



GEOLOGICAL LINKED DATA.ES
by Ontology Engineering Group

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Motivation

- **80% information has a geospatial part.**
- **GeoLinkedData** is an open initiative whose aim is to enrich the Web of Data with Spanish **geospatial** data.



<http://geo.linkeddata.es>

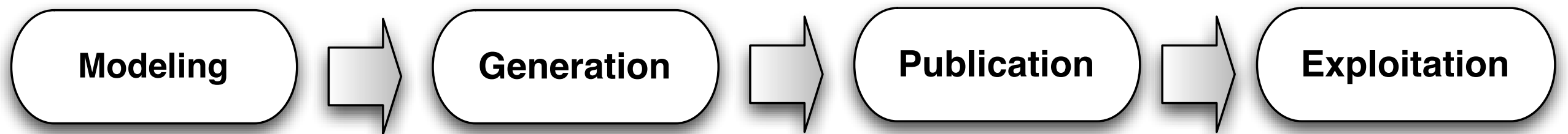
Motivation

- It is publishing diverse information from the **National Geographic Institute (IGN)** and the **National Statistics Institute (INE)**.



<http://geo.linkeddata.es>

Linked Data Life Cycle



Domain Modeling



Domain Modeling

- Designing the **vocabularies/ontologies** that model a view of the domain at hand.
- **Reuse** existing vocabularies in full or partially.

Geometry Model

- **Simple Features Specification** as base hierarchy of geometry types.
- **Feature** and **Geometry** are separate objects

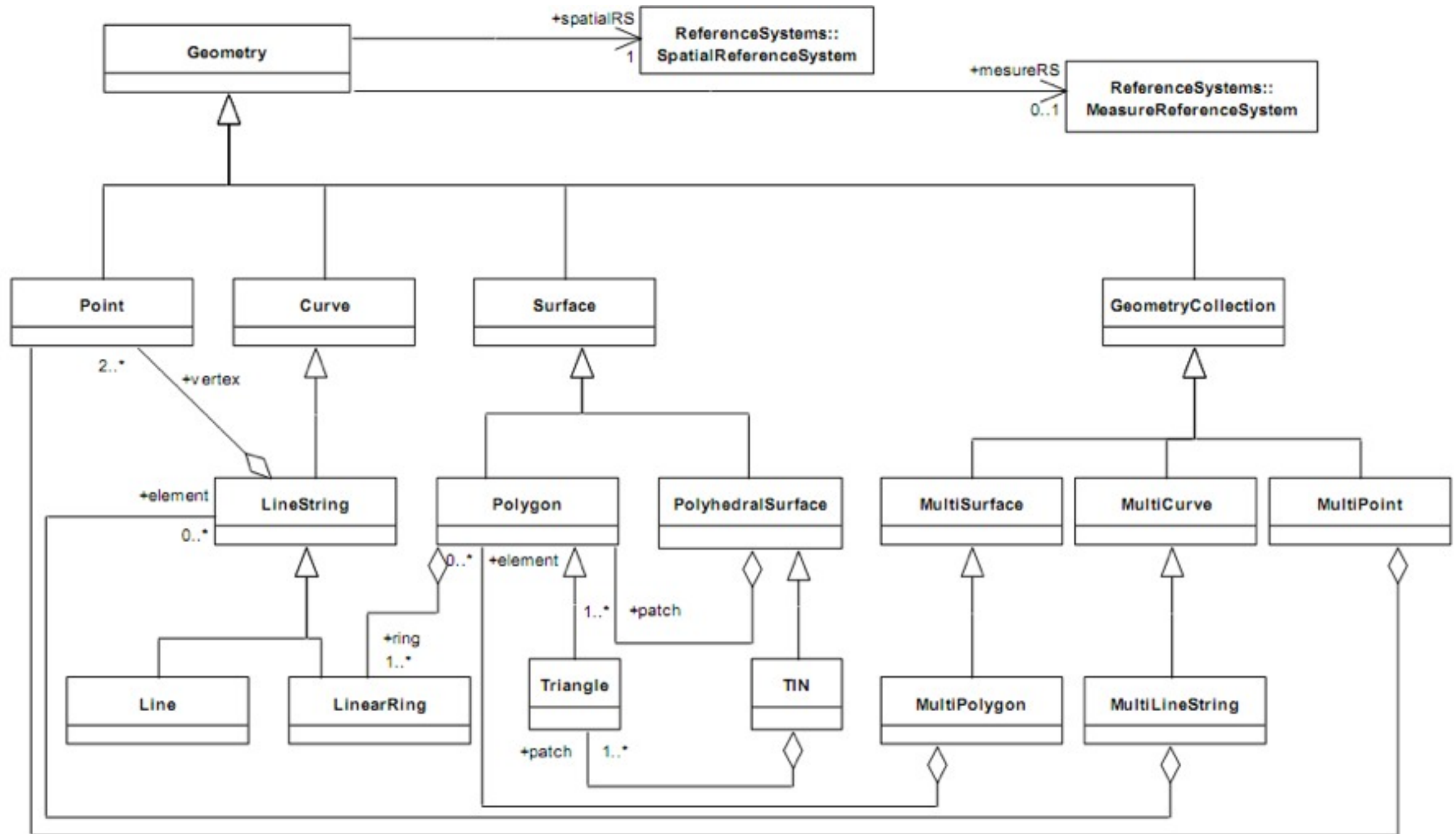
Geometry Model

- A feature can have multiple geometries, geometries are **parameterized** (e.g. reference system, dimension, resolution, temporal aspects)
- Different geometry representations are resolvable via **content negotiation**.

Geometry Model

- **Topological relations** (as per RCC8) can be inferred or made explicit between geometries.

Geometry Model



Geometry Model

- **One importante issue:** How to handle order of points in composite geometries?
 - Using an *order* data property.
 - *rdf:seq*
 - ***rdf:List***
 - SPARQL 1.1 allows to query this.

Data Generation



Data Generation

- Adquiere data from heterogenous data sources and **transforme** it to **RDF** using the choose domain model;
- Or generate new data directly as RDF.

```
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  xmlns:j.1="http://geo.linkeddata.es/ontology/
  xmlns:j.2="http://www.w3.org/2003/01/geo/wgs84_pos#" >
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    294875579" />
    perteneceA
    rdf:resource="http://geo.linkeddata.es/resource/
    Comunidad_AutonomadeExtremadura" />
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  <rdfs:label
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    <j.2:lat
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```

Data Generation

What's in our toolbox?



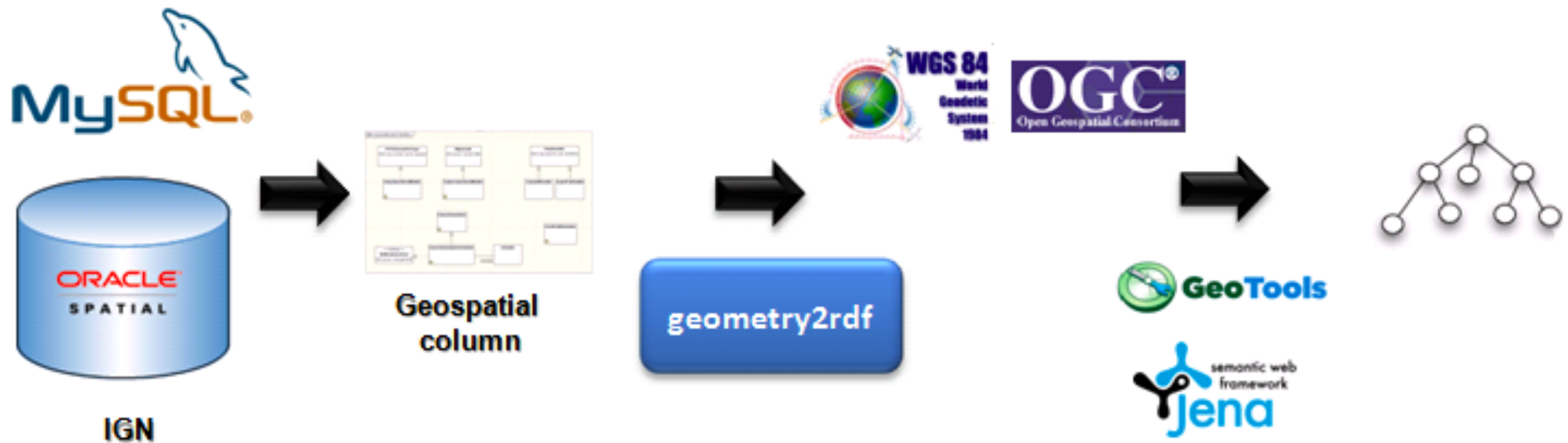
- Domain independent tools:
 - **ODEMapster**
 - **NOR2O**
- Domain specific tools:
 - **geometry2rdf**

geometry2rdf

Generation of **RDF** from **geospatial** relational databases.

- **Configurable** data model
- Support of **geo datatypes** in RDBMS (e.g. Oracle, GML, WKT)

geometry2rdf



geometry2rdf

NOMBRE	GMLGEOMETRY
Abengibre	(HUGE_CLOB)
Alatoz	(HUGE_CLOB)
Albatana	(HUGE_CLOB)
Balsa de Ves	(HUGE_CLOB)
Ballesteros, El	(HUGE_CLOB)
Alborea	(HUGE_CLOB)
Alcázar	(HUGE_CLOB)
Alcalá del Júcar	(HUGE_CLOB)

Oracle STO UTIL package

```
SELECT TO_CHAR(SDO_UTIL.TO_GML311GEOMETRY(geometry))
      AS Gml311Geometry
FROM "BCN200"."BCN200_0301L_RIO" c
WHERE  c.Etiqueta='Arroyo'
```

```
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geometry2rdf

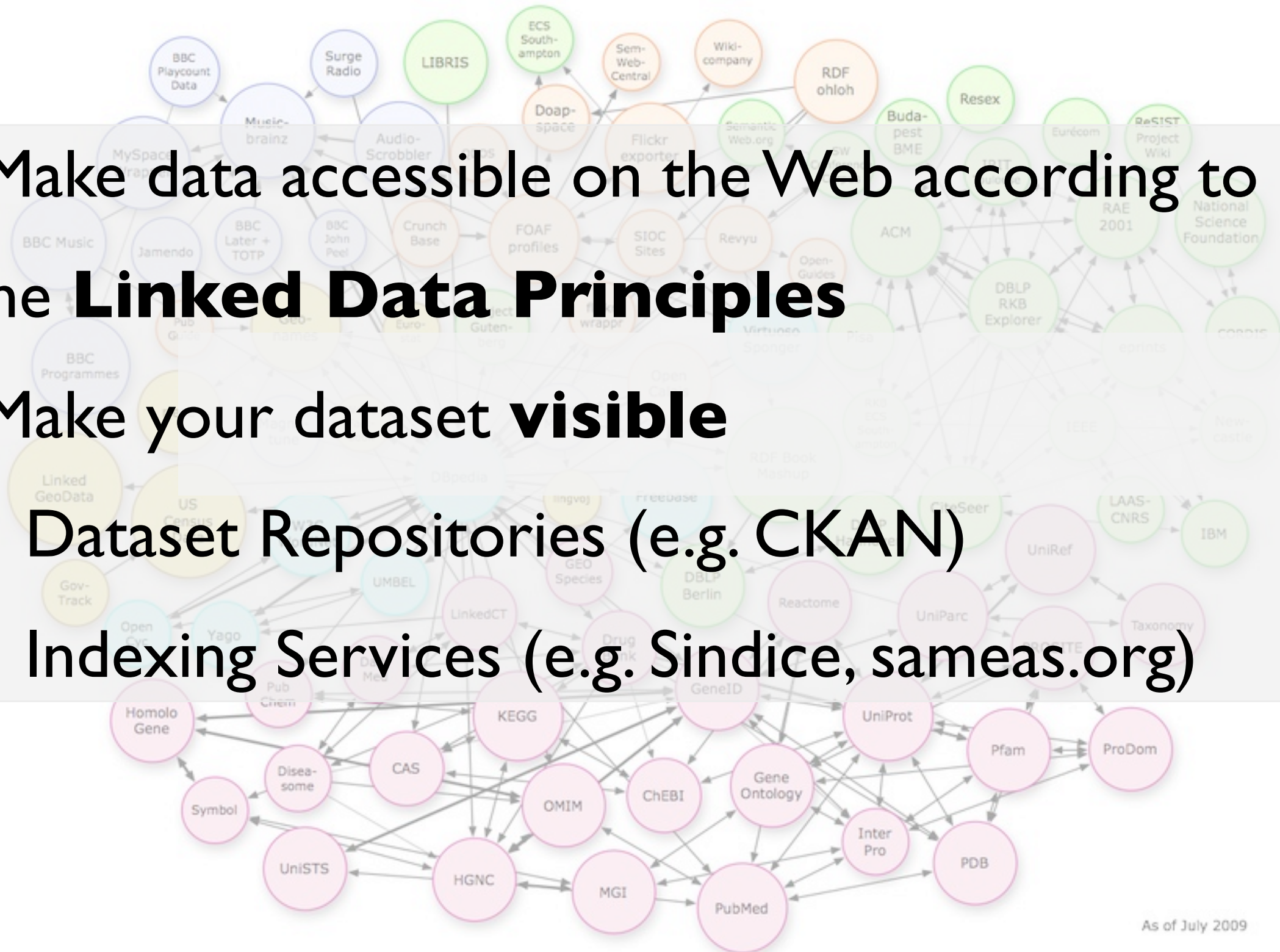
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```

Data Publication



Data Publication

- Make data accessible on the Web according to the **Linked Data Principles**
- Make your dataset **visible**
- Dataset Repositories (e.g. CKAN)
- Indexing Services (e.g. Sindice, sameas.org)



As of July 2009

Data Publication

What's in our toolbox?



- **Virtuoso**
- **Apache Webserver + Pubby**
- **Snorql**

Exploitation



Exploitation

- Develop application that **unlocks the value** of the data to provide **benefits** to a specific community of end **users**.

Exploitation

What's in our toolbox?



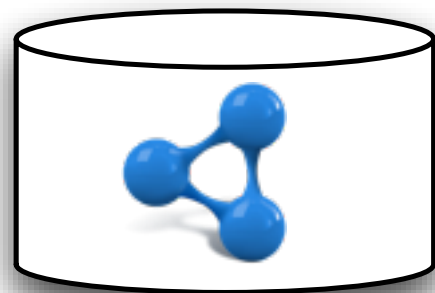
- **map4rdf**

map4rdf

Map-based visualization of **RDF Linked Data**
with **Geospatial** dimensions.

- **Faceted** navigation.
- Support for complex **geometries** (Lines, Polygons, etc)
- Extensible **overlays** (e.g. statical data)

map4rdf



SPARQL
Endpoint



map4rdf
Server



Visualization in
User's Browser

map4rdf

GEOLINKEDDATA.ES 1.0
by Ontology Engineering Group

Facets

Type

- ☐ Airbase
- ☒ Airport
- ☐ Aquifer
- ☐ Beach
- ☐ Channel

Overlays

Results

Madrid/ Cuatro Vientos, Aeropuerto de (es)
Latitude: 40.3666666666667
Longitude: -3.7666666666667
For further information, click [here](#)

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map4rdf



