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Ecuadorian Geospatial Linked Data

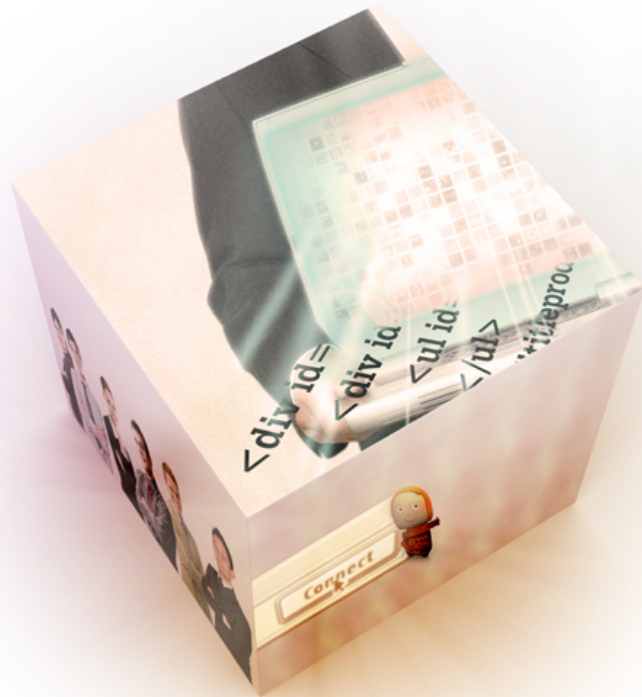
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Nelson Piedra², and Boris Villazón-Terrazas³**

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@boricles

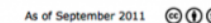
<http://www.slideshare.net/boricles>



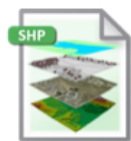
ToC

- » Motivation
- » Architecture
- » Geospatial Linked Data Life Cycle

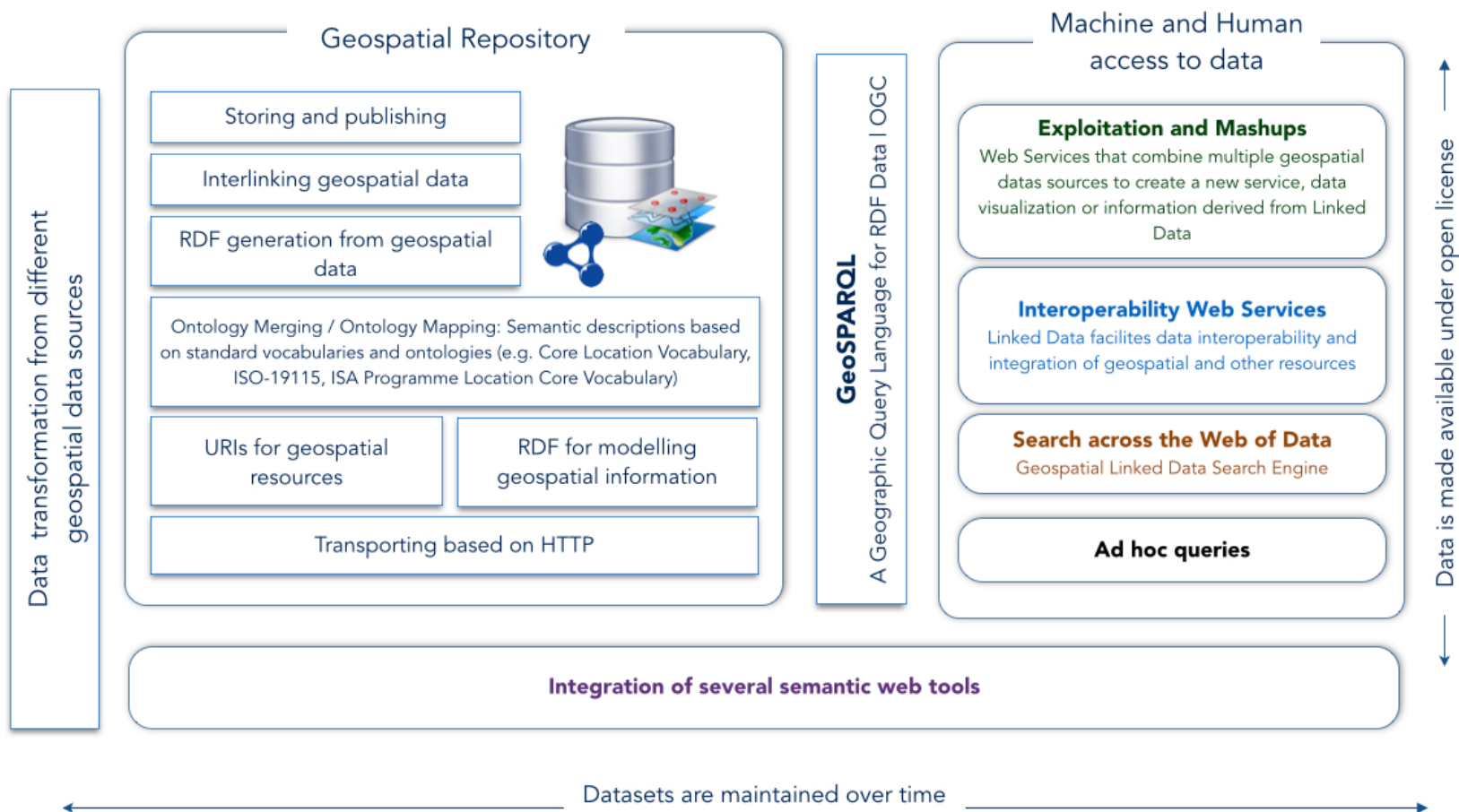
<http://datosenlazados.org/cms/>



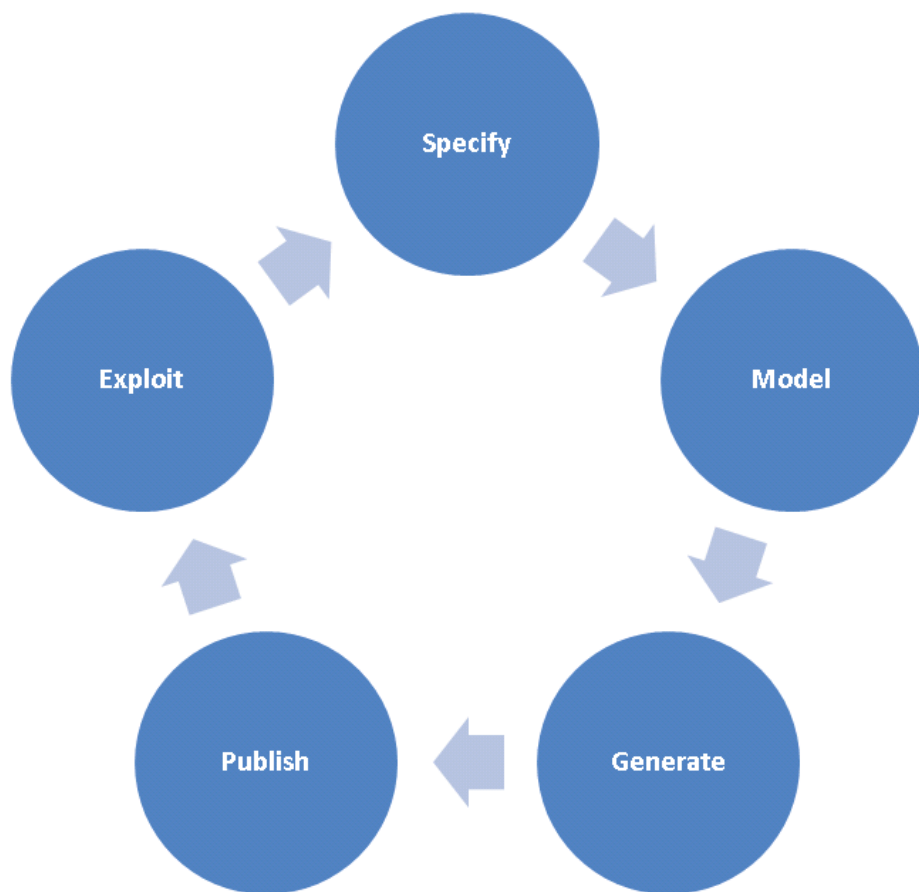
Selection of Data Sources



Ecuadorian Geospatial Linked Data Architecture



Geospatial Linked Data Life Cycle

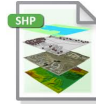
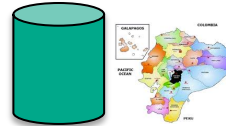


Taking into account geospatial component

- **Selection of geospatial data sources**
- **URIs for geospatial resources**
- **Geospatial Vocabularies**
- **RDF generation for the geospatial data**
- **Linking of geospatial data**

- Identify and select geospatial resources from Ecuadorian Government Agencies.

- Geo-databases
- Shapefiles
- Spreadsheets
- KML





<http://geo.linkeddata.ec/sources/sources.xls>

- General guidelines

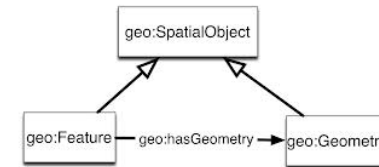
- BP for publishing LD <http://www.w3.org/TR/ld-bp/>
- URIs for UK Public sector
<https://www.gov.uk/government/publications/designing-uri-sets-for-the-uk-public-sector>
- Study of persistent URIs <http://philarcher.org/diary/2013/uripersistence/>
- Guidelines for Naming and Labeling Ontologies
<http://dcevents.dublincore.org/IntConf/dc-2011/paper/download/47/15>
-

- Geospatial specific guidelines

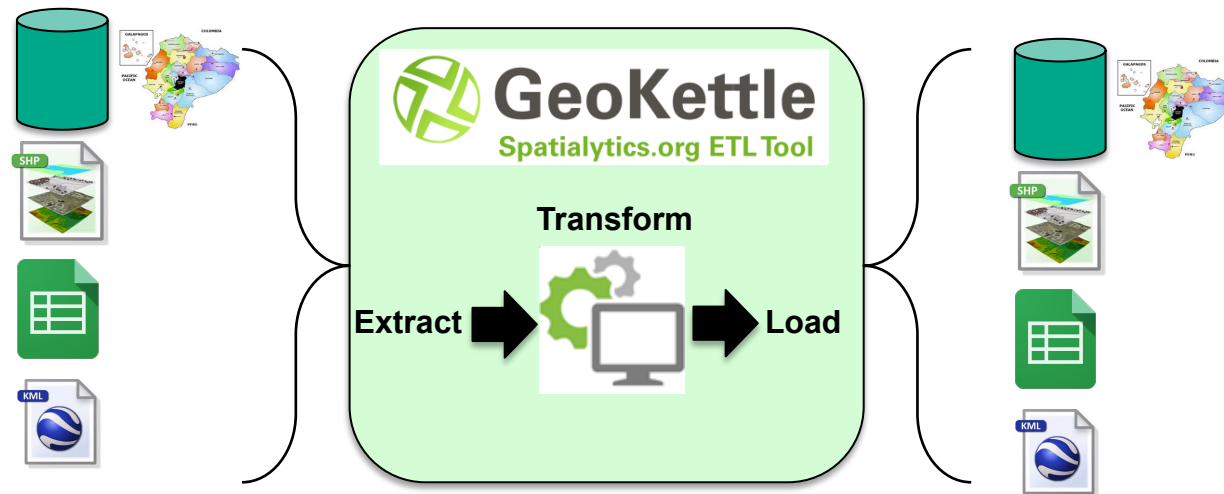
- RFC5870 URI for geospatial locations <http://tools.ietf.org/search/rfc5870>
- INSPIRE http://inspire.jrc.ec.europa.eu/events/conferences/inspire_2012/presentations/ds1/Clements%20Portele.pdf
- <https://www.deri.ie/content/applying-design-patterns-uri-strategies-naming-linked-geospatial-data-infrastructure>
- <http://inspire-forum.jrc.ec.europa.eu/pg/forum/topic/29922/cool-uris-for-linked-geospatial-data/>
- ...

- NeoGeo <http://geovocab.org/doc/neogeo/>
- GeoSPARQL <http://www.opengeospatial.org/standards/geosparql> 
- ISA Programme Location Core Vocabulary <http://www.w3.org/ns/locn>
- schema.org <http://schema.org/>
 - Place <http://schema.org/Place>
 - GeoShape <http://schema.org/GeoShape>
 - GeoCoordinates <http://schema.org/GeoCoordinates>
- ISO-19115 Ontology <https://www.seegrid.csiro.au/subversion/xmml/metadata/ISO19115/iso-19115.owl> 
- ...

- Some discussions
 - Geometry separated from the feature
 - Represent geometry as RDF Literal
 - Represent CRS as a property.
 - URIs for the CRSs, e.g.,
<http://geovocab.org/crs/EPSG4979>
 - Multilinguality



- GeoKettle
 - Spatially-enabled version of the generic ETL tool, Kettle (Pentaho Data Integration)
 - Powerful, metadata-driven spatial ETL tool dedicates to the integration of different geospatial data resources



RDF Generator Plugins

Reading shape files

RDF Generation



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Silk Workbench Workspace: VOLCANES Editor: LINKVOLCANES Generate Links Learn Reference Links Population About

Stop Generate Links Task finished in 262ms (100,0%) Help

Expand All Collapse All Prev 1 Next Filter:

Source: VocanesPROMSA	Target: volcanesGENP-STGR	Score	Correct?
source/VOLCAN/COTOPAXI90ee2d7a80120c8c01f5e25f4f6707f56384934f	source/VOLCAN/Cotopaxifc75efe7ec1a1f5ad2ca20362115d46d8bf02e84	100,0%	✓ ? ✕
Aggregation: max (unnamed_6) 100,0% Comparison: levenshteinDistance (unnamed_5) 100,0% Transform: lowerCase (unnamed_8) cotopaxi Input: ?b/<http://www.w3.org/2000/01/rdf-schema#label> (unnamed_10) Cotopaxi Transform: lowerCase (unnamed_7) cotopaxi Input: ?a/<http://www.w3.org/2000/01/rdf-schema#label> (unnamed_9) COTOPAXI			
e/VOLCAN/CHIMBORAZO640e36ecd376af11fed15595824f3f25578b7efb	ce/VOLCAN/Chimborazo86b8d5bca6cf8c4dab3f6a92dcd4d7ed4713052a	100,0%	✓ ? ✕
VOLCAN/TUNGURAHUA9dde89f7e7a5e1708e92b734b493bfdb0133a95	rce/VOLCAN/Tungurahua0554ea8798855d84f92a526d18f4c0f5e7a59c02	100,0%	✓ ? ✕
e/VOLCAN/PULULAHUA4d685fc13040e5dbe08aba9a68c888c3f4d370f9a	source/VOLCAN/Pululahuaa9cf30e5a5fe9b3c8419d7ba2df2dcf8f98dbe9e	100,0%	✓ ? ✕
rce/VOLCAN/ANTISANA35479f51fe9e3cd378813070a677971ac2fc892a	source/VOLCAN/Antisana0121b648d4f1048729c43a7f71b28aa4bf117fe0	100,0%	✓ ? ✕

Silk Workbench Workspace: VOLCANES-DBPEDIA Editor: linkVolcanes Generate Links Learn Reference Links Population About

Start Generate Links Task finished in 251s (100,0%) Help

Expand All Collapse All Prev 1 Next Filter:

Source: volcanes-Ecuador	Target: DBPEDIA	Score	Correct?
jgenp-stgr/Guagua%20Pichinchad67f8d73b8e950628165ef90d5bb38dd4b4f5ec2	dbr:Pichincha_Volcano	100,0%	✓ ? ✕
ce/Volcanes_jgenp-stgr/Antisana0121b648d4f1048729c43a7f71b28aa4bf117fe0	dbr:Antisana	100,0%	✓ ? ✕
lcanes_jgenp-stgr/Reventador2bc412ae99ac7b3b74dc23cdf63abb27e11b28ba	dbr:Reventador	100,0%	✓ ? ✕
lcanes_jgenp-stgr/Tungurahua0554ea8798855d84f92a526d18f4c0f5e7a59c02	dbr:Tungurahua	100,0%	✓ ? ✕
ce/Volcanes_jgenp-stgr/Cotopaxifc75efe7ec1a1f5ad2ca20362115d46d8bf02e84	dbr:Cotopaxi	100,0%	✓ ? ✕
lcanes_jgenp-stgr/Chimborazo86b8d5bca6cf8c4dab3f6a92dcd4d7ed4713052a	dbr:Chimborazo_(volcano)	100,0%	✓ ? ✕

Rivers of the province of Guayas

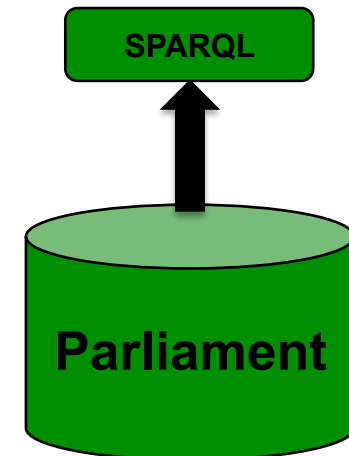
PREFIX geo: <<http://www.opengis.net/ont/geosparql#>>
PREFIX rdf: <<http://www.w3.org/1999/02/22-rdf-syntax-ns#>>
PREFIX geof: <<http://www.opengis.net/def/function/geosparql/>>
PREFIX sf: <<http://www.opengis.net/ont/sf#>>
PREFIX units: <<http://www.opengis.net/def/uom/OGC/1.0/>>

```
SELECT distinct ?r ?label ?Figure ?r2 ?Figure2
WHERE {
  ?r rdf:type <http://geo.linkeddata.ec/ontology/riosdobles\_promsa>.
  ?r rdfs:label ?label.
  ?r geo:hasGeometry ?geo.
  ?geo rdf:type ?geoType .
  ?geo geo:asWKT ?Figure.

  ?r2 rdf:type <http://geo.linkeddata.ec/ontology/provincias\_promsa>.
  ?r2 rdfs:label "GUAYAS"@es.
  ?r2 geo:hasGeometry ?geo2.
  ?geo2 rdf:type ?geoType2 .
  ?geo2 geo:asWKT ?Figure2.

  FILTER (geof:sfIntersects(?Figure2, ?Figure)).
}
```

<http://purl.org/Ecuador/geo/sparql>



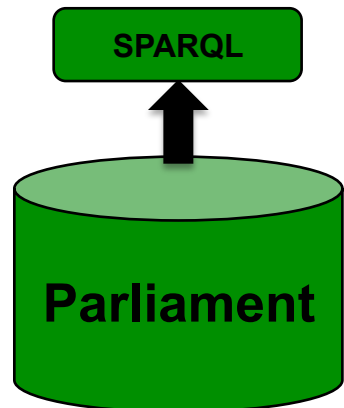
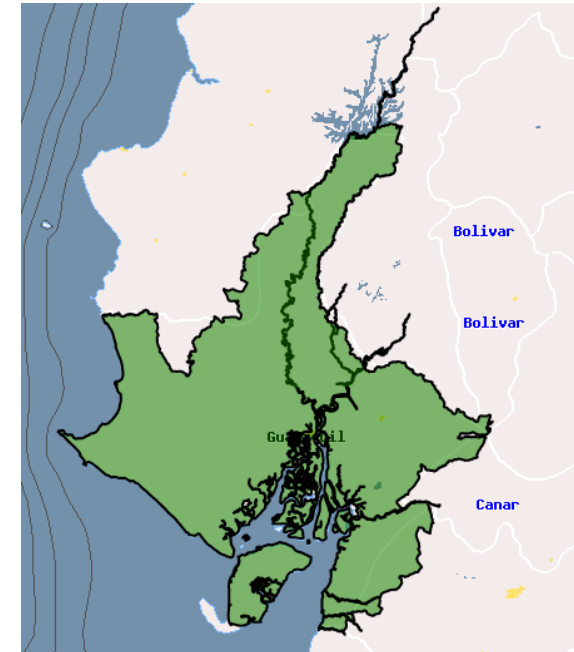
Rivers of the province of Guayas

```
PREFIX geo: <http://www.opengis.net/ont/geosparql#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX geof: <http://www.opengis.net/def/function/geosparql/>
PREFIX sf: <http://www.opengis.net/ont/sf#>
PREFIX units: <http://www.opengis.net/def/uom/OGC/1.0/>
```

```
SELECT distinct ?r ?label ?Figure ?r2 ?Figure2
WHERE {
  ?r a <http://geo.linkeddata.ec/ontology/riosdobles_promsa>.
  ?r rdfs:label ?label.
  ?r geo:hasGeometry ?geo.
  ?geo rdf:type ?geoType .
  ?geo geo:asWKT ?Figure.
```

```
?r2 a <http://geo.linkeddata.ec/ontology/provincias_promsa>.
?r2 rdfs:label "GUAYAS"@es.
?r2 geo:hasGeometry ?geo2.
?geo2 rdf:type ?geoType2 .
?geo2 geo:asWKT ?Figure2.
```

```
FILTER (geof:sfIntersects(?Figure2, ?Figure)).
}
```



<http://200.0.31.28:8081/map4rdf-0.0.4-OL-SNAPSHOT/#dashboard>





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