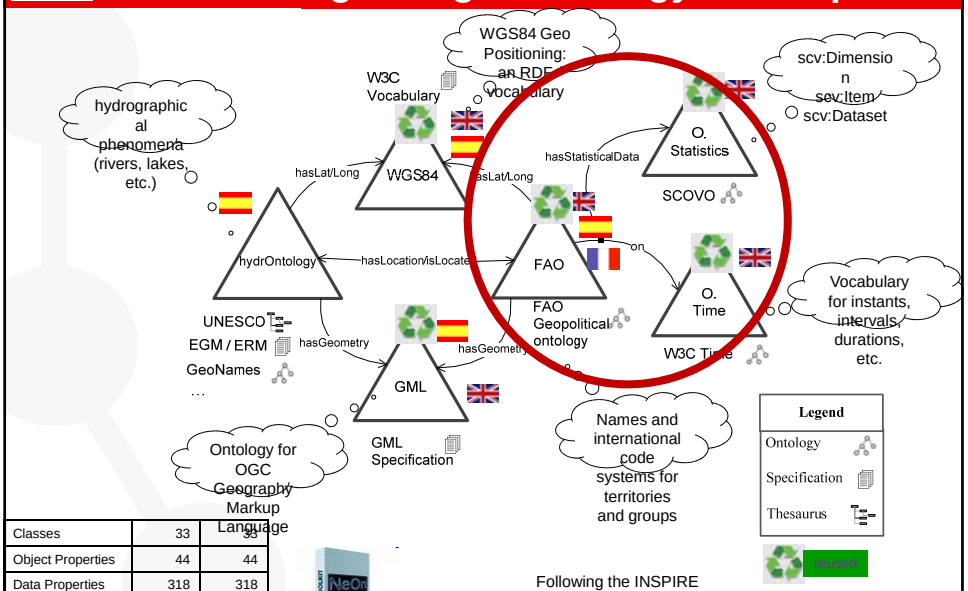
Property
http://geo.linkeddata.es/ontology/distancia

Other domains:

http://museum.linkeddata.es/ontology
http://edu.linkeddata.es/ontology
http://gov.linkeddata.es/ontology

- URIs in Spanish
  - http://geo.linkeddata.es/ontology/Río
  - RDF allows UTF-8 characters for URIs
  - But, Linked Data URIs has to be URLs as well
  - So, non ASCII-US characters have to be %code
    - http://geo.linkeddata.es/ontology/R%C3%ADo

2. Lightweight Ontology Development

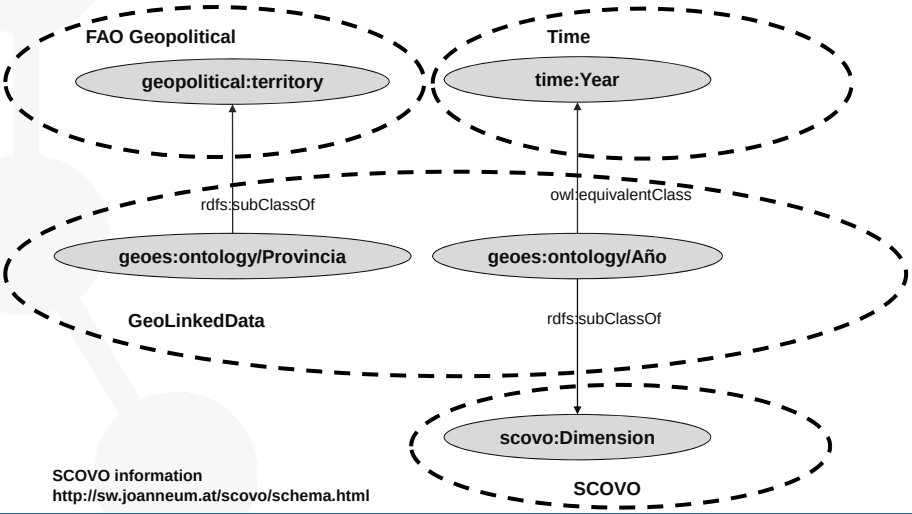


Classes	33	33
Object Properties	44	44
Data Properties	318	318

Following the INSPIRE (INfrastructure for SPatial InfoRmation in Europe) recommendation. hydrOntology,SCOVO, FAO Geopolitcal, WGS84, GML, and Time

Zoom in

geoes: http://geo.linkeddata.es/
geopolitical: http://aims.fao.org/aos/geopolitical.owl#
time: http://www.w3.org/2006/time#
scovo: http://purl.org/NET/scovo#



SCOVO information
http://sw.joanneum.at/scovo/schema.html

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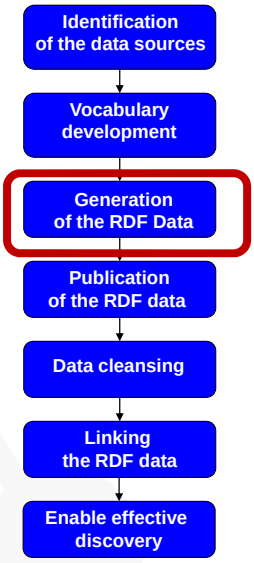
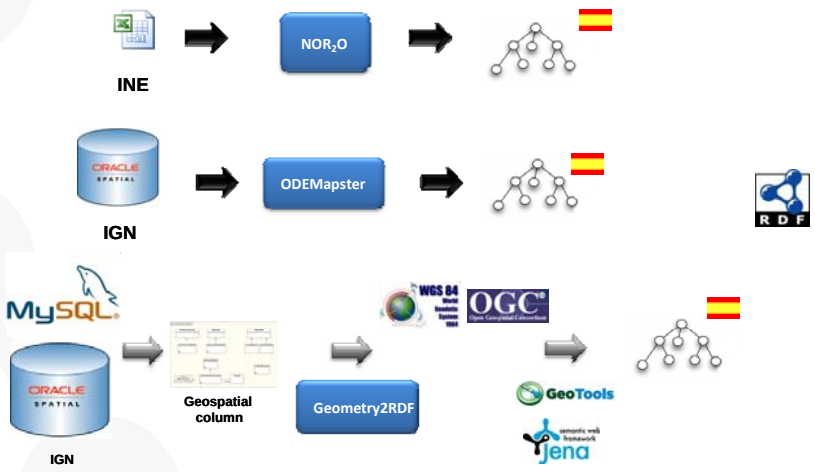
3. Generation of RDF



- From the Data sources
  - Geographic information (Databases)
  - Statistic information (.xsl)
  - Geospatial information
- Different technologies for RDF generation
  - Reengineering patterns
  - R20 and ODEMapster
  - Annotation tools
  - Geometry generation

3. Generation of the RDF Data



3. Generation of the RDF Data – Geometry2RDF


```
<rdf:Description rdf:about="http://geo.linkeddata.es/resource/wgs84/39.158523176194414_-1.6341427210305737">
  <geontology:order rdf:datatype="http://www.w3.org/2001/XMLSchema#int">205</geontology:order>
  <geo:long rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">-1.6341427210305737</geo:long>
  <geo:lat rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">39.158523176194414</geo:lat>
  <rdf:type rdf:resource="http://www.w3.org/2003/01/geo/wgs84_pos#Point"/>
</rdf:Description>
<rdf:Description rdf:about="http://geo.linkeddata.es/resource/wgs84/38.65501872007066_-2.6158910085778153">
  <geontology:order rdf:datatype="http://www.w3.org/2001/XMLSchema#int">6</geontology:order>
  <geo:long rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">-2.6158910085778153</geo:long>
  <geo:lat rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">38.65501872007066</geo:lat>
  <rdf:type rdf:resource="http://www.w3.org/2003/01/geo/wgs84_pos#Point"/>
</rdf:Description>
<rdf:Description rdf:about="http://geo.linkeddata.es/resource/wgs84/38.37015012539368_-1.6964507982671462">
  <geontology:order rdf:datatype="http://www.w3.org/2001/XMLSchema#int">141</geontology:order>
  <geo:long rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">-1.6964507982671462</geo:long>
  <geo:lat rdf:datatype="http://www.w3.org/2001/XMLSchema#decimal">38.37015012539368</geo:lat>
  <rdf:type rdf:resource="http://www.w3.org/2003/01/geo/wgs84_pos#Point"/>
</rdf:Description>
```

URIs of the RDF instances generated

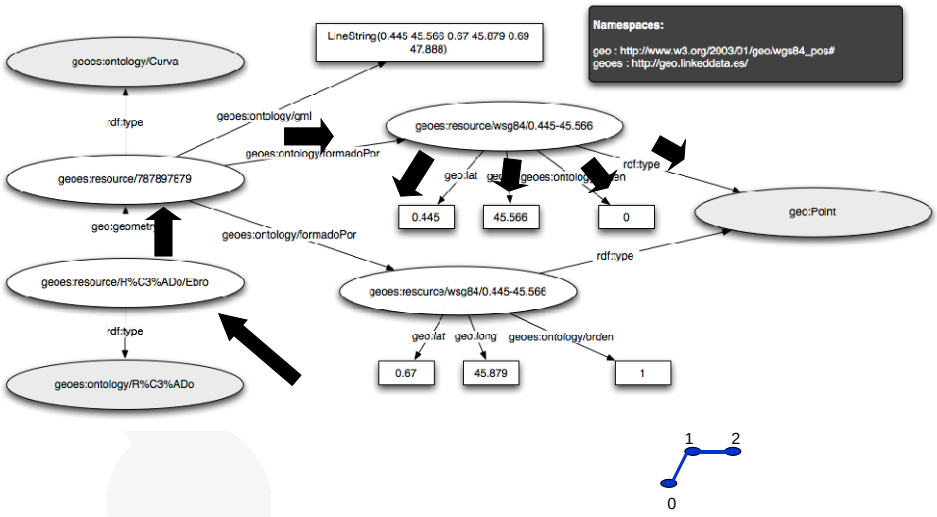
Cool URIs for the Semantic Web http://www.w3.org/TR/cooluris/

http://geo.linkeddata.es/resource/@@Type@@/Name

Examples:

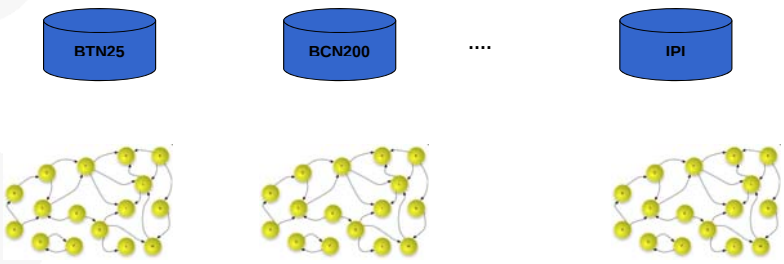
http://geo.linkeddata.es/resource/Provincia/Madrid
http://geo.linkeddata.es/resource/Municipio/Soria

4. Creation of RDF from geometrical information



3. Generation of the RDF data – RDF graphs

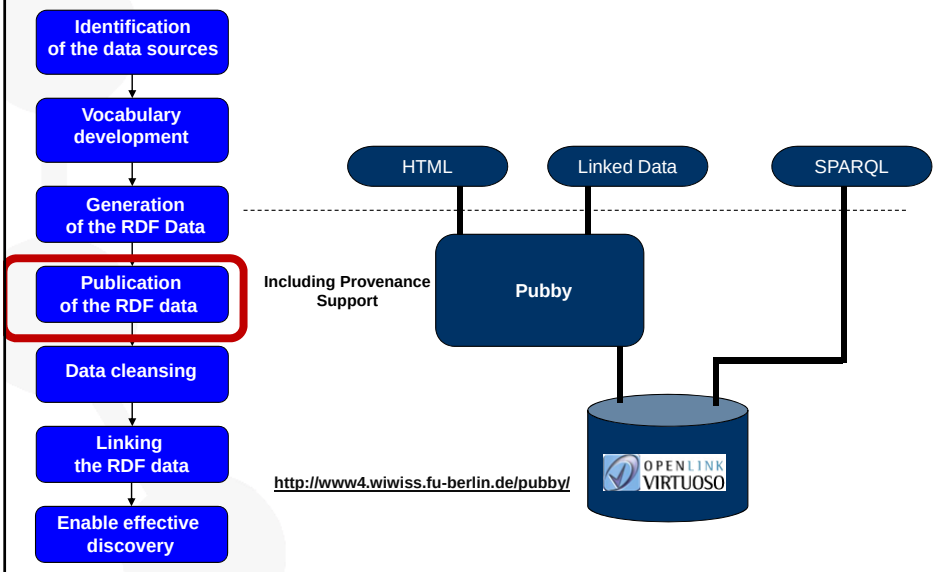
- IGN INE



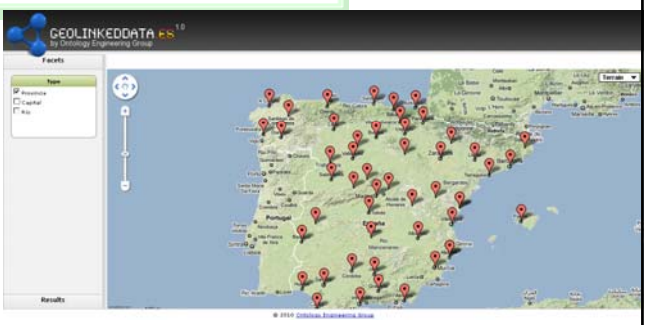
http://geo.linkeddata.es/dataset/IGN/BTN25 http://geo.linkeddata.es/dataset/IGN/BCN200 http://geo.linkeddata.es/dataset/INE/IPI

- So far
- 7 RDF Named Graphs
- 21.498.953 triples

4. Publication of the RDF Data



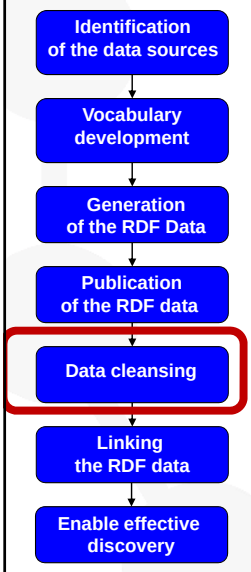
4. Publication of the RDF Data



4. Publication of the RDF Data - License

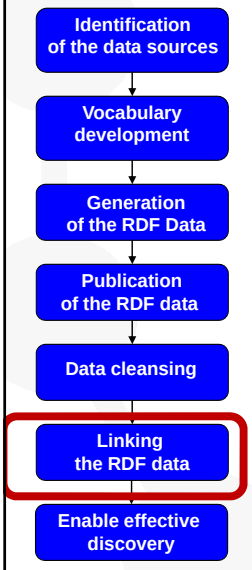
- License for GeoLinkedData
  - Creative Commons Attribution-ShareAlike 3.0
  - GNU Free Documentation License
- Each dataset will have its own specific license, IGN, INE, etc.

5. Data cleansing



- Lack of documentation of the IGN datasets
- Broken links: Spain, IGN resources
- Lack of documentation of the ontology
- Missing english and spanish labels
- Building a spanish ontology and importing some concepts of other ontology (in English):
  - Importing the English ontology. Add annotations like a Spanish label to them.
  - Importing the English ontology, creating new concepts and properties with a Spanish name and map those to the English equivalents.
  - Re-declaring the terms of the English ontology that we need (using the same URI as in the English ontology), and adding a Spanish label.
  - Creating your own class and properties that model the same things as the English ontology.

6. Linking of the RDF Data

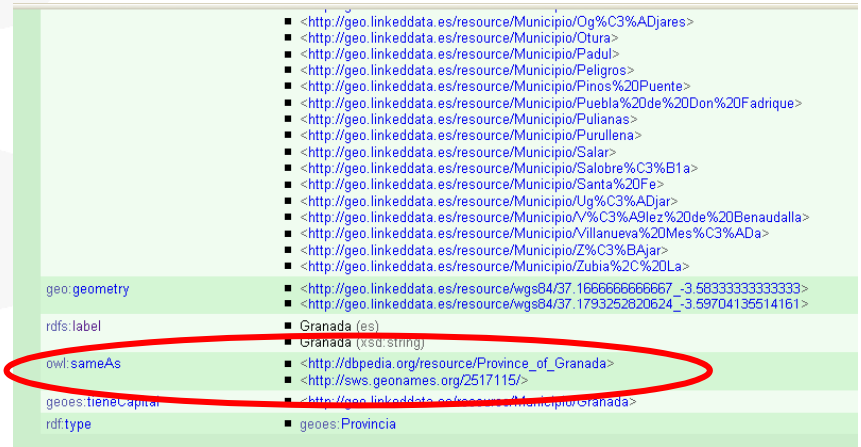


- Silk - A Link Discovery Framework for the Web of Data

- First set of links: Provinces of Spain
  - 86% accuracy

6. Linking of the RDF Data

- http://geo.linkeddata.es/page/Provincia/Granada



Silk

- Download: http://www4.wiwiss.fu-berlin.de/bizer/silk/
- Configuration file (xml), main sections
  - Prefixes
  - Datasources
  - Interlinks
    - Interlink
      - LinkType
      - LinkCondition
      - Filter
      - Outputs

Silk – Example : airports (geolinkeddata – dbpedia)

```
<Prefixes>
  <Prefix id="rdf" namespace="http://www.w3.org/1999/02/22-rdf-syntax-ns#" />
  <Prefix id="rdfs" namespace="http://www.w3.org/2000/01/rdf-schema#" />
  <Prefix id="owl" namespace="http://www.w3.org/2002/07/owl#" />
  <Prefix id="dbpedia" namespace="http://dbpedia.org/ontology/" />
 <DataSources>
  <DataSource id="dbpedia" type="sparqlEndpoint">
   <Param name="endpointURI" value="http://dbpedia.linkeddata.es/sparql" />
  </DataSource>
  <DataSource id="geolinkeddata" type="sparqlEndpoint">
   <Param name="endpointURI" value="http://geo.linkeddata.es/sparql" />
  </DataSource>
 </DataSources>
<Interlinks>
 <Interlink id="airport">
  <LinkType>owl:sameAs</LinkType>
  <SourceDataset dataSource="dbpedia" var="a">
   <RestrictTo>
    ?a rdf:type dbpedia:Airport
   </RestrictTo>
  </SourceDataset>
  <TargetDataset dataSource="geolinkeddata" var="b">
   <RestrictTo>
    ?b rdf:type geoes:Aeropuerto
   </RestrictTo>
  </TargetDataset>
```

Silk – Example : airports (geolinkeddata – dbpedia)

```
<LinkCondition>
  <Aggregate type="average">
    <Aggregate type="max" required="true" >
      <Compare metric="jaro" >
        <Input path="?a/rdfs:label[@lang='es']" />
        <Input path="?b/rdfs:label[@lang='es']" />
      </Compare>
    </Aggregate>

  <Filter threshold="0.8" limit="1" />

  <Outputs>
    <Output maxConfidence="0.9" type="file" >
      <Param name="file" value="geo_dbpedia_aeropuerto.xml"/>
      <Param name="format" value="alignment"/>
    </Output>
    <Output minConfidence="0.91" type="file">
      <Param name="file" value="geo_dbpedia_aeropuerto.nt"/>
      <Param name="format" value="ntriples"/>
    </Output>
  </Outputs>
```

```
C:\Users\boricles>java -DconfigFile=dbpedia_geo.xml -jar silk.jar_
```

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Silk – Example : airports (geolinkeddata – dbpedia)

Accepted links, nt file

```
<http://geo.linkeddata.es/resource/Provincia/Tarragona> <owl:sameAs> <http://dbpedia.org/resource/Tarragona> .
<http://geo.linkeddata.es/resource/Provincia/Sevilla> <owl:sameAs> <http://dbpedia.org/resource/Seville> .
<http://geo.linkeddata.es/resource/Provincia/Lugo> <owl:sameAs> <http://dbpedia.org/resource/Lugo> .
<http://geo.linkeddata.es/resource/Provincia/Teruel> <owl:sameAs> <http://dbpedia.org/resource/Teruel> .
```

Links to verify, xml file

```
<Alignment>
<map>
    <Cell>
      <entity1 rdf:resource="http://geo.linkeddata.es/resource/Provincia/Toledo"></entity1>
      <entity2 rdf:resource="http://dbpedia.org/resource/Teolo"></entity2>
      <relation>http://dbpedia.org/ontology/Place</relation>
      <measure rdf:datatype="http://www.w3.org/2001/XMLSchema#float">0.8777777777777779</measure>
    </Cell>
  </map>
<map>
```

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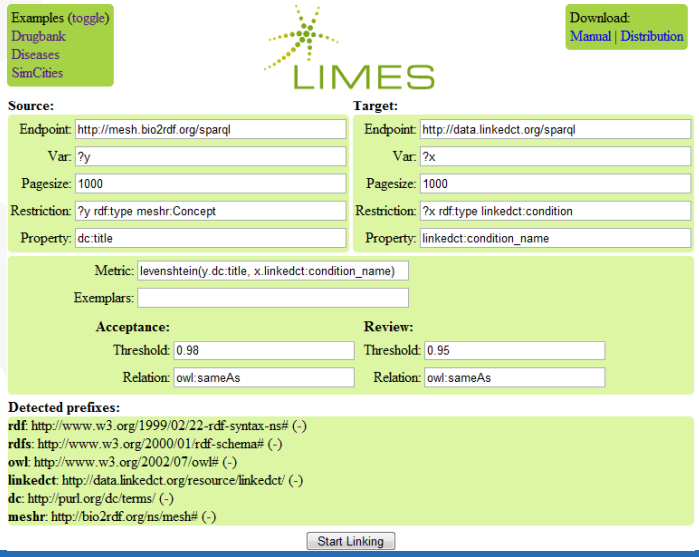
Limes

- http://aksw.org/Projects/limes



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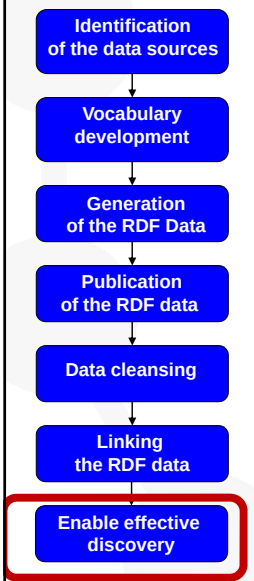
7. Enable effective discovery



GeoLinked Data

< SITEMAP XML />

indice
THE SEMANTIC WEB INDEX

sitemap4rdf

http://lab.linkeddata.deri.ie/2010/sitemap4rdf/

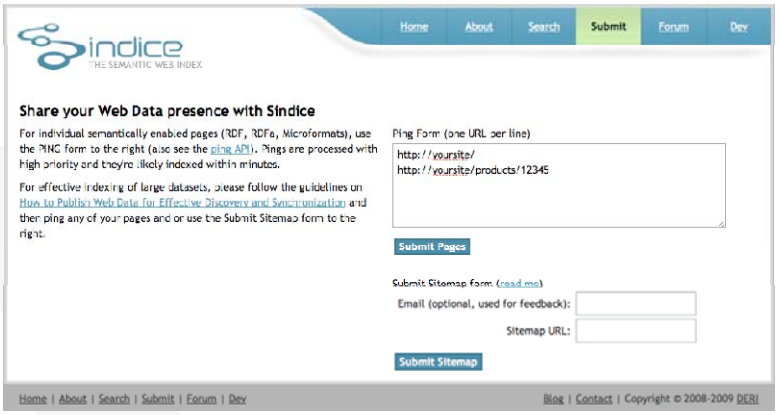
sitemap4rdf

- Simple command line tool
- Sends a SPARQL query to list all URIs
- Generates sitemap

```
sitemap4rdf http://yoursite/sparql http://yoursite/resource/
```

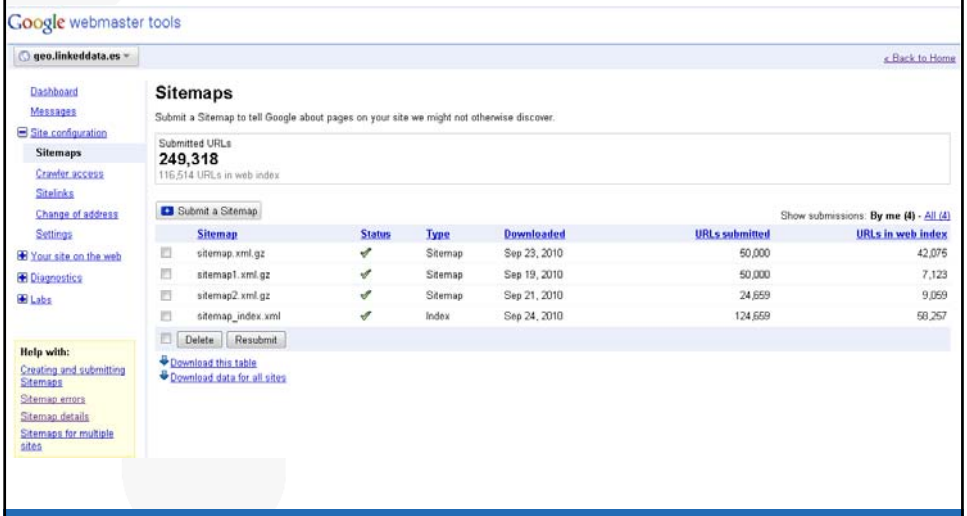
Submit the sitemap location - Sindice

- http://sindice.com/main/submit



Submit the sitemap location - Google

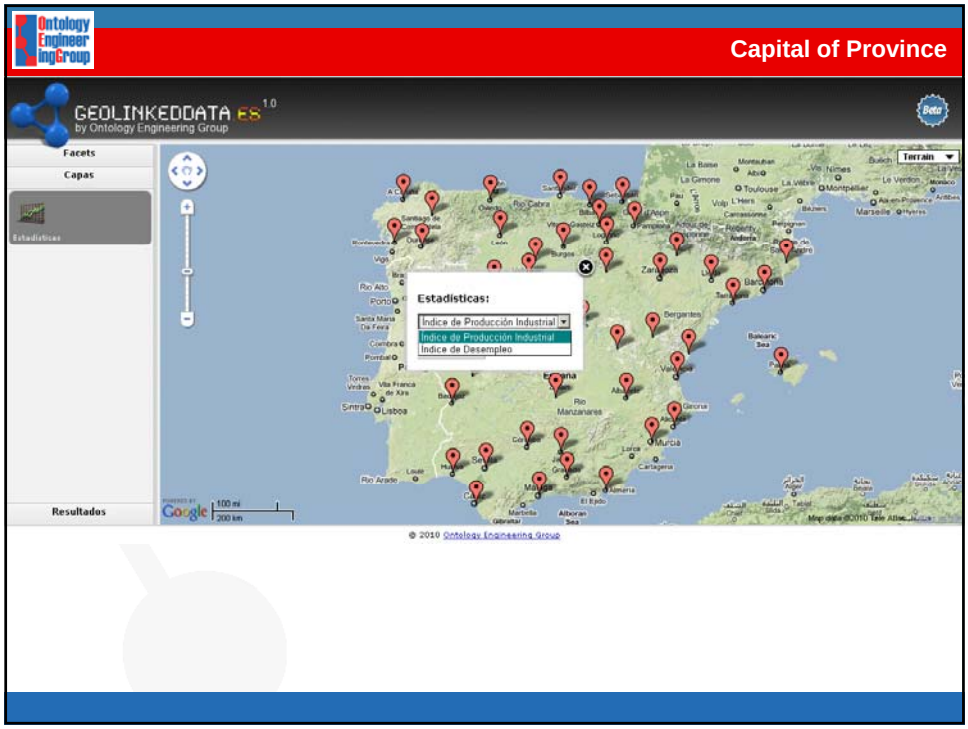
- https://www.google.com/webmasters/tools/

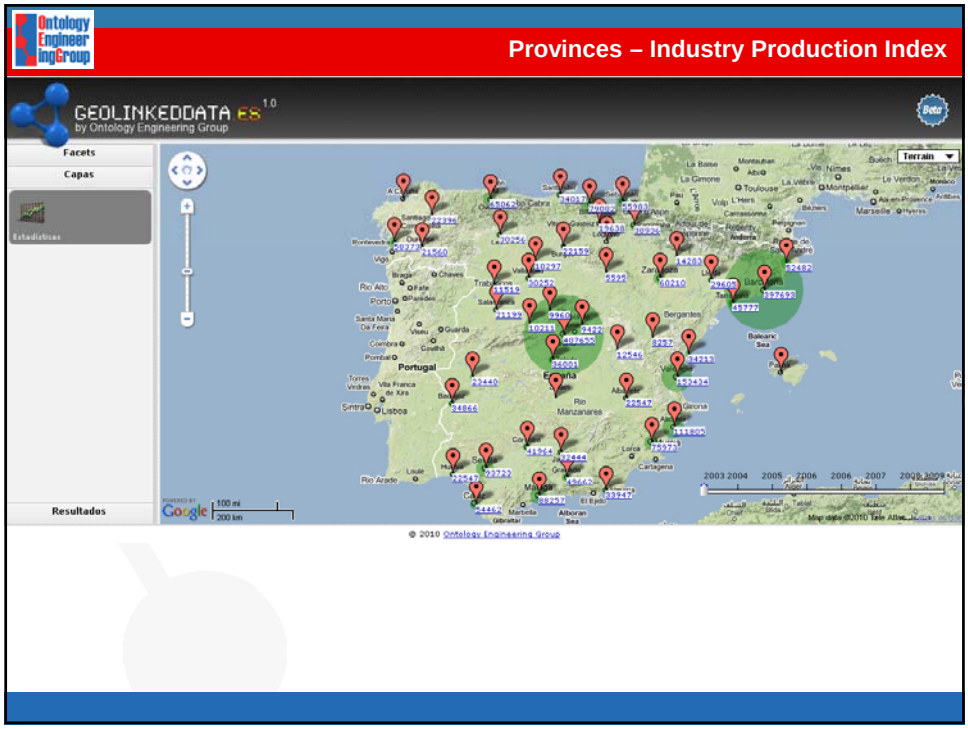


DEMO

http://geo.linkeddata.es/


Provinces
GEOLINKEDDATA ES 1.0
by Ontology Engineering Group
Beta
Facets
Type
Playa
Ponor
Poza
Pozo
Provincia
Capas
Resultados
Portugal
Lisboa
Sintra
Murcia
Cartagena
Balearic Sea
Terrain
Google
100 mi
200 km
© 2010 Ontology Engineering Group


Capital of Province
GEOLINKEDDATA ES 1.0
by Ontology Engineering Group
Beta
Facets
Capas
Estadísticas
Resultados
Estadísticas:
Índice de Producción Industrial
Índice de Producción Industrial
Índice de Desempleo
Portugal
Lisboa
Sintra
Murcia
Cartagena
Balearic Sea
Terrain
Google
100 mi
200 km
© 2010 Ontology Engineering Group


Provinces – Industry Production Index
GEOLINKEDDATA ES 1.0
by Ontology Engineering Group
Beta
Facets
Capas
Resultados
Terrain
Portugal
España
Google
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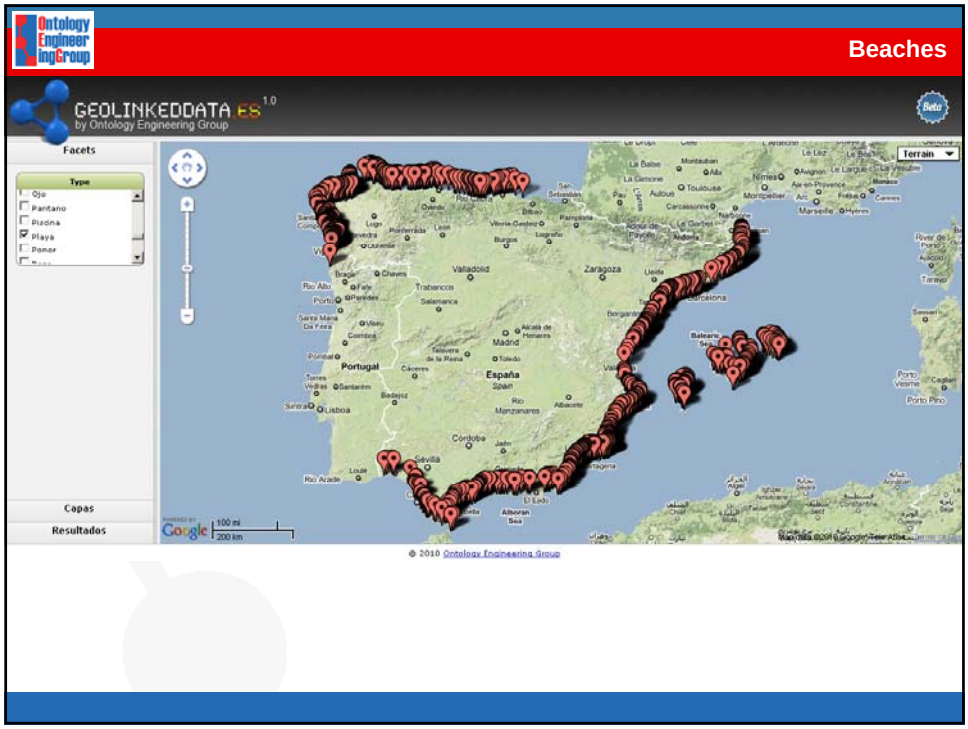
Beaches
GEOLINKEDDATA ES 1.0
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Beta
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Piscina
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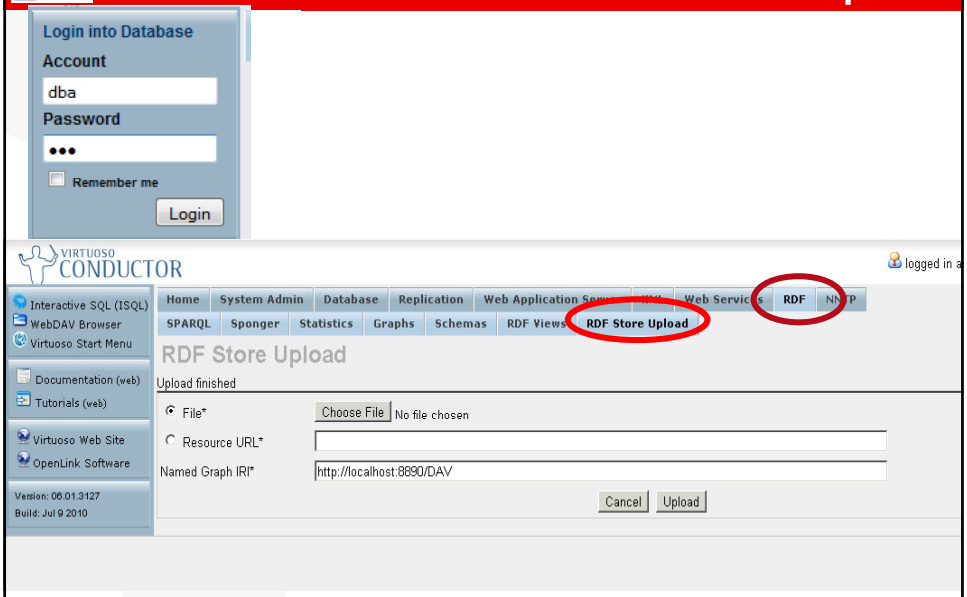
Contents

- Review of last class
  - Linked Data Principles
  - LOD Cloud
- Methodological guidelines for Linked Data Publication
- Technical aspects of Linked Data publication

Virtuoso on Windows - Installation

- http://virtuoso.openlinksw.com/dataspace/dav/wiki/Main/VOSUsageWindows
- Download
- http://sourceforge.net/projects/virtuoso/files/virtuoso/6.1.2/virtuso-opensource-win32-6.1.2.zip/download
- ODBC Registration
  - Set up VIRTUOSO_HOME variable pointing out to virtuoso-opensource directory
  - cd %VIRTUOSO_HOME%\lib
  - regsvr32 virtodbc.dll
- Creating a Windows Service
  - cd %VIRTUOSO_HOME%\database
  - SET PATH=%PATH%;%VIRTUOSO_HOME%\bin;%VIRTUOSO_HOME%\lib
  - virtuoso-t -? //to verify
  - virtuoso-t +service screate +instance "Instance Name" +configfile virtuoso.ini
  - virtuoso-t +service list //to verify
  - virtuoso-t -I "Instance Name" +service start //start the service
- Virtuoso Web Admin Tool (conductor)
  - http://localhost:8890/conductor

Virtuoso on Windows – RDF Store Upload



Virtuoso on Windows – SPARQL endpoint

- http://localhost:8890/sparql

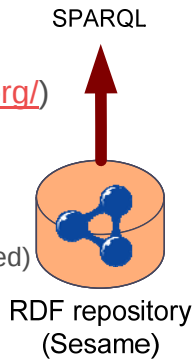
Query text

```
select distinct ?x
where {?x a <http://geo.linkeddata.es/ontology/Playa>}
```

x
http://geo.linkeddata.es/resource/%C3%81guila_Playa_del
http://geo.linkeddata.es/resource/%C3%81guila_o_de_Punta_Llana_Playa_del_
http://geo.linkeddata.es/resource/%C3%81lamos_Playa_de_los
http://geo.linkeddata.es/resource/%C3%81mbar_Playa_del
http://geo.linkeddata.es/resource/%C3%81valo_Playa_de
http://geo.linkeddata.es/resource/%C3%89zaro_Praia_Maior_do

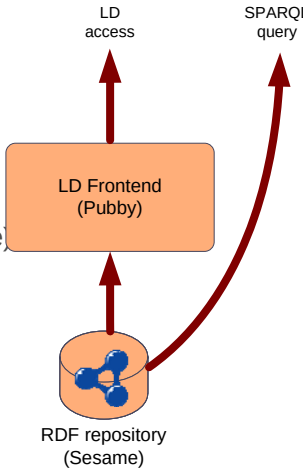
Using an RDF repository

- It allows storing and accessing RDF data
- For example, SESAME (http://www.openrdf.org/)
- Download it from http://www.openrdf.org/download.jsp
  - openrdf-sesame-2.3.0-sdk.zip
  - Deploy the .war in Tomcat (JDK and Tomcat needed)
- Create a repository at
  - http://localhost:8080/openrdf-sesame
- Check:
  - http://localhost:8080/openrdf-sesame/repositories/XXXX
  - http://localhost:8080/openrdf-sesame/repositories/XXX/statements



Linked Data frontend

- To expose data as Linked Data
  - Including content negotiation, etc.
- For example, Pubby
  - http://www4.wiwiss.fu-berlin.de/pubby/
- Installation
  - Use pubby-0.3.zip
  - Deploy the webapp folder (and rename) in Tomcat
  - Modify config.n3
  - Restart tomcat
  - Check: http://localhost:8080/XXX/



Pubby – Configuration file

```
conf:dataset [
    # SPARQL endpoint URL of the dataset
    conf:sparqlEndpoint <http://geo.linkeddata.es/sparql>;
    # Default graph name to query (not necessary for most endpoints)
    # conf:sparqlDefaultGraph <http://geo.linkeddata.es/dataset/IGN/NGCE>;
    # Common URI prefix of all resource URIs in the SPARQL dataset
    conf:datasetBase <http://geo.linkeddata.es/>;
    # Will be appended to the conf:webBase to form the public
    # resource URIs; if not present, defaults to ""
    # conf:webResourcePrefix "resource/";
    # Fixes an issue with the server running behind an Apache proxy;
    # can be ignored otherwise
    conf:fixUnescapedCharacters "(),'!$&*+;=@";

    # include metadata
    conf:metadataTemplate "metadata.n3";

    # configure your metadata here
    # Use properties with the meta: prefix where the property name
    # corresponds to the placeholder URIs in metadata.n3 that begin
    # with about:metadata:metadata:
    # Examples for such properties are:
#       meta:pubbyUser <URI of the data publisher who uses this Pubby>;
#       meta:pubbyOperator <URI of the service provider who operates this Pubby>;
#       meta:endpointUser <URI of the data publisher who uses the SPARQL endpoint queried by this Pubby>;
#       meta:endpointOperator <URI of the service provider who operates the SPARQL endpoint>;
    meta:graph <http://geo.linkeddata.es/dataset/ngce>;
  conf:addSameAsStatements "true";
  conf:queryPrefix "DEFINE sql:describe-mode \"CBD\"";
];
```

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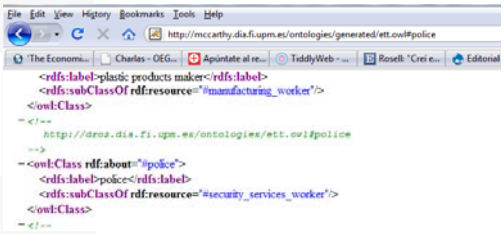
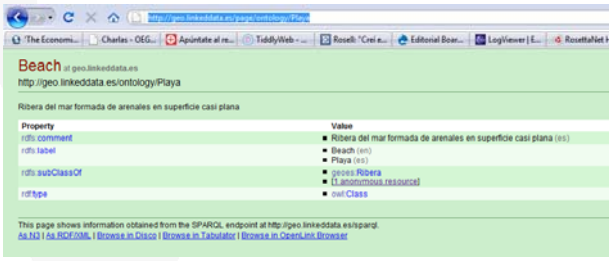
Pubby

- http://mccarthy.dia.fi.upm.es/ontologies/generated/ett.owl#police



- http://geo.linkeddata.es/page/ontology/Playa



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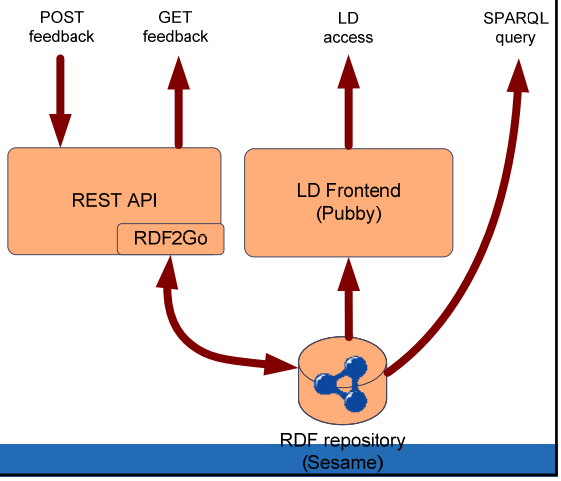
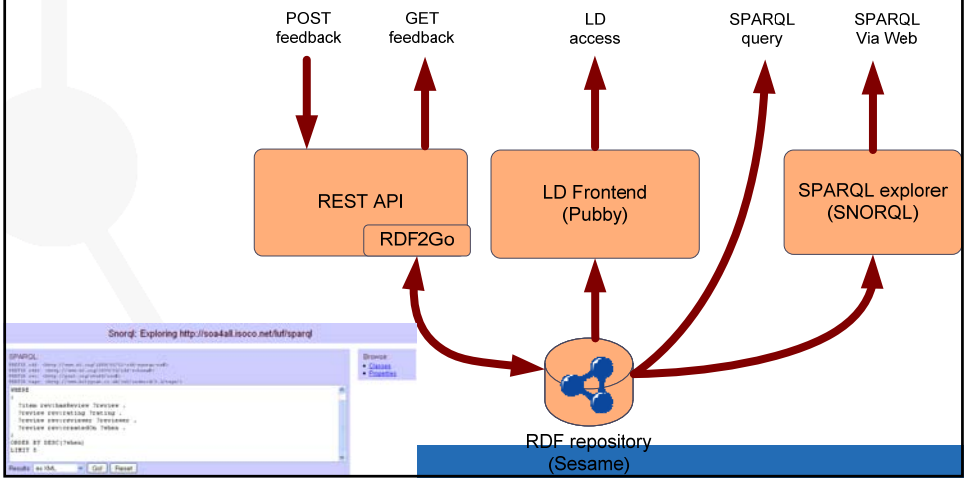
REST API

- For example, RDF2Go
  - Java abstraction over RDF repositories
  - `http://rdf2go.semweb4j.org/`



Add SPARQL explorer

- For example, SNORQL (http://wiki.github.com/kurtjx/SNORQL/)

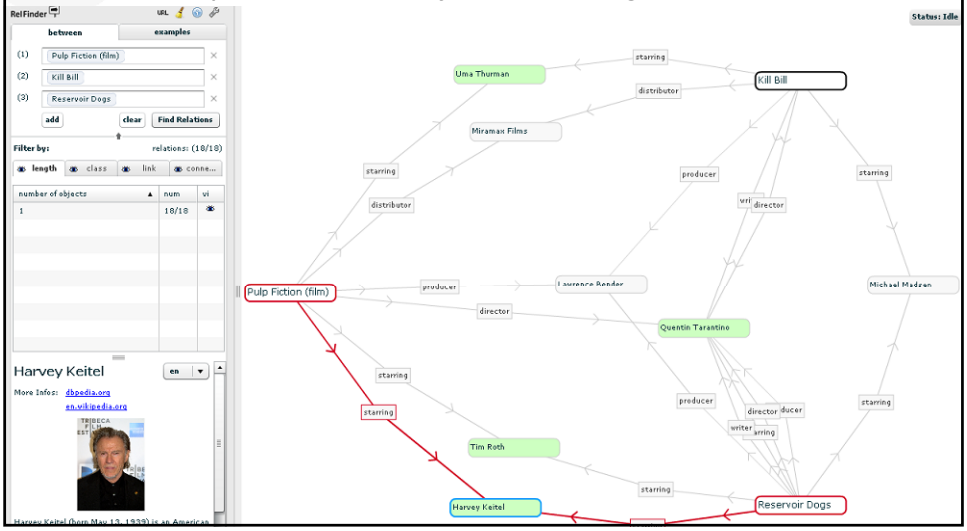


Validating Linked Data URLs

- http://validator.linkeddata.org/vapour

RelFinder: finding relations in Linked Data

- http://relfinder.dbpedia.org/relfinder.html
- E.g., relations between films
  - "Pulp Fiction", "Kill Bill" y "Reservoir Dogs"



GeoLinkedData

- http://geo.linkeddata.es/sparql

Query text

```
SELECT distinct ?g { GRAPH ?g { ?s ?p ?o } }
```

- Get all the named graphs

g
http://www.openlinksw.com/schemas/virtrdf#
http://geo.linkeddata.es/ontology
http://geo.linkeddata.es/dataset/IGN/NOMGEO
http://geo.linkeddata.es/dataset/IGN/BTN25
http://geo.linkeddata.es/dataset/IGN/NGCE
http://geo.linkeddata.es/metadata
http://geo.linkeddata.es/dataset/INE/IPI
http://geo.linkeddata.es/links
http://geo.linkeddata.es/dataset/INE/IDD
http://geo.linkeddata.es/dataset/años

GeoLinkedData

- Get Lagunas with their longs

Query text

```
SELECT ?x ?long
WHERE {?x rdf:type <http://geo.linkeddata.es/ontology/Laguna> .
       ?x <http://www.w3.org/2003/01/geo/wgs84_pos#geometry> ?g .
       ?g <http://www.w3.org/2003/01/geo/wgs84_pos#long> ?long. }
```

- Get Lagunas from a particular graph

Query text

```
SELECT ?x
FROM NAMED <http://geo.linkeddata.es/dataset/IGN/NGCE>
WHERE {?x rdf:type <http://geo.linkeddata.es/ontology/Laguna> . }
```

- http://data.semanticweb.org/snorql/
- Browse classes

SPARQL:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX swrc: <http://swrc.ontoware.org/ontology#>
PREFIX swrc-ext: <http://www.cs.vu.nl/~mcaklein/onto/swrc_ext/2005/05#>
PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
PREFIX ical: <http://www.w3.org/2002/12/cal/ical#>
PREFIX swc: <http://data.semanticweb.org/ns/swc/ontology#>
SELECT DISTINCT ?class
WHERE { [] a ?class }
ORDER BY ?class
```


- Get the persons

SPARQL:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX swrc: <http://swrc.ontoware.org/ontology#>
PREFIX swrc-ext: <http://www.cs.vu.nl/~mcaklein/onto/swrc_ext/2005/05#>
PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
PREFIX ical: <http://www.w3.org/2002/12/cal/ical#>
PREFIX swc: <http://data.semanticweb.org/ns/swc/ontology#>
SELECT DISTINCT ?instance
WHERE { ?instance a <http://xmlns.com/foaf/0.1/Person> }
ORDER BY ?instance
```

- Get “boris” persons

SPARQL:

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX swrc: <http://swrc.ontoware.org/ontology#>
PREFIX swrc-ext: <http://www.cs.vu.nl/~mcaklein/onto/swrc_ext/2005/05#>
PREFIX geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
PREFIX ical: <http://www.w3.org/2002/12/cal/ical#>
PREFIX swc: <http://data.semanticweb.org/ns/swc/ontology#>

SELECT DISTINCT ?instance
WHERE { ?instance a <http://xmlns.com/foaf/0.1/Person> .
        FILTER(REGEX(STR(?instance),"boris")). }
ORDER BY ?instance
```


- Public schools in London that contain the word “music”

Datasources:
Education

Please select a datasource

Data format:
XML

Please select a data format

Enter your SPARQL query:

```
prefix sch-ont:  <http://education.data.gov.uk/def/school/>
  SELECT ?name WHERE {
    ?school a sch-ont:School;
       sch-ont:establishmentName ?name;
       sch-ont:districtAdministrative
<http://statistics.data.gov.uk/id/local-authority-district
/00AA> .
       FILTER( regex(?name, "music", "i" ))
  }
  ORDER BY ?name
```

Exercise: find information in DBPedia

Image by http://www.flickr.com/photos/bflv/

http://dbpedia.org/resource/Darth_Vader)

- Find ficticious serial killers in DBPedia

```
SELECT DISTINCT ?who WHERE {
  ?who rdf:type <http://dbpedia.org/class/yago/FictionalMassMurderers>.
}
```

Results: Browse Go! Reset

SPARQL results:

who	
:Dalek	:Wild_Dog_(Time_Crisis)
:Lord_Voldemort	:Dante_(Fullmetal_Alchemist)
:Darth_Vader	:Dr._Robotnik_(TV_series_&_Archie_comic)
:His_Divine_Shadow	:Skynet_(fictional)
:Tommy_Vercetti	:Cromartie_(Terminator)
:Ganon	:Makuta_(Phantoka)
:Revan	:Vegeta
:Darth_Malak	:Judge_Death
:Deathstroke	:Taurus_Bulba
:Marisa_Coulter	:Stryfe
:Auric_Goldfinger	:Sauron
:Keyser_S%C3%B6ze	:Dark_Kingdom
:Francisco_Scaramanga	:Kodos_the_Executioner
:Lord_Djibril	:Muruta_Azrael
:Visser_Three	:Colonel_Phillip_Green
:Akihiro_Kurata	:Grimgor_Ironhide
:Hate-Monger	:Shishio_Makoto
:Baby_Bonnie_Hood	:Delkar_Ditterleaf
:Darth_Krayt	:Boddole_Zer
:Dolza	:Kid_Marvelman
:Death_Guard	:Mandarinnestro
:Doctor_Nefarious	:Lawrence_Dimmick
:Emperor_Malthazar	:Flippy
:Spike_(Buffy_the_Vampire_Slayer)	:Freeza
:Joker_(comics)	:Gauron
:Iron_Warriors	:Lelouch_Lamperouge
:Doctor_Light_(Arthur_Light)	:No._18
:Emperor's_Children	:Z%C3%A9_Pequeno
	:Shredder_(TMNT)

(etc)

Asociación Española de Linked Data

AELID ASOCIACIÓN ESPAÑOLA DE LINKED DATA

www.aelid.es

- Fundada por miembros de iSOCO y UPM-OEG (Marzo, 2010)
- Objetivos:
  - Actuar como punto de encuentro de la comunidad española.
  - Organización y participación en eventos de diseminación, campañas de concienciación
  - Retos para estimular el desarrollo de la tecnología y aplicaciones Linked Data
  - Promoción de la investigación científica de alta calidad e innovación tecnológica, de acuerdo con los estándares de excelencia y mejores prácticas.
  - Establecimiento de relaciones con entidades públicas y privadas europeas.

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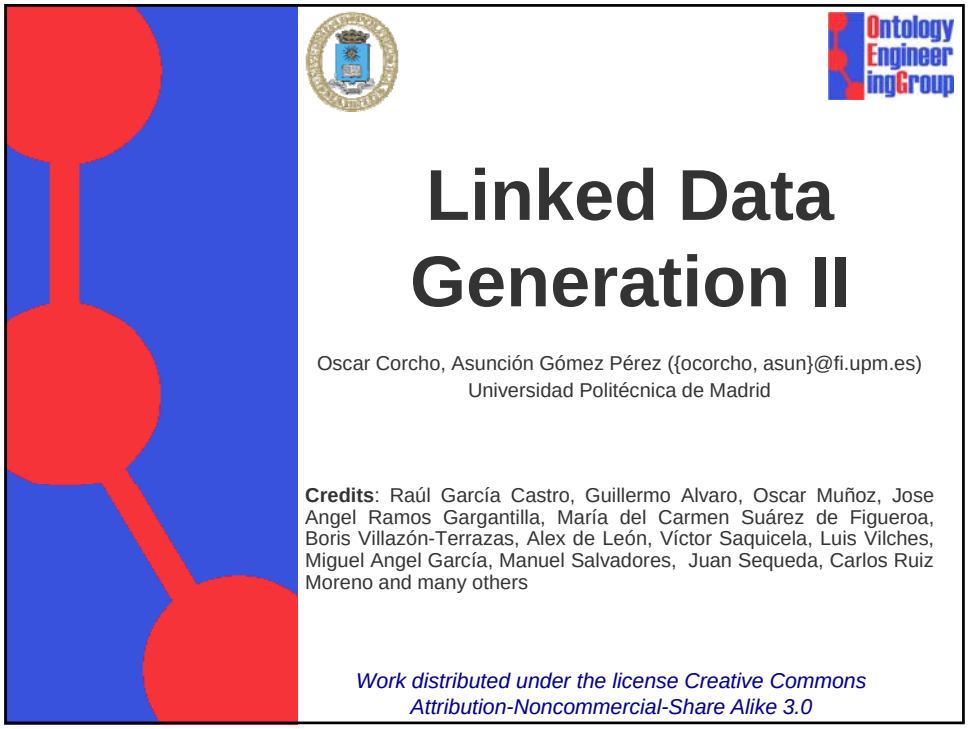

Linked Data Generation II

Oscar Corcho, Asunción Gómez Pérez ({ocorcho, asun}@fi.upm.es)
Universidad Politécnica de Madrid

Credits: Raúl García Castro, Guillermo Alvaro, Oscar Muñoz, Jose Angel Ramos Gargantilla, María del Carmen Suárez de Figueroa, Boris Villazón-Terrazas, Alex de León, Víctor Saquicela, Luis Vilches, Miguel Angel García, Manuel Salvadores, Juan Sequeda, Carlos Ruiz Moreno and many others

Práctica

- Document.
- Ontology/Vocabulary
  - owl file
- RDF Instances
  - rdf file
- Links
  - nt/rdf files
- For using the map visualizator, you should include the geolocalization information in your resources, lat. long.
- http://geo.linkeddata.es:8282/GeoLinkedData-DbPedia/?uri=http://dbpedia.org/resource/Madrid#dashboard