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The Semantic Web
Linked Data and RDF
An Introduction

Nigel Shadbolt

British Library, London

27th May 2010

Pre Reading

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- Paper on the evolution of the Semantic Web and the Pragmatic Web of Linked Data

  Shadbolt, N., Berners-Lee, T. and Hall, W. (2006) The Semantic Web Revisited. IEEE Intelligent Systems, 21 (3). pp. 96-101. ISSN 1541-1672

  http://eprints.ecs.soton.ac.uk/12614/

- A good review of the development of Open Linked Data and the technology, approaches and philosophy

  Christian Bizer, Tom Heath and Tim Berners-Lee (2009) Linked Data - The Story So Far. International Journal on Semantic Web and Information Systems, Vol. 5(3), Pages 1-22. DOI: 10.4018/jswis.2009081901

  http://tomheath.com/publications/html

Pre Reading

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- A somewhat technical description of the linked data approach to open government data

  Omitola, T., Koumenides, C. L., Popov, I. O., Yang, Y., Salvadores, M., Szomszor, M., Berners-Lee, T., Gibbins, N., Hall, W., schraefel, m. and Shadbolt, N. (2010) Put in your postcode, out comes the data: A Case Study. In: 7th Extended Semantic Web Conference, May 2010, Greece.

  http://eprints.ecs.soton.ac.uk/18765/

  4 A review of cataloguing work in the area of government data repositories

  Koumenides, C., Alani, H., Shadbolt, N. and Salvadores, M. (2010) Global Integration of Public Sector Information. In: Web Science Conference 2010, 26-27 April, 2010, Raleigh, NC, USA.

  http://eprints.ecs.soton.ac.uk/21025/

Follow on Reading

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- Excellent slide set for those who want to deepen understanding of RDF and Linked Data

  http://www.slideshare.net/bhaslhofer/linked-data-tutorial

  Basis of some examples in introduction

Origins

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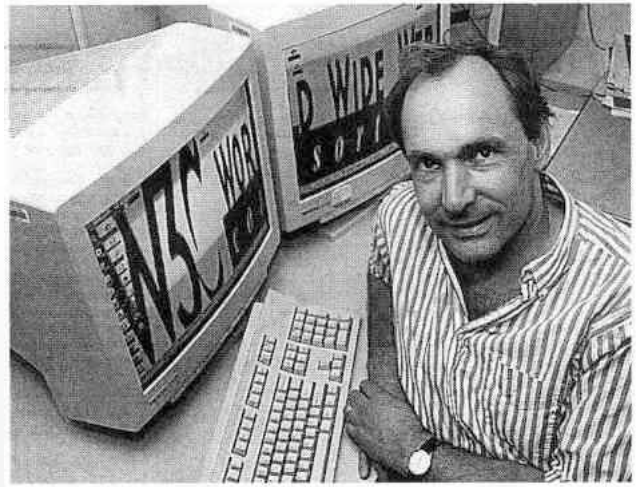
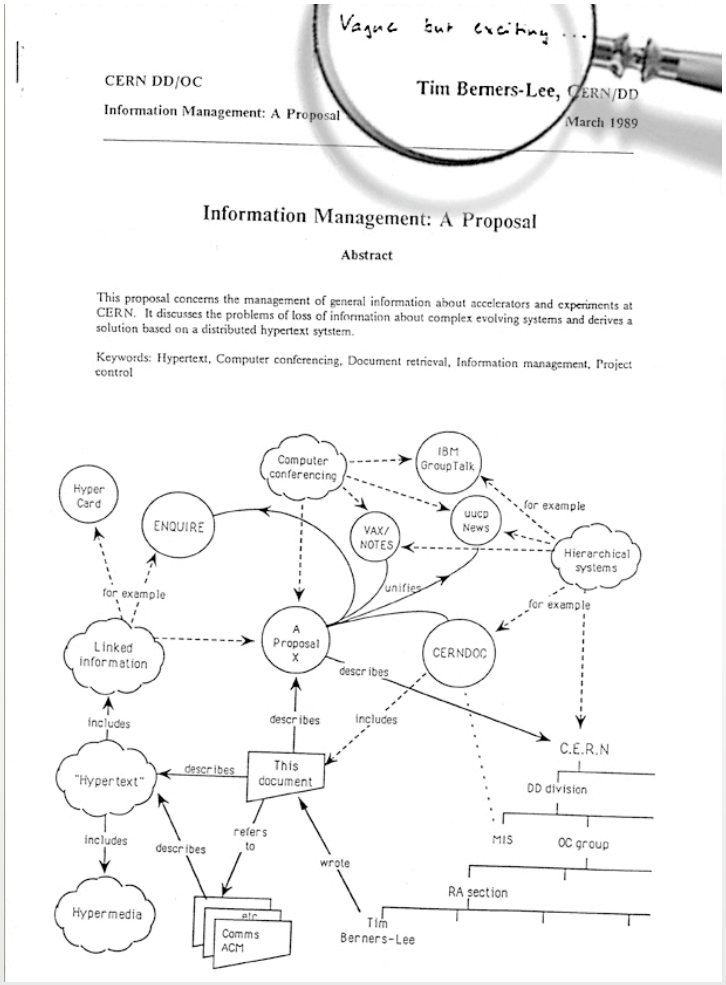


Tim Berners-Lee: Erfinderstolz Foto: AP



Vague but exciting ...

CERN DD/OC

Information Management: A Proposal

Tim Berners-Lee, CERN/DD

March 1989

Information Management: A Proposal

Abstract

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext sytstem.

Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

Lessons learnt

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- Big is beautiful: the network is everything
- Scruffy works: let the links fail to make it scale
- Democracy rules: open, free and universal

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The Semantic Web circa 2000

Too Complex

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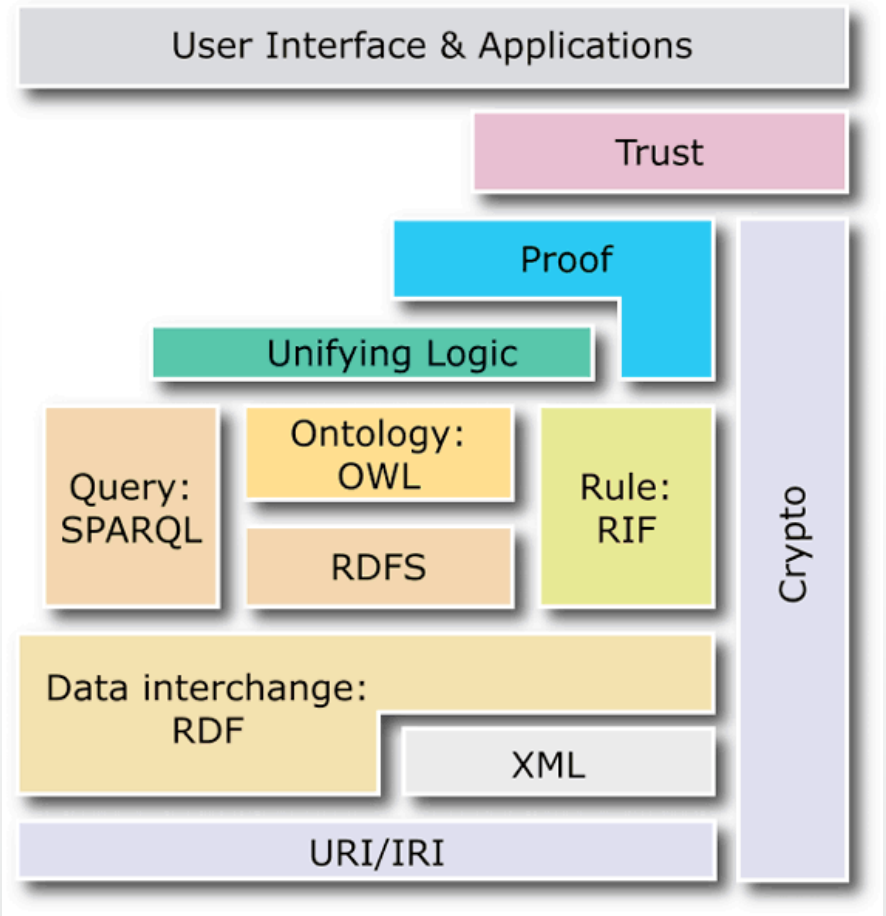

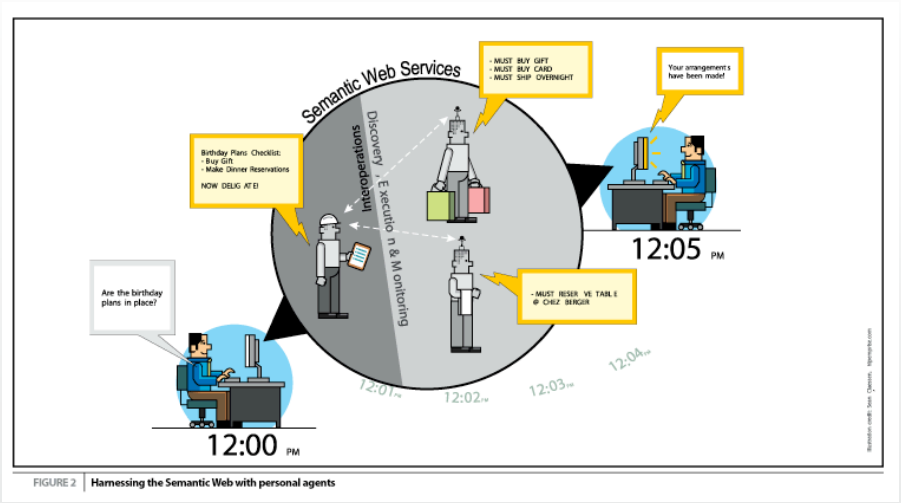

FIGURE 2 | Harnessing the Semantic Web with personal agents

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The Semantic Web circa 2010

Much Simpler

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The four micro principles of the Semantic Web

1. All entities of interest, such as information resources, real-world objects, and vocabulary terms should be identified by URI references.
2. URI references should be dereferenceable, meaning that an application can look up a URI over the HTTP protocol and retrieve RDF data about the identified resource.
3. Data should be provided using the RDF/XML syntax.
4. Data should be interlinked with other data.

Nigel Shadbolt is a professor of artificial intelligence in the School of Electronics and Computer Science at Southampton University. Contact him at nrs@ecs.soton.ac.uk.

Tim Berners-Lee is the director of the World Wide Web Consortium, a senior researcher at the Massachusetts Institute of Technology's Computer Science and Artificial Intelligence Laboratory, and a professor of computer science in the Department of Electronics and Computer Science at Southampton University. Contact him at timbl@w3.org.

Wendy Hall is a professor of computer science in the School of Electronics and Computer Science at Southampton University. Contact her at wh@ecs.soton.ac.uk.

The Semantic Web Revisited

Nigel Shadbolt and Wendy Hall, *University of Southampton*
Tim Berners-Lee, *Massachusetts Institute of Technology*

Linked Data on the Web: May 2007

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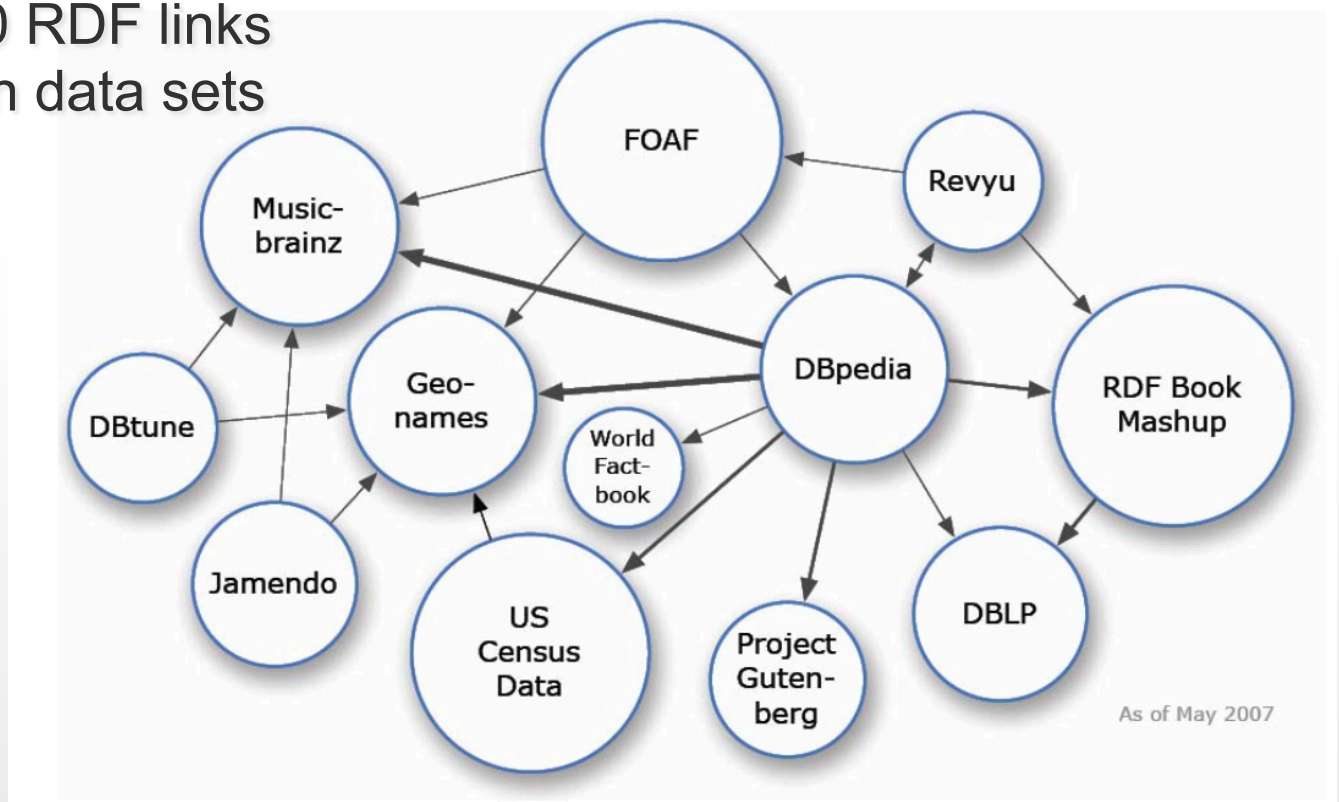
500 Million RDF Triples
120,000 RDF links
between data sets



Linked Data on the Web: April 2008

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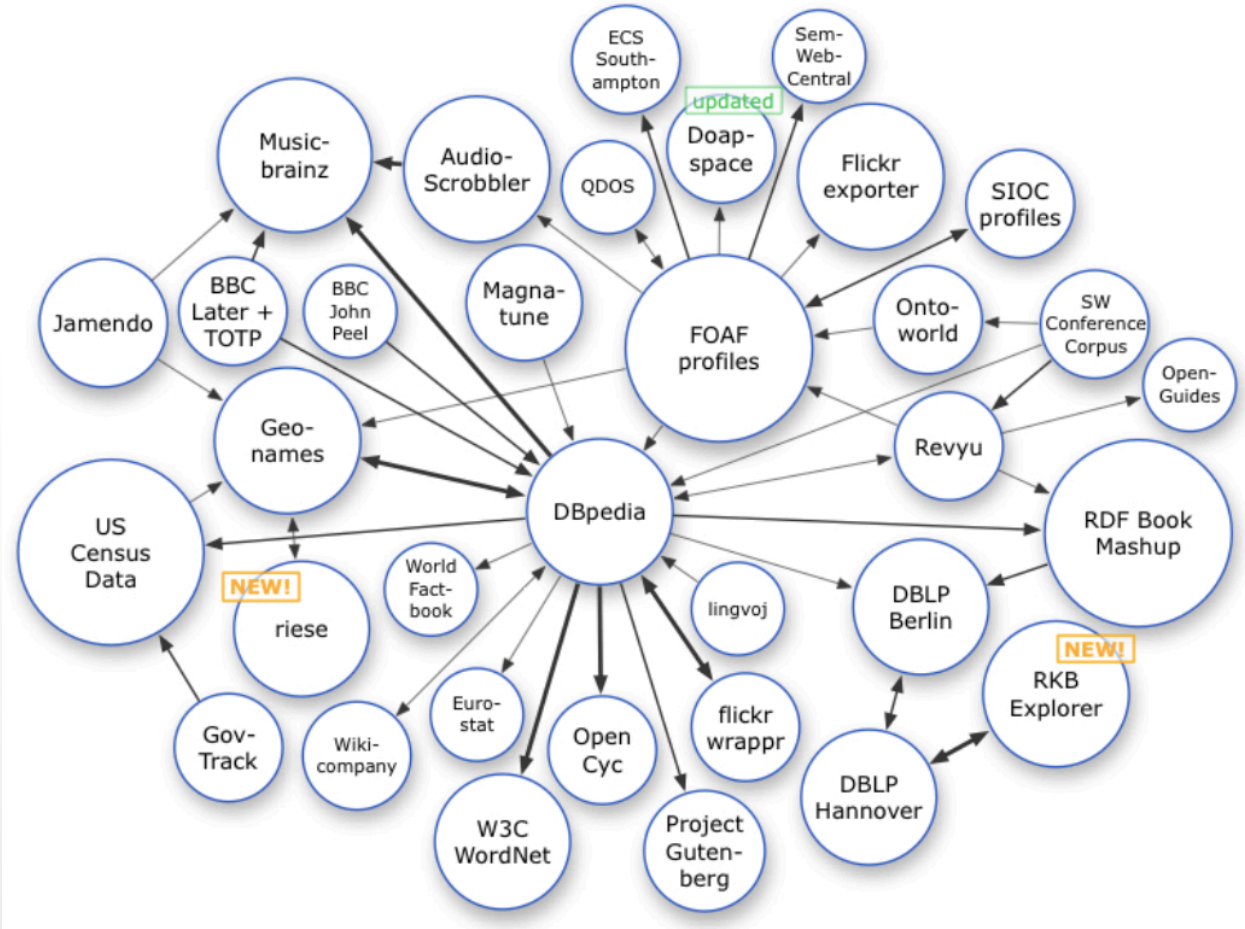

Linked Data on the Web: July 2009

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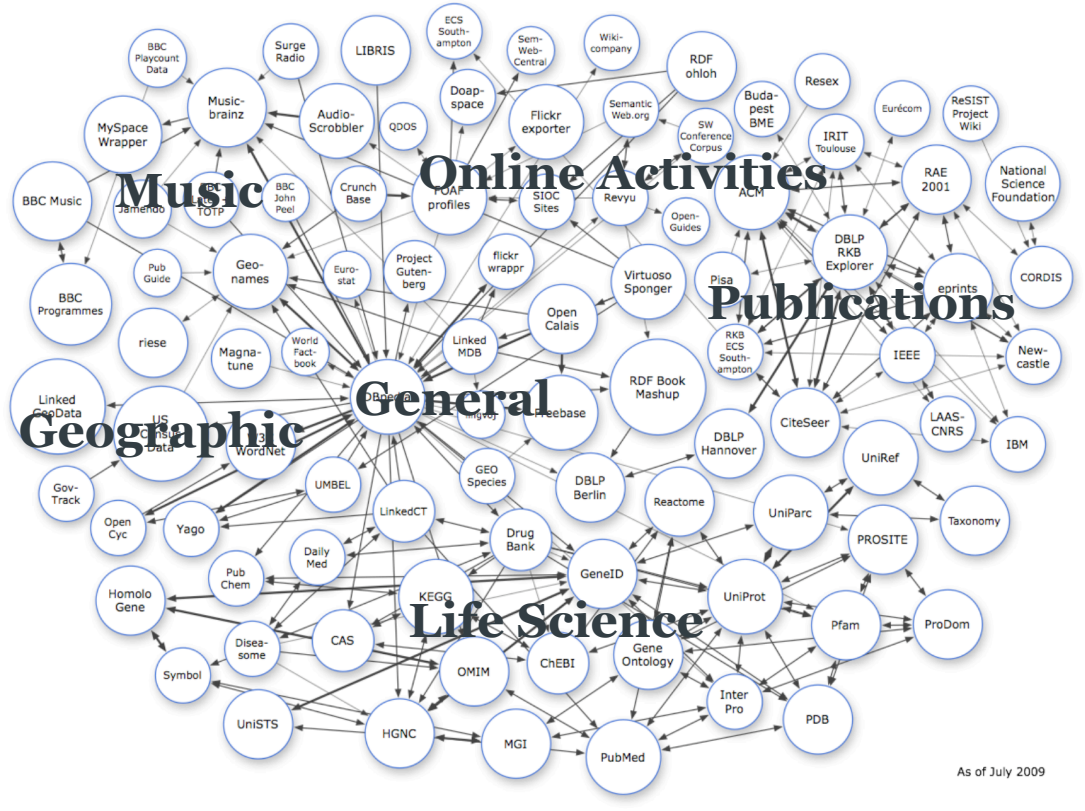

Richard Cyganiak

Open Linked Data on the Web:
July 2009
Billions of triples and hundreds of millions of links

The Shape of Linked Data

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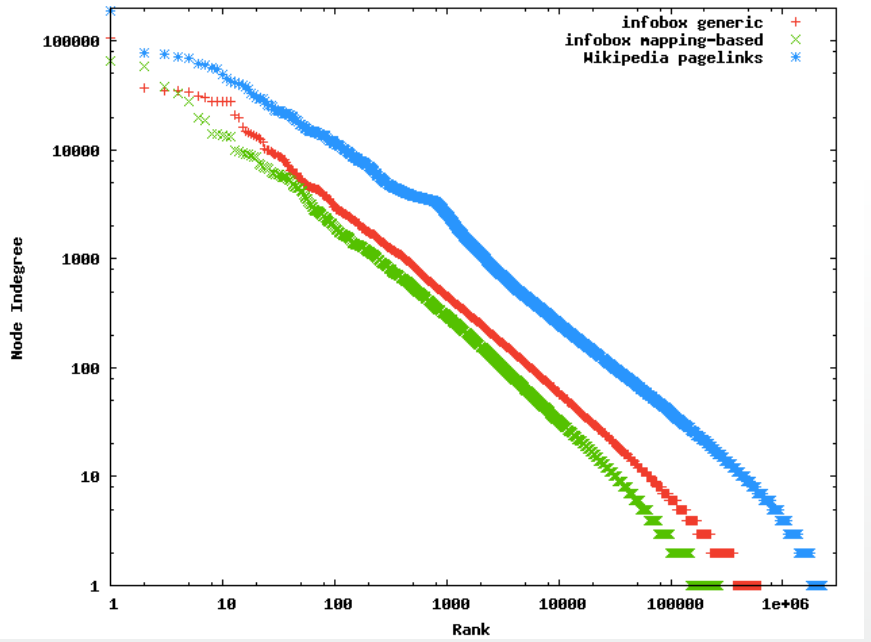
- Micro principles to macro phenomena
- Shape and structure
- Scale free
- Preferential attachment
- Communities
- Values and obligations
- Incentives



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From documents to data

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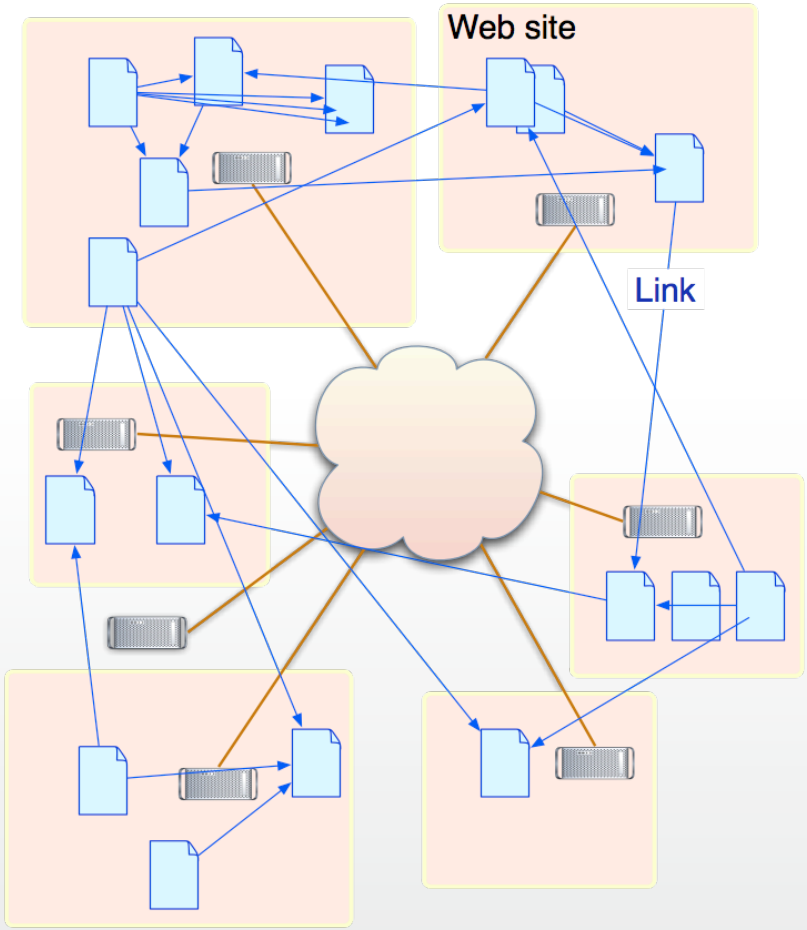
From a Web of documents...



To a Web of data...

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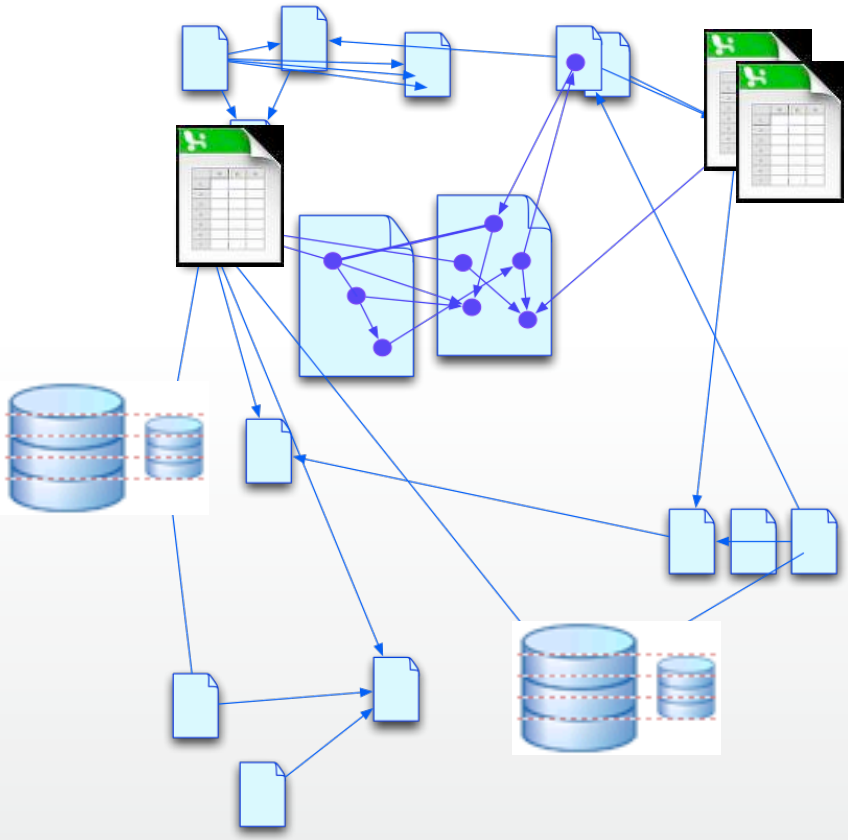

An Evolution

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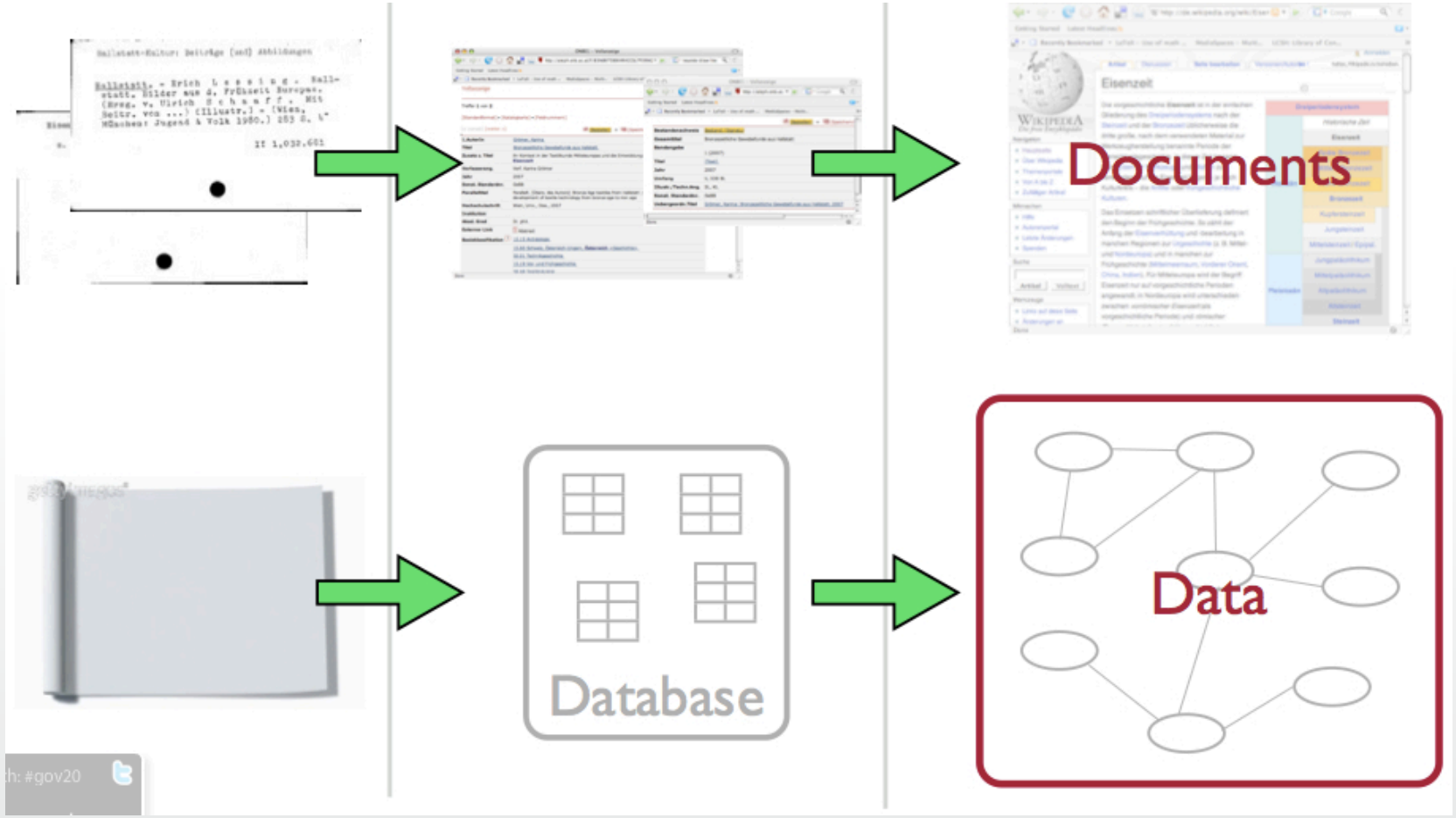

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Babel

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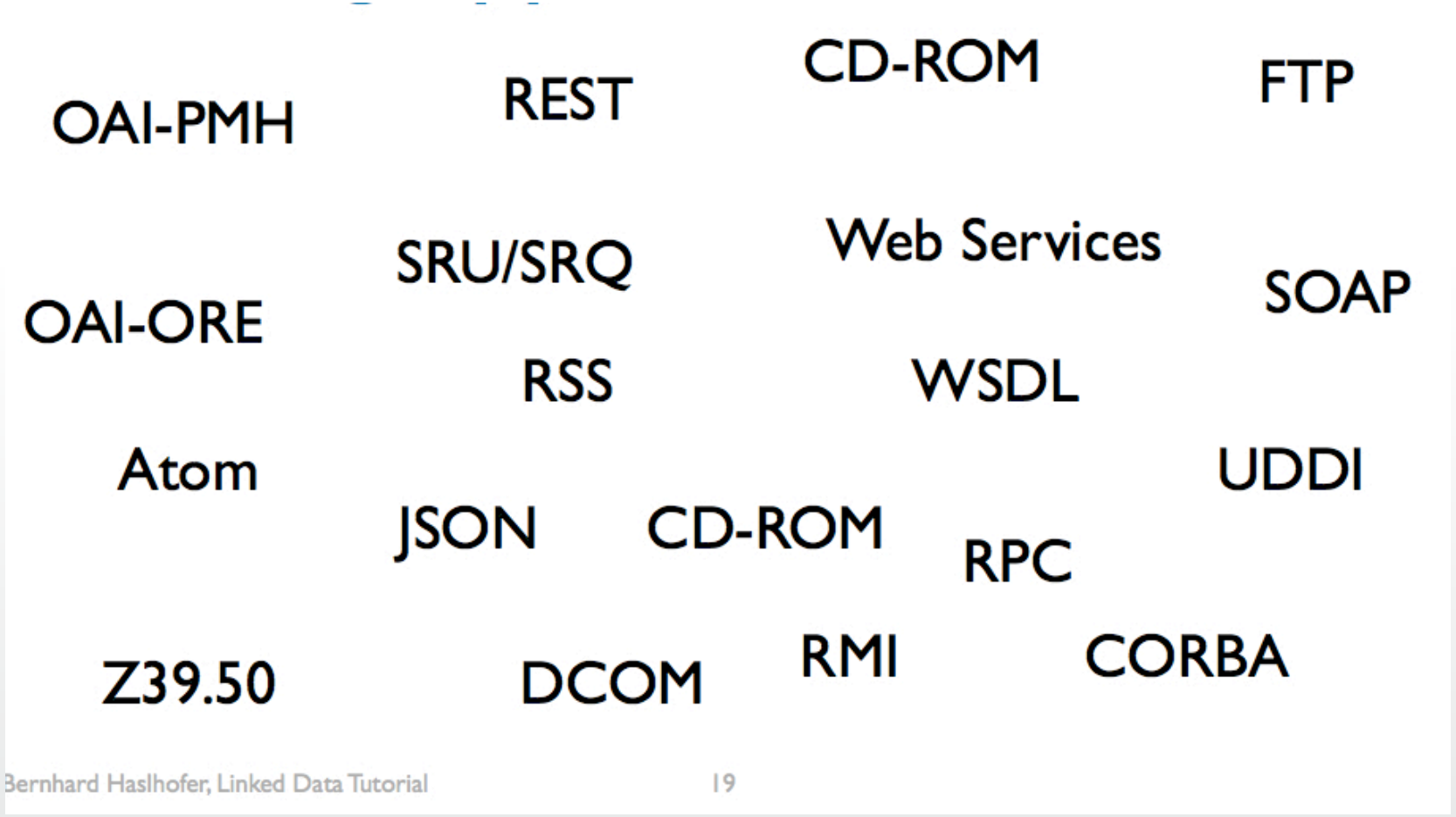

Aim

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- Get into the data silos
- Move from a view dominated by the repository
- Publish data of interest on the Web in a way that
- other applications can access and interpret the data
- using common Web technologies

- BTW you can use Linked Data for Intranets too

CS AKTive: Pioneering Linked Data

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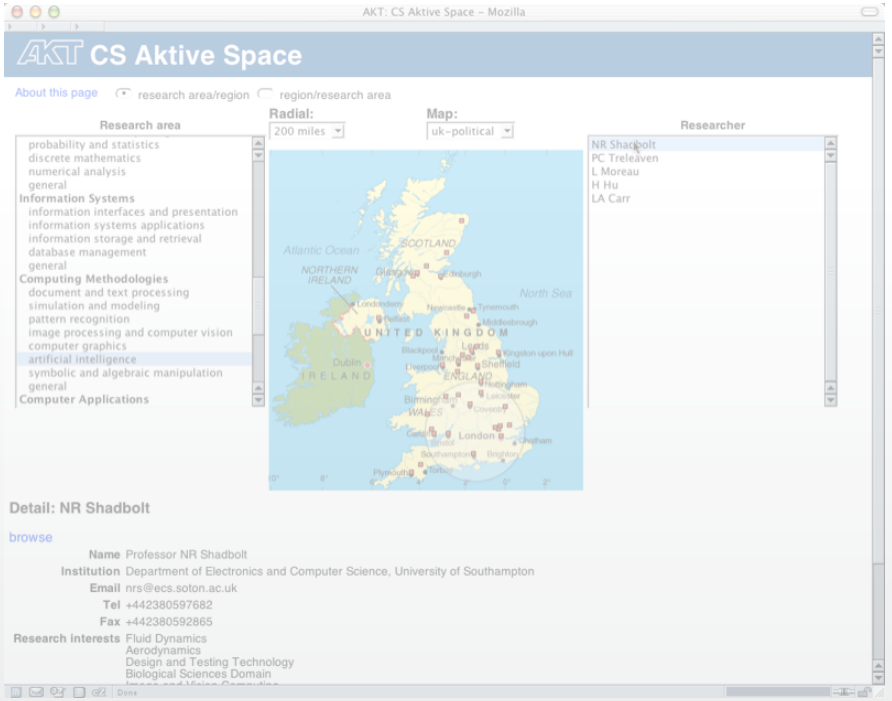
- Content harvested and published from multiple different sources
- Higher Education directories
- 2001 RAE submissions
- UK EPSRC project database
- Personnel, projects and publications UK CS Web sites



RKBExplorer: Linked Data today

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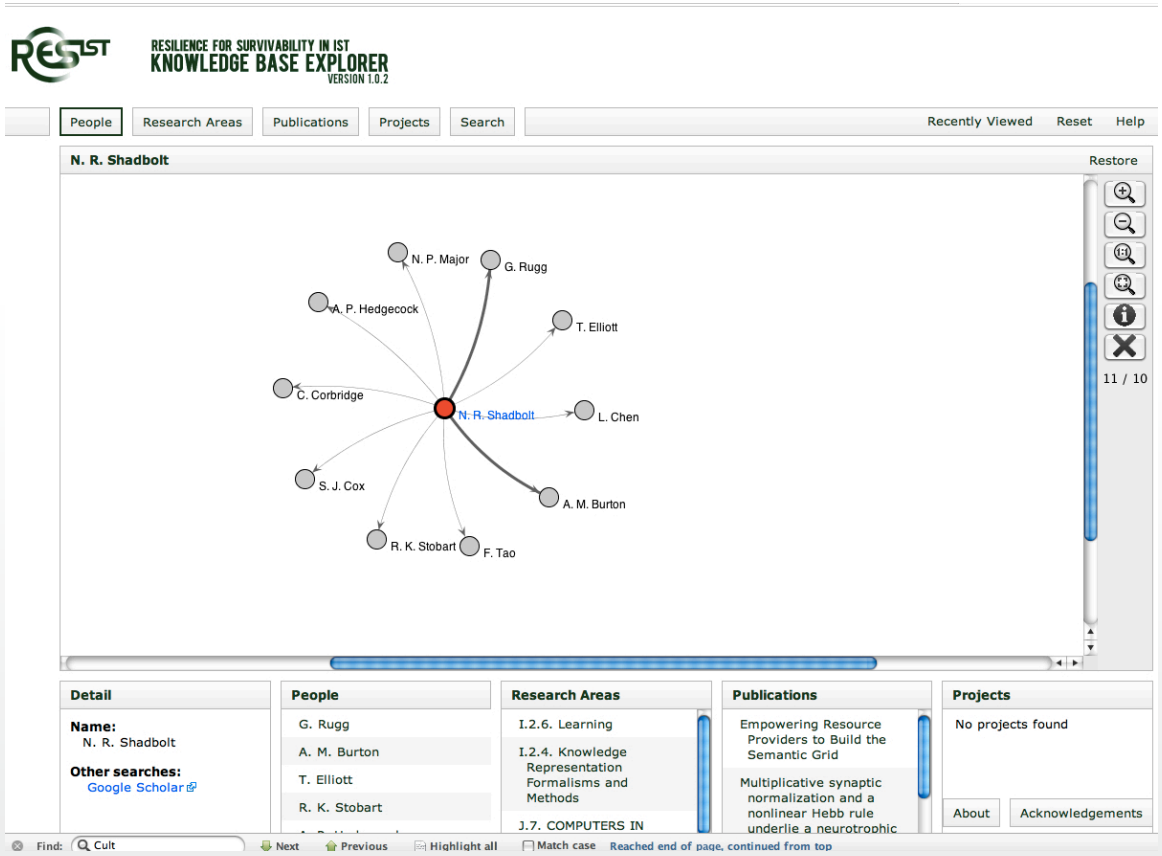

Searching for Linked Data
sig.ma

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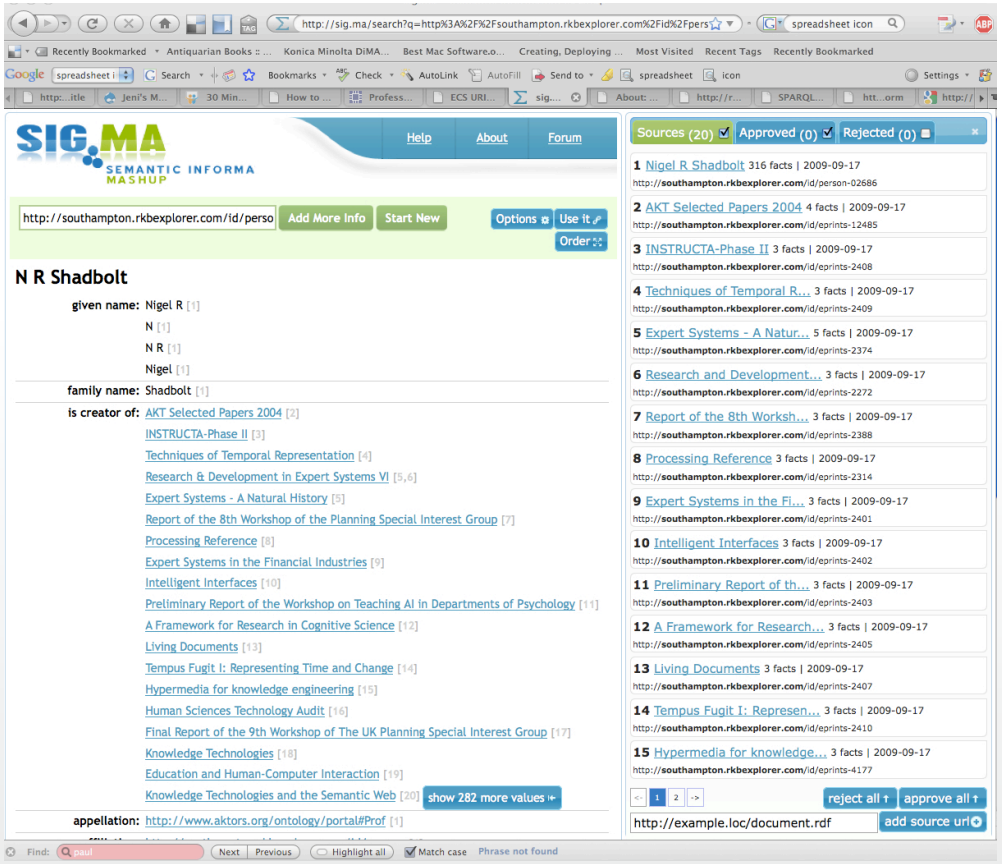

The Principles of Linked Data

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The four micro principles of the Semantic Web

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The Semantic Web Revisited

Nigel Shadbolt and Wendy Hall, *University of Southampton*
Tim Berners-Lee, *Massachusetts Institute of Technology*

Principle 1: URIs
Web addresses for data

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- Uniform Resource identifier
- Names for the things of interest
- A Web based identifier
- You can dereference them – get something back
- Information about objects, relations, properties and values

http://rdf.ecs.soton.ac.uk/person/2686

http://rdf.ecs.soton.ac.uk/project/464

http://rdf.ecs.soton.ac.uk/publication/11065

http://education.data.gov.uk/doc/school/120805

http://southampton.rkbexplorer.com/id/person-02686

http://dbpedia.org/resource/Nigel_Shadbolt

Principle 2: Dereferencable

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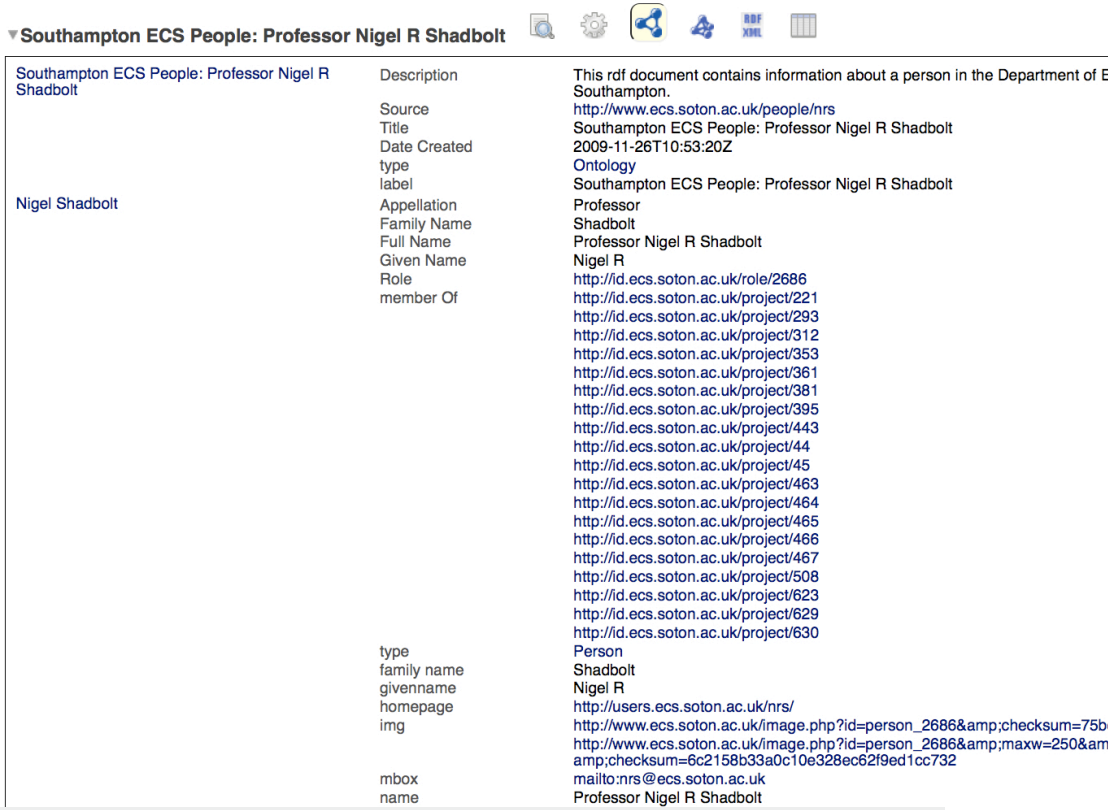
- Uniform Resource identifier
- Names for the things of interest
- A Web based identifier
- You can dereference them – get something back
- Information about objects, relations, properties and values



Southampton ECS People: Professor Nigel R Shadbolt

Southampton ECS People: Professor Nigel R Shadbolt	Description	This rdf document contains information about a person in the Department of E Southampton.
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	label	Southampton ECS People: Professor Nigel R Shadbolt
Nigel Shadbolt	Appellation	Professor
	Family Name	Shadbolt
	Full Name	Professor Nigel R Shadbolt
	Given Name	Nigel R
	Role	http://id.ecs.soton.ac.uk/role/2686
	member Of	http://id.ecs.soton.ac.uk/project/221
		http://id.ecs.soton.ac.uk/project/293
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		http://id.ecs.soton.ac.uk/project/630
	type	Person
	family name	Shadbolt
	givenname	Nigel R
	homepage	http://users.ecs.soton.ac.uk/nrs/
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		http://www.ecs.soton.ac.uk/image.php?id=person_2686&maxw=250&am amp;checksum=6c2158b33a0c10e328ec62f9ed1cc732
	mbox	mailto:nrs@ecs.soton.ac.uk
	name	Professor Nigel R Shadbolt

Principle 3: RDF back

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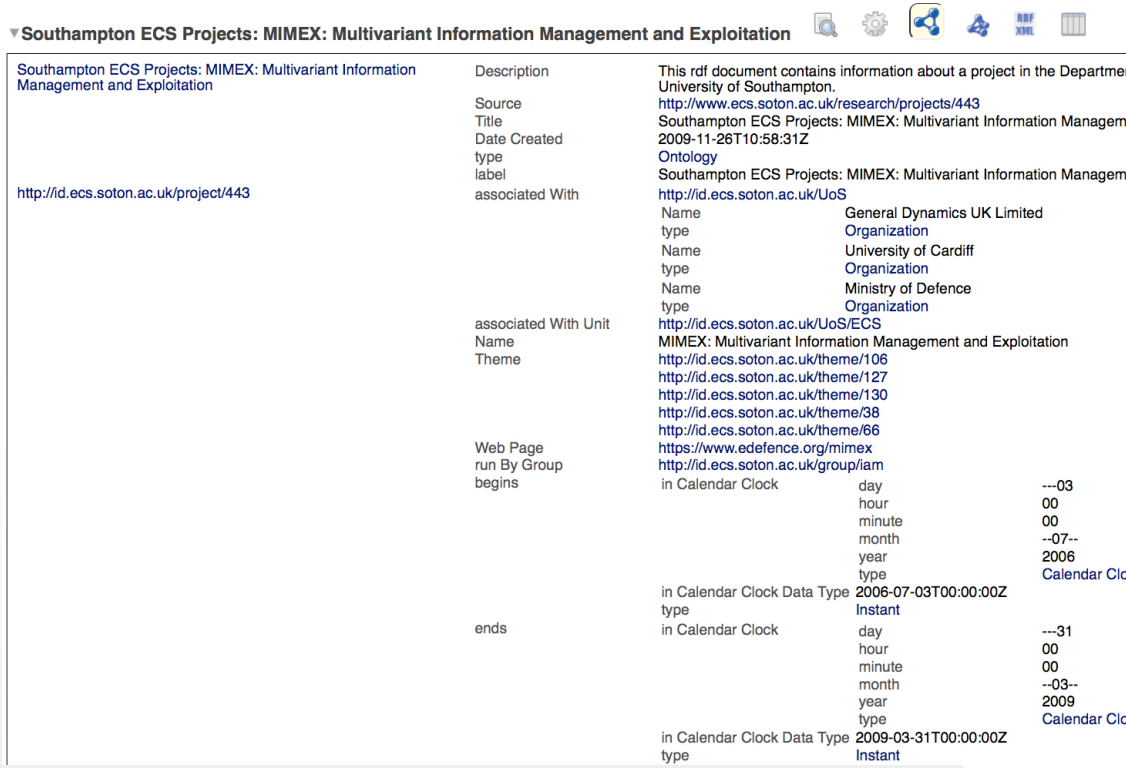
- Uniform Resource identifier
- A Web based identifier
- You can dereference them – get something back
- Information about objects, relations, properties and values



Southampton ECS Projects: MIMEX: Multivariant Information Management and Exploitation

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		Name	General Dynamics UK Limited
		type	Organization
		Name	University of Cardiff
		type	Organization
		Name	Ministry of Defence
		type	Organization
	associated With Unit	http://id.ecs.soton.ac.uk/UoS/ECS	
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	Web Page	https://www.edefence.org/mimex	
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			month --07--
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			type Calendar Clo
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			month --03--
			year 2009
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		in Calendar Clock Data Type	2009-03-31T00:00:00Z
		type	Instant

Essential RDF – a simple way to represent information

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- Statements about resources in the from of subject-predicate-object
- A knowledge representation language for the Web
- Represents information as sets of triples – subject verb object
- Every element of a triple can be a URI or a concrete value (literal)
- Sets of RDF triples can be represented as graphs

```
rc:cygri          rdf:type          foaf:Person.
rc:cygri          foaf:name         ”Richard Cyganiak" .
rc:cygri          foaf:based_near    dbpedia:Berlin .

dbpedia:Berlin    dp:population     “3,405,259”
dpedia:Berlin     skos:subject      dp:Cities_in_Germany.
```

Essential RDF

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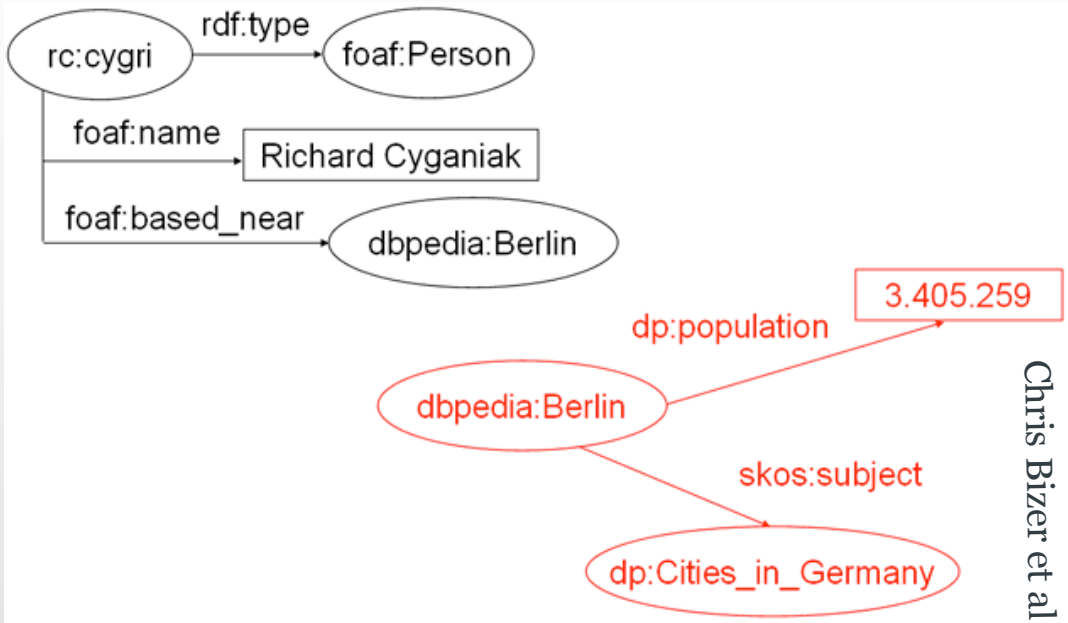
- **Statements about resources in the from of subject-predicate-object**
- **A knowledge representation language for the Web**
- **Represents information as sets of triples – subject verb object**
- **Every element of a triple can be a URI or a concrete value (literal)**
- **Sets of RDF triples can be represented as graphs**



More on RDF

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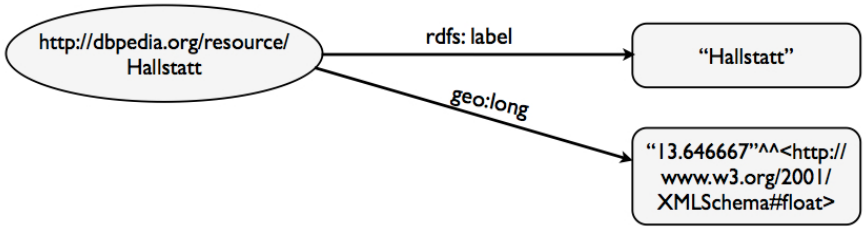

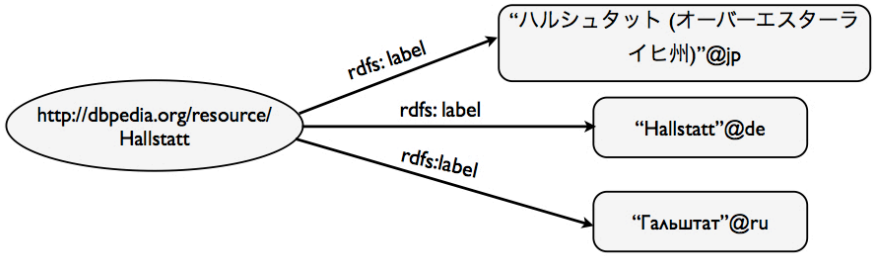

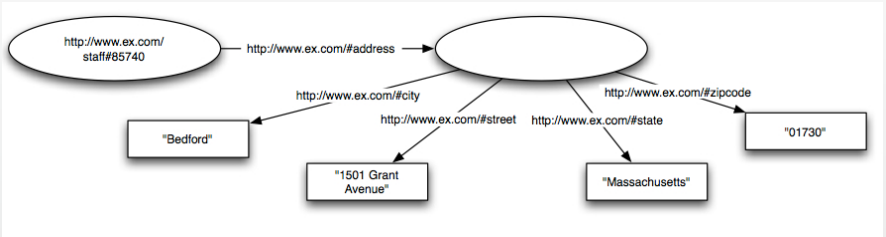

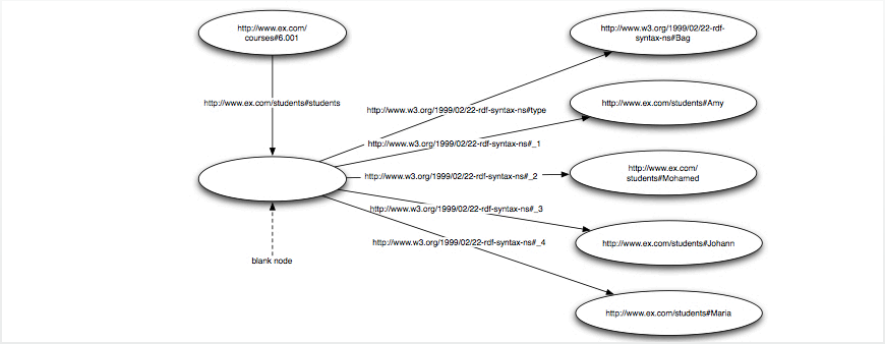

http://www.slideshare.net/bhaslhofer/linked-data-tutorial

RDF Schema

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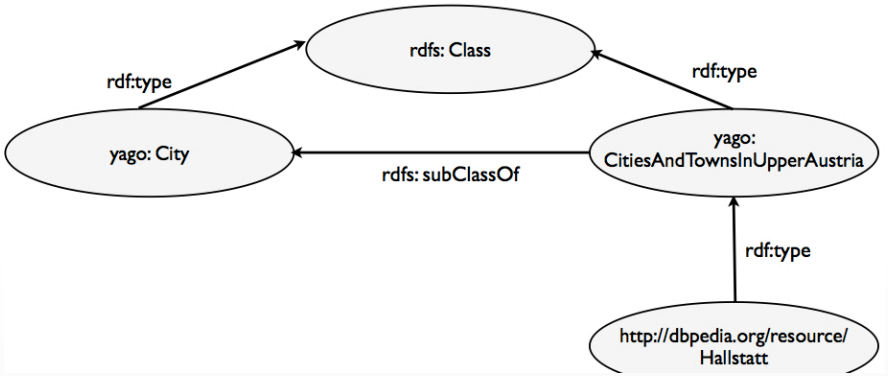

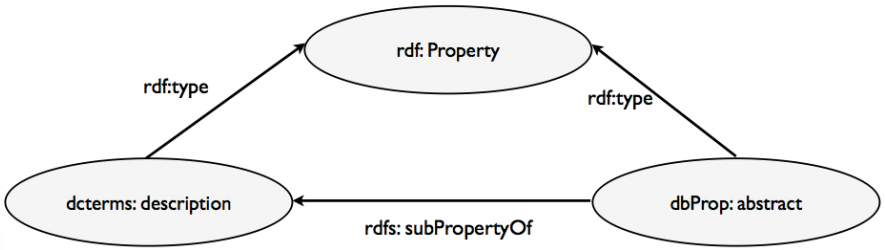

- classes and subclass relationships
- properties and subPropertyOf relationships

- no cardinality constraints on properties
- no inverse / transitive / symmetric properties
- no union / disjoint / enumeration classes

http://www.slideshare.net/bhaslhofer/linked-data-tutorial

Web Ontology Language OWL – more expressive

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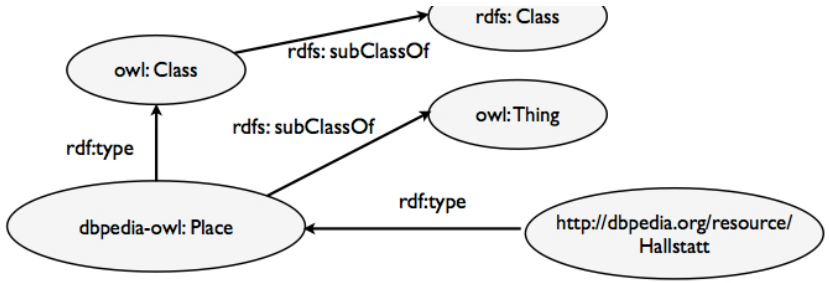

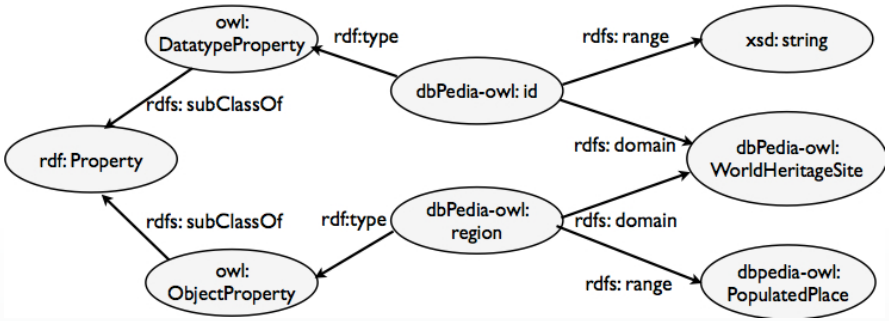

- Plus additional logical relations
- owl: inverseOf (e.g., hasChild inverseOf hasParent)
- owl: transitiveProperty (e.g., hasAncestor)
- owl: symmetricProperty (e.g., knows)
- :

- owl: intersectionOf (e.g., EmployedPerson = Person Intersection CorporateResources)
- owl: unionOf (e.g., NorthAmericanCitizen = USCitizen Union CanadaCitizen)
- owl: disjointWith (e.g.,Woman Intersection Man = 0
- :

Principle 4: Link data

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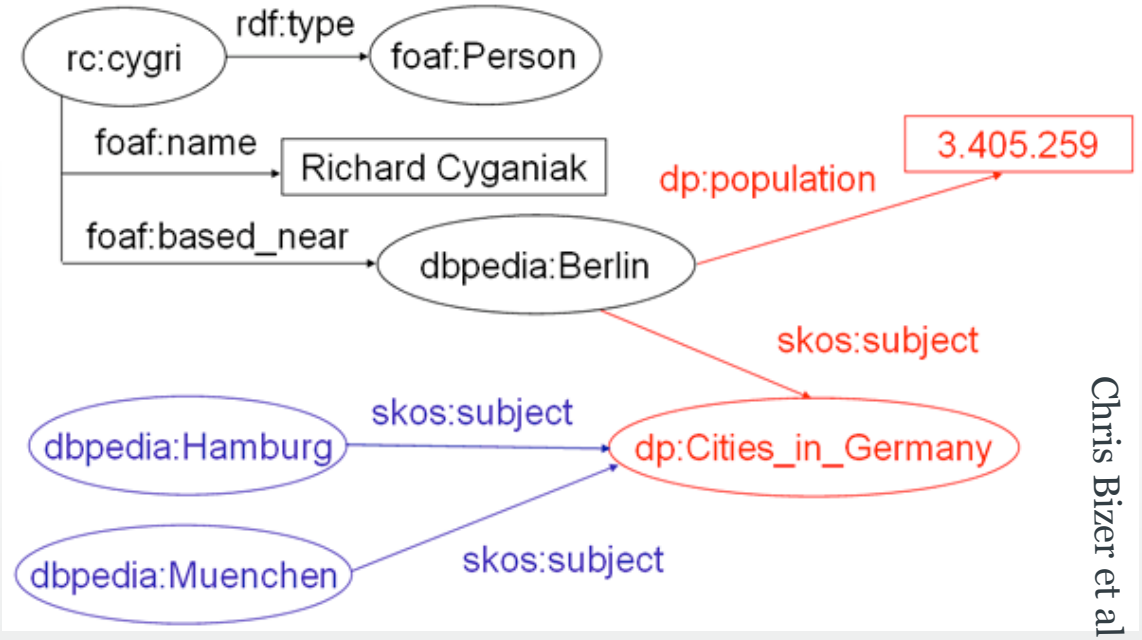

Principle 4: Link data

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http://rdf.ecs.soton.ac.uk/person/2686

SameAs

http://southampton.rkbexplorer.com/id/person-02686

SameAs

http://dbpedia.org/resource/Nigel_Shadbolt

Ontologies and Vocabularies e.g. SKOS

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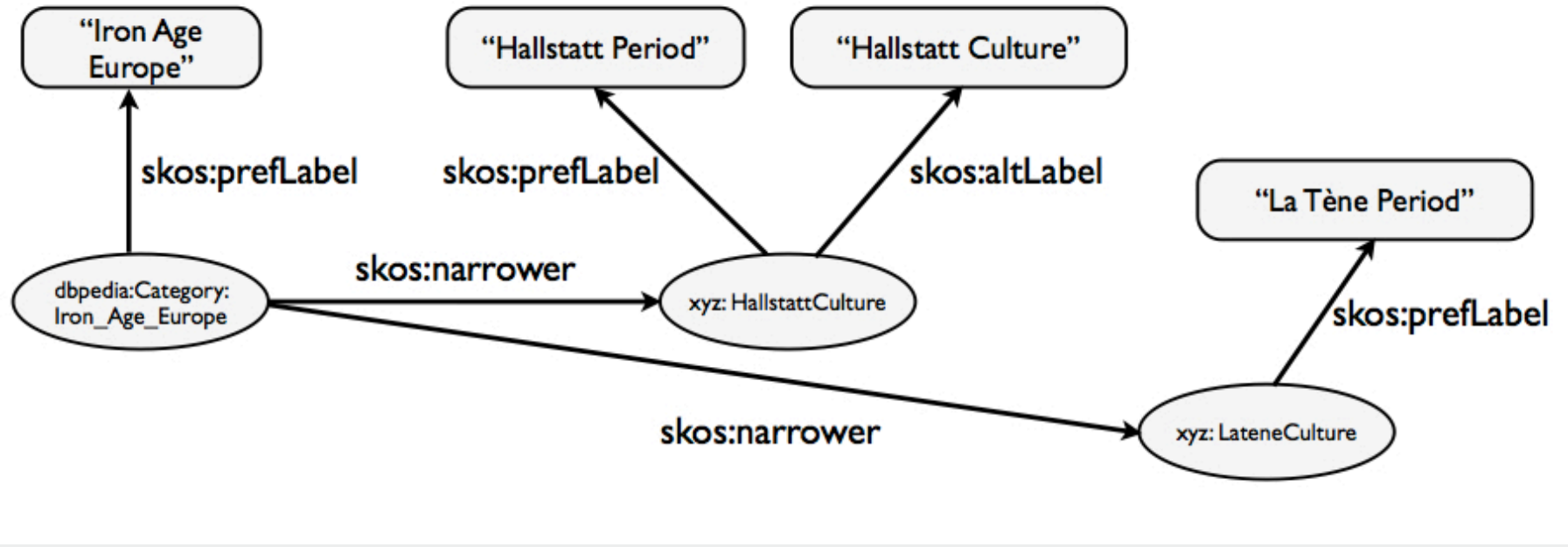

http://www.slideshare.net/bhaslhofer/linked-data-tutorial

Wikipedia as Data: DBpedia

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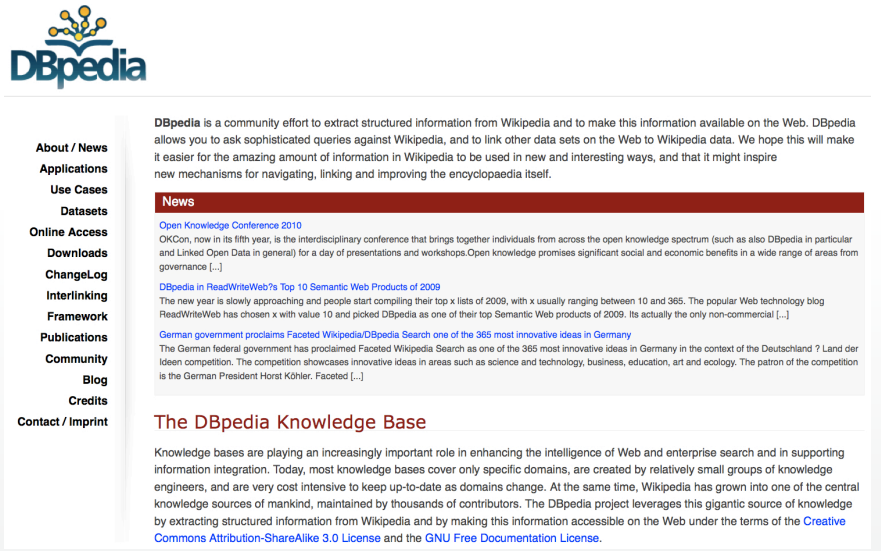
- 2.9 million things
- > 282,000 persons
- 339,000 places
- 88,000 music albums
- 44,000 films
- 15,000 video games
- 119,000 organizations
- 130,000 species
- 4400 diseases.



SPARQL

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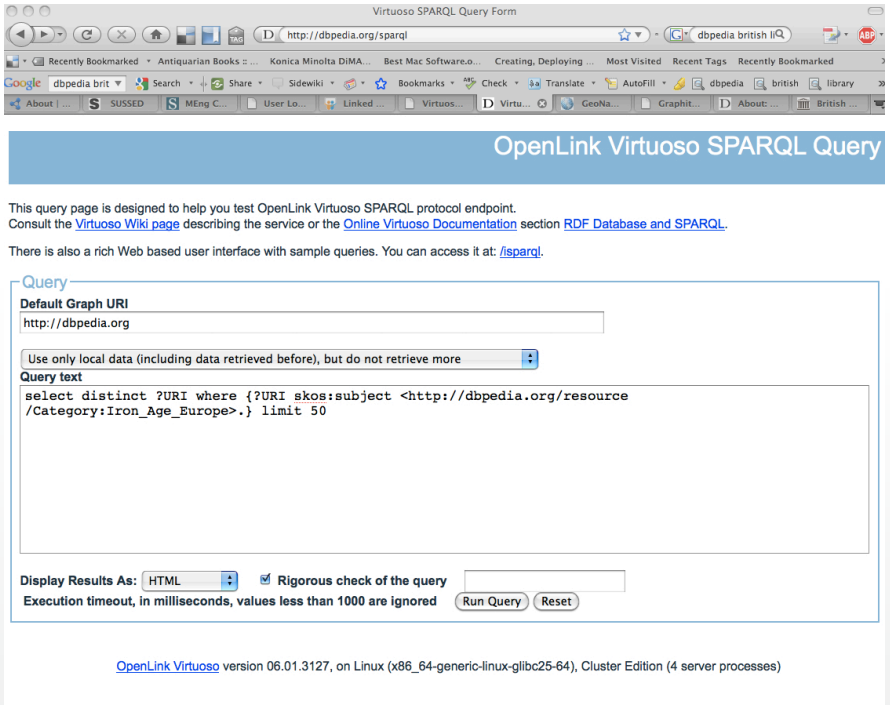
- A data access language for the Web
- Queries across diverse data sources
- SPARQL contains capabilities for querying required and optional patterns



SPARQL

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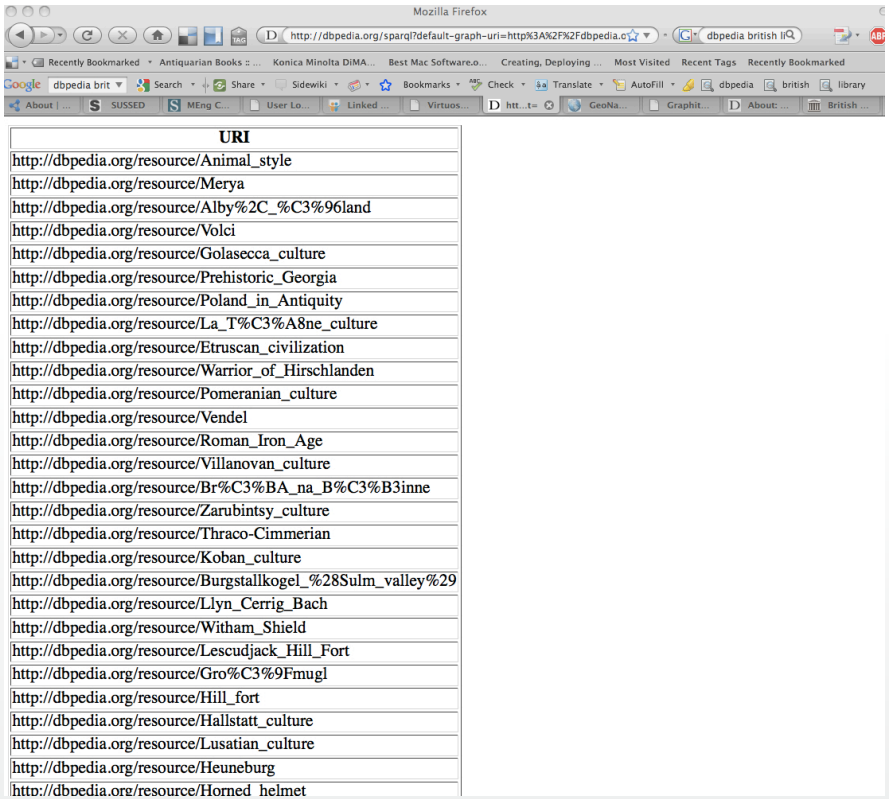

URI
http://dbpedia.org/resource/Animal_style
http://dbpedia.org/resource/Merya
http://dbpedia.org/resource/Alby%2C_%C3%96land
http://dbpedia.org/resource/Volci
http://dbpedia.org/resource/Golasecca_culture
http://dbpedia.org/resource/Prehistoric_Georgia
http://dbpedia.org/resource/Poland_in_Antiquity
http://dbpedia.org/resource/La_T%C3%A8ne_culture
http://dbpedia.org/resource/Etruscan_civilization
http://dbpedia.org/resource/Warrior_of_Hirschlanden
http://dbpedia.org/resource/Pomeranian_culture
http://dbpedia.org/resource/Vendel
http://dbpedia.org/resource/Roman_Iron_Age
http://dbpedia.org/resource/Villanovan_culture
http://dbpedia.org/resource/Br%C3%BA_na_B%C3%B3inne
http://dbpedia.org/resource/Zarubintsy_culture
http://dbpedia.org/resource/Thraco-Cimmerian
http://dbpedia.org/resource/Koban_culture
http://dbpedia.org/resource/Burgstallkogel_%28Sulm_valley%29
http://dbpedia.org/resource/Llyn_Cerrig_Bach
http://dbpedia.org/resource/Witham_Shield
http://dbpedia.org/resource/Lescudjack_Hill_Fort
http://dbpedia.org/resource/Gro%C3%9Fmugl
http://dbpedia.org/resource/Hill_fort
http://dbpedia.org/resource/Hallstatt_culture
http://dbpedia.org/resource/Lusatian_culture
http://dbpedia.org/resource/Heuneburg
http://dbpedia.org/resource/Horned_helmet

SPARQL

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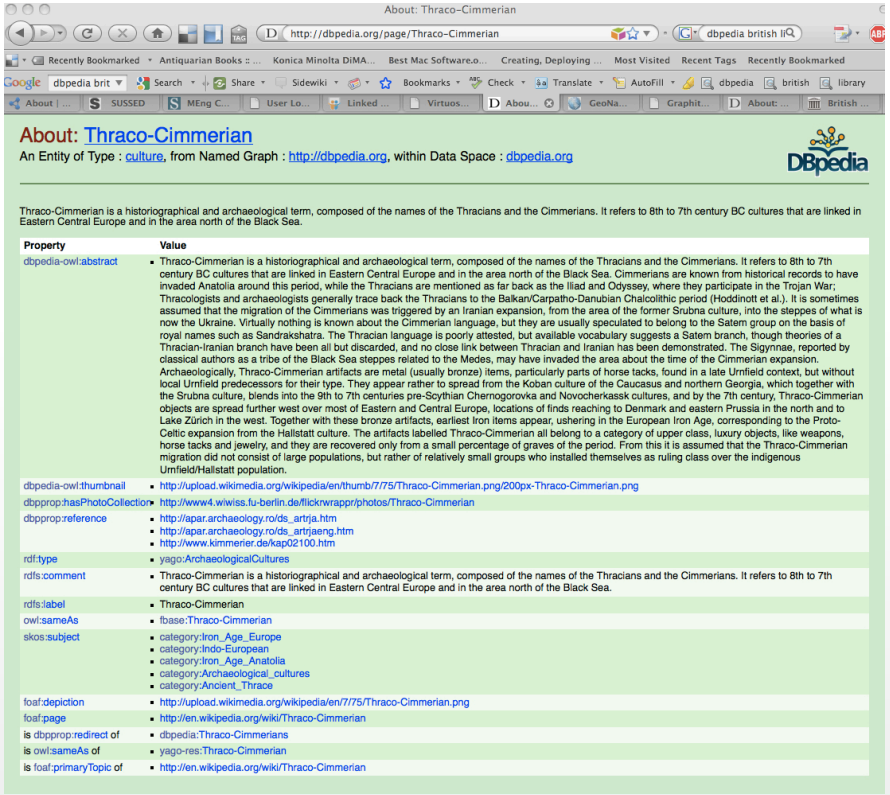

Wikipedia as a searchable KB

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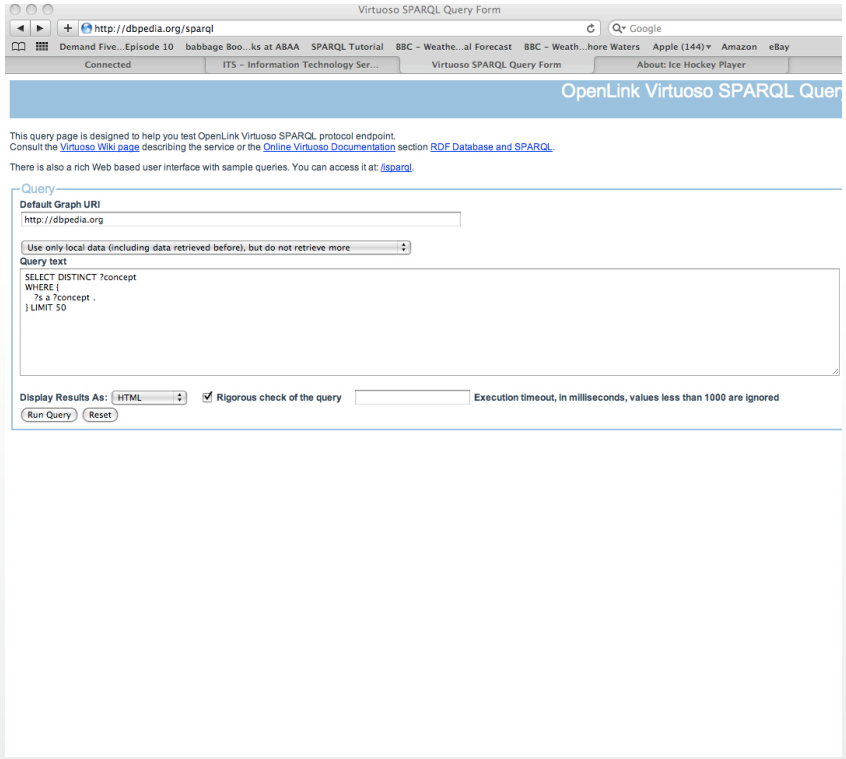

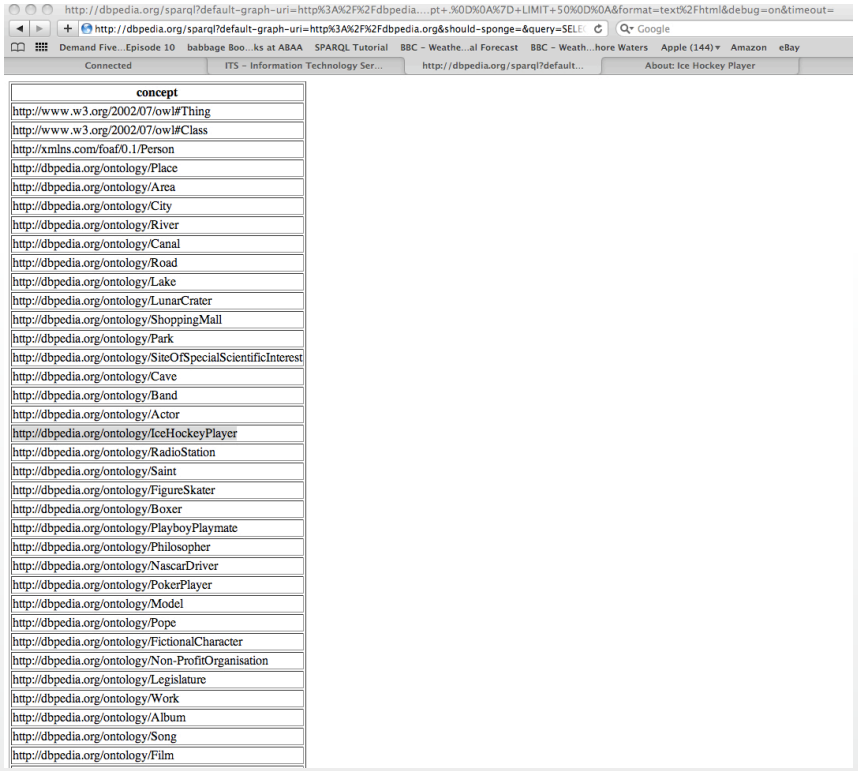

concept
http://www.w3.org/2002/07/owl#Thing
http://www.w3.org/2002/07/owl#Class
http://xmlns.com/foaf/0.1/Person
http://dbpedia.org/ontology/Place
http://dbpedia.org/ontology/Area
http://dbpedia.org/ontology/City
http://dbpedia.org/ontology/River
http://dbpedia.org/ontology/Canal
http://dbpedia.org/ontology/Road
http://dbpedia.org/ontology/Lake
http://dbpedia.org/ontology/LunarCrater
http://dbpedia.org/ontology/ShoppingMall
http://dbpedia.org/ontology/Park
http://dbpedia.org/ontology/SiteOfSpecialScientificInterest
http://dbpedia.org/ontology/Cave
http://dbpedia.org/ontology/Band
http://dbpedia.org/ontology/Actor
http://dbpedia.org/ontology/IceHockeyPlayer
http://dbpedia.org/ontology/RadioStation
http://dbpedia.org/ontology/Saint
http://dbpedia.org/ontology/FigureSkater
http://dbpedia.org/ontology/Boxer
http://dbpedia.org/ontology/PlayboyPlaymate
http://dbpedia.org/ontology/Philosopher
http://dbpedia.org/ontology/NascarDriver
http://dbpedia.org/ontology/PokerPlayer
http://dbpedia.org/ontology/Model
http://dbpedia.org/ontology/Pope
http://dbpedia.org/ontology/FictionalCharacter
http://dbpedia.org/ontology/Non-ProfitOrganisation
http://dbpedia.org/ontology/Legislature
http://dbpedia.org/ontology/Work
http://dbpedia.org/ontology/Album
http://dbpedia.org/ontology/Song
http://dbpedia.org/ontology/Film

Wikipedia as a searchable KB

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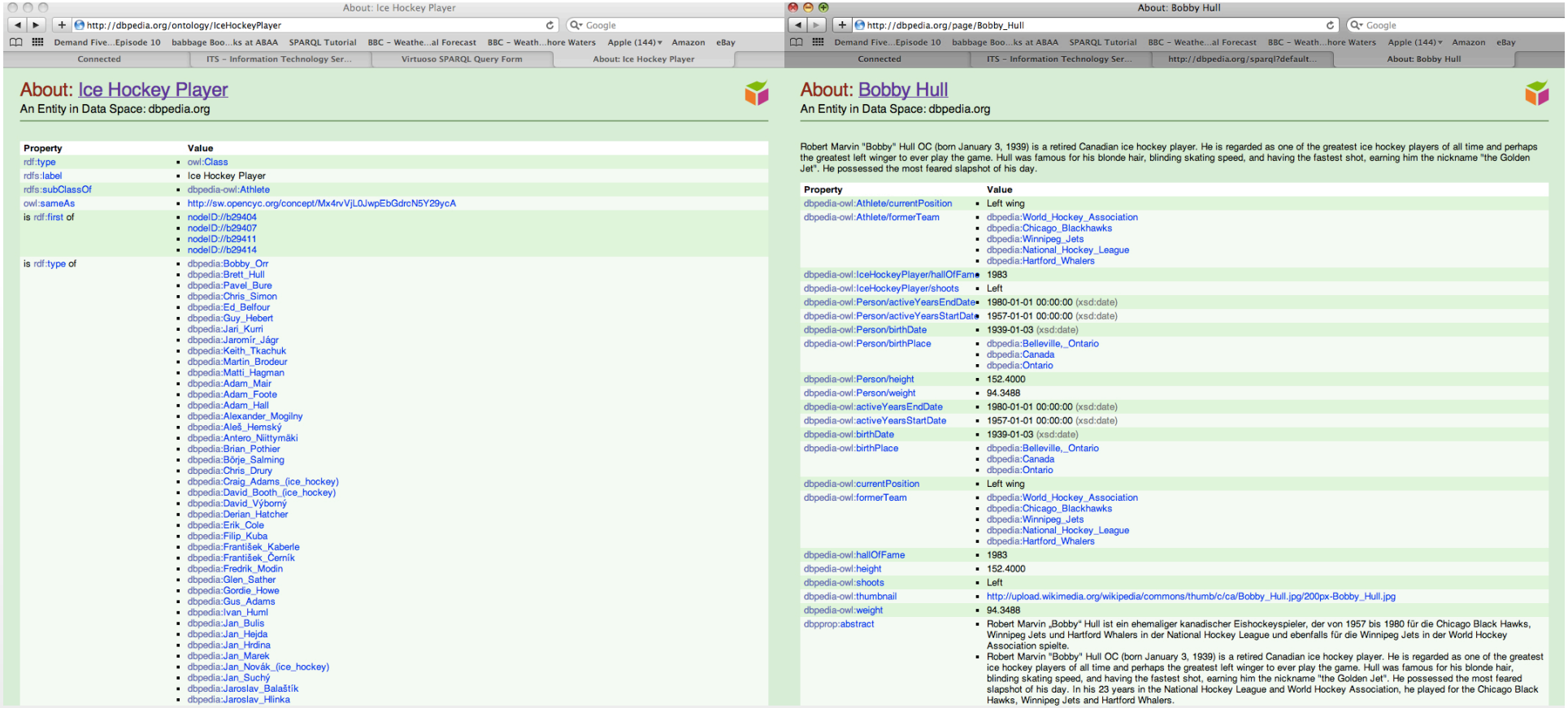

About: Ice Hockey Player

http://dbpedia.org/ontology/IceHockeyPlayer

About: Ice Hockey Player

An Entity in Data Space: dbpedia.org

Property	Value
rdf:type	owl:Class
rdfs:label	Ice Hockey Player
rdfs:subClassOf	dbpedia-owl:Athlete
owl:sameAs	http://sw.opencyc.org/concept/Mx4rvVjL0JwpEbGdrcN5Y29ycA
is rdf:first of	nodeID://b29404 nodeID://b29407 nodeID://b29411 nodeID://b29414
is rdf:type of	dbpedia:Bobby_Orr dbpedia:Brett_Hull dbpedia:Pavel_Bure dbpedia:Chris_Simon dbpedia:Ed_Belfour dbpedia:Guy_Hebert dbpedia:Jari_Kurri dbpedia:Jaromír_Jágr dbpedia:Keith_Tkachuk dbpedia:Martin_Brodeur dbpedia:Matti_Hagman dbpedia:Adam_Mair dbpedia:Adam_Foote dbpedia:Adam_Hall dbpedia:Alexander_Mogilny dbpedia:Aleš_Hemský dbpedia:Antero_Niittymäki dbpedia:Brian_Pothier dbpedia:Börje_Salming dbpedia:Chris_Drury dbpedia:Craig_Adams_(ice_hockey) dbpedia:David_Booth_(ice_hockey) dbpedia:David_Výborný dbpedia:Derian_Hatcher dbpedia:Erik_Cole dbpedia:Filip_Kuba dbpedia:František_Kaberle dbpedia:František_Černík dbpedia:Fredrik_Modin dbpedia:Glen_Sather dbpedia:Gordie_Howe dbpedia:Gus_Adams dbpedia:Ivan_Huml dbpedia:Jan_Bulis dbpedia:Jan_Hejda dbpedia:Jan_Hrdina dbpedia:Jan_Marek dbpedia:Jan_Novák_(ice_hockey) dbpedia:Jan_Suchý dbpedia:Jaroslav_Balaštík dbpedia:Jaroslav_Hlinka

About: Bobby Hull

http://dbpedia.org/page/Bobby_Hull

About: Bobby Hull

An Entity in Data Space: dbpedia.org

Robert Marvin "Bobby" Hull OC (born January 3, 1939) is a retired Canadian ice hockey player. He is regarded as one of the greatest ice hockey players of all time and perhaps the greatest left winger to ever play the game. Hull was famous for his blonde hair, blinding skating speed, and having the fastest shot, earning him the nickname "the Golden Jet". He possessed the most feared slapshot of his day.

Property	Value
dbpedia-owl:Athlete/currentPosition	Left wing
dbpedia-owl:Athlete/formerTeam	dbpedia:World_Hockey_Association dbpedia:Chicago_Blackhawks dbpedia:Winnipeg_Jets dbpedia:National_Hockey_League dbpedia:Hartford_Whalers
dbpedia-owl:IceHockeyPlayer/hallOfFame	1983
dbpedia-owl:IceHockeyPlayer/shoots	Left
dbpedia-owl:Person/activeYearsEndDate	1980-01-01 00:00:00 (xsd:date)
dbpedia-owl:Person/activeYearsStartDate	1957-01-01 00:00:00 (xsd:date)
dbpedia-owl:Person/birthDate	1939-01-03 (xsd:date)
dbpedia-owl:Person/birthPlace	dbpedia:Belleville,_Ontario dbpedia:Canada dbpedia:Ontario
dbpedia-owl:Person/height	152.4000
dbpedia-owl:Person/weight	94.3488
dbpedia-owl:activeYearsEndDate	1980-01-01 00:00:00 (xsd:date)
dbpedia-owl:activeYearsStartDate	1957-01-01 00:00:00 (xsd:date)
dbpedia-owl:birthDate	1939-01-03 (xsd:date)
dbpedia-owl:birthPlace	dbpedia:Belleville,_Ontario dbpedia:Canada dbpedia:Ontario
dbpedia-owl:currentPosition	Left wing
dbpedia-owl:formerTeam	dbpedia:World_Hockey_Association dbpedia:Chicago_Blackhawks dbpedia:Winnipeg_Jets dbpedia:National_Hockey_League dbpedia:Hartford_Whalers
dbpedia-owl:hallOfFame	1983
dbpedia-owl:height	152.4000
dbpedia-owl:shoots	Left
dbpedia-owl:thumbnail	http://upload.wikimedia.org/wikipedia/commons/thumb/c/ca/Bobby_Hull.jpg/200px-Bobby_Hull.jpg
dbpedia-owl:weight	94.3488
dbpprop:abstract	Robert Marvin „Bobby" Hull ist ein ehemaliger kanadischer Eishockeyspieler, der von 1957 bis 1980 für die Chicago Black Hawks, Winnipeg Jets und Hartford Whalers in der National Hockey League und ebenfalls für die Winnipeg Jets in der World Hockey Association spielte. Robert Marvin "Bobby" Hull OC (born January 3, 1939) is a retired Canadian ice hockey player. He is regarded as one of the greatest ice hockey players of all time and perhaps the greatest left winger to ever play the game. Hull was famous for his blonde hair, blinding skating speed, and having the fastest shot, earning him the nickname "the Golden Jet". He possessed the most feared slapshot of his day. In his 23 years in the National Hockey League and World Hockey Association, he played for the Chicago Black Hawks, Winnipeg Jets and Hartford Whalers.

Wikipedia as a searchable KB

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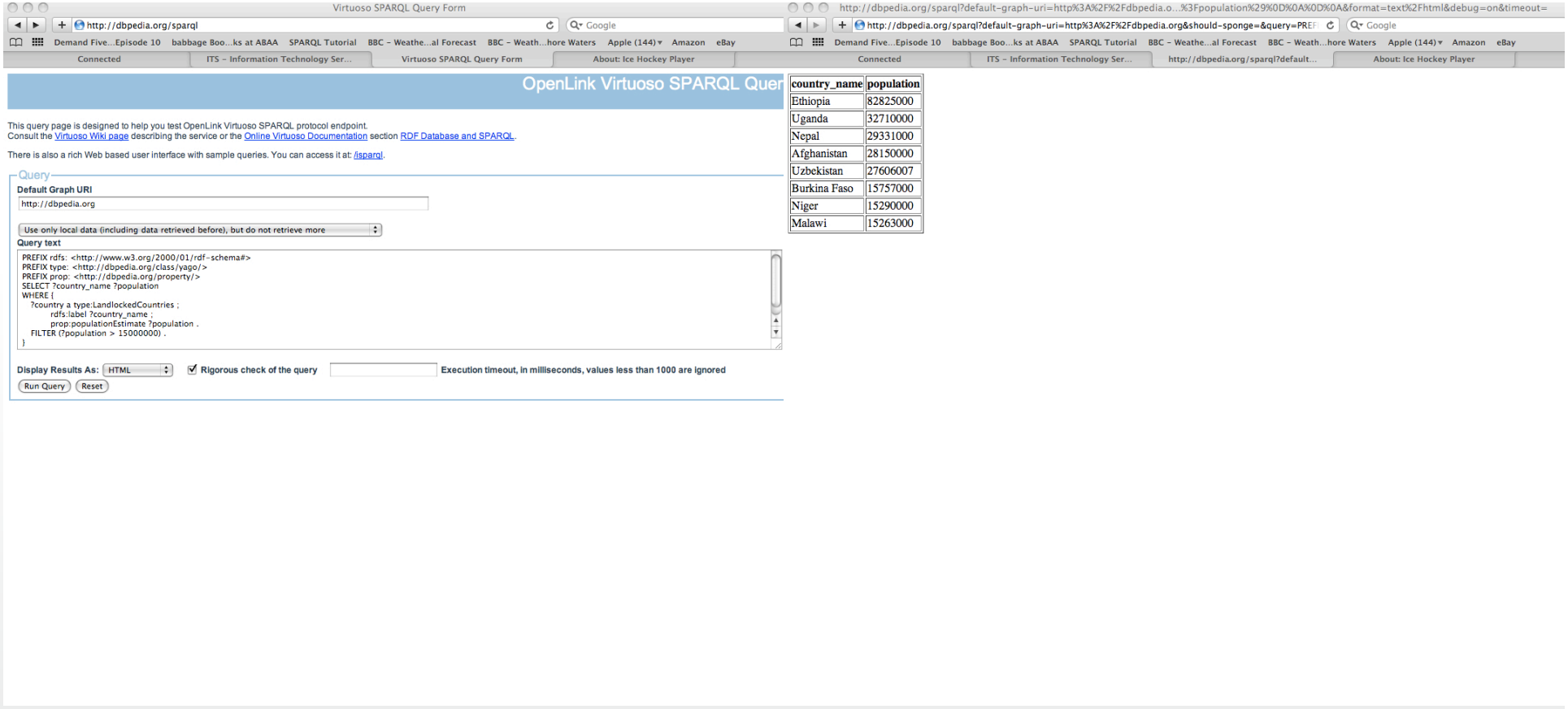

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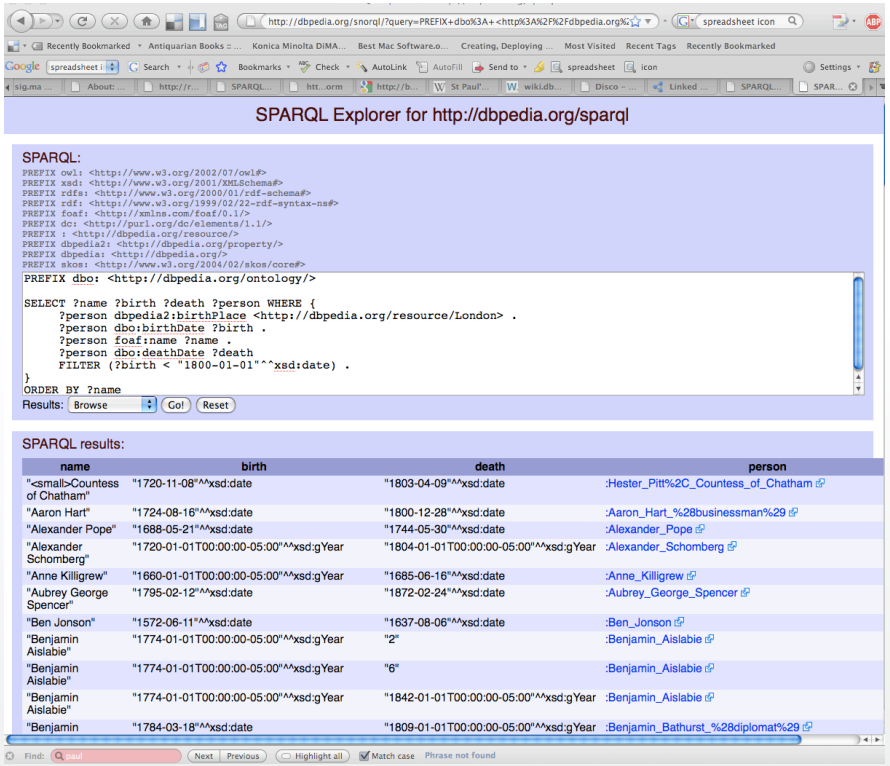

SPARQL Explorer for http://dbpedia.org/sparql

SPARQL:

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX : <http://dbpedia.org/resource/>
PREFIX dbpedia2: <http://dbpedia.org/property/>
PREFIX dbpedia: <http://dbpedia.org/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
PREFIX dbo: <http://dbpedia.org/ontology/>

SELECT ?name ?birth ?death ?person WHERE {
      ?person dbpedia2:birthPlace <http://dbpedia.org/resource/London> .
      ?person dbo:birthDate ?birth .
      ?person foaf:name ?name .
      ?person dbo:deathDate ?death
      FILTER (?birth < "1800-01-01"^^xsd:date) .
}
ORDER BY ?name
```

Results: Browse Go! Reset

SPARQL results:

name	birth	death	person
"<small>Countess of Chatham"	"1720-11-08"^^xsd:date	"1803-04-09"^^xsd:date	:Hester_Pitt%2C_Countess_of_Chatham
"Aaron Hart"	"1724-08-16"^^xsd:date	"1800-12-28"^^xsd:date	:Aaron_Hart_%28businessman%29
"Alexander Pope"	"1688-05-21"^^xsd:date	"1744-05-30"^^xsd:date	:Alexander_Pope
"Alexander Schomberg"	"1720-01-01T00:00:00-05:00"^^xsd:gYear	"1804-01-01T00:00:00-05:00"^^xsd:gYear	:Alexander_Schomberg
"Anne Killigrew"	"1660-01-01T00:00:00-05:00"^^xsd:gYear	"1685-06-16"^^xsd:date	:Anne_Killigrew
"Aubrey George Spencer"	"1795-02-12"^^xsd:date	"1872-02-24"^^xsd:date	:Aubrey_George_Spencer
"Ben Jonson"	"1572-06-11"^^xsd:date	"1637-08-06"^^xsd:date	:Ben_Jonson
"Benjamin Aislabie"	"1774-01-01T00:00:00-05:00"^^xsd:gYear	"2"	:Benjamin_Aislabie
"Benjamin Aislabie"	"1774-01-01T00:00:00-05:00"^^xsd:gYear	"6"	:Benjamin_Aislabie
"Benjamin Aislabie"	"1774-01-01T00:00:00-05:00"^^xsd:gYear	"1842-01-01T00:00:00-05:00"^^xsd:gYear	:Benjamin_Aislabie
"Benjamin	"1784-03-18"^^xsd:date	"1809-01-01T00:00:00-05:00"^^xsd:gYear	:Benjamin_Bathurst_%28diplomat%29

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Linked Data at Scale

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Public Sector Information

MPDP
Making Public Data Public

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- Berners-Lee and Shadbolt
- HMG Information Advisors
- Context - PoI Taskforce
- Previous work with OPSI
- Strategic Drivers
  - Transparency and accountability
  - Economic and Social Value
  - Public Service Improvement
  - New Industries New Jobs

The Power of Public Data

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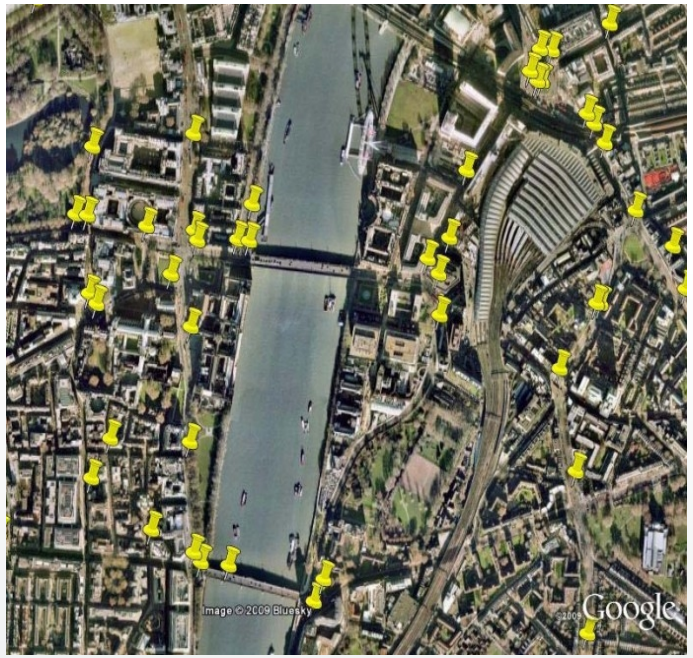
Cholera cases



Bicycling traffic accidents

Key Elements of our ToR

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1. Establish single point of access for all public UK datasets - data.gov.uk
2. Specific proposals to implement and extend to wider public sector PSI principle
   - Select and implement common standards for release of public data
   - Select, develop and implement common terms for data where necessary
   - Develop licenses - CC variants

Accomplishments

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- Embodied Public Data Principles in Government
- Beta service launched data.gov.uk - Jan 2010
  - Currently >3200 datasets including linked data
  - 2500 developer community
  - Open source and open standards
  - Self describing Catalogue
- Key data sets released and applications emerging
- New Crown Commons data licence
- Local Data Panel

UK Public Data Principles

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1. Public data will be published in reusable, machine readable form
2. Public data will be available and easy to find through a single easy to use online access point data.gov.uk
3. Public data will be published using open standards and following the recommendations of the World Wide Web Consortium
4. Any 'raw' dataset will be represented in linked data form
5. More public data will be released under an open licence which enables free reuse, including commercial reuse
6. Data underlying the Government's own websites will be published in reusable form for others to use
7. Personal, classified, commercially sensitive and third-party data will continue to be protected.

HM Government

PUTTING THE FRONTLINE FIRST:
smarter government

Coaltion Government's Commitment

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- Prime Minister's letter on to Ministers on Transparency and Open Data
- Established Public Sector Transparency Board under Francis Maude – members including Tom Steinberg, Tim Berners-lee and Nigel Shadbolt
- creating a powerful new right to government data, enabling the public to request and receive government datasets
- publishing data in open and standardised formats
- transforming the culture of the public sector from one that presumes secrecy to one that presumes datasets should be open and shared with the public on an ongoing basis.
- bringing in new measures to enable to public to scrutinise the government's accounts
- requiring public bodies to publish online job titles, salaries and expenses of senior staff
- publishing in full government contracts for good and services worth over £25,000
- making the performance of the NHS transparent by publishing information about the results that healthcare providers are achieving.
- applying these transparency principles to local government

data.gov.uk

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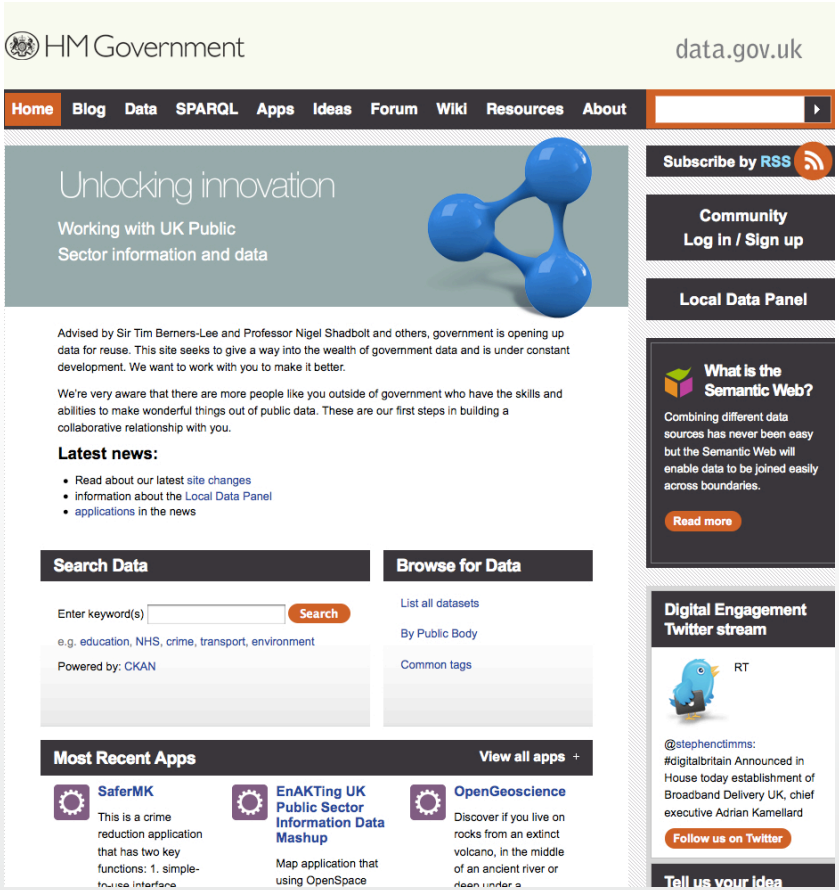

data.gov.uk

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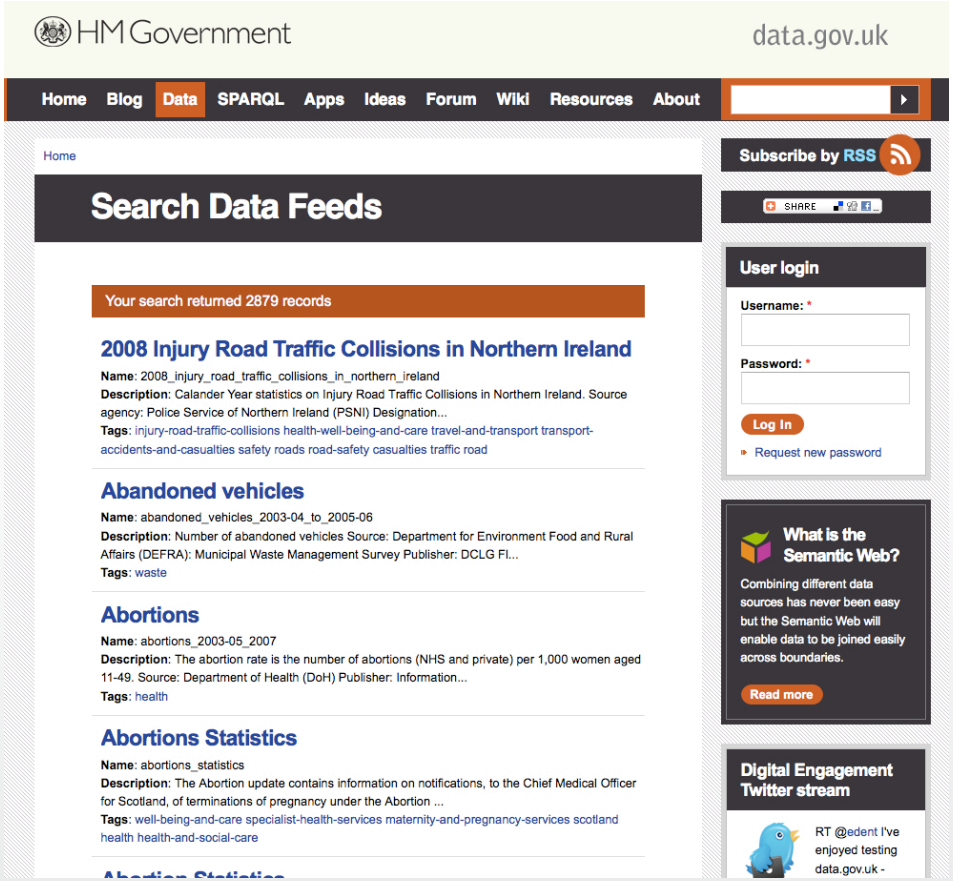

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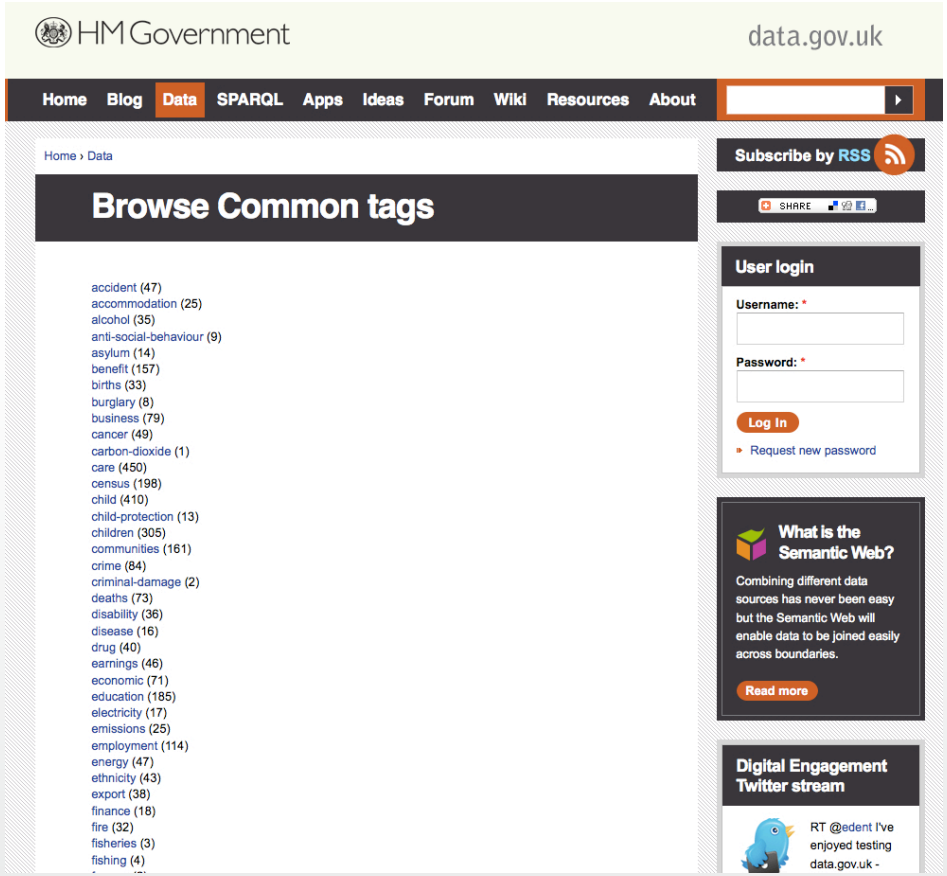

data.gov.uk

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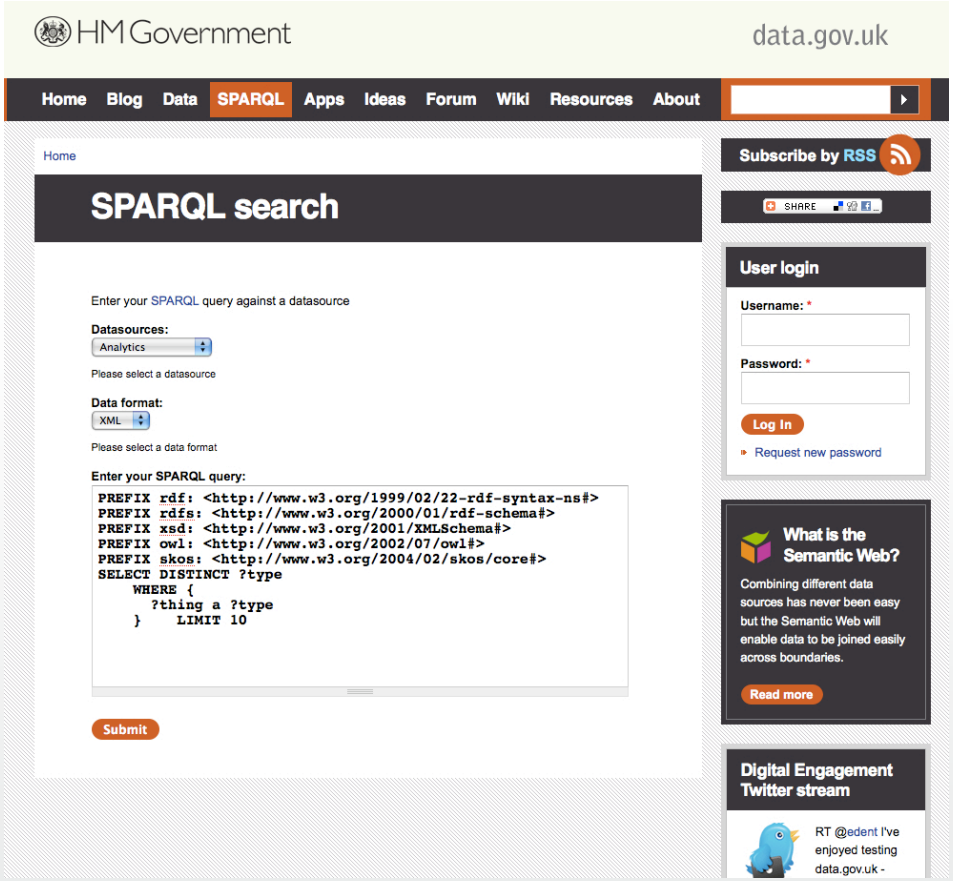

data.gov.uk

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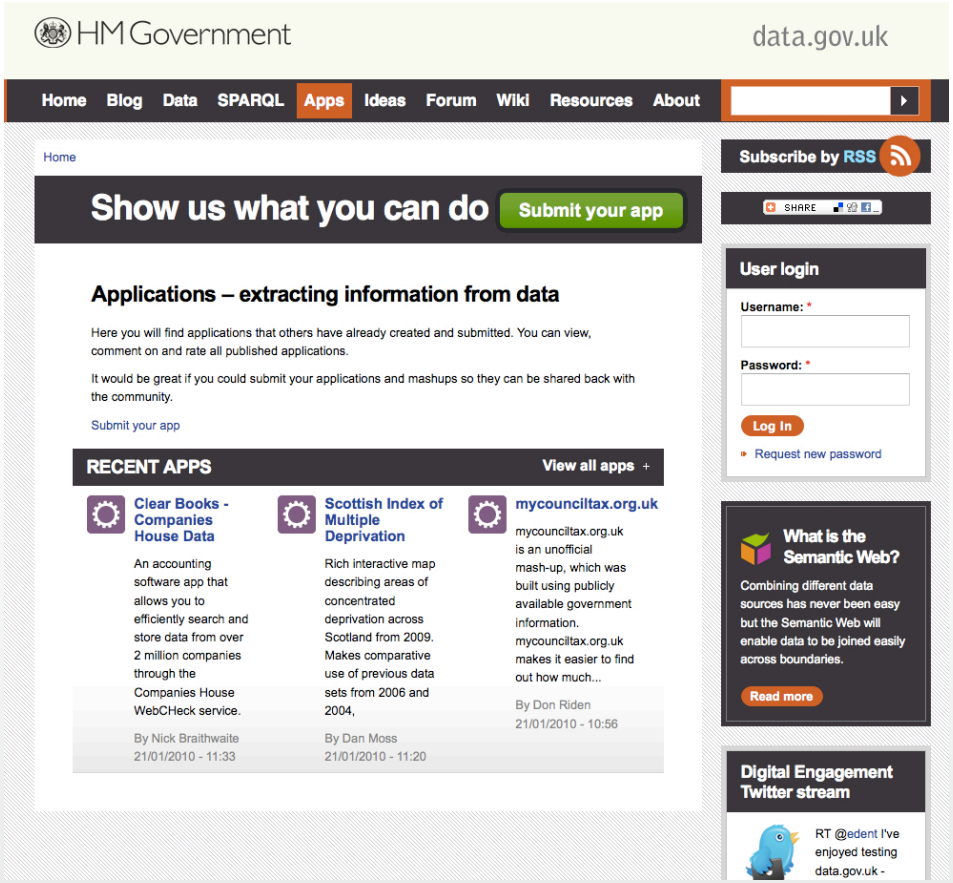

data.gov.uk

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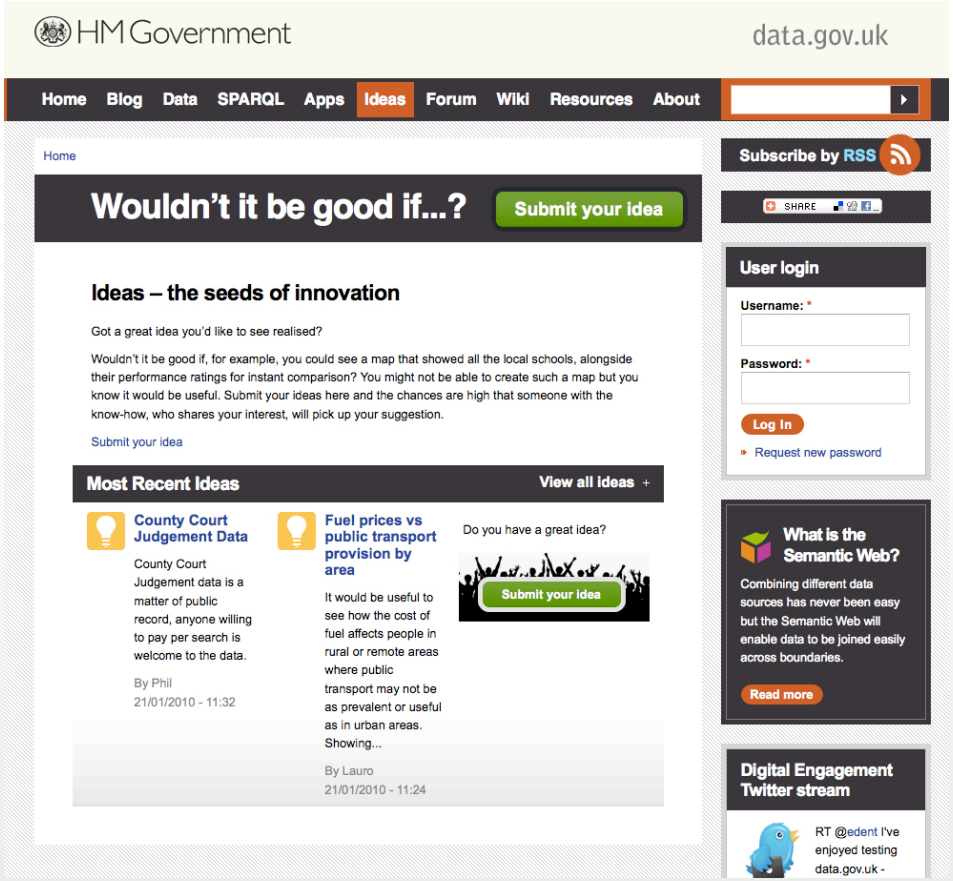

ASBOrometer

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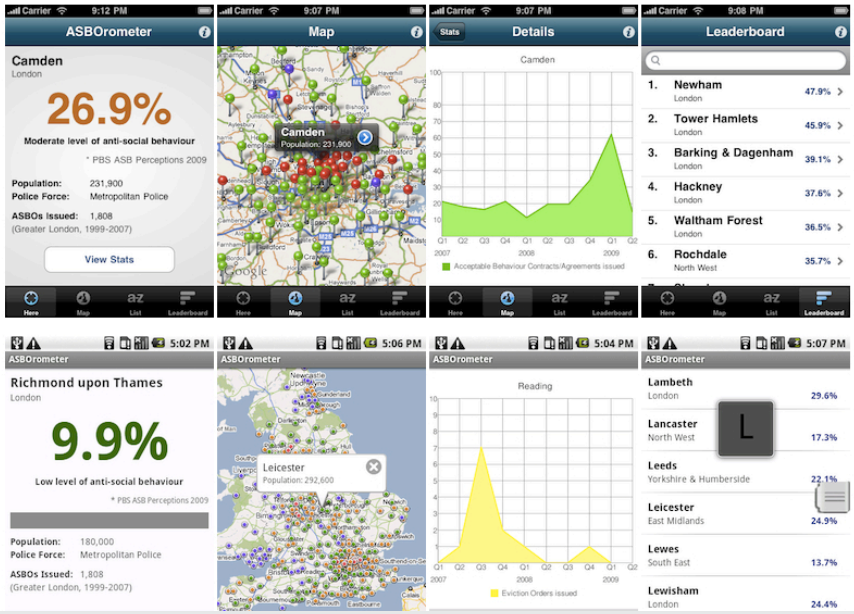
ASBOrometer is a mobile application that measures levels of anti-social behaviour at your current location (within England and Wales) and gives you access to key local ASB statistics.

ASBOrometer is available for iPhone and Android phones. Get it FREE from the iTunes App Store or Android Market now!

This app was created by Jeff Gilfelt and made possible by the data.gov.uk initiative, which is opening up UK government data for public reuse.

Available on the App Store



Put the data out applications will come

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Home
News
Apps
- Find GPs
- Find Pharmacies
- Find Postboxes
- Find Pubs
- Find Toilets
- SF Trees
- UK Dentists

Support
Contact

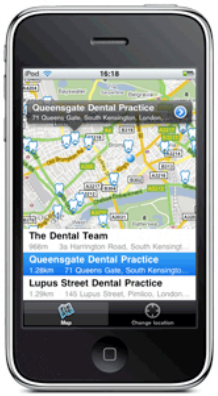
follow us on twitter

Available on the App Store

UK Dentists

Find your nearest NHS dentist quickly and easily!

The National Health Service has over 7,500 dental surgeries across England but finding one can be a difficult and time consuming task. This app is based on data provided by the UK's Health and Social Care Information Centre (HSCIC)* and covers 99.4% of all registered NHS dental surgeries in England.



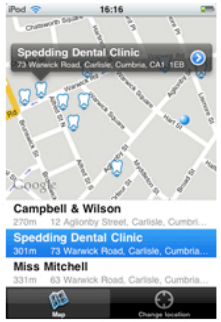
Search for an NHS dentist around your current location, or look for one in another area (where you may be moving to, or for a friend) via a simple place name or postcode search. Distances can be displayed in metric or imperial units (configured in the application preferences).

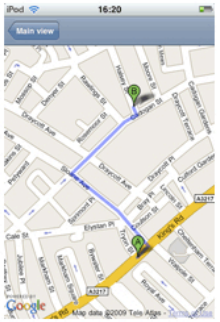
UK Dentists uses the built in GPS on the iPhone to get your current location, but can also locate an iPod Touch in built-up WiFi areas. If your location cannot be determined automatically then you can always enter your post code to get started. Please note that an internet connection is required to get location and map data.

* Data reproduced under the terms of the Office of Public Sector Information (OPSI) Click-Use Licence.

Application Screenshots

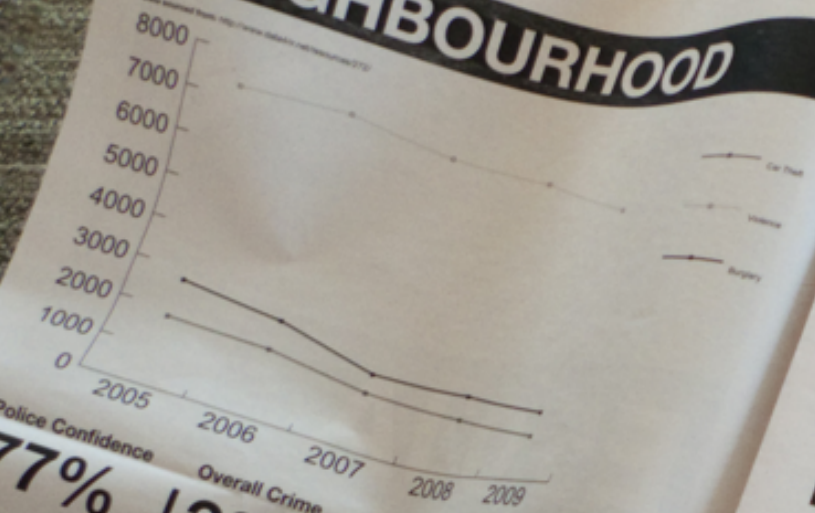
Click on any of the images to see a larger version





Buy on iTunes

NEIGHBOURHOOD



Police Confidence
77%

Overall Crime
↓39%

Gun Crime
↓37%

Knife Crime
↓17%

Robbery
↓14%

Theft
↓13%

Woundings
↑220%

10000
fewer crime victims

Summary

Hackney Police and the Council work very closely to tackle and prevent crime in the borough. Seventy seven per cent of residents now have confidence in Hackney's Police, according to the British Crime Survey, a rise of 55 per cent in less than two years.

The survey also reveals that crime in Hackney has dropped 39.5 per cent over five years, the second largest drop of all London boroughs. Last year, there were ten thousand fewer victims of crime in Hackney than five years ago.

In 2008/09, gun crime was reduced by over 37 per cent and knife crime by 17 per cent. Youth crime also fell by 10 per cent. Satisfaction with the Police and the Fire Brigade are six per cent above the London average.

-- Hackney Council

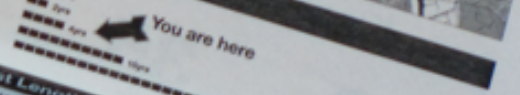
ALLOTMENTS

Allotment Plots

Tower Hamlet	282
Waltham Forest	1,382
Newham	415
Hackney	113
Haringey	1,715
Camden	195

Waiting List Time

Tower Hamlet
Waltham Forest
Newham
Hackney
Haringey
Camden



Waiting List Length

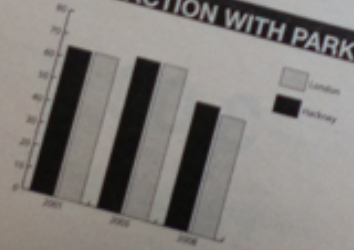
Tower Hamlet
Waltham Forest
Newham
Hackney
Haringey
Camden

GREEN SPACE

23%
by land area in Hackney

Your nearest parks are:
- Hackney Marshes (10 mins east)
- Victoria Park (15 mins south)
- London Fields (20 mins south west)

% SATISFACTION WITH PARKS



RECYCLING

Your nearest Recycling and Reuse Center is on South Access Road, Walthamstow, E17 (via Marshouse Avenue, near Low Hall Manor Business Centre).

Open every day of the year, except on 25 December, 26 December and 1 January. Open from 8.30am to 5.15pm. South Access Road is for mixed, bulky household waste and recyclables. This site does not accept trade waste.

If you intend to use a van to bring your waste please call 020 8509 3064 at least 24 hours prior to visiting the site. Vans are only allowed to the site between 8.30am and 4pm Monday to Saturday.

You can recycle the following items at this site:

- Bicycles
- Car batteries
- Cardboard
- Computers and printers
- Cooking oil
- Electrical items
- Engine oil
- Food/drink cans and foil
- Furniture in good condition
- Garden waste
- Gas bottles
- Glass bottles and jars
- Hardcore/rubble
- Household batteries
- Long life light bulbs
- Metal
- Mobile telephones
- Paper
- Plasterboard
- Plastic bottles
- Reusable paint
- Tetra paks
- Textiles and shoes
- Tools for reuse

Linked data at data.gov.uk

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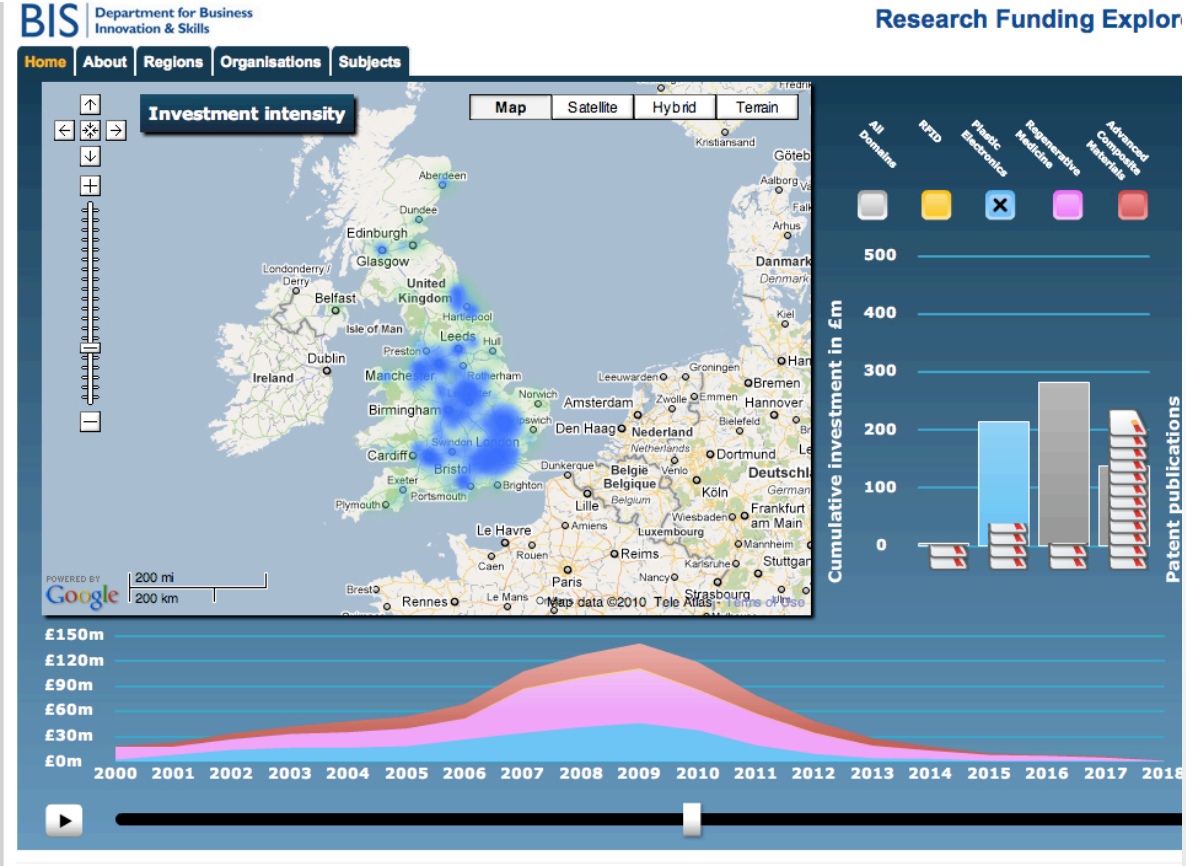

Linked data at data.gov.uk

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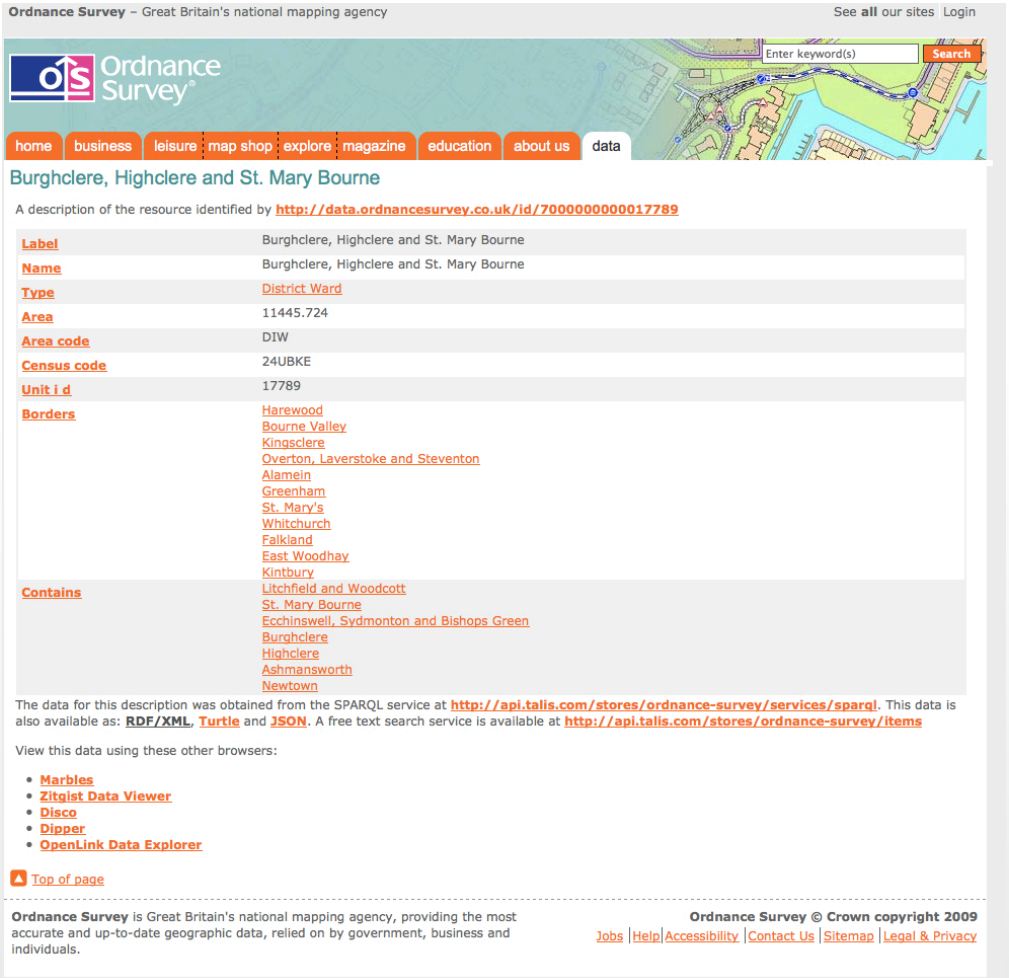

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Enter keyword(s) Search

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Burghclere, Highclere and St. Mary Bourne

A description of the resource identified by http://data.ordnancesurvey.co.uk/id/7000000000017789

Label	Burghclere, Highclere and St. Mary Bourne
Name	Burghclere, Highclere and St. Mary Bourne
Type	District Ward
Area	11445.724
Area code	DIW
Census code	24UBKE
Unit i d	17789
Borders	Harewood Bourne Valley Kingsclere Overton, Laverstoke and Steventon Alamein Greenham St. Mary's Whitchurch Falkland East Woodhay Kintbury
Contains	Litchfield and Woodcott St. Mary Bourne Ecchinswell, Sydmonton and Bishops Green Burghclere Highclere Ashmansworth Newtown

The data for this description was obtained from the SPARQL service at http://api.talis.com/stores/ordnance-survey/services/sparql. This data is also available as: RDF/XML, Turtle and JSON. A free text search service is available at http://api.talis.com/stores/ordnance-survey/items

View this data using these other browsers:

- Marbles
- Zitgist Data Viewer
- Disco
- Dipper
- OpenLink Data Explorer

Top of page

Ordnance Survey is Great Britain's national mapping agency, providing the most accurate and up-to-date geographic data, relied on by government, business and individuals.

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Linked data at data.gov.uk

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http://data.ordnancesurvey.co.uk/doc/7000000000017789.rdf

Litchfield and Woodcott	label	Litchfield and Woodcott
Burghclere, Highclere and St. Mary Bourne	Area	11445.724
	Area Code	DIW
	Census Code	24UBKE
	Unit ID	17789
	borders	Greenham
		Falkland
		Kintbury
		Overton, Laverstoke and Steventon
		Harewood
		St. Mary's
		Whitchurch
		Kingsclere
		East Woodhay
		Bourne Valley
		Alamein
	contains	St. Mary Bourne
		Ecchinswell, Sydmonton and Bishops Green
		Newtown
		Burghclere
		Highclere
		Litchfield and Woodcott
		Ashmansworth
	type	District Ward
	label	Burghclere, Highclere and St. Mary Bourne
	name	Burghclere, Highclere and St. Mary Bourne
Highclere	label	Highclere
Harewood	label	Harewood
Alamein	label	Alamein
Ecchinswell, Sydmonton and Bishops Green	label	Ecchinswell, Sydmonton and Bishops Green
Burghclere	label	Burghclere
Greenham	label	Greenham
St. Mary Bourne	label	St. Mary Bourne
Newtown	label	Newtown
Bourne Valley	label	Bourne Valley
District Ward	label	District Ward
East Woodhay	label	East Woodhay
Falkland	label	Falkland
Kingsclere	label	Kingsclere
Kintbury	label	Kintbury
St. Mary's	label	St. Mary's
Whitchurch	label	Whitchurch
Ashmansworth	label	Ashmansworth
Overton, Laverstoke and Steventon	label	Overton, Laverstoke and Steventon
http://data.ordnancesurvey.co.uk/doc/7000000000017789	Has Format	http://data.ordnancesurvey.co.uk/doc/7000000000017789.html
		http://data.ordnancesurvey.co.uk/doc/7000000000017789.json
		http://data.ordnancesurvey.co.uk/doc/7000000000017789.rdf
		http://data.ordnancesurvey.co.uk/doc/7000000000017789.ttl
	Title	Linked Data for Burghclere, Highclere and St. Mary Bourne
	type	http://purl.org/dc/dcmitype/Text
		Document
	primary topic	Burghclere, Highclere and St. Mary Bourne
http://data.ordnancesurvey.co.uk/doc/7000000000017789.rdf	Format	application/rdf+xml
	Is Format Of	http://data.ordnancesurvey.co.uk/doc/7000000000017789
	Title	Linked Data in RDF/XML format for Burghclere, Highclere and St. Mary Bourne
	type	http://purl.org/dc/dcmitype/Text
		Document
	primary topic	Burghclere, Highclere and St. Mary Bourne
http://data.ordnancesurvey.co.uk/doc/7000000000017789.html	Format	text/html

http://map.psi.enakting.org/how

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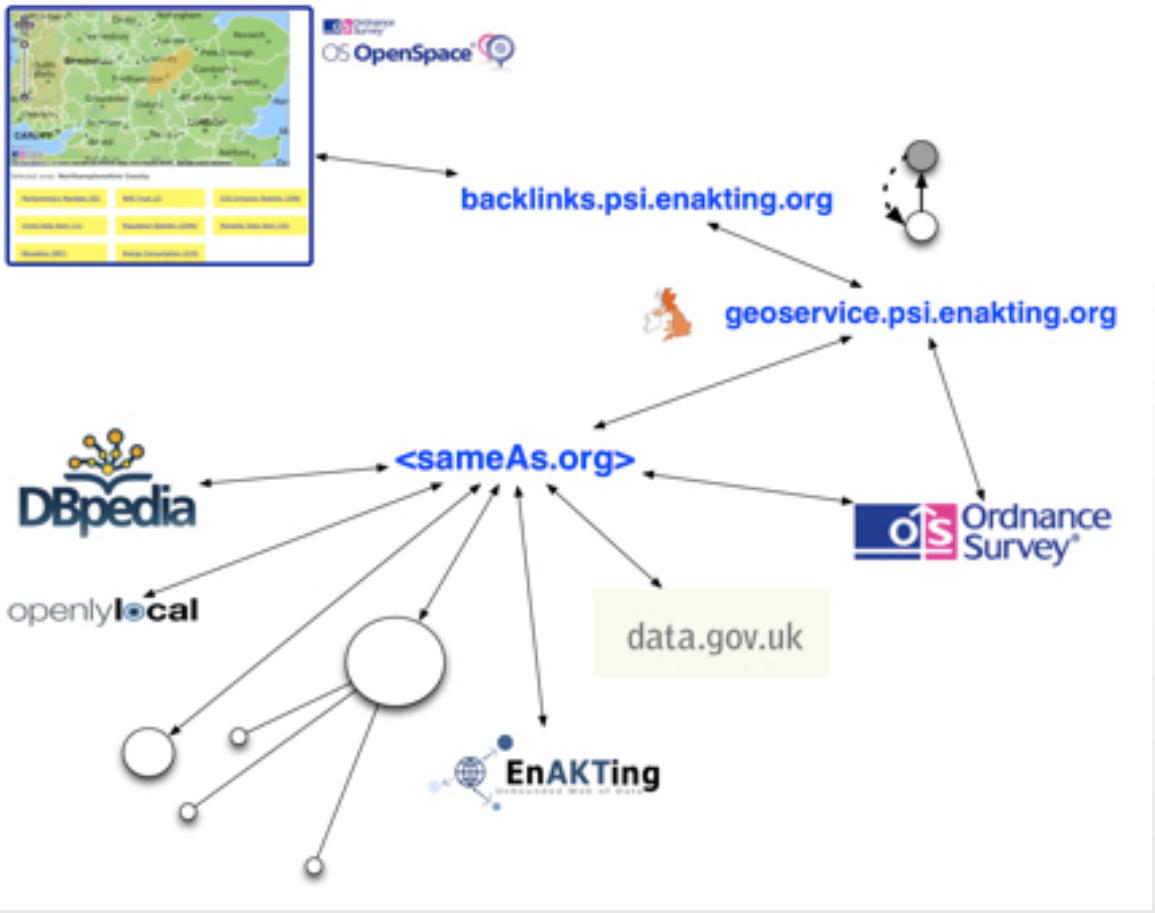

New data?

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- Make data available for re-use.
- The data on data.gov.uk includes:
  - data not previously available at all
  - data previously only available in non-reusable form (e.g. PDF)
  - data previously only available with licensing restrictions on its reuse (there is a new, open licence for data on data.gov.uk)
  - data previously only available to a limited or specialist set of users
  - data previously not easy to find
- Invariably the case for any organisation

data.gov....
is taking hold

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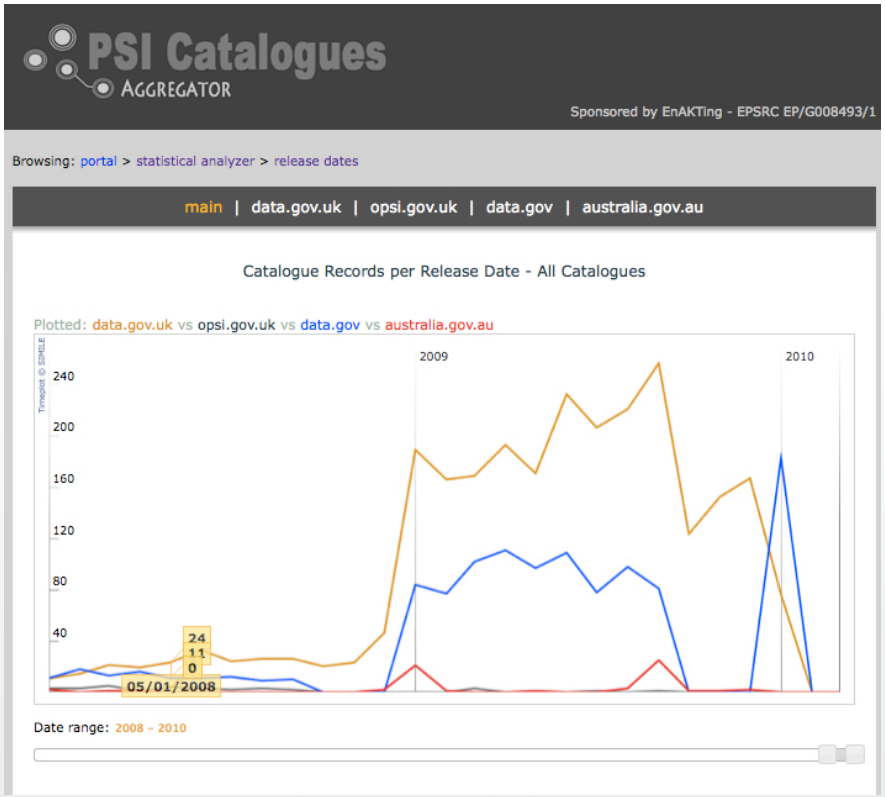

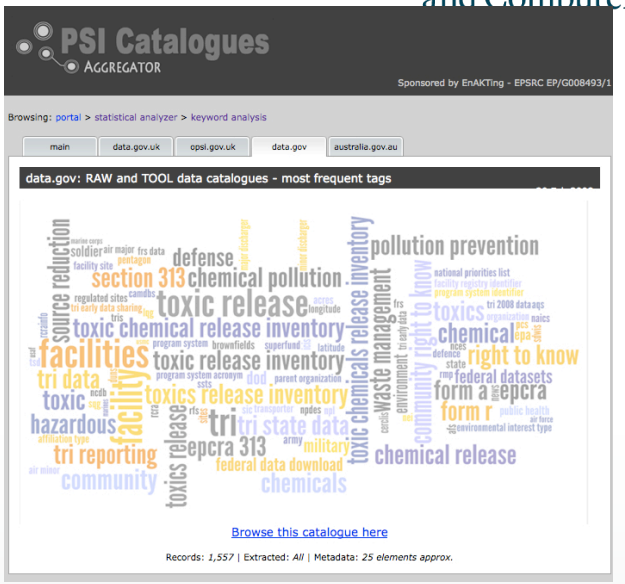

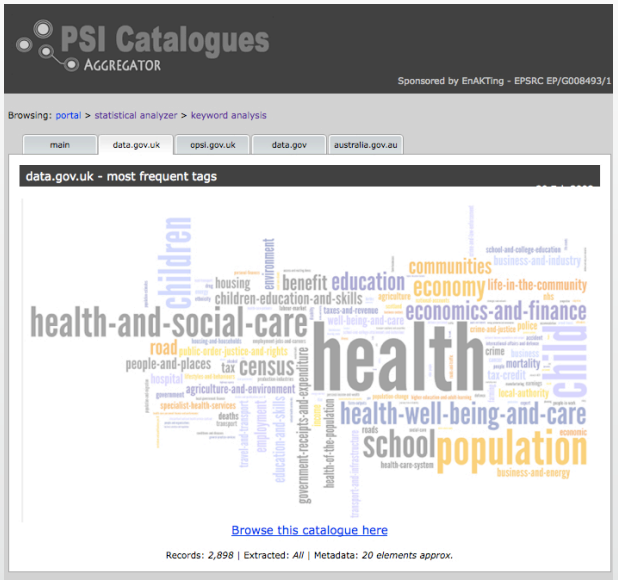

Global Linked Data

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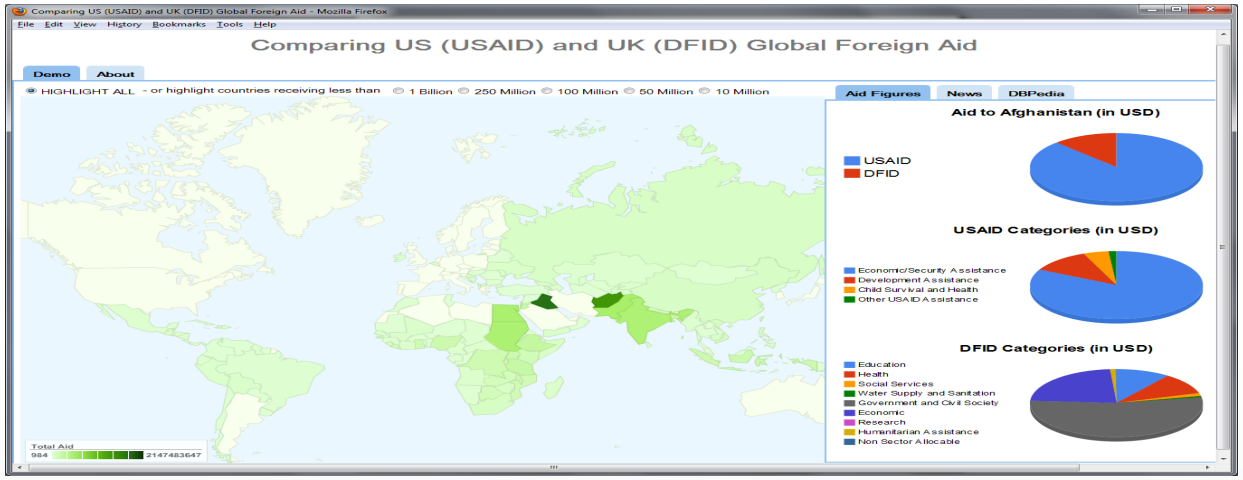
This application presents a mashup of foreign aid data (represented in US Dollars) from the United States Agency for International Development (USAID) and UK Department for International Development (DFID) for the 2007 US Fiscal Year.



Users may retrieve foreign aid data for specific countries by clicking on a provided world map (shaded based on total combined contributions for USAID and DFID). Upon clicking on a desired country, three kinds of information are presented: Aid Figures, New York Times news, and wikipedia description.

http://data-gov.tw.rpi.edu/demo/linked/aidviz-1554-10030.html

Global Linked Data

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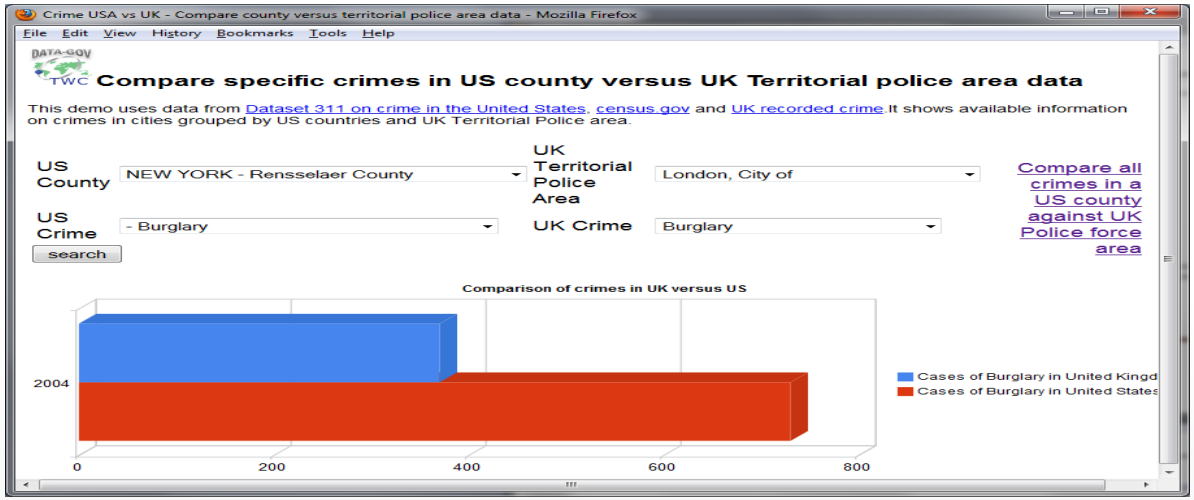
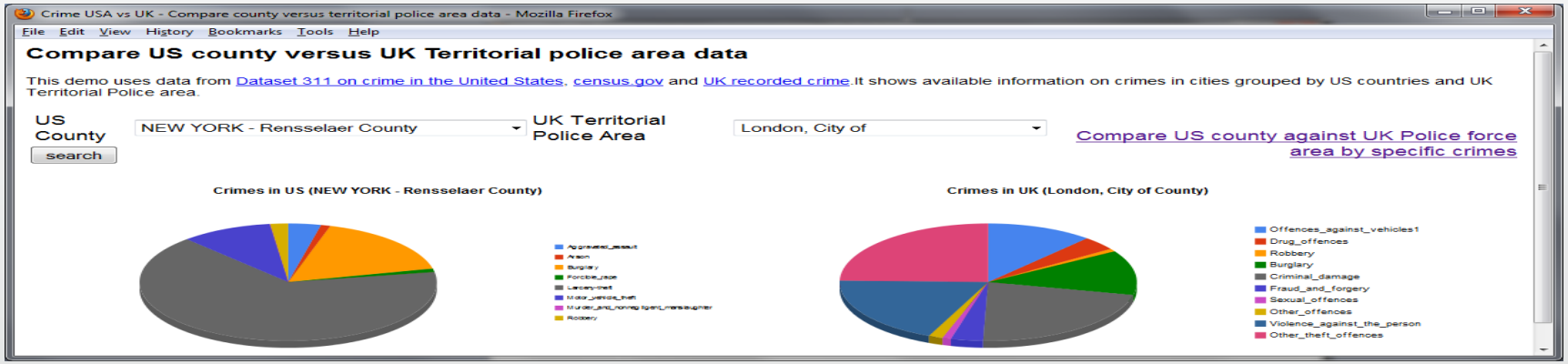


This demo uses data from Dataset 311 on crime in the United States, census.gov and UK recorded crime.It shows available information on crimes in cities grouped by US countries and UK Territorial Police area.



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Media Linked Data – BBC

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BBC Home | News | Sport | Weather | iPlayer | TV | Radio | More... Search

Wildlife Ontology

Latest Version	http://purl.org/ontology/wo/
Created	2010-01-04
Last Modified	2010-02-19
Authors	Leigh Dodds
	Tom Scott

Abstract

A simple vocabulary for describing biological species and related taxa. The vocabulary defines terms for describing the names and ranking of taxa, as well as providing support for describing their habitats, conservation status, and behavioural characteristics, etc
Copyright © 2010 the British Broadcasting Corporation.

This work is licensed under a Creative Commons Attribution License. This copyright applies to the *Wildlife Ontology* and accompanying documentation in RDF. This ontology uses W3C's RDF technology, an open Web standard that can be freely used by anyone.

Introduction

The Wildlife Ontology is a simple lightweight ontology for publishing data about all forms of biological taxa, including phyla, families, and species. The terms in this ontology allow data to be published about:

The relationships between taxa
Their associations with specific habitats, their mode of life, as well as their specific behaviours
Whether a taxon is endangered according to the IUCN terms
Topic relations between web documents and multimedia objects that may feature a taxon
...etc
The Wildlife Ontology was originally designed to support the publishing of data from the BBC Wildlife Finder application. This application provides access to a rich set of information and data about biological species, as well as pointers to BBC broadcast output that relate to these topics. The ontology should therefore complement the existing Programmes Ontology for describing TV programmes.

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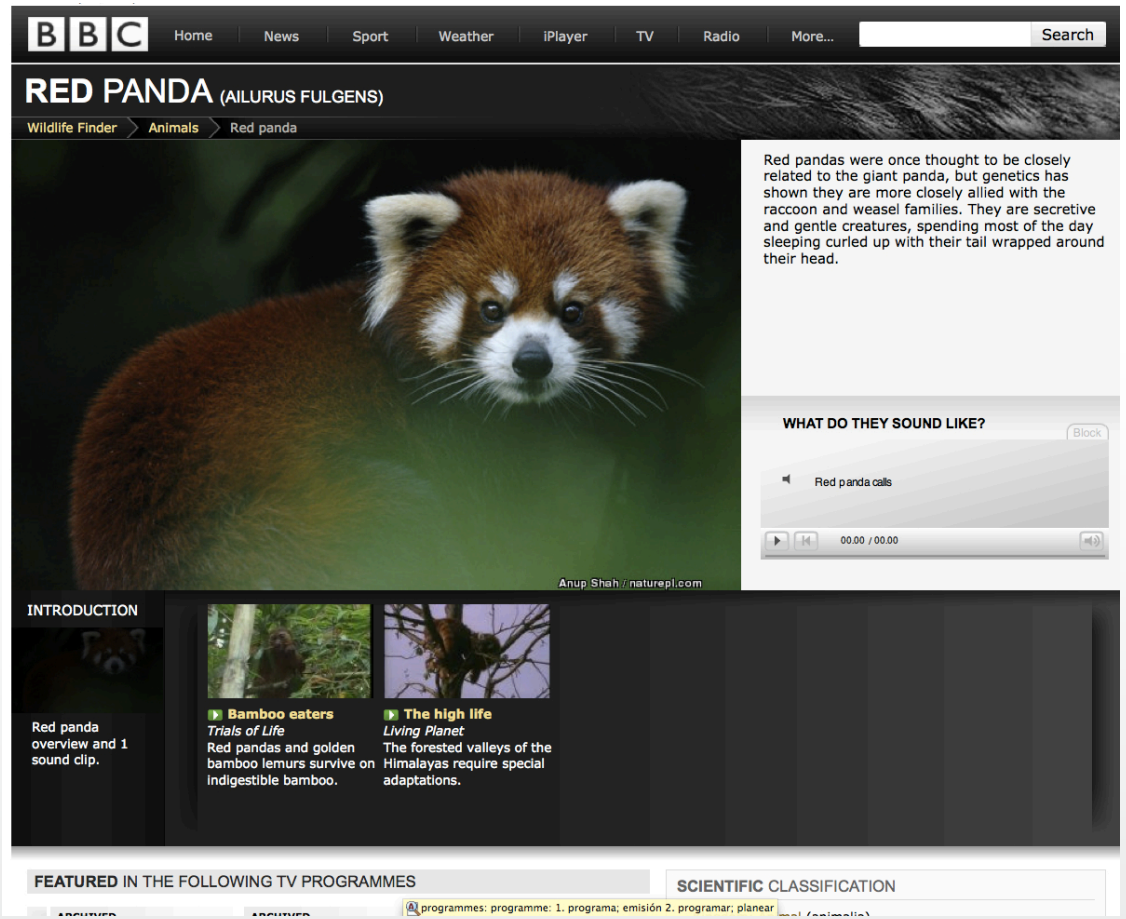

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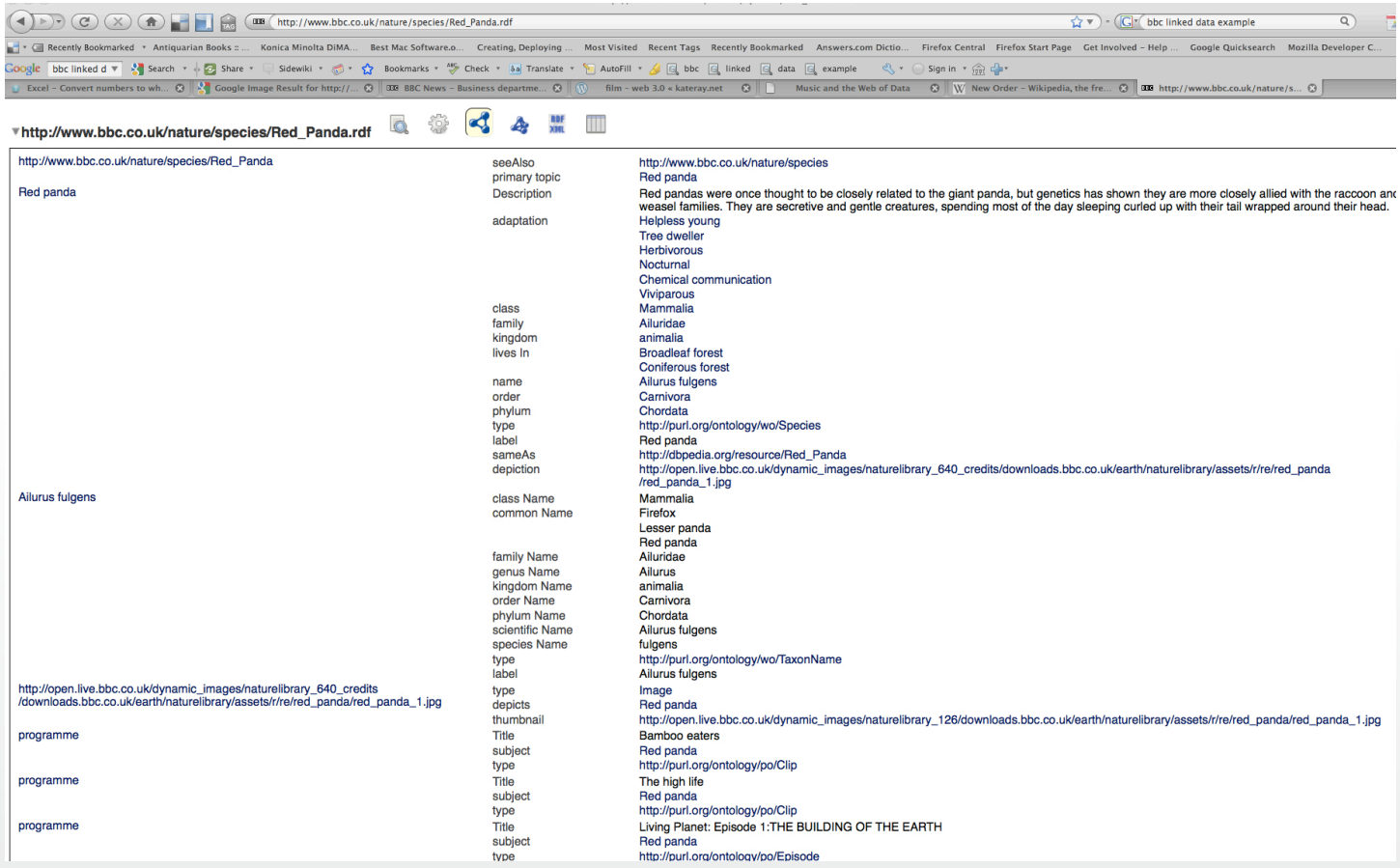

http://www.bbc.co.uk/nature/species/Red_Panda.rdf

http://www.bbc.co.uk/nature/species/Red_Panda	seeAlso	http://www.bbc.co.uk/nature/species
	primary topic	Red panda
Red panda	Description	Red pandas were once thought to be closely related to the giant panda, but genetics has shown they are more closely allied with the raccoon and weasel families. They are secretive and gentle creatures, spending most of the day sleeping curled up with their tail wrapped around their head.
	adaptation	Helpless young
		Tree dweller
		Herbivorous
		Nocturnal
		Chemical communication
		Viviparous
	class	Mammalia
	family	Ailuridae
	kingdom	animalia
	lives In	Broadleaf forest
		Coniferous forest
	name	Ailurus fulgens
	order	Carnivora
	phylum	Chordata
	type	http://purl.org/ontology/wo/Species
	label	Red panda
	sameAs	http://dbpedia.org/resource/Red_Panda
	depiction	http://open.live.bbc.co.uk/dynamic_images/naturelibrary_640_credits/downloads.bbc.co.uk/earth/naturelibrary/assets/r/re/red_panda/red_panda_1.jpg
Ailurus fulgens	class Name	Mammalia
	common Name	Firefox
		Lesser panda
		Red panda
	family Name	Ailuridae
	genus Name	Ailurus
	kingdom Name	animalia
	order Name	Carnivora
	phylum Name	Chordata
	scientific Name	Ailurus fulgens
	species Name	fulgens
	type	http://purl.org/ontology/wo/TaxonName
	label	Ailurus fulgens
http://open.live.bbc.co.uk/dynamic_images/naturelibrary_640_credits/downloads.bbc.co.uk/earth/naturelibrary/assets/r/re/red_panda/red_panda_1.jpg	type	Image
	depicts	Red panda
	thumbnail	http://open.live.bbc.co.uk/dynamic_images/naturelibrary_126/downloads.bbc.co.uk/earth/naturelibrary/assets/r/re/red_panda/red_panda_1.jpg
programme	Title	Bamboo eaters
	subject	Red panda
	type	http://purl.org/ontology/po/Clip
programme	Title	The high life
	subject	Red panda
	type	http://purl.org/ontology/po/Clip
programme	Title	Living Planet: Episode 1:THE BUILDING OF THE EARTH
	subject	Red panda
	type	http://purl.org/ontology/po/Episode

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Data Federation: EPSRC

Information Aggregation: UK Research Councils

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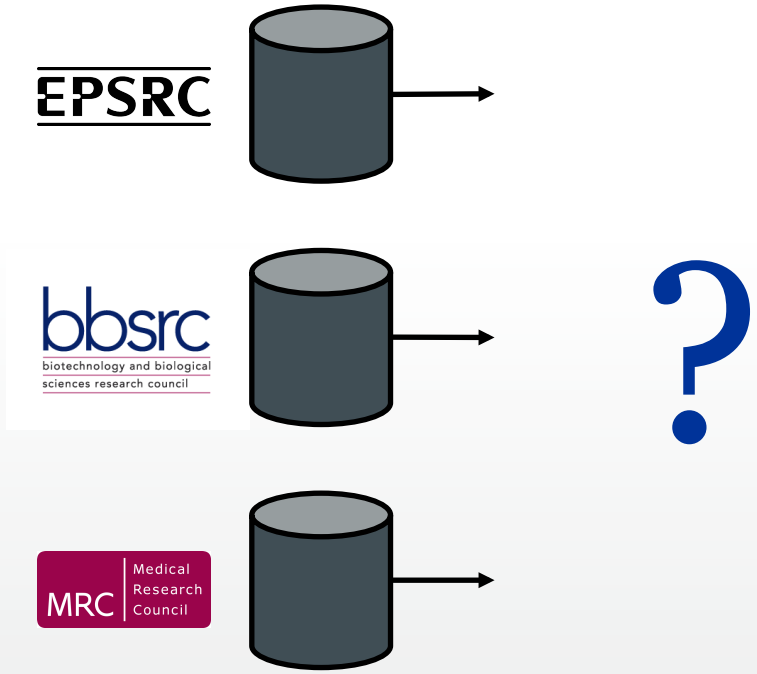

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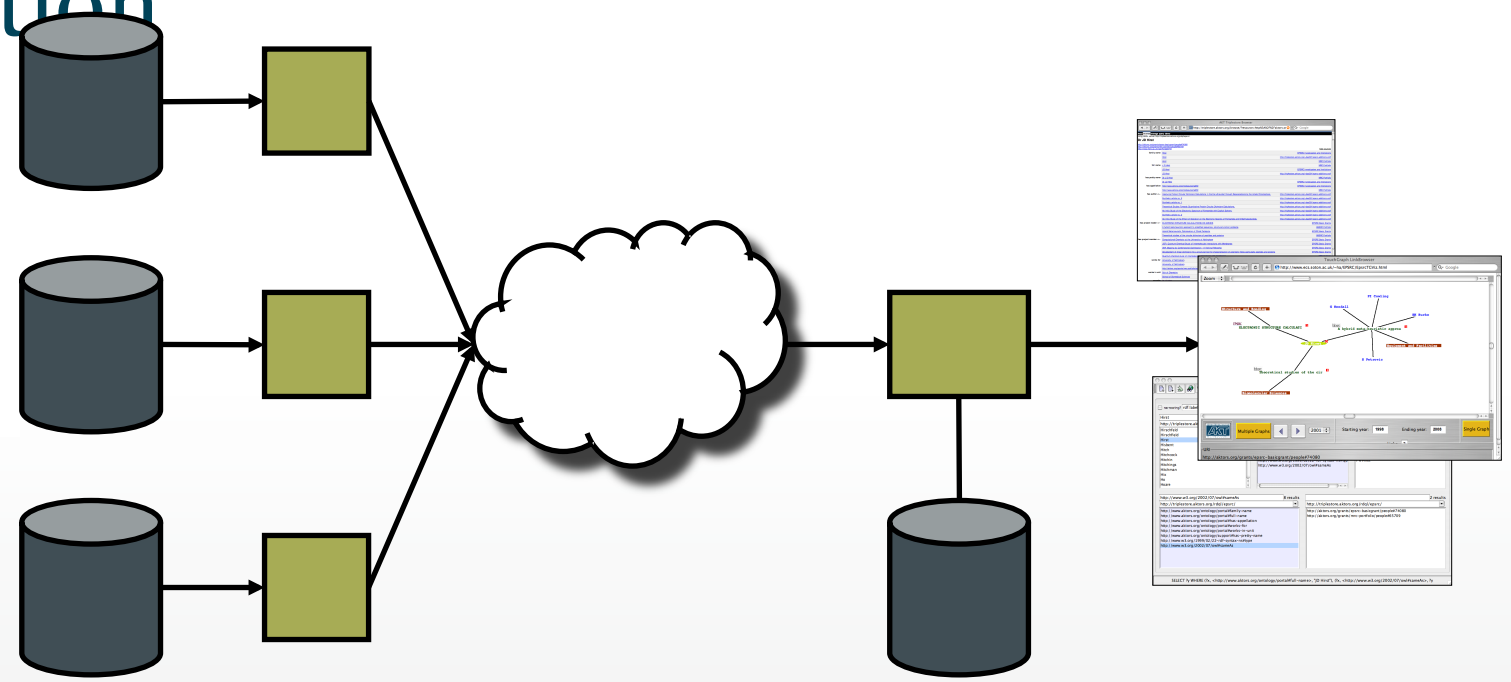
A Solution

EPSRC

bbsrc biotechnology and biological sciences research council

MRC Medical Research Council



data sources

gatherers

Ontology

knowledge repository (triplestore)

applications

RDF Integration

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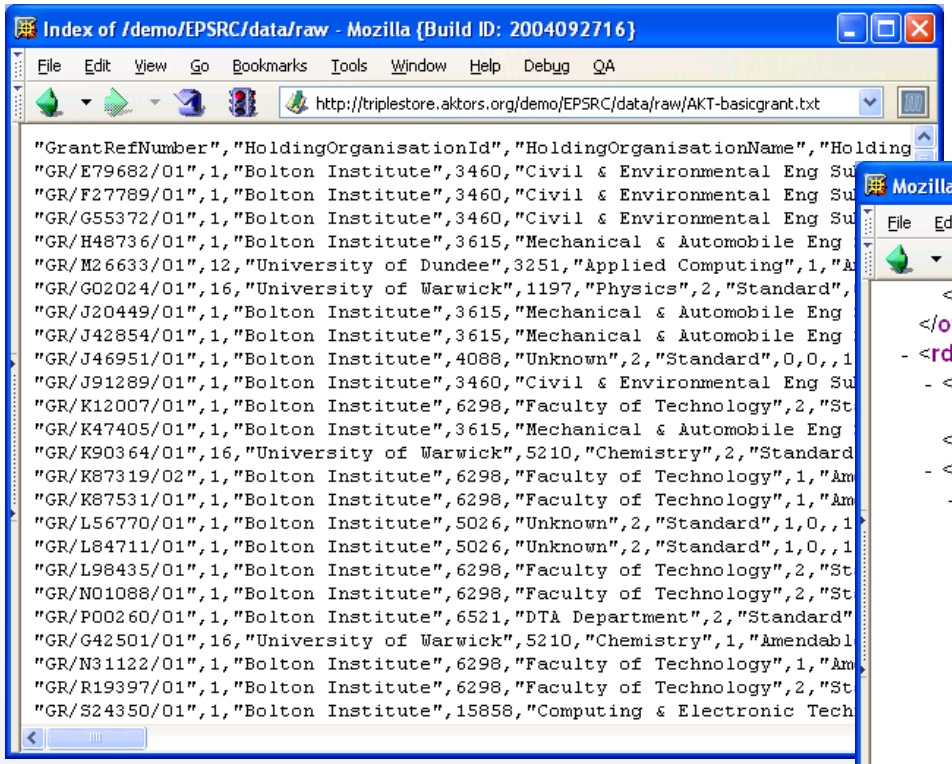
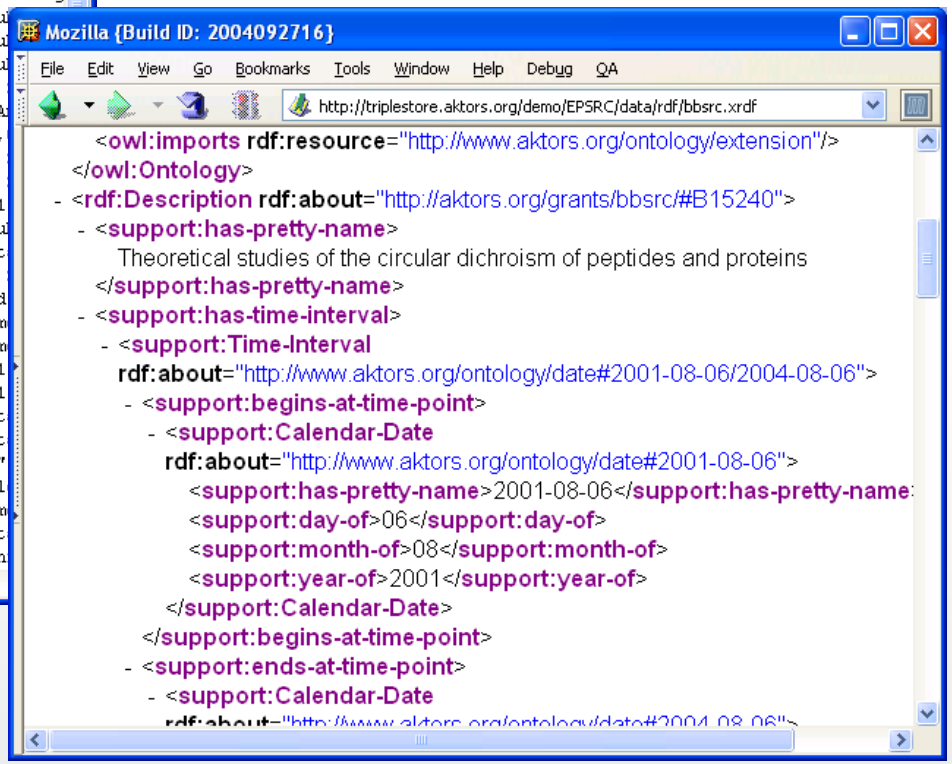


Raw CSV data
Heterogeneous tables



Processed RDF information
Uniform format for files

An Application Service

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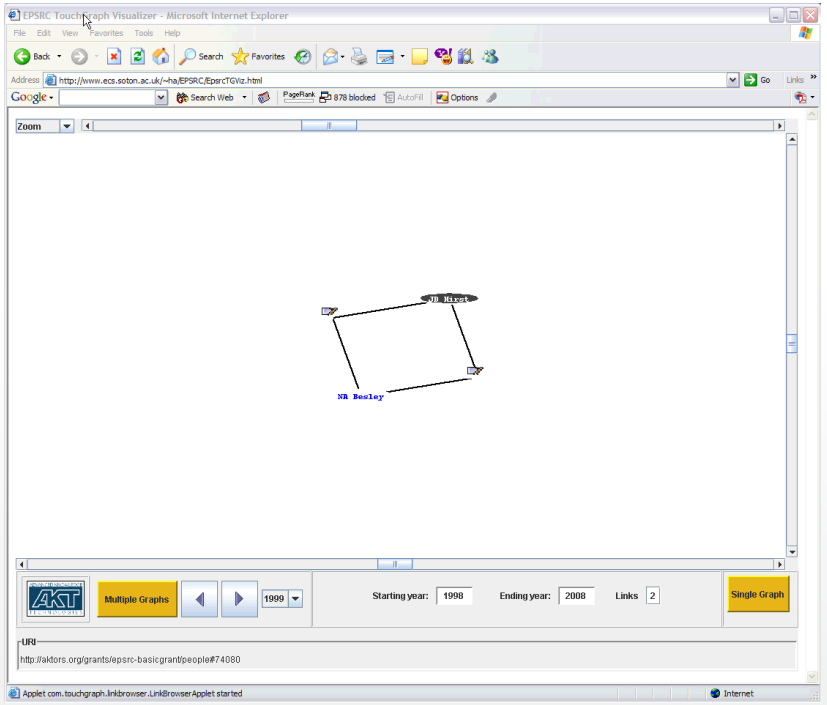
- Relatively simple could yield real information integration and interoperability benefits
- Reuse was real but again lightweight
- Ontology winnowing needed



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What this means for you

Web of Linked Data

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- The Web of Linked Data will change
  - Government
  - Business
  - Cities
  - Universities
  - Libraries
  - :
- Exploitation of
  - open data
  - open standards
- Can apply to data intranets as well as extranets

Your Data Environment

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- What data do you hold?
- What form is it in?
- Are there licenses that restrict its use
- Do there need to be?
- Can you easily exchange it?
- Can you publish it so that machines can use directly as data?
- What data do your clients/users/collaborators/external agents hold?
- Is information flow efficient?
- What data could you exploit that is out there?

How could YOU exploit YOUR data?

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- Transparency
- Accountability
- Efficiency
- Economic value
- Social capital
- Marketing
- Apps for your data

Next steps

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- A data Web strategy
- Catalogue your data environment
- Build a prototype or proof of concept
- We are here to help