

# **Semantic Web, Linked Data, and Semantic 3D Media**

**Ivan Herman, W3C**

**FOCUS 3D Conference, Sophia Antipolis, France  
2010-02-11**

# Significant buzz...

- There is quite a buzz around “Semantics”, “Semantic Technologies”, “Semantic Web”, “Web 3.0”, “Data Web”, etc, these days
- New applications, companies, tools, etc, come to the fore frequently

# Significant buzz...

- It is, of course, not always clear what these terms all mean:
  - “Semantic Web” is a way to specify data and data relationships; it is also a collection of specific technologies (RDF, OWL, GRDDL, SPARQL, ...)
  - “Semantic Technologies”, “Web 3.0” often mean more, including intelligent agents, usage of complex logical procedures, etc

# Lots of Tools (not an exhaustive list!)

- Categories:
  - Triple Stores
  - Inference engines
  - Converters
  - Search engines
  - Middleware
  - CMS
  - Semantic Web browsers
  - Development environments
  - Semantic Wikis
  - ...
- Some names:
  - Jena, AllegroGraph, Mulgara, Sesame, flickurl, ...
  - TopBraid Suite, Virtuoso environment, Falcon, Drupal 7, Redland, Pellet, ...
  - Disco, Oracle 11g, RacerPro, IODT, Ontobroker, OWLIM, Talis Platform, ...
  - RDF Gateway, RDFLib, Open Anzo, DartGrid, Zitgist, Ontotext, Protégé, ...
  - Thetus publisher, SemanticWorks, SWI-Prolog, RDFStore...
  - ...

- The main lesson:
  - *Anybody can start developing Semantic Web applications*

# There is a great community

- There are lots of tutorials, overviews, and books around
  - some of them good, some of them bad, just as with any other areas...
- Active developers' communities
  - blogs, IRC channels, mailing lists, various fora: more than what one person can oversee...
- Some measures claim that there are over  $10^7$  Semantic Web documents on the Web

# Some deployment communities

- Major communities pick the technology up: digital libraries, defence, eGovernment, energy sector, financial services, health care, oil and gas industry, life sciences, social web applications ...

# So what *is* the Semantic Web?



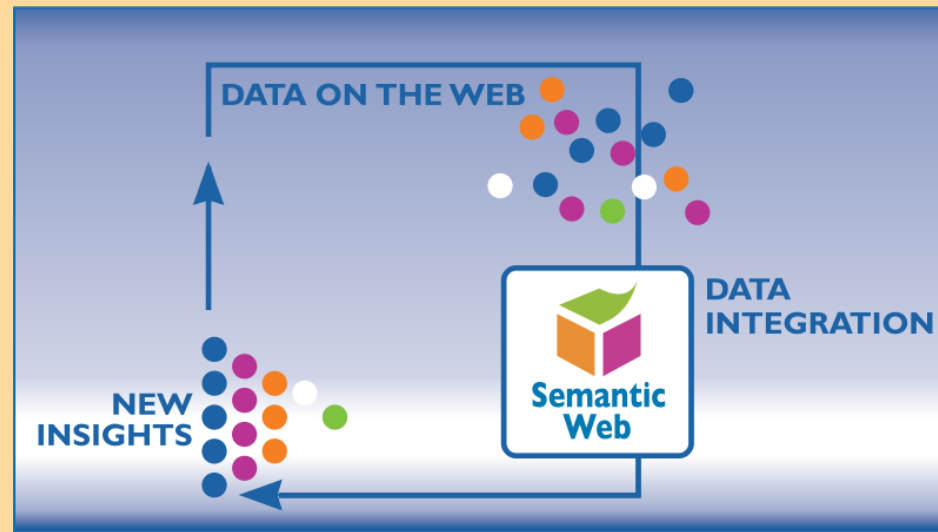
- There is a growing number of application patterns referring to the Semantic Web:
  - data integration using RDF, SKOS, OWL, ...
  - knowledge engineering with complex ontologies
    - using, e.g., OWL and/or rule based reasoning
  - better data management, archiving, cataloguing, etc
    - e.g., digital library applications
  - managing, coordinating, combining Web services
  - intelligent software agents
  - improving search (usually using domain specific vocabularies...)
  - etc

# Is this where we are?



- Maybe, but being an elephant is not necessary bad! 😊
  - it shows that the Semantic Web is a mature technology
  - that there is lots of interest, applications
  - various application areas pick what they need...
    - e.g., some need sophisticated knowledge management, so they go for complex ontology's...
    - some concentrate on semantically simpler vocabularies but large volume of data
  - ...and that is fine, there is room for many!

- But it is good to (re-)emphasize some principles
- The Semantic Web:
  - *extends the principles of the Web from documents to data; create a Web of data*



- It is the Semantic Web, and not only Semantics!
  - data, ontologies, vocabularies, etc, can (and should!) be shared, reused, potentially on Web scale
    - *the “network effect” on data*
- The major importance of RDF is that it provides an abstract integration layer for data on the Web

# Applications are not always very complex...

- Eg: simple semantic annotations of data provides easy integration (eg, with MusicBrainz, Wikipedia, geographic data sets, etc)
- What is needed: some simple vocabularies, simple annotation
  - annotation can be generated by a server automatically, or
  - added by the user via some user interface
- This extra data can be in some microformats, in RDFa, ...

# A relatively simple application

- Goal: reuse of older experimental data
- Keep data in databases or XML, just export key “fact” as RDF
- Use a faceted browser to visualize and interact with the result

**Internal Compound Repurposing Example**

Welcome, Allergy & Respiratory Team Member

This tool allows you to identify opportunities for additional uses of compounds from other teams within your project. It combines internal data, public data and the results of data mining experiments to provide testable hypotheses.

Control Panel & Item Filtering

**Internal Compound Repurposing Example**

Welcome, Allergy & Respiratory Team Member

This tool allows you to identify opportunities for additional uses of compounds from other teams within your project. It combines internal data, public data and the results of data mining experiments to provide testable hypotheses.

Control Panel & Item Filtering

Area	5/2	Approach	3/2	Term+Reason	1/2	Max_Stage_Reached	1/2	Literature Links
20 Pain	<input checked="" type="checkbox"/>	7 Antibody	<input type="checkbox"/>	37 ACTIVE	<input type="checkbox"/>	51 Candidate	<input checked="" type="checkbox"/>	0 - 50
10 Metabolic Disease	<input checked="" type="checkbox"/>	1 Recombinant	<input type="checkbox"/>	12 BIOMARKER	<input type="checkbox"/>	10 Discovery	<input type="checkbox"/>	
8 Cancer	<input type="checkbox"/>	18 SM_Agonist	<input checked="" type="checkbox"/>	51 EFFICACY	<input checked="" type="checkbox"/>	41 Exploratory	<input type="checkbox"/>	
3 Sexual Health	<input checked="" type="checkbox"/>	12 SM_Antagonist	<input checked="" type="checkbox"/>	11 MARKET	<input checked="" type="checkbox"/>	19 HTS	<input type="checkbox"/>	
2 Infectives	<input checked="" type="checkbox"/>	21 SM_Inhibitor	<input checked="" type="checkbox"/>	11 REORG	<input type="checkbox"/>	11 Phase I	<input type="checkbox"/>	
1 Urogenitals	<input checked="" type="checkbox"/>		<input type="checkbox"/>	10 TOXIC	<input type="checkbox"/>	13 Phase III	<input type="checkbox"/>	
						41 Screening	<input type="checkbox"/>	

51 items filtered from 710 originally (Reset All Filters)

Area	Original Indication	Target Name	Approach	Start	Term+Reason	Max_Stage_Reached	Owner	OMIM	Lit_All	Lit_2007	Lit_Mech	DMA	GED	Pathway	Compounds
Metabolic Disease	Diabetes	Liver glycogen phosphorylase	SM_Inhibitor	2007-Q2	EFFICACY	Candidate	P. Person								SW-030072
Sexual Health	Erectile Dysfunction	Integrin alpha-3 (Galactoprotein BS(VLA-3) (CD49C))	SM_Antagonist	2006-Q3	EFFICACY	Candidate	P. Person						1		SW-029782
Sexual Health	Erectile Dysfunction	Leukotriene C4 synthase	SM_Agonist	2006-Q3	EFFICACY	Candidate	M. Manager				1	1			SW-029630
Sexual Health	Erectile Dysfunction	transcription elongation factor A (S1)-like 4	SM_Inhibitor	2005-Q2	EFFICACY	Candidate	P. Person								SW-029026
Infectives	HIV	Putative four repeat channel (h)	SM_Inhibitor	2006-Q2	EFFICACY	Candidate	L. Leader								SW-029994
Infectives	HIV	Voltage-gated potassium channel protein Kv3.2 (h)	SM_Agonist	2007-Q1	EFFICACY	Candidate	A. Scientist							1	SW-029653
Urogenitals	Incontinence	Human RNA binding motif (RBM) gene, partial cds	SM_Agonist	2007-Q3	EFFICACY	Candidate	L. Leader							1	SW-029684
Pain	Migraine	Monocarboxylate transporter homologus234064CD1 (h)	SM_Inhibitor	2007-Q3	EFFICACY	Candidate	L. Leader							18	SW-030085

**But is there already a Web of  
Data out there?**





# Example data source: DBpedia

- [DBpedia](#) is a community effort to
  - extract structured (“infobox”) information from Wikipedia
  - provide a SPARQL endpoint to the dataset
  - interlink the DBpedia dataset with other datasets on the Web



UNIVERSITÄT LEIPZIG



# Extracting structured data from Wikipedia

Amsterdam	
	
The Keizersgracht at dusk	
Location of Amsterdam	
Coordinates:  <span><span><span><span>52°22′23″N</span> <span>4°53′32″E</span></span></span></span>	
<b>Country</b>	<b>Netherlands</b>
<b>Province</b>	<b>North Holland</b>
<b>Government</b>	
<span> </span> - <b>Type</b>	Municipality
<span> </span> - <b>Mayor</b>	Job Cohen <sup>[1]</sup> (PvdA)
<span> </span> - <b>Aldermen</b>	Lodewijk Asscher Carolien Gehrels Tjeerd Herrema Maarten van Poelgeest Marijke Vos
<span> </span> - <b>Secretary</b>	Erik Gerritsen
<b>Area</b> <sup>[2][3]</sup>	
<span> </span> - <b>City</b>	219 km <sup>2</sup> (84.6 sq mi)
<span> </span> - <b>Land</b>	166 km <sup>2</sup> (64.1 sq mi)
<span> </span> - <b>Water</b>	53 km <sup>2</sup> (20.5 sq mi)
<span> </span> - <b>Urban</b>	1,003 km <sup>2</sup> (387.3 sq mi)
<span> </span> - <b>Metro</b>	1,815 km <sup>2</sup> (700.8 sq mi)
<b>Elevation</b> <sup>[4]</sup>	2 m (7 ft)
<b>Population</b> (1 October 2008) <sup>[5][6]</sup>	
<span> </span> - <b>City</b>	756,269
<span> </span> - <b>Density</b>	4,459/km <sup>2</sup> (11,548.8/sq mi)
<span> </span> - <b>Urban</b>	1,364,422
<span> </span> - <b>Metro</b>	2,158,372
<span> </span> - <b>Demonym</b>	Amsterdammer
<b>Time zone</b>	CET (UTC+1)
<span> </span> - <b>Summer (DST)</b>	CEST (UTC+2)
<b>Postcodes</b>	1011 – 1109
<b>Area code(s)</b>	020
<b>Website</b>	<a href="http://www.amsterdam.nl">www.amsterdam.nl</a> 

```
@prefix dbpedia <http://dbpedia.org/resource/>.
@prefix dbterm <http://dbpedia.org/property/>.
```

```
dbpedia:Amsterdam
```

```
dbterm:officialName "Amsterdam" ;
```

```
dbterm:longd "4" ;
```

```
dbterm:longm "53" ;
```

```
dbterm:longs "32" ;
```

```
...
```

```
dbterm:leaderName dbpedia:Job_Cohen ;
```

```
...
```

```
dbterm:areaTotalKm "219" ;
```

```
...
```

```
dbpedia:ABN_AMRO
```

```
dbterm:location dbpedia:Amsterdam ;
```

```
...
```

# Automatic links among open datasets

```
<http://dbpedia.org/resource/Amsterdam> ←  
  owl:sameAs <http://rdf.freebase.com/ns/...> ;  
  owl:sameAs <http://sws.geonames.org/2759793> ;  
  ...
```

```
<http://sws.geonames.org/2759793>  
  owl:sameAs <http://dbpedia.org/resource/Amsterdam>  
  wgs84_pos:lat "52.3666667" ;  
  wgs84_pos:long "4.8833333" ;  
  geo:inCountry <http://www.geonames.org/countries/#NL> ;  
  ...
```

Processors can switch automatically from one to the other...



# Accessing the cloud

- Applications can access the data directly (via the URI-s)
- There are several “instantiations” of part of the cloud that user can access
  - these store copies of several “blobs”
    - possibly with some inferred triples based on, eg, OWL
  - often offering a SPARQL endpoint to query to cloud

# Example for cloud exploration

The screenshot shows a web browser window with the URL <http://ldsr.ontotext.com/resource/dbpedia/Amsterdam>. The browser's address bar and navigation buttons are visible. The page title is "LDSR Beta". The main content area displays the title "Amsterdam" with an "RDF Rank" indicator. Below the title is a description: "Amsterdam is the capital and largest city of the Netherlands, located in the province of North Holland in the west of the country. The city, which had a population of 1...". The source is listed as <http://dbpedia.org/resource/Amsterdam>. There are also links for "Same as" with various URIs. A search box labeled "RDF Search and Explore:" is present. Below the search box, there are navigation options: "Subject (100 of 3140)", "Predicate", "Object", and "All". There are also options to "View as Graph" or "Tabulator", and a "Download in" menu with options for JSON, RDF, Turtle, N3, and NTriples. Below these options, there are dropdown menus for "Named Graph:" (set to "All"), "Locale:" (set to "English"), and "Inference:" (set to "Explicit and implicit"). The main content area shows a table with two columns: "Predicate" and "Object". The "Predicate" column contains the value [rdf:type](#). The "Object" column contains a list of classes: [Agent](#), [Agent, generic](#), [Agent, generic](#), [Agent, partially tangible](#), [Area](#), [Boundary, underspecified](#), [Capital city of region](#), [Capital city of region](#), [City](#), [City](#), [Enduring thing, localized](#), [Feature](#), [geo-pos:Point](#), [geo-pos:SpatialThing](#), [Geographical agent](#), and [Geographical place](#).

# Example for cloud exploration

Predicate	Object
	<a href="#">host cities of the Summer Olympic Games</a> <a href="#">populated place</a> <a href="#">Port cities and towns in the Netherlands</a> <a href="#">Port cities and towns of the North Sea</a> <a href="#">second-order administrative division</a> <a href="#">Settlements established in the 13th century</a>
<a href="#">alternate name</a>	Amsterdam@en
<a href="#">name</a>	Amsterdam Gemeente Amsterdam
<a href="#">population</a>	2000000 738434 741636 743000
<a href="#">children features</a>	<a href="http://sws.geonames.org/2759793/contains.rdf">http://sws.geonames.org/2759793/contains.rdf</a>
<a href="#">feature class</a>	<a href="#">geo-ont:A</a> <a href="#">geo-ont:P</a> <a href="#">geo-ont:P</a>
<a href="#">feature code</a>	<a href="#">capital of a political entity</a> <a href="#">populated place</a> <a href="#">second-order administrative division</a>
<a href="#">country</a>	<a href="http://www.geonames.org/countries/#NL">http://www.geonames.org/countries/#NL</a>
<a href="#">map</a>	<a href="http://www.geonames.org/2759793/gemeente-amsterdam.html">http://www.geonames.org/2759793/gemeente-amsterdam.html</a> <a href="http://www.geonames.org/2759794/amsterdam.html">http://www.geonames.org/2759794/amsterdam.html</a>
<a href="#">nearby features</a>	<a href="http://sws.geonames.org/2759794/nearby.rdf">http://sws.geonames.org/2759794/nearby.rdf</a>
<a href="#">parent feature</a>	<a href="#">Kingdom of the Netherlands</a> <a href="#">Provincie Noord-Holland</a>
<a href="#">wikipedia article</a>	<a href="http://en.wikipedia.org/wiki/Amsterdam">http://en.wikipedia.org/wiki/Amsterdam</a>



# Example for cloud exploration

The screenshot shows a web browser window displaying the LDSR Beta interface. The URL in the address bar is <http://ldsr.ontotext.com/resource/http%3A%252F%252Fsws%252Egeonames%252Eorg%252F2749879/>. The page title is "Provincie Noord-Holland" with an "RDF Rank" indicator. Below the title, there is a list of identifiers: "4.9166667 North Holland 52", "http://sws.geonames.org/2749879/", "d Северная Голландия Hollande-Septentrionale Nord-Holland Noord-Holland 2498931 Noord-Holland /", and "Source: http://sws.geonames.org/2749879/".

The interface includes navigation links: "RDF Search and Explore", "SPARQL Query", "About", and "Contact". There are also tabs for "Subject (29)", "Predicate", "Object", and "All". The "View as" options are "Graph" and "Tabulator". The "Download in" options are "JSON", "RDF", "Turtle", "N3", and "NTriples".

Below the navigation, there are filters for "Named Graph: All", "Locale: English", and "Inference: Explicit and implicit".

Predicate	Object
<a href="#">rdf:type</a>	<a href="#">Boundary, underspecified</a> <a href="#">Feature</a> <a href="#">geo-pos:SpatialThing</a> <a href="#">Location, underspecified</a> <a href="#">Location, underspecified</a> <a href="#">Region, underspecified</a> <a href="#">Region, underspecified</a> <a href="#">Resource</a> <a href="#">Spatial thing, localized</a> <a href="#">Thing</a>
<a href="#">has subject</a>	<a href="#">first-order administrative division</a> <a href="#">geo-ont:A</a>
<a href="#">Subject</a>	<a href="#">first-order administrative division</a> <a href="#">geo-ont:A</a>
<a href="#">alternate name</a>	Noord-Holland North Holland@en
<a href="#">name</a>	Provincie Noord-Holland

# Example for cloud exploration

The screenshot shows a web browser window displaying the LDSR interface. The URL in the address bar is <http://ldsr.ontotext.com/resource/dbpedia/Amsterdam?role=object>. The page title is "Amsterdam" with an "RDF Rank" indicator. The main content area shows a description of Amsterdam as the capital and largest city of the Netherlands, located in the province of North Holland. Below the description, there are several tabs: "Subject", "Predicate", "Object (100 of 6)", and "All". The "Object (100 of 6)" tab is selected and circled in red. Below the tabs, there are filters for "Named Graph" (set to "All"), "Locale" (set to "English"), and "Inference" (set to "Explicit and implicit"). The main content area displays a table of results with two columns: "Subject" and "Predicate". The first row shows "Amsterdam" as the subject and "same as" as the predicate. The second row shows "http://upload.wikimedia.org/wikipedia/commons/6/6a/Sights\_in\_Amsterdam2.jpg" as the subject and "depicts" as the predicate. The third row shows "http://bat-smg.wikipedia.org/wiki/Amsterdams" as the subject and "topic" as the predicate. The fourth row shows "http://be-x-old.wikipedia.org/wiki/Амстэрдам" as the subject and "topic" as the predicate. The fifth row shows "http://www.amsterdam.nl" as the subject and "topic" as the predicate. The sixth row shows "http://www.amsterdam.nl/" as the subject and "topic" as the predicate. The seventh row shows "http://zh-yue.wikipedia.org/wiki/阿姆斯特丹" as the subject and "topic" as the predicate. The eighth row shows "wikip-en:Amsterdam" as the subject and "topic" as the predicate.

Amsterdam RDF Rank

Amsterdam is the capital and largest city of the Netherlands, located in the province of North Holland in the west of the country. The city, which had a population of 1...

Source: <http://dbpedia.org/resource/Amsterdam>

Same as: [fb.guid.9202a8c04000641f8000000000004475](http://fb.guid.9202a8c04000641f8000000000004475), <http://sws.geonames.org/2759793/>, [yago:Amsterdam](http://yago:Amsterdam), [umbel-en:Amsterdam](http://umbel-en:Amsterdam), <http://sws.geonames.org/2759794/>, [yago:VOC\\_ship\\_Amsterdam](http://yago:VOC_ship_Amsterdam), [dbpedia:VOC\\_ship\\_Amsterdam](http://dbpedia:VOC_ship_Amsterdam)

Subject Predicate **Object (100 of 6)** All

View as [Graph](#) | [Tabulator](#) Download in [JSON](#) | [RDF](#) | [Turtle](#) | [N3](#) | [NTriples](#)

Statements in which the resource exists as an object. Named Graph: [All](#) Locale: [English](#) Inference: [Explicit and implicit](#)

Subject	Predicate
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
Amsterdam	same as
<a href="http://upload.wikimedia.org/wikipedia/commons/6/6a/Sights_in_Amsterdam2.jpg">http://upload.wikimedia.org/wikipedia/commons/6/6a/Sights_in_Amsterdam2.jpg</a>	depicts
<a href="http://bat-smg.wikipedia.org/wiki/Amsterdams">http://bat-smg.wikipedia.org/wiki/Amsterdams</a>	topic
<a href="http://be-x-old.wikipedia.org/wiki/Амстэрдам">http://be-x-old.wikipedia.org/wiki/Амстэрдам</a>	topic
<a href="http://www.amsterdam.nl">http://www.amsterdam.nl</a>	topic
<a href="http://www.amsterdam.nl/">http://www.amsterdam.nl/</a>	topic
<a href="http://zh-yue.wikipedia.org/wiki/阿姆斯特丹">http://zh-yue.wikipedia.org/wiki/阿姆斯特丹</a>	topic
wikip-en:Amsterdam	topic

# Example for cloud exploration

Linked Data Semantic Repository

http://ldsr.ontotext.com/resource/dbpedia/Amsterdam?role=object

Netvibes Feedly Social Private Mailing lists SW Python RDFa it! Bookmarklets Add Zemanta bit.ly To Mendeley TinyURL To Faviki

Subject	Predicate
<a href="#">Settlements established in the 13th century</a>	
<a href="#">Kingdom of the Netherlands</a>	<a href="#">capital</a>
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">Kingdom of the Netherlands</a>	<a href="#">capital</a>
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">Netherlands</a>	
<a href="#">A-Film Distribution B.V.</a>	<a href="#">location</a>
<a href="#">ABN AMRO Holding N.V.</a>	
<a href="#">AKZO Nobel N.V.</a>	
<a href="#">Amsterdamse Trade Bank N.V.</a>	
<a href="#">APX B.V.</a>	
<a href="#">Armada Music</a>	
<a href="#">Barlaeus Gymnasium</a>	
<a href="#">Bugaboo International B.V.</a>	
<a href="#">Celtel</a>	
<a href="#">Central European Media Enterprises Ltd.</a>	
<a href="#">CNH Global N.V.</a>	
<a href="#">Commodore Gaming BV</a>	
<a href="#">Corporate Express N.V.</a>	
<a href="#">dance4life</a>	
<a href="#">De Bijenkorf</a>	
<a href="#">De Meer Stadion</a>	
<a href="#">Delta Lloyd Groep N.V.</a>	

# Linking Open Data Project (cont)

- This is a major community project
  - anybody can participate; to subscribe to the list:
    - <http://lists.w3.org/Archives/public/public-lod/>
  - or look at the project site:
    - <http://esw.w3.org/topic/SweoIG/TaskForces/CommunityProjects/LinkingOpenData>
  - if you know of open data sets: contact the project to incorporate it with the rest!



# Using the LOD to build Web site: BBC

BBC - Music - Eric Clapton - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.bbc.co.uk/music/artists/618b6900-0618-4f1e-b835-bccb17f84294.html

BBC BBC - Music - Eric Clapton


## Music BETA

BBC Music > Artists > Eric Clapton

### Eric Clapton




Born 30 March 1945.

MOST PLAYED ON **BBC RADIO 2**



#### Played By

Since December 2008

-  **Steve Wright in the Afternoon**  
**2 BBC Radio 2**  
Steve Wright's afternoon show with special guests and host of other features
-  **Ken Bruce**  
**2 BBC Radio 2**  
The best in music every weekday with Ken Bruce sessions
-  **Chris Hawkins**  
**6 BBC 6 Music**  
Join Chris for regular great music and a new show

Done

antastic 29

# Using the LOD to build Web site: BBC

BBC - Music - Eric Clapton - Mozilla Firefox

http://www.bbc.co.uk/music/artists/618b6900-0618-4f1e-b835-bccb17f84294.html

BBC - Music - Eric Clapton

...this hits the spot nicely and underlines just why Clapton is so revered amongst...

More Eric Clapton Releases »

Credits

ROLE	ARTIST	RELEASE
Instrument	<a href="#">George Harrison</a>	All Things Must Pass (1987)
Instrument	<a href="#">Roger Waters</a>	The Pros and Cons of Hitch Hiking (1984)
Performer	<a href="#">T.D.F.</a>	Retail Therapy

Credits comes from MusicBrainz. You can add or edit information about Eric Clapton at musicbrainz.org. Find out more about our use of this data.

More Eric Clapton Credits »

Blind Faith

Cream

Derek and the Dominos

John Mayall & The Bluesbreakers

The Yardbirds

Information about group members comes from MusicBrainz. You can add or edit information about group members at musicbrainz.org. Find out more about our use of this data.

Connected Artists

COLLABORATED ON

J.J. Cale & Eric Clapton

Eric Clapton & The Immediate All Stars

Eric Clapton & The Impressions

Connected artists information comes from MusicBrainz. You can add or edit information about connected artists at musicbrainz.org. Find out more about our use of this data.

More Eric Clapton Connected Artists

Links

Official homepage at [ericclapton.com](#)

Fanpage at [whereseric.com](#)

Wikipedia article on Eric Clapton

MySpace at [myspace.com/ericclapton](#)

Last.fm page on Eric Clapton

MusicBrainz entry on Eric Clapton

# Using the LOD to build Web site: BBC

```
Mozilla Firefox
http://www.bbc.co.uk/music/artists/618b6900-0618-4f1e-b835-bccb17f84294.rdf

<foaf:homepage rdf:resource="http://www.ericclapton.com/">
<mo:fanpage rdf:resource="http://www.whereseric.com/">
<mo:wikipedia rdf:resource="http://en.wikipedia.org/wiki/Eric_Clapton">
<mo:myspace rdf:resource="http://www.myspace.com/ericclapton">
<mo:member_of rdf:resource="/music/artists/53fa91ca-a2b9-463d-b78e-daca9894082a#artist"/>
<mo:member_of rdf:resource="/music/artists/04cd0cfd-bfd1-4c36-bc38-95c35e2c045f#artist"/>
<mo:member_of rdf:resource="/music/artists/2155a81a-f0c6-417a-9b16-2f86f98bb8bc#artist"/>
<mo:member_of rdf:resource="/music/artists/4756395c-57ed-4a63-afb2-01117f14dff6#artist"/>
<mo:member_of rdf:resource="/music/artists/191de76f-a224-445d-b041-54df16d65bf7#artist"/>
- <foaf:made>
- <mo:Record>
  <dc:title>Me and Mr. Johnson</dc:title>
  <mo:musicbrainz rdf:resource="http://musicbrainz.org/release/cf83ac25-374f-4cd4-9872-c6c00aaced92.html"/>
  <rev:hasReview rdf:resource="/music/reviews/5dqv#review"/>
</mo:Record>
</foaf:made>
- <foaf:made>
- <mo:Record>
  <dc:title>Martin Scorsese Presents the Blues: Eric Clapton</dc:title>
  <mo:musicbrainz rdf:resource="http://musicbrainz.org/release/a36c1d21-5669-44d6-969c-179fb6039359.html"/>
  <rev:hasReview rdf:resource="/music/reviews/6jxm#review"/>
</mo:Record>
</foaf:made>
</mo:MusicArtist>
<mo:MusicArtist rdf:about="/music/artists/53fa91ca-a2b9-463d-b78e-daca9894082a#artist">
  <foaf:name>Blind Faith</foaf:name>
</mo:MusicArtist>
- <mo:MusicArtist rdf:about="/music/artists/04cd0cfd-bfd1-4c36-bc38-95c35e2c045f#artist">
  <foaf:name>Cream</foaf:name>
</mo:MusicArtist>
- <mo:MusicArtist rdf:about="/music/artists/2155a81a-f0c6-417a-9b16-2f86f98bb8bc#artist">
```

# Using the LOD cloud on an iPhone





# Using the LOD cloud on an iPhone





# Publication of data: Library of Congress Subject Headings

The screenshot shows a Mozilla Firefox browser window displaying the Library of Congress Semantic Web interface. The address bar shows the URL <http://id.loc.gov/authorities/sh2002000569>. The page title is "Authorities & Vocabularies (Library of Congress): Semantic Web - Mozilla Firefox". The navigation menu includes "LIBRARY OF CONGRESS", "ASK A LIBRARIAN", "DIGITAL COLLECTIONS", and "LIBRARY CATALOGS". The breadcrumb trail reads "The Library of Congress > Authorities & Vocabularies > Semantic Web". The main heading is "Authorities & Vocabularies". Below this, there is a "Return" button and a search box with the placeholder text "Enter search terms..." and a "GO" button. Two tabs are visible: "Details" (selected) and "Visualize". The "Details" tab shows the following information:

- Semantic Web**
- URI:** <<http://id.loc.gov/authorities/sh2002000569#concept>>
- Type:** Topical Term
- Broader Terms:**
  - Semantic integration (Computer systems)
  - Semantic networks (Information theory)
  - World Wide Web
- Sources:**
  - Work cat.: 2002070545: The Semantic Web--ISWC 2002, 2002.
  - ASTL on FirstSearch, May 6, 2002; in: title (semantic Web)

# Publication of data: Library of Congress Subject Headings

```
Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/DOCUME~1/IVANHE~1/LOCALS~1/Temp/extract-1
powerpoint mec ABP

@prefix dcterms: <http://purl.org/dc/terms/> .
@prefix owl: <http://www.w3.org/2002/07/owl#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix skos: <http://www.w3.org/2004/02/skos/core#> .
@prefix xhv: <http://www.w3.org/1999/xhtml/vocab#> .
@prefix xml: <http://www.w3.org/XML/1998/namespace> .
@prefix xsd: <http://www.w3.org/2001/XMLSchema#> .

<http://id.loc.gov/authorities/sh2002000569> xhv:alternate
  <http://id.loc.gov/authorities/feed/>,
  <http://id.loc.gov/authorities/sh2002000569.json>,
  <http://id.loc.gov/authorities/sh2002000569.nt>,
  <http://id.loc.gov/authorities/sh2002000569.rdf> ;
xhv:icon <http://www.loc.gov/favicon.ico> ;
xhv:stylesheet <http://id.loc.gov/static/css/subject_headings_print.css>, <http://id

<http://id.loc.gov/authorities/sh2002000569#concept> a skos:Concept ;
dcterms:source "ASTI on FirstSearch, May 6, 2002: in titles (semantic Web)"@en, "Eng
skos:broader <http://id.loc.gov/authorities/sh2004000479>, <http://id.loc.gov/author
skos:closeMatch <http://stitch.cs.vu.nl/vocabularies/rameau/ark:/12148/cb14521343b>
skos:inScheme <http://id.loc.gov/authorities#conceptScheme> ;
skos:prefLabel "Semantic Web"@en .
```

# And what about ontologies?

- I.e.: where does, e.g., OWL come into the LOD picture?
- Ontologies are necessary to properly integrate data
  - “term used in this dataset relates to the term used there this and this way...”
  - OWL, Rules, RDF vocabularies are vital

# And what about ontologies?

- But...
  - Ontologies/vocabularies can be very simple (few terms)
  - Expressivity vs. complexity of management and usage has always be balanced
- *You are perfectly decent Semantic Web citizen even if you do not use complex OWL (or not use OWL at all...)*

# How does this apply to Semantic 3D?

**Caveat: I am an outsider, sorry if  
I bang on open doors...**



# Think of the data out there from the start!

- Modeling 3D objects with Semantic technologies (OWL, SKOS, etc) is important
  - (and looks fairly complex from where I stand...)
- But... think of the data out there!
  - applications may use this in many different ways...
- Also: contribute if you can, make your data widely available!

# An artificial example



- There is, of course, the 3D modeling aspect
- But there may be, also, additional data on the artifact
- This can be connected to the outside world



# An artificial example



About: [http://dbpedia.org/resource/Ramesses\\_I](http://dbpedia.org/resource/Ramesses_I)  
An Entity in Data Space: dbpedia.org

Menpehtyre Ramesses I was the founding Pharaoh of Ancient Egypt's 19th dynasty. The dates for his short reign are not completely known but the time-line of late 1292-1290 BC is frequently cited as well as 1295-1294 BC.

Property	Value
dbpedia-owl:thumbnail	<a href="http://upload.wikimedia.org/wikipedia/commons/thumb/1/16/StatueHeadC">http://upload.wikimedia.org/wikipedia/commons/thumb/1/16/StatueHeadC</a>
dbpprop:abstract	Menpehtyre Ramesses I was the founding Pharaoh of Ancient Egypt's 19th dynasty, in reality his brief reign marked the bringing Egypt up to new heights of imperial power.
dbpprop:burial	dbpedia:KV16
dbpprop:caption	Stone head carving of Paramessu (Ramesses I), originally part of a statuette.
dbpprop:children	dbpedia:Seti_I
dbpprop:died	1290 BC
dbpprop:dynasty	dbpedia:Nineteenth_Dynasty_of_Egypt
dbpprop:father	dbpedia:Seti_(commander)
dbpprop:hasPhotoCollection	<a href="http://www4.wiwiwiss.fu-berlin.de/flic/rwrapp/photos/Ramesses_I">http://www4.wiwiwiss.fu-berlin.de/flic/rwrapp/photos/Ramesses_I</a>

About: [http://dbpedia.org/resource/Nineteenth\\_Dynasty\\_of\\_Egypt](http://dbpedia.org/resource/Nineteenth_Dynasty_of_Egypt)  
An Entity in Data Space: dbpedia.org

Property	Value
dbpprop:redirect	dbpedia:Nineteenth_dynasty_of_Egypt
is dbpprop:dynasty of	<ul style="list-style-type: none"><li>dbpedia:Amenmesse</li><li>dbpedia:Merneptah</li><li>dbpedia:Ramesses_I</li><li>dbpedia:Ramesses_II</li><li>dbpedia:Seti_I</li><li>dbpedia:Siptah</li><li>dbpedia:Seti_II</li><li>dbpedia:Twosret</li></ul>

Browse using: [OpenLink Data Explorer](#) | [Zitgist Data Viewer](#) | [Marbles](#) | [DISCO](#) | [Tabulator](#) | [Raw Data](#)  
in: [N3/Turtle](#) | [JSON+RDF](#) | [RDF/XML](#) | [About](#)

POWERED BY VIRTUOSO | LINKINGOPENDATA | W3C SPARQL | OPEN DATA

# You can of course make it nicer...



# Obviously, there are other datasets



- Use Geodata for precise information on Egypt
- Use the LOC data to give precise subject descriptions
- ...

# Make the data available!



- Make the data available to others!
- Wouldn't it be cool to see your data appear on an iPhone? 😊

# What does it mean in practice?



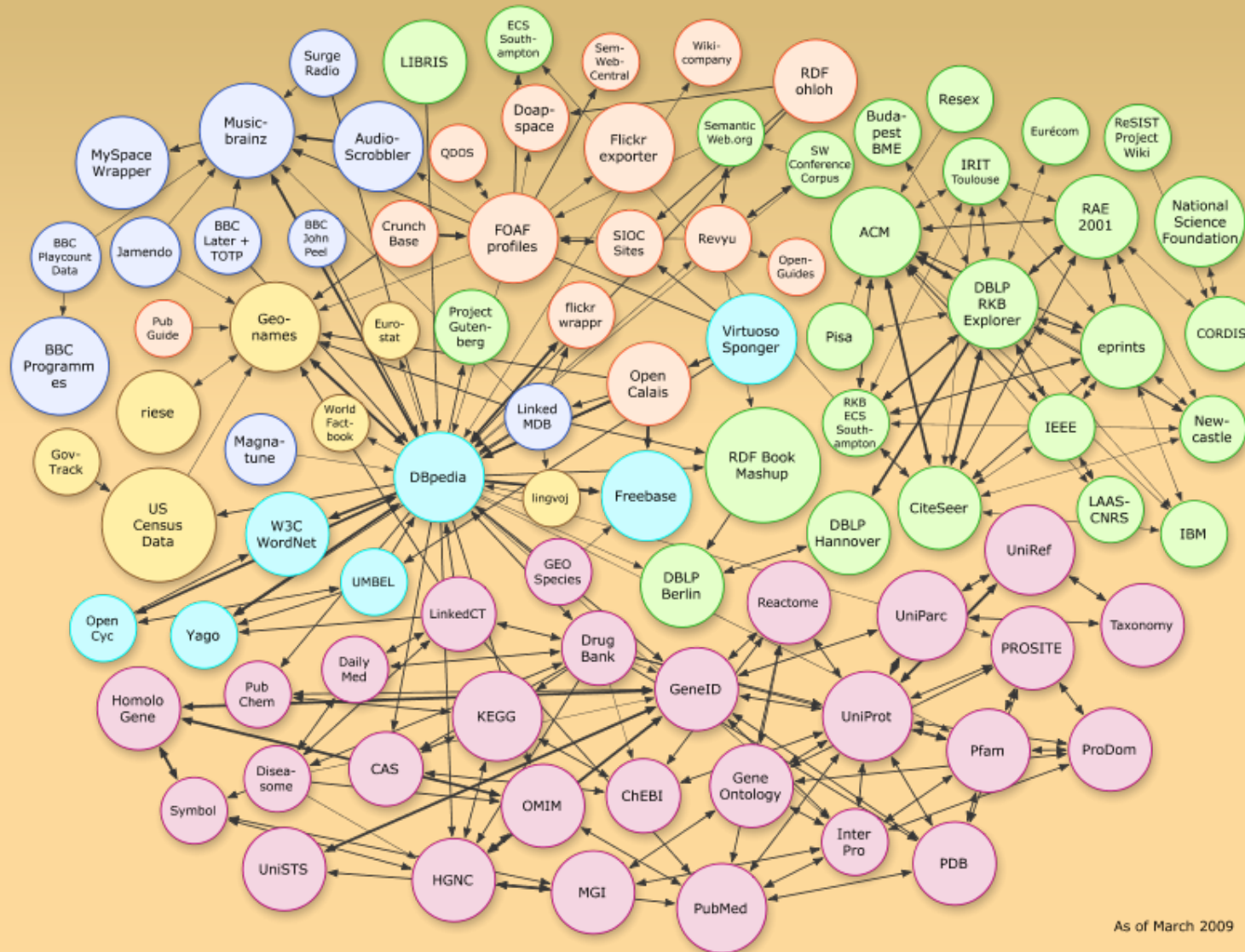
- Add (meta)data to your artifacts
  - use http URI-s
  - use public vocabularies if possible
- *Add links to other public datasets*
  - that is how others will find you!
- Make your data and vocabularies public
- If you can: set up a SPARQL endpoint



# Practice in other areas

- I used a very “webby” example with Wikipedia
- Of course other areas have their own datasets that can be used

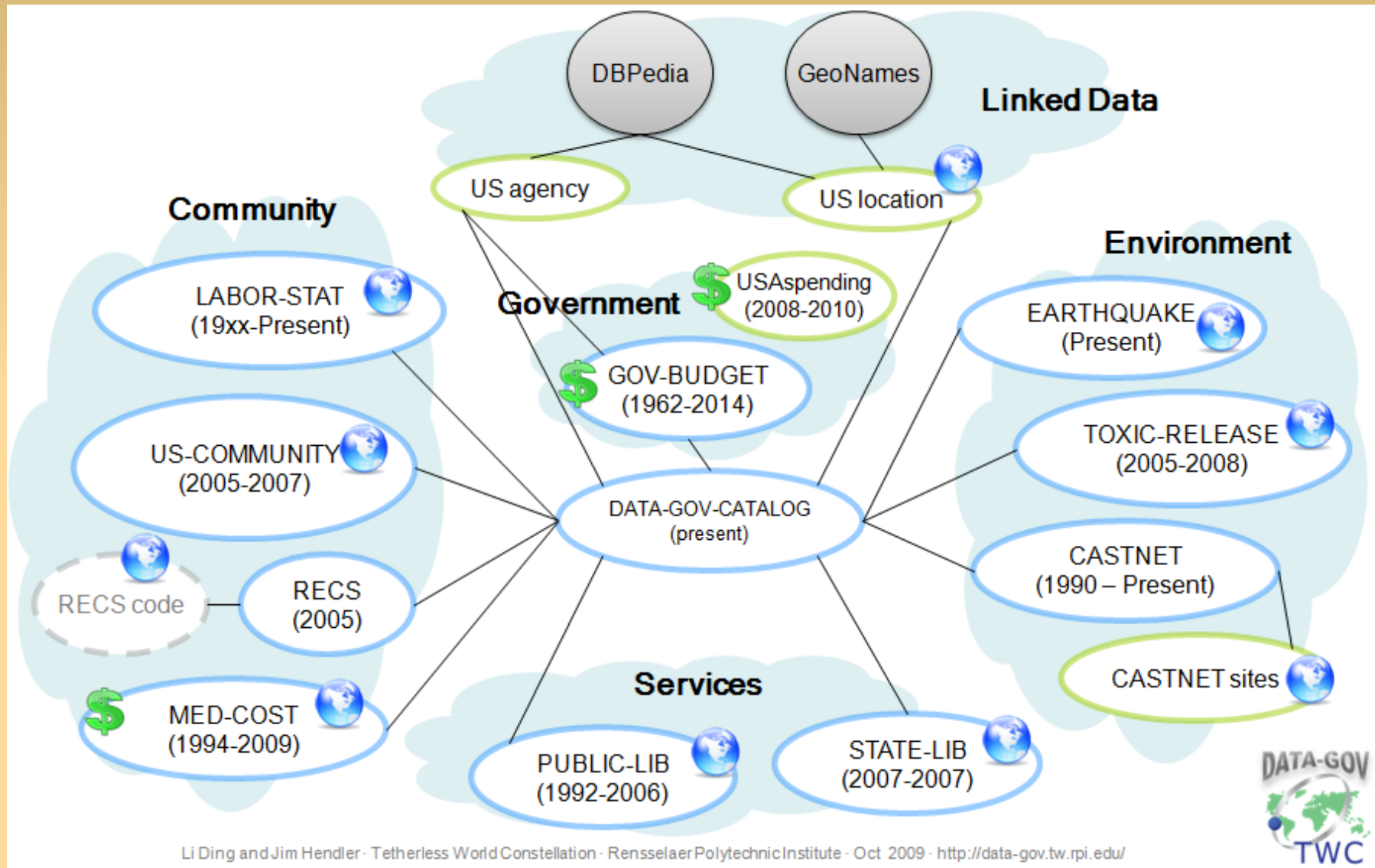
# Colored LOD cloud...



As of March 2009

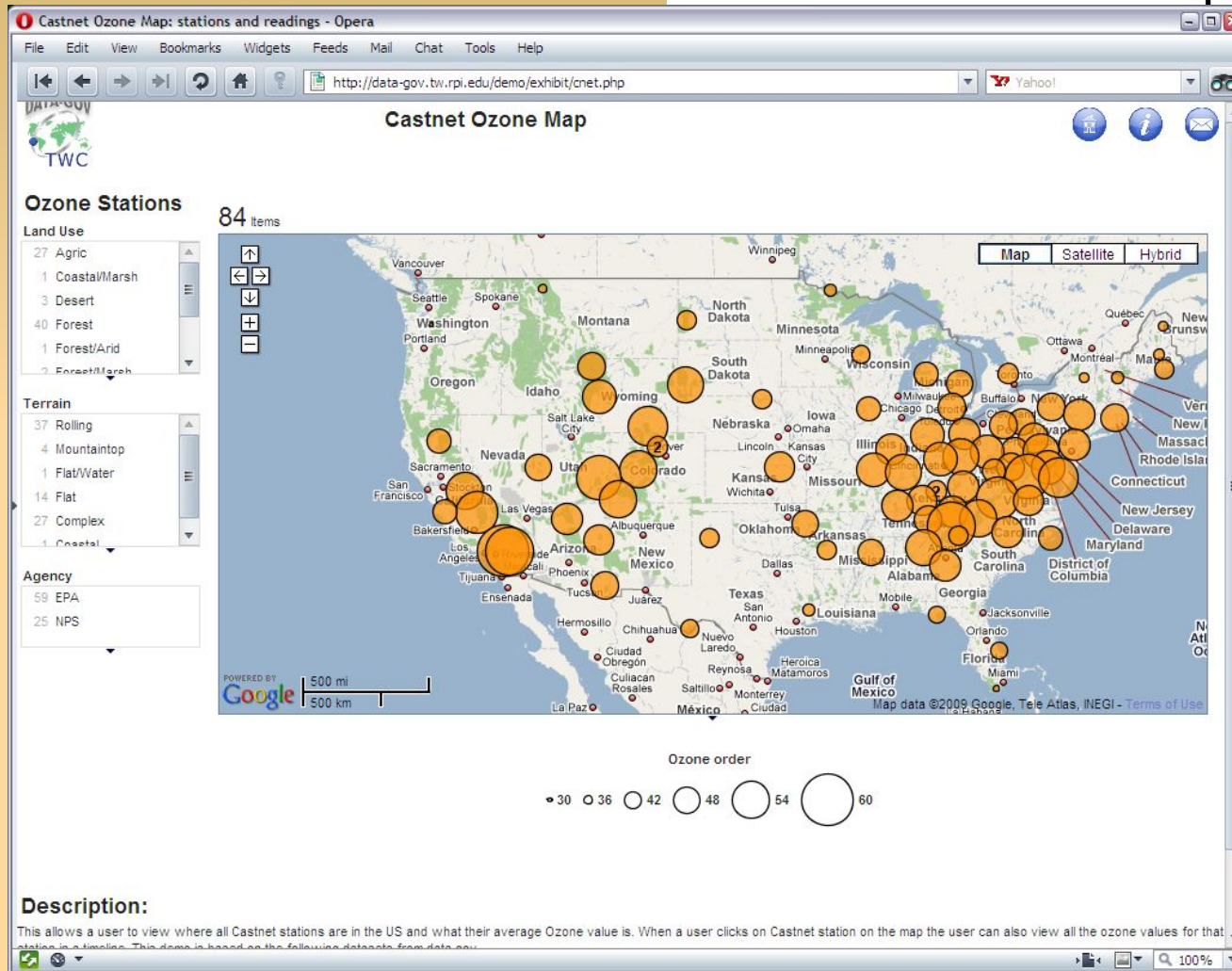


# Linked Open eGov Data (US example)



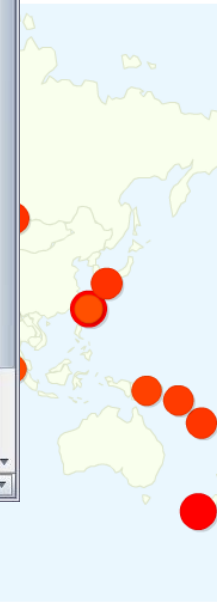
# You publish the raw data, others use it...

## Individual and Corporate Tax Receipts



et 403

Corporation Income and Excess Profits Taxes 419.04 m | September 30, 2014



# An example with UK government data

Data.gov.uk Newspaper | Newspaper Club

http://blog.newspaperclub.co.uk/2009/10/16/data-gov-uk-newspaper/ RSS Dogpile

Netvibes Feedly Social Private Mailing lists SW Python RDFa it! Bookmarklets Add Zemanta bit.ly To Mendeley TinyURL To Faviki

## Newspaper Club

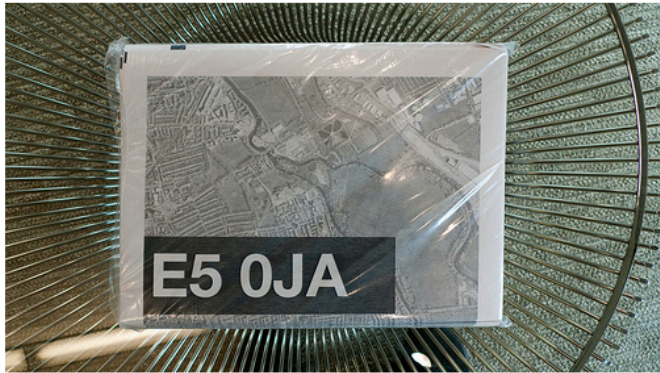
### Data.gov.uk Newspaper

Friday, October 16th 2009

Over the last three days we've been working on a side project. A design exercise if you like.

We've been thinking about the beta [Data.gov.uk](http://Data.gov.uk) repository, and wanted to explore putting some of the information contained within into people's hands in a form that is accessible, timely, and relevant.

And perhaps unsurprisingly, we thought a good way to do that was with a newspaper. So here it is, the Postcode Paper:



It's a prototype of a service for people moving into a new area. In our exercise we imagined you might receive it after paying your council tax for the first time.

It gathers information about your area, such as local services, environmental information and crime statistics.

This is a post by Tom from the **Newspaper Club Blog**. File under [case studies](#).

**We're building a service to help people make their own newspapers.** This is the blog where we're alarmingly honest about where it's all going wrong. And occasionally smug about where it's going right.

**WE'RE IN ALPHA** You can stick your name on the beta invite list [here](#).

**Search**

[Subscribe via RSS](#)

**Archives**

- [January 2010](#)
- [December 2009](#)
- [November 2009](#)
- [October 2009](#)
- [September 2009](#)
- [August 2009](#)
- [July 2009](#)
- [June 2009](#)

**Filed under**

- [4ip](#) (3)
- [art](#) (8)
- [case studies](#) (9)
- [engineering](#) (5)
- [fulfillment etc](#) (2)
- [investors](#) (2)
- [media](#) (1)
- [printers](#) (6)
- [Uncategorized](#) (31)

# Conclusions

- The Semantic Web is, primarily a *Web of Data*
- Think of the out there when looking at 3D Media
  - use data out there
  - link your data to the rest of the Web of Data
- Making these available opens up nice application facilities!

# Thank you for your attention!

- These slides are publicly available on:

<http://www.w3.org/2010/Talks/0211-Sophia-IH/>

