¿qué es esto de Linked data?

Lorena Etcheverry - Instituto de Computación, Facultad de Ingeniería, UdelaR

Octubre 2013

La web clásica es una red de

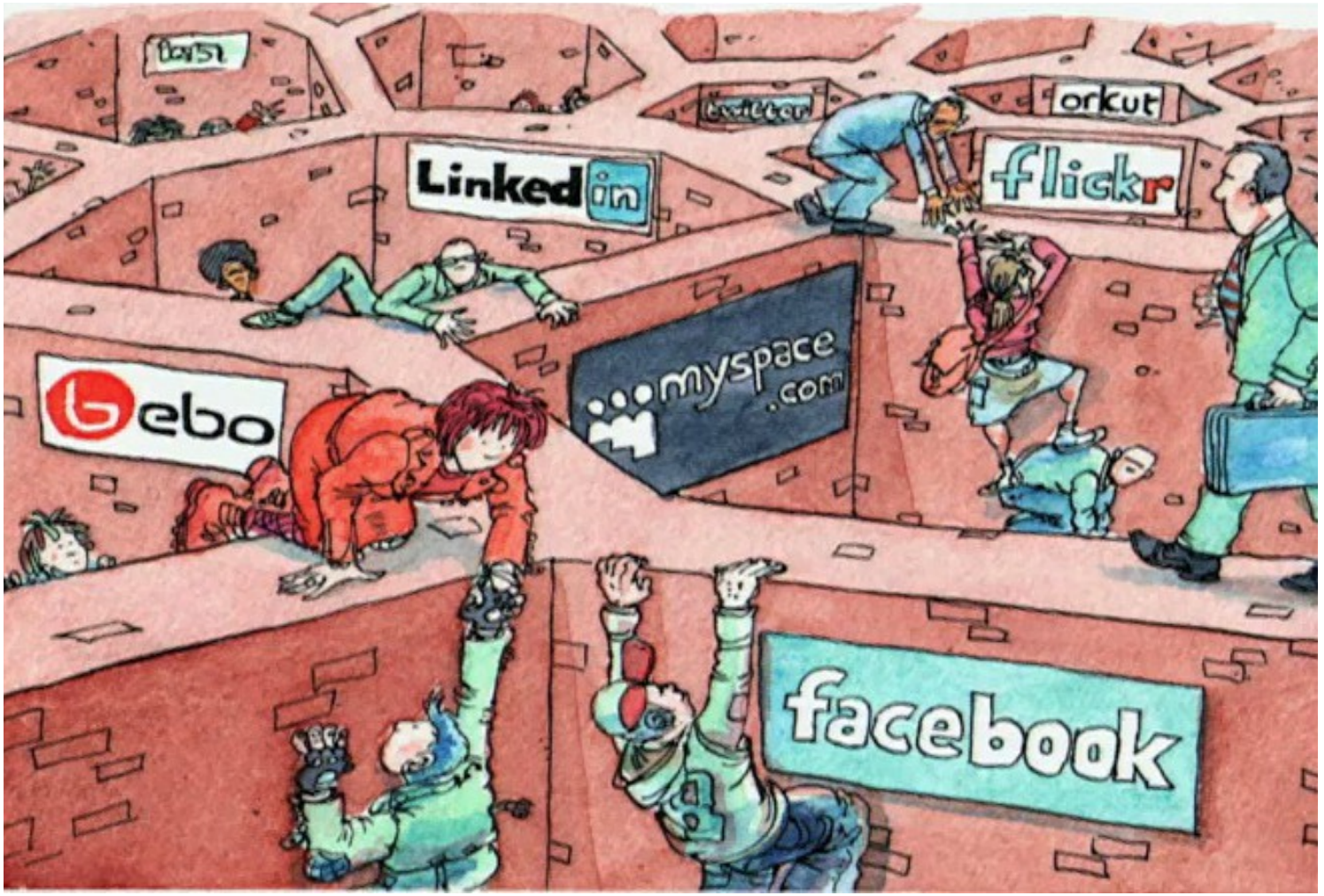
documentos,

interpretable por humanos,

donde las relaciones entre documentos no tienen un

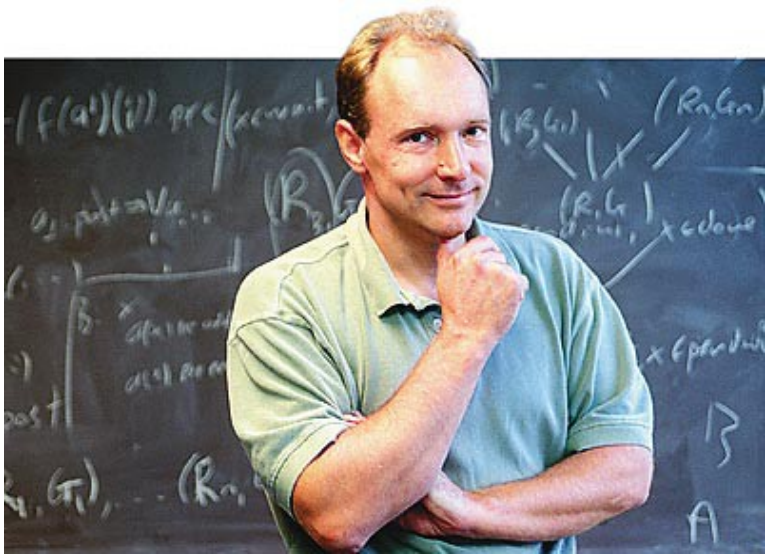
significado.

Además, la mayoría de los datos en la web están **a i s l a d o s**



La **web de datos** es una red de afirmaciones, interpretable por humanos y máquinas, donde las afirmaciones se relacionan y **tienen un significado**.

W3C Semantic Web



RDF: un modelo de datos basado en triplas que permite representar relaciones.

SPARQL: el lenguaje de consultas sobre RDF.

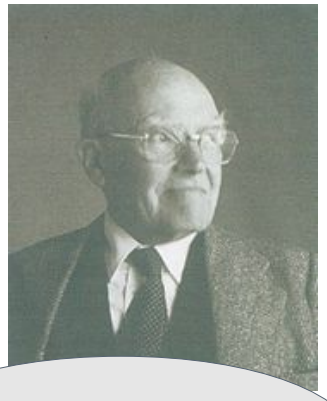
RDF-S y OWL, para representar metadatos y darles significado (ontologías).

http://www.w3.org/2001/sw/wiki/RDF

http://www.w3.org/2001/sw/wiki/SPARQL

afirmación o tripla

<sujeto, predicado, objeto>



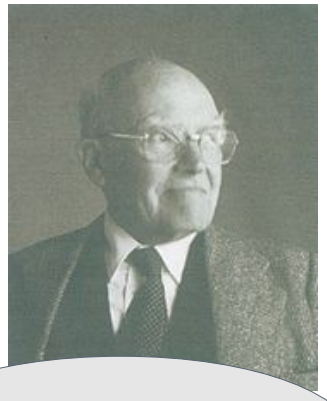
Ing. Eladio Dieste

esAutor

MVD Shopping Center

afirmación o tripla

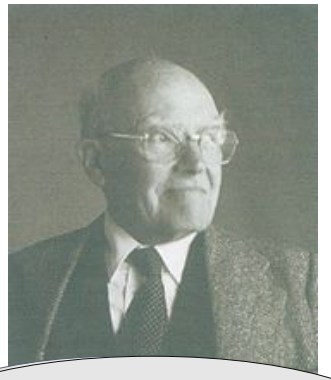
<sujeto, predicado, objeto>



En RDF todo es una tripla.
Los recursos y las propiedades se identifican por URIs

afirmación o tripla

<sujeto, predicado, objeto>



http://.../Eladio_Dieste

esAutor

http://.../Montevideo_Shopping

ubicadoEn

http://.../Buceo

En RDF todo es una tripla.
Los recursos y las propiedades se identifican por URIs

Linked Data

es un conjunto de
buenas prácticas para
publicar y *relacionar*
datos en la web,
usando
tecnologías de la

web semántica

Principios de Linked Data

1) Usar **URIs** para nombrar cosas

2) Usar **URIs HTTP** que sean consultables por humanos y máquinas

3) Proveer información **útil** acerca de cada URI en RDF

4) Crear **links** entre URIs

Tim Berners-Lee – Linked Data (2006)
http://www.w3.org/DesignIssues/LinkedData
#TED Talk Tim Berners-Lee on the next Web (2009)
http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html

1) Usar URIs para nombrar cosas

URI's *minting*: the act of establishing the association between the URI and the resource it denotes. A URI MUST only be minted by the URI's owner or delegate. Minting a URI from someone else's URI space is known as URI *squatting*

The URI Lifecycle in Semantic Web Architecture, David Booth, http://dbooth.org/2009/lifecycle/

1) Usar URIs para nombrar cosas

- Evitar el uso de *namespaces* que no están bajo nuestro control

  `http://www.imdb.com/title/tt0057012/#film`

- No incluir detalles de implementación

  `http://tiger.biglynx.co.uk/people.php?id=dave-smith&format=rdf`

- Evitar claves “artificiales”

  `http://data.nytimes.com/66209802438676211043`

2) Usar URIs HTTP que sean consultables por humanos y máquinas

HTTP URI: mecanismo universal de acceso a una URI

Las URIs HTTP deberían ser

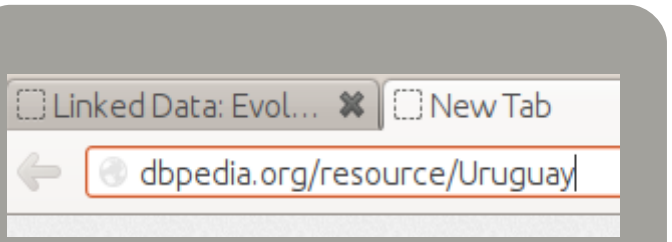
desreferenciables

"HTTP clients can look up the URI using the HTTP protocol and retrieve a description of the resource that is identified by the URI"

Heath, Bizer, *Linked Data: Evolving the Web into a Global Data Space*

Redireccionamiento y negociación de contenido

`text/html`

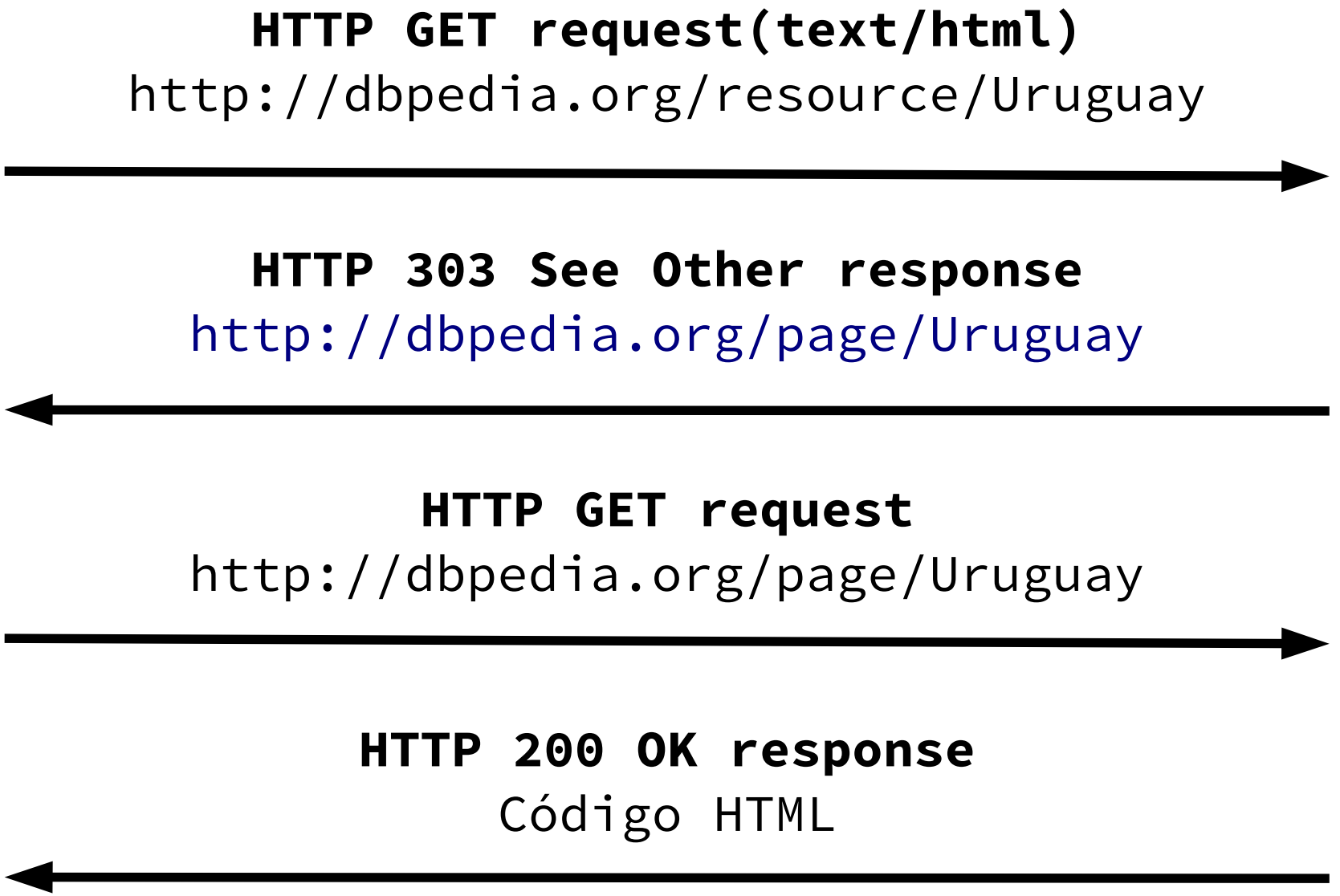


URI que identifica al concepto Uruguay

URI que identifica el documento **HTML** que describe al concepto Uruguay

`application/rdf+xml`

URI que identifica el documento **RDF** que describe al concepto Uruguay


HTTP GET request(text/html)
http://dbpedia.org/resource/Uruguay
HTTP 303 See Other response
http://dbpedia.org/page/Uruguay
HTTP GET request
http://dbpedia.org/page/Uruguay
HTTP 200 OK response
Código HTML

```
curl -i -L -H "Accept: text/html" http://dbpedia.org/resource/Uruguay

HTTP/1.1 303 See Other
Date: Wed, 02 Oct 2013 22:21:01 GMT
Content-Type: text/html; charset=UTF-8
Server: Virtuoso/07.00.3203 (Linux) i686-generic-linux-glibc212-64  VDB
Location: http://dbpedia.org/page/Uruguay
...

HTTP/1.1 200 OK
Date: Wed, 02 Oct 2013 21:59:40 GMT
Content-Type: text/html; charset=UTF-8
Content-Length: 608380
Server: Virtuoso/07.00.3203 (Linux) i686-generic-linux-glibc212-64  VDB
...

<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML+RDFa 1.0//EN" ...
```

HTTP GET request(application/rdf+xml)

http://dbpedia.org/resource/Uruguay

HTTP 303 See Other response

http://dbpedia.org/data/Uruguay.xml

HTTP GET request

http://dbpedia.org/data/Uruguay.xml

HTTP 200 OK response

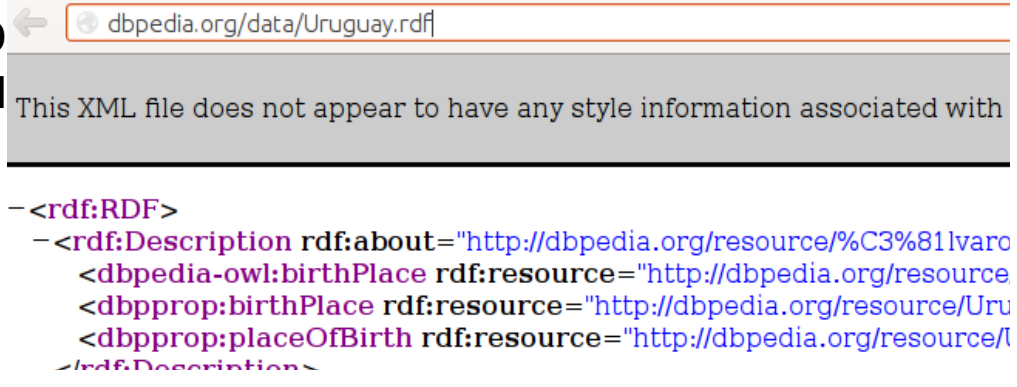
Datos en RDF

```
curl -i -L -H "Accept: application/rdf+xml"
http://dbpedia.org/resource/Uruguay

HTTP/1.1 303 See Other
Date: Wed, 02 Oct 2013 22:28:35 GMT
Content-Type: application/rdf+xml; qs=0.95
Server: Virtuoso/07.00.3203 (Linux) i686-generic-linux-glibc212-64  VDB
Location: http://dbpedia.org/data/Uruguay.xml
...

HTTP/1.1 200 OK
Date: Wed, 02 Oct 2013 22:28:35 GMT
Content-Type: application/rdf+xml; charset=UTF-8
Content-Length: 603067
...

<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:owl="http://www.w3.org/200
    xmlns:dcterms="http://purl.org/d
...
```



```
curl -i -L -H "Accept: text/rdf+n3" http://dbpedia.org/resource/Uruguay

HTTP/1.1 303 See Other
Date: Wed, 02 Oct 2013 22:29:03 GMT
Content-Type: text/rdf+n3; qs=0.8
Server: Virtuoso/07.00.3203 (Linux) i686-generic-linux-glibc212-64  VDB
Location: http://dbpedia.org/data/Uruguay.nt
...

HTTP/1.1 200 OK
Date: Wed, 02 Oct 2013 22:29:04 GMT
Content-Type: text/rdf+n3; charset=UTF-8
Content-Length: 296903
...

@prefix owl:  <http://www.w3.org/2002/07/owl#> .
@prefix ns1:  <http://cs.dbpedia.org/resource/> .
@prefix dbpedia:  <http://dbpedia.org/resource/> .
ns1:Uruguay   owl:sameAs dbpedia:Uruguay .
@prefix ns3:  <http://pl.dbpedia.org/resource/> .
ns3:Urugwaj   owl:sameAs dbpedia:Uruguay .
```

Utilización de Hash URIs

```
curl -i  http://www.w3.org/2006/07/SWD/recipes/examples-20080421/
example1#ClassA

HTTP/1.1 200 OK
Date: Thu, 03 Oct 2013 13:08:38 GMT
Server: Apache/2
Content-Type: application/rdf+xml;
...

<?xml version="1.0"?>
<rdf:RDF
xml:base="http://www.w3.org/2006/07/SWD/recipes/examples20080421/example1">
<owl:Ontology
rdf:about="http://www.w3.org/2006/07/SWD/recipes/examples20080421/example1">
  <rdfs:comment>An example vocab for minimal hash setup.</rdfs:comment>
  <rdfs:label>Example 1 Ontology</rdfs:label>
</owl:Ontology>
<owl:Class rdf:about="http://www.w3.org/2006/07/SWD/recipes/examples-
20080421/example1#ClassA">
</owl:Class> ...
</rdf:RDF>
```

3) Proveer información útil acerca de cada URI en RDF

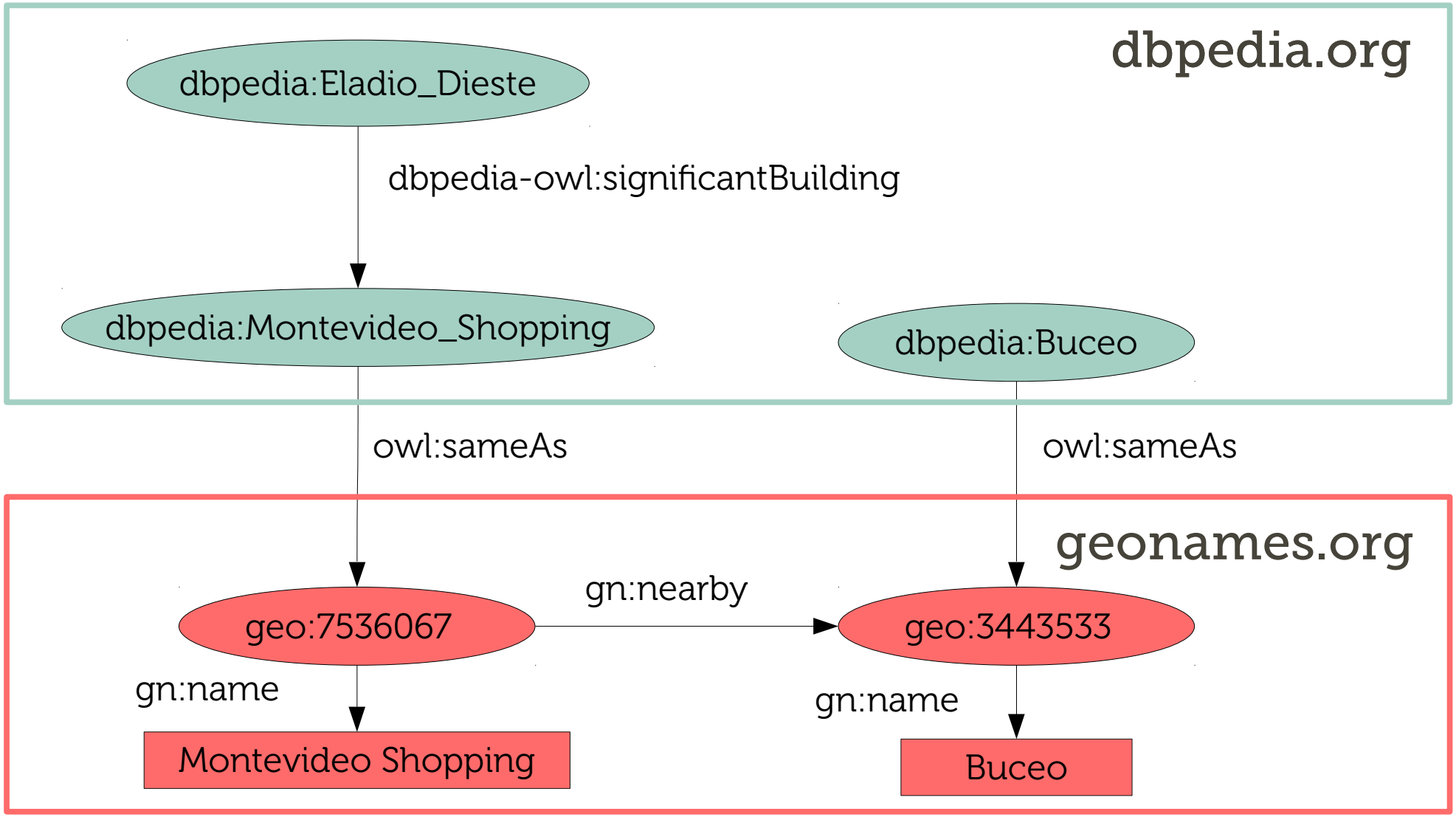
```
dbpedia:Eladio_Dieste   dbpedia-owl:birthPlace
dbpedia:Uruguay ;
    dbpprop:birthPlace   dbpedia:Uruguay ;
    dbpprop:deathPlace   dbpedia:Uruguay ;
    dbpedia-owl:deathPlace dbpedia:Uruguay .
```

4) Crear links entre URIs

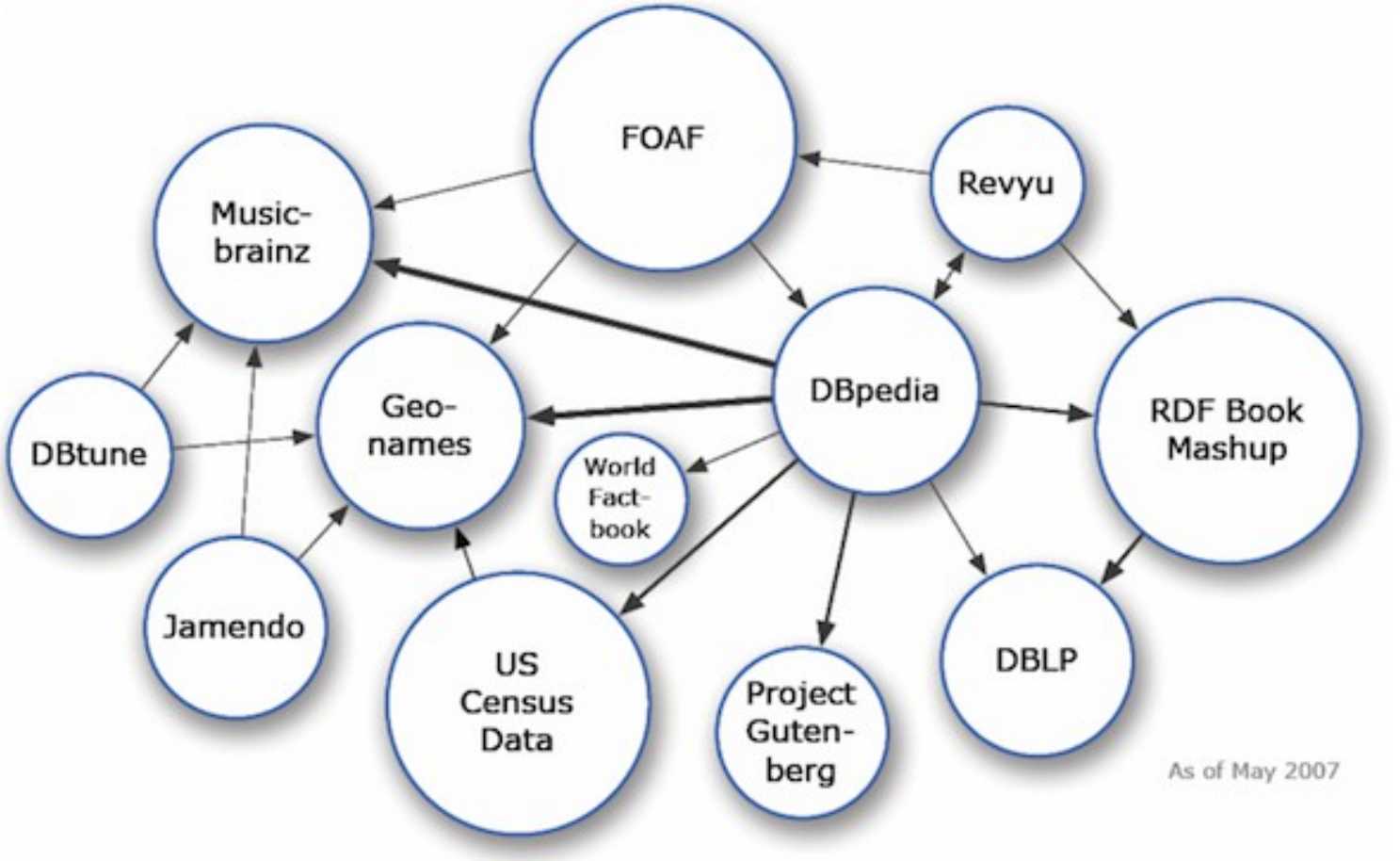
```
@prefix ns192: <http://www.wikidata.org/entity/> .
@prefix ns17:  <http://nl.dbpedia.org/resource/> .
@prefix ns18:  <http://eu.dbpedia.org/resource/> .

dbpedia:Uruguay owl:sameAs ns192:Q77 ,
      <http://gadm.geovocab.org/id/0_233> ,
      dbpedia:Uruguay ,
      <http://rdf.freebase.com/ns/m.07twz> ,
      ns18:Uruguai ,
      ns17:Uruguay .
```

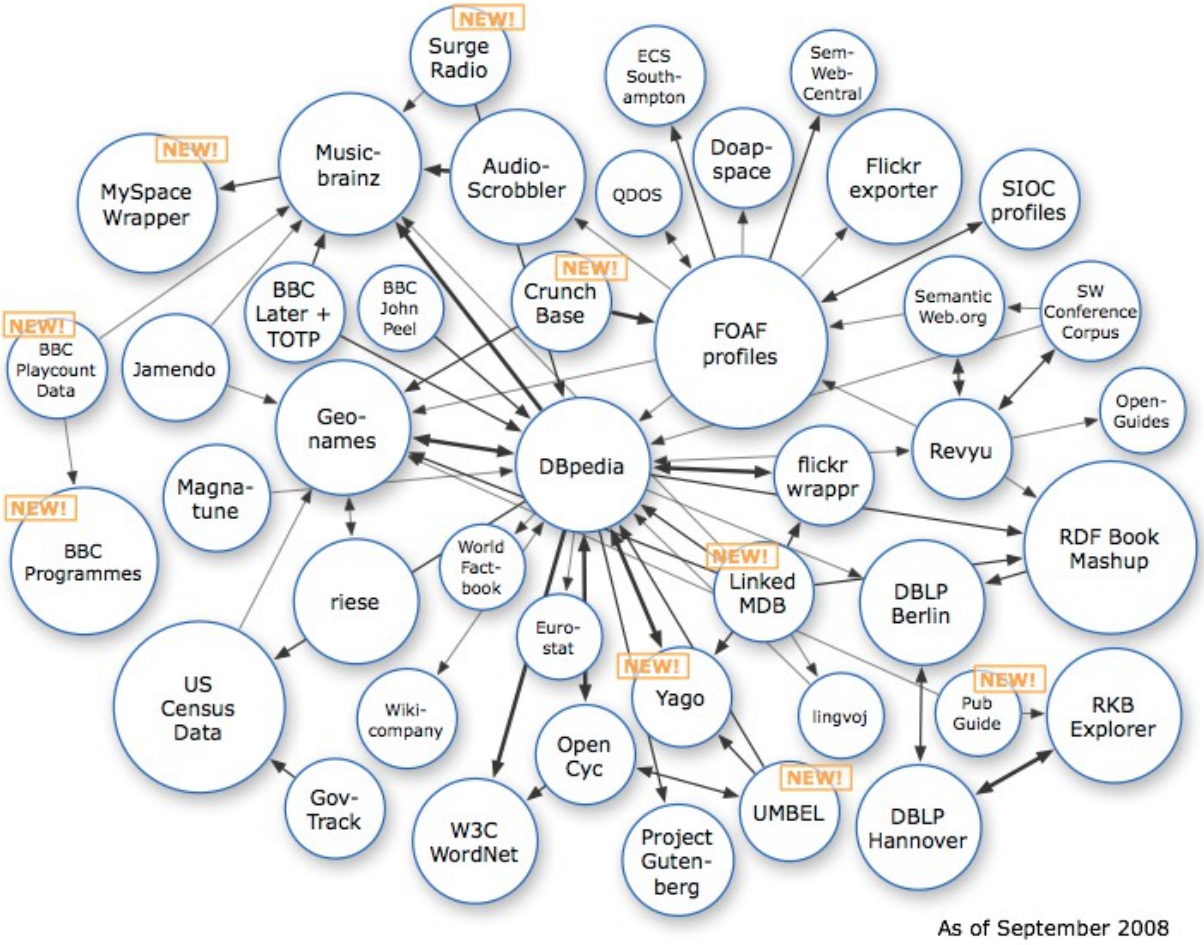
@prefix gn: http://www.geonames.org/ontology
@prefix dbpedia: http://dbpedia.org/resource/
@prefix dbpedia-owl: http://dbpedia.org/ontology/
@prefix geo:http://sws.geonames.org/
@prefix owl:http://www.w3.org/2002/07/owl#



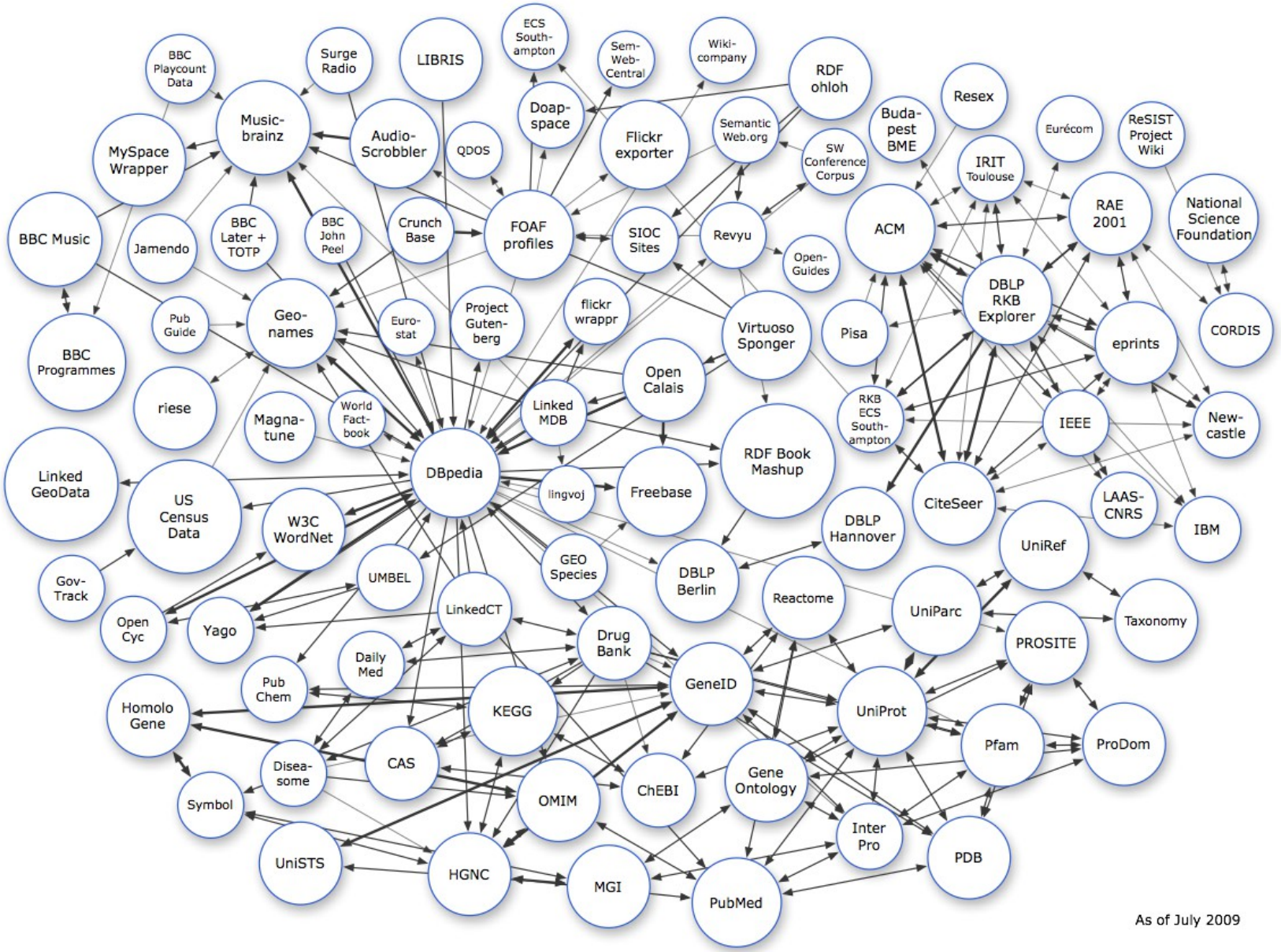
Linked Data + Open Data = LOD



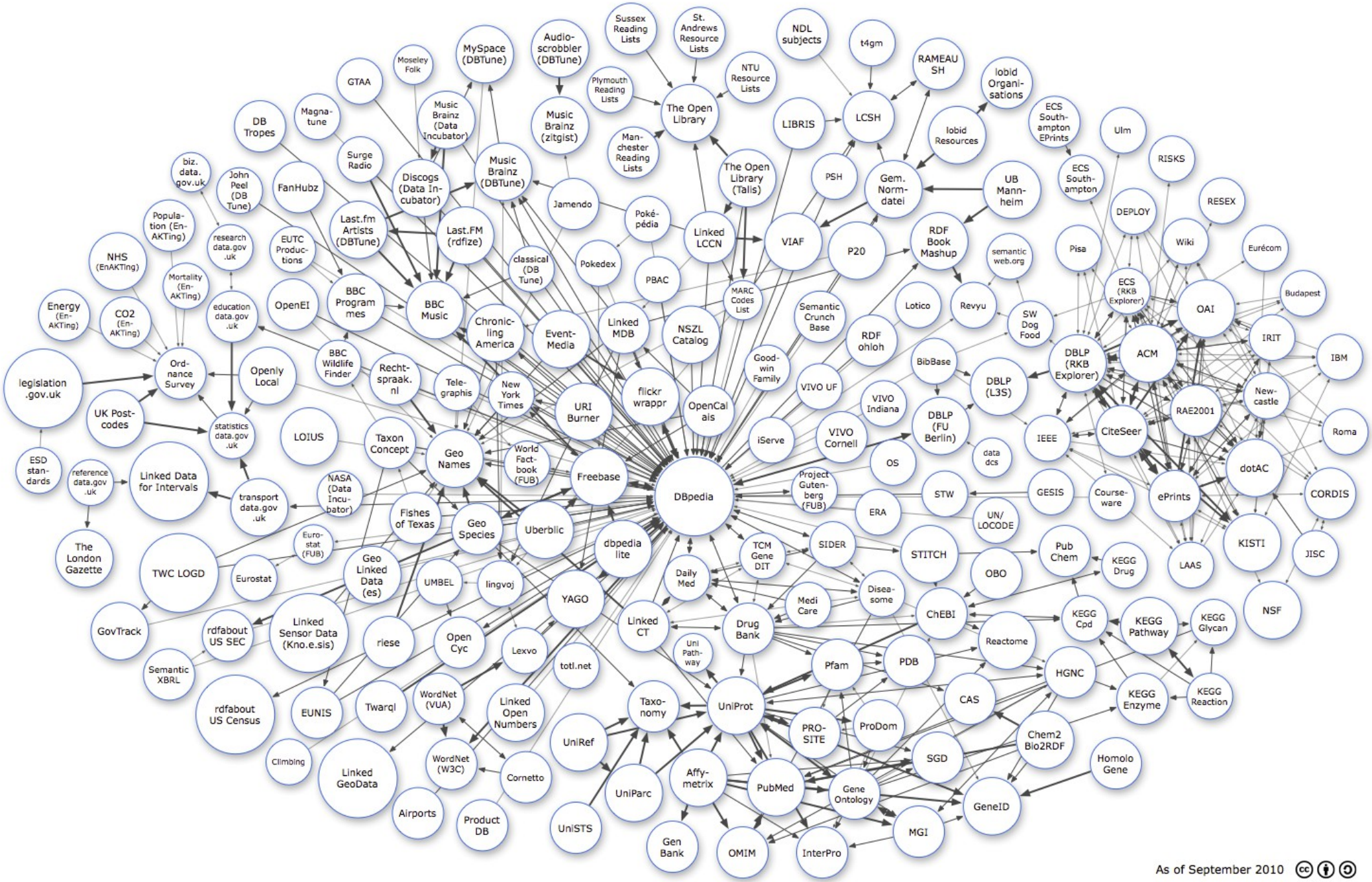
http://lod-cloud.net/ 2007



http://lod-cloud.net/ 2008

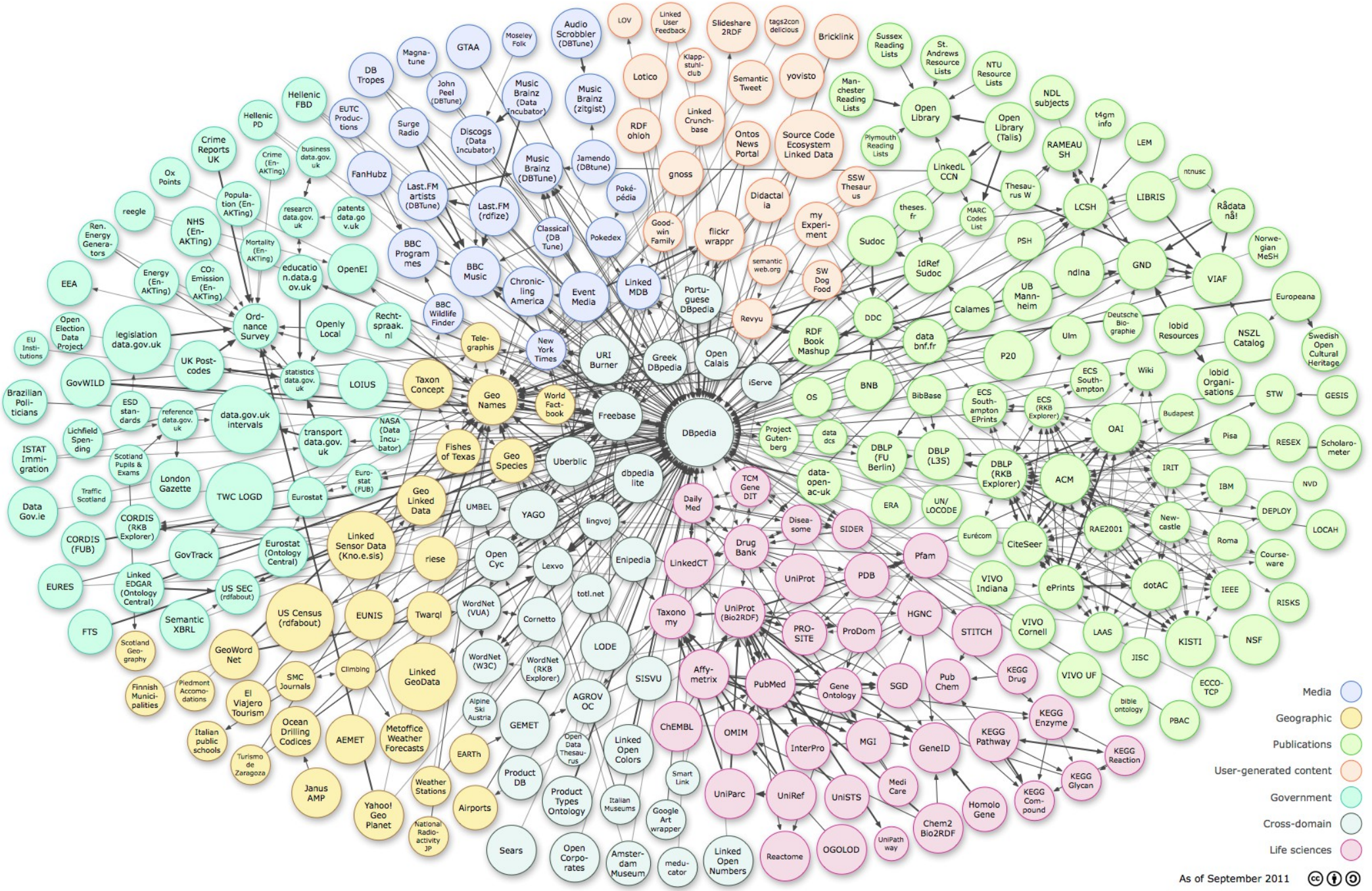


http://lod-cloud.net/ 2009



As of September 2010

http://lod-cloud.net/ 2010



http://lod-cloud.net/ 2011

Referencias

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- Juan Sequeda, Daniel P. Miranker, *Linked Data Tutorial*, Semantic Technology Conference 2012, http://www.slideshare.net/juansequeda/linked-data-tutorial-at-semtech-2012
- Tom Heath, *Linked Data - Connect Distributed Data across the Web* http://linkeddata.org

Gracias

Lorena Etcheverry

lorenae@fing.edu.uy