

Government Linked Data: A Tipping Point for the Semantic Web

Professor Nigel Shadbolt FREng
UK Government Information Advisor

ASWC 2009, Shanghai 8 December 2009

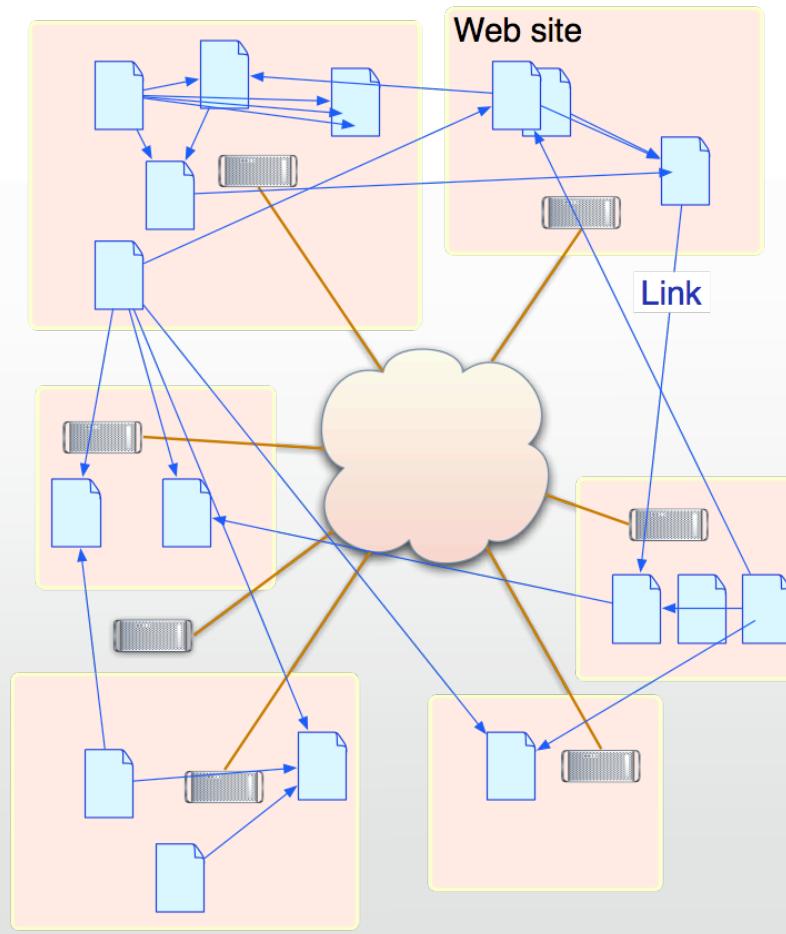


Nigel Shadbolt

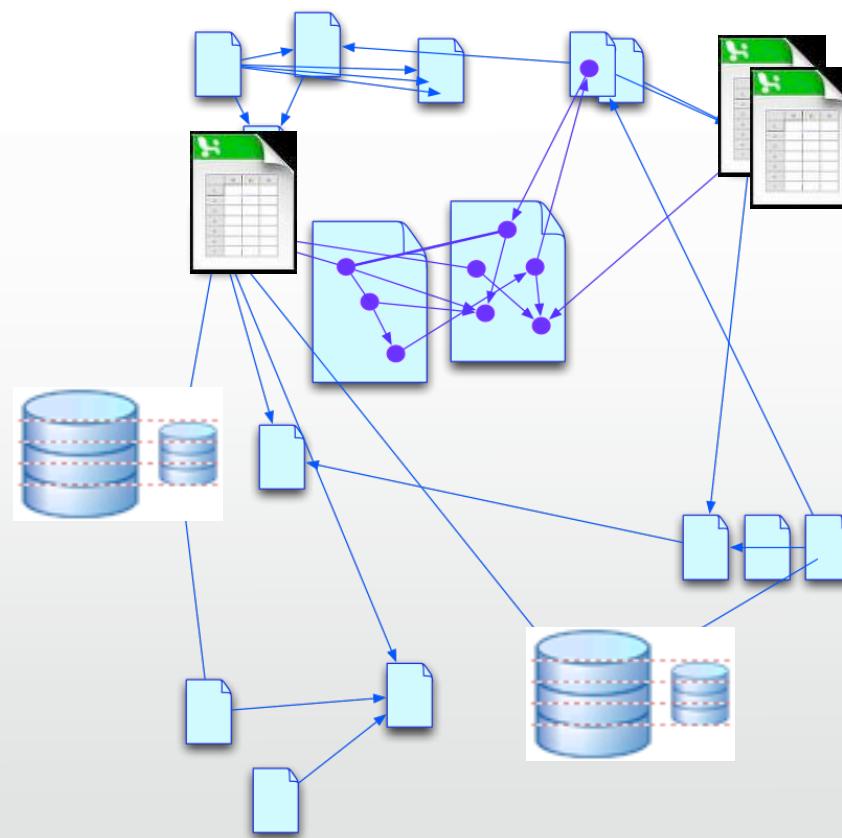
Structure

- Review the principles of Linked Data
- The growing Web of Linked Open Data
- Describe the UK Making Public Data Public Project
- Lessons Learnt
- Implications and opportunities

From a Web of documents...



To a Web of data...



Technical Principles

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.

The Semantic Web Revisited

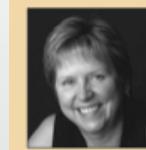
*Nigel Shadbolt and Wendy Hall, University of Southampton
Tim Berners-Lee, Massachusetts Institute of Technology*



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.



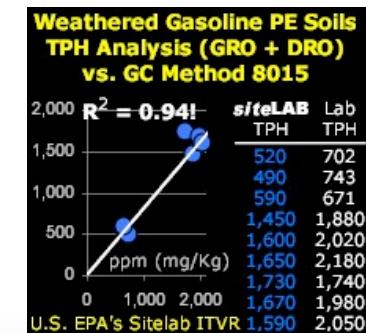
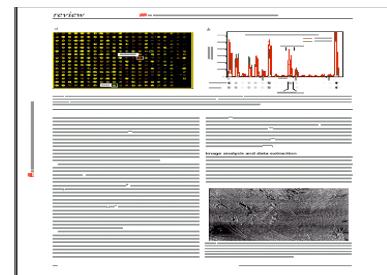
Tim Berners-Lee is the director of the World Wide Web Consortium, a senior researcher at the Massachusetts Institute of Technology's Computer Science and Artificial Intelligence Laboratory, and a professor of computer science in the Department of Electronics and Computer Science at Southampton University.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



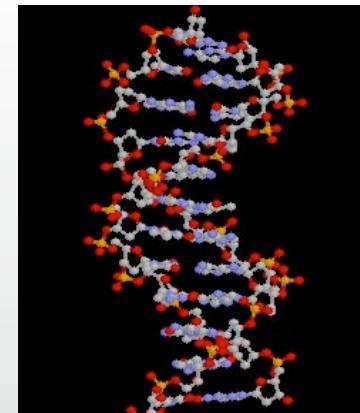
Wendy Hall is a professor of computer science in the School of Electronics and Computer Science at Southampton University. Contact her at wh@ecs.soton.ac.uk.

Can mark up and link any resource...

- Publications...
- Multimedia...
- Databases...
- Scientific structures...
- Workflow...
- People...



Web data set (XHTML)



Principle 1: URIs

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

<http://id.ecs.soton.ac.uk/person/2686>

<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

- Uniform Resource identifier
- 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		
	Description	This rdf document contains information about a person Southampton. http://www.ecs.soton.ac.uk/people/nrs
	Source	Southampton ECS People: Professor Nigel R Shadbo
	Title	2009-11-26T10:53:20Z
	Date Created	Ontology
	type	Southampton ECS People: Professor Nigel R Shadbo
	label	Professor
Nigel Shadbolt	Appellation	Shadbolt
	Family Name	Professor Nigel R Shadbolt
	Full Name	Nigel R
	Given Name	http://id.ecs.soton.ac.uk/role/2686
	Role	http://id.ecs.soton.ac.uk/project/221
	member Of	http://id.ecs.soton.ac.uk/project/293
		http://id.ecs.soton.ac.uk/project/312
		http://id.ecs.soton.ac.uk/project/353
		http://id.ecs.soton.ac.uk/project/361
		http://id.ecs.soton.ac.uk/project/381
		http://id.ecs.soton.ac.uk/project/395
		http://id.ecs.soton.ac.uk/project/443
		http://id.ecs.soton.ac.uk/project/44
		http://id.ecs.soton.ac.uk/project/45
		http://id.ecs.soton.ac.uk/project/463
		http://id.ecs.soton.ac.uk/project/464
		http://id.ecs.soton.ac.uk/project/465
		http://id.ecs.soton.ac.uk/project/466
		http://id.ecs.soton.ac.uk/project/467
		http://id.ecs.soton.ac.uk/project/508
		http://id.ecs.soton.ac.uk/project/623
		http://id.ecs.soton.ac.uk/project/629
		http://id.ecs.soton.ac.uk/project/630
	type	Person
	family name	Shadbolt
	givenname	Nigel R
	homepage	http://users.ecs.soton.ac.uk/nrs/
	img	http://www.ecs.soton.ac.uk/image.php?id=person_268
	mbox	http://www.ecs.soton.ac.uk/image.php?id=person_268&checksum=6c2158b33a0c10e328ec62f9ed1cc73
	name	mailto:nrs@ecs.soton.ac.uk
		Professor Nigel R Shadbolt

Principle 3: RDF back

- 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		
Southampton ECS Projects: MIMEX: Multivariant Information Management and Exploitation	Description	This rdf document contains information about a University of Southampton. http://www.ecs.soton.ac.uk/research/projects/4
http://id.ecs.soton.ac.uk/project/443	Source	Southampton ECS Projects: MIMEX: Multivariant Information Management and Exploitation
	Title	2009-11-26T10:58:31Z
	Date Created	Ontology
	type	Southampton ECS Projects: MIMEX: Multivariant Information Management and Exploitation
	label	http://id.ecs.soton.ac.uk/UoS
	associated With	General Dynamics
		Organization
	associated With Unit	University of Card
	Name	Organization
	Theme	Ministry of Defenc
		Organization
	Web Page	http://id.ecs.soton.ac.uk/UoS/ECS
	run By Group	MIMEX: Multivariant Information Management
	begins	http://id.ecs.soton.ac.uk/theme/106
		http://id.ecs.soton.ac.uk/theme/127
	ends	http://id.ecs.soton.ac.uk/theme/130
		http://id.ecs.soton.ac.uk/theme/38
		http://id.ecs.soton.ac.uk/theme/66
		https://www.edefence.org/mimex
		http://id.ecs.soton.ac.uk/group/iam
		in Calendar Clock
		day
		hour
		minute
		month
		year
		type
		2006-07-03T00:00:00Z
		Instant
		in Calendar Clock
		day
		hour
		minute
		month
		year
		type
		2009-03-31T00:00:00Z
		Instant

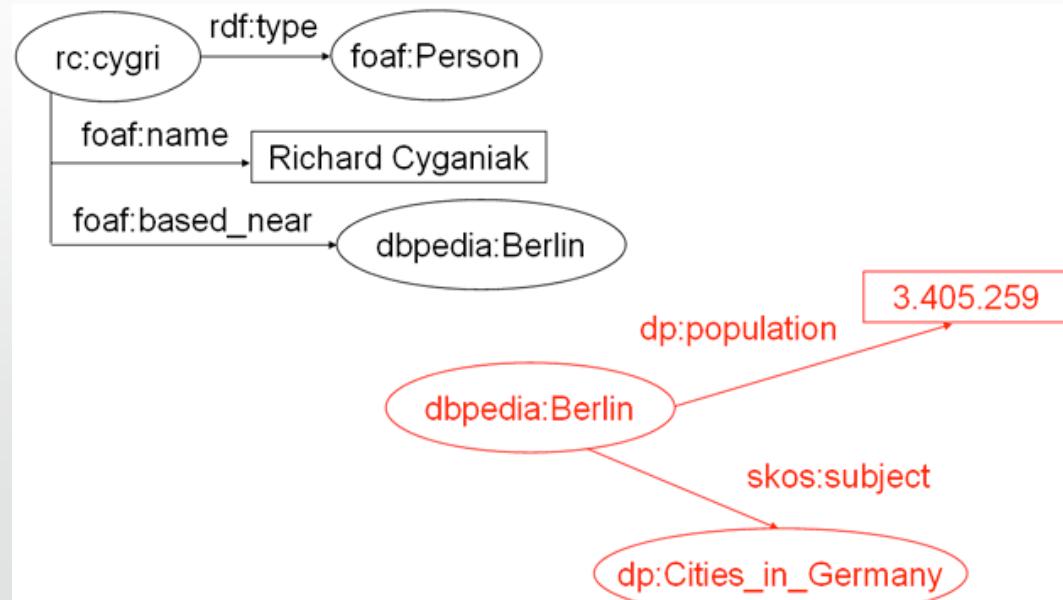
Essential RDF

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

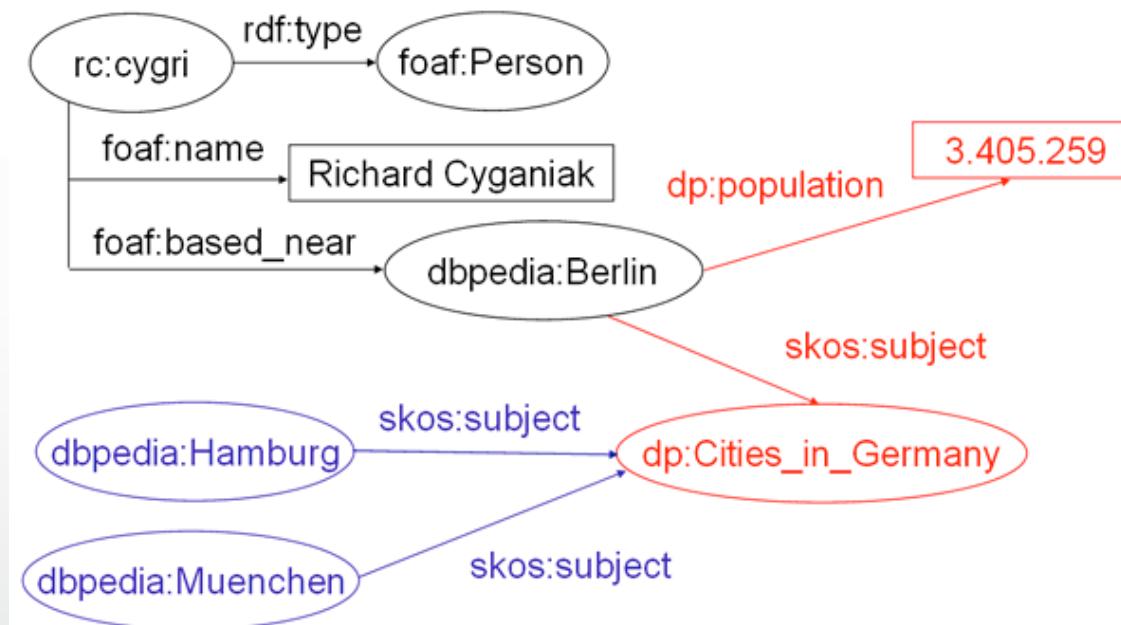
rc:cygri	rdf:type	foaf:Person.
rc:cygri	foaf:name	"Richard Cyganiak" .
rc:cygri	foaf:based_near	dbpedia:Berlin .
dbpedia:Berlin	dp:population	"3,405,259"
dpedia:Berlin	skos:subject	dp:Cities_in_Germany.

Essential RDF

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



Principle 4: Link data



Chris Bizer et al

Principle 4: Link data

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

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

http://dbpedia.org/resource/Nigel_Shadbolt

The image shows three parallel web browser windows, each displaying a list of linked data resources for 'Nigel Shadbolt'.

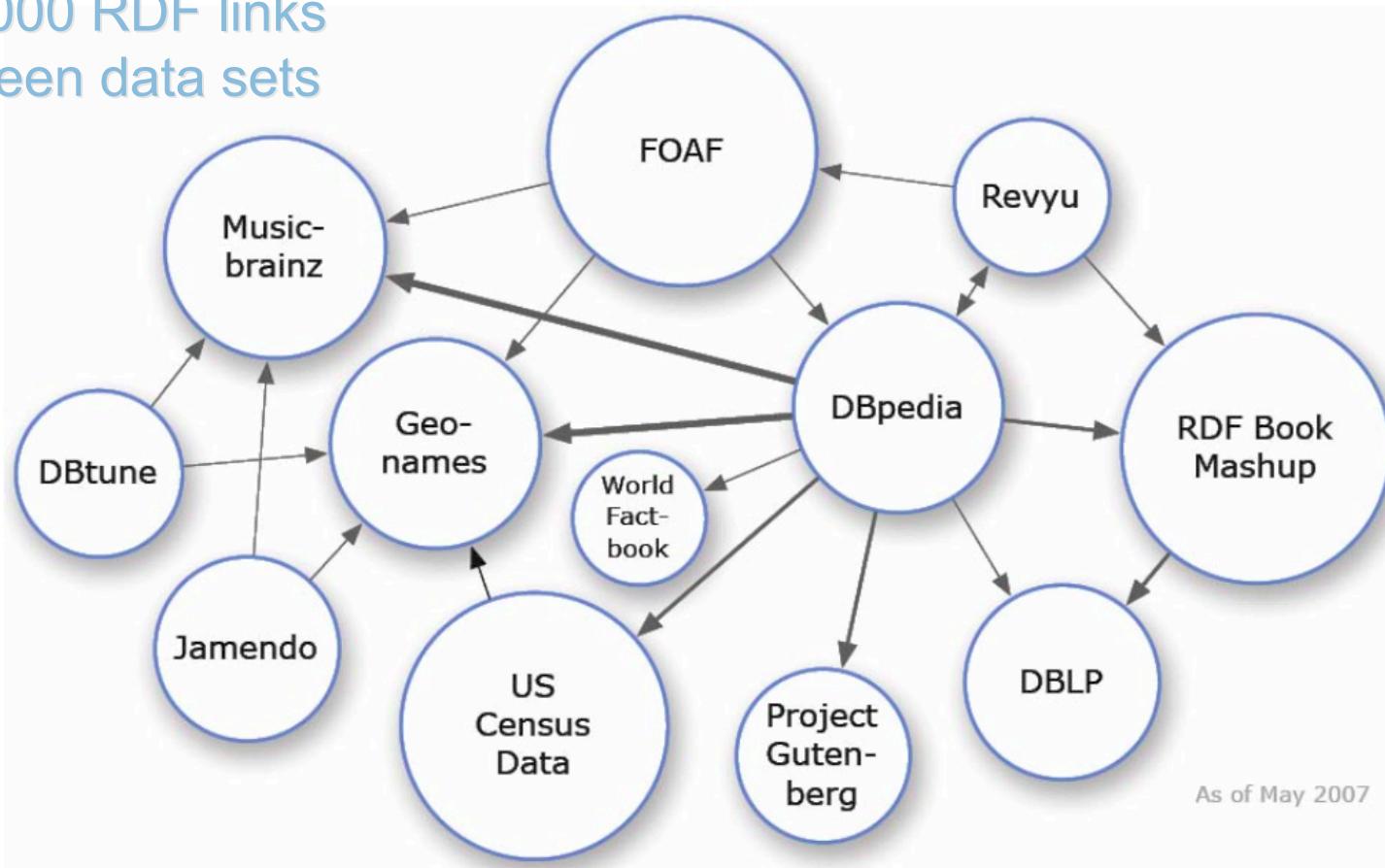
- SIGMA (Left):** Shows a list of 20 sources, including various academic papers and reports. Examples include 'Nigel.R.Shadbolt', 'AKT Selected Papers 2004', and 'INSTRUCTA-Phase II'.
- AANTIC (Middle):** Shows a list of 20 sources, including 'Nigel_Shadbolt', 'Semantic Web', and 'Academics of the University of Southampton'.
- DBpedia (Right):** Shows a list of 20 sources, including 'Nigel Shadbolt', 'Untitled document', and 'Academics of the University of Southampton'.

Each browser window has a 'Sources (20)' button, an 'Approved (0)' button, and a 'Rejected (0)' button. The DBpedia window also shows a 'Hide' button. The bottom of each window has a navigation bar with buttons for 'reject all', 'approve all', and 'add source url'.

Linked Data on the Web: May 2007^{an}

500 Million RDF Triples

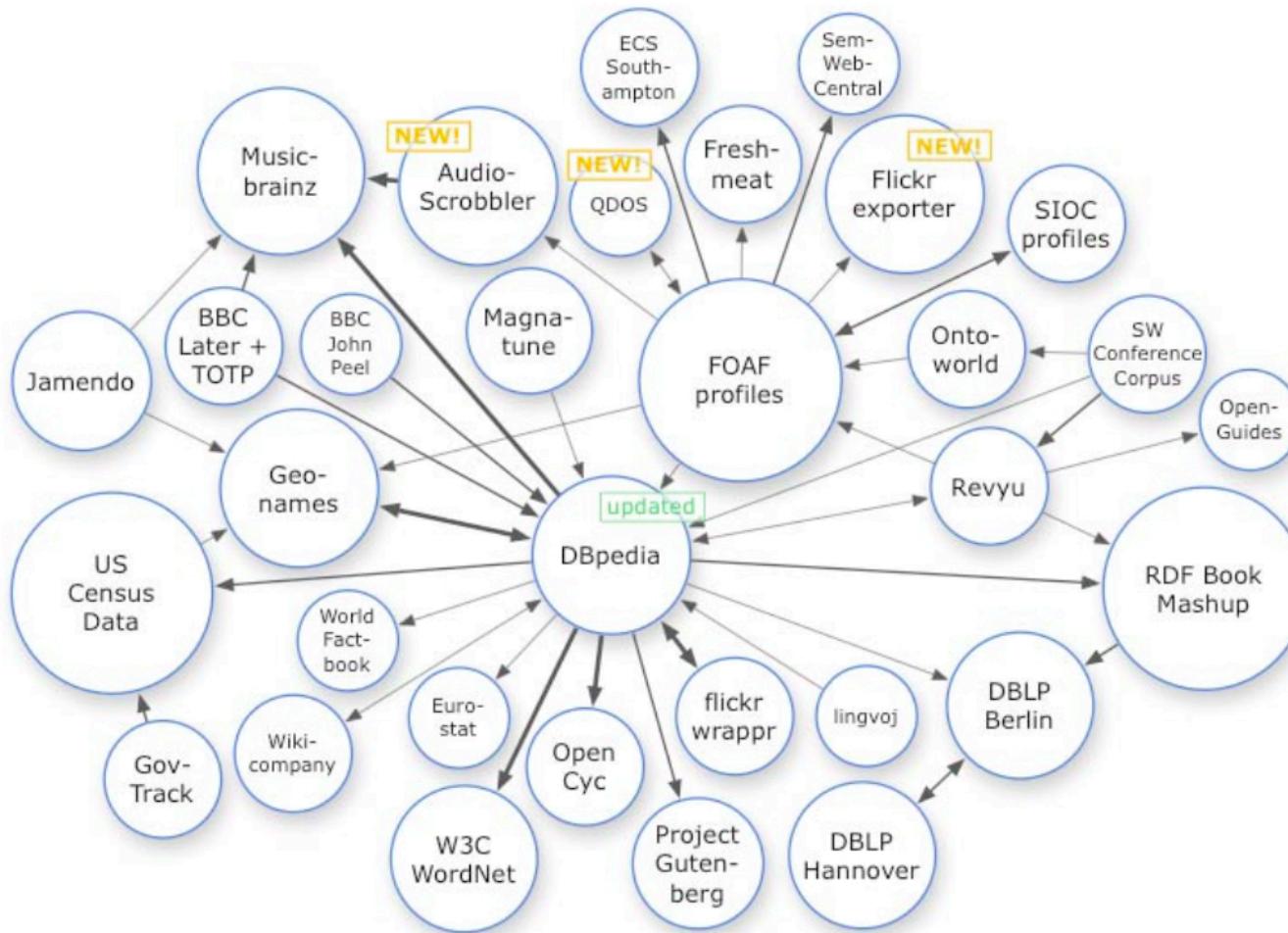
120,000 RDF links
between data sets



As of May 2007

Richard Cyganiak

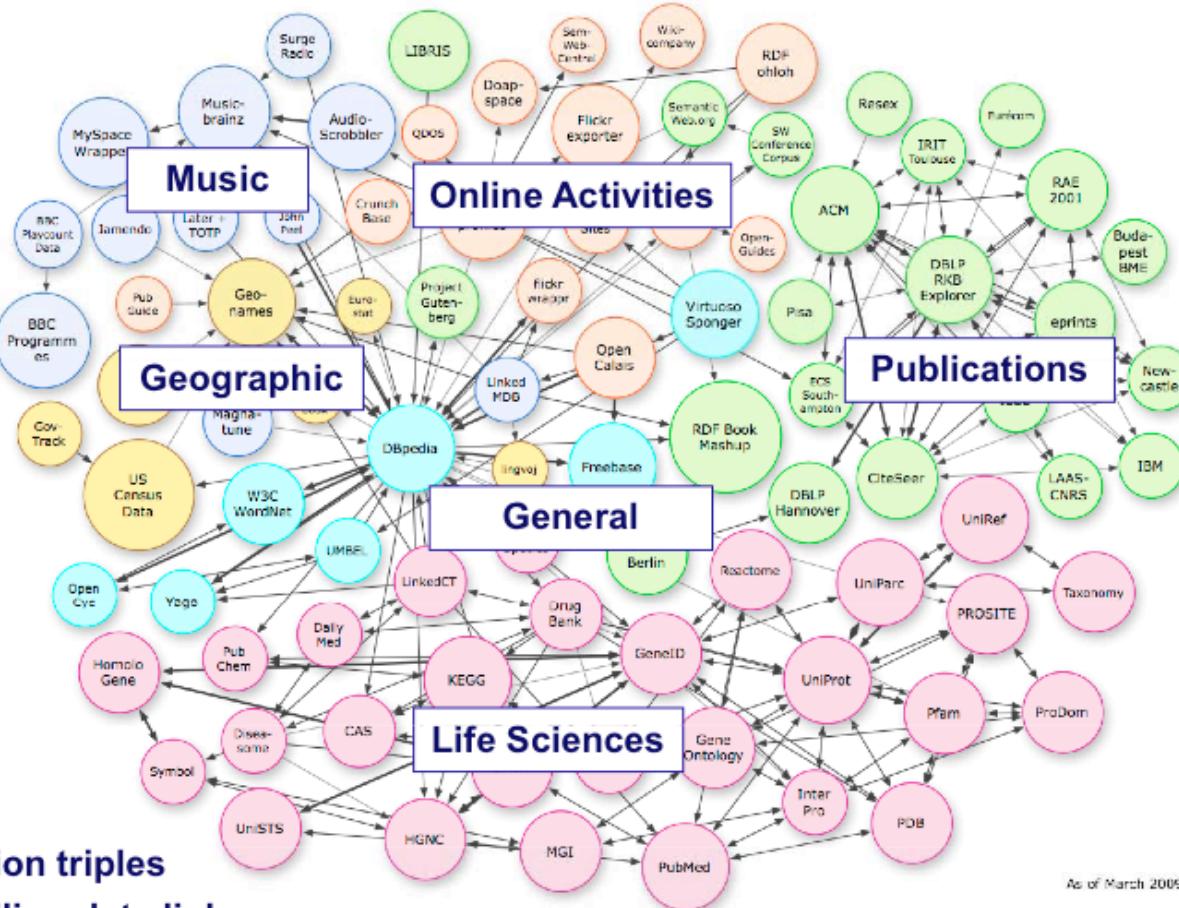
Linked Data on the Web: February 2008



Richard Cyganiak

Linked Data on the Web: March 2009

LOD Datasets on the Web: March 2009



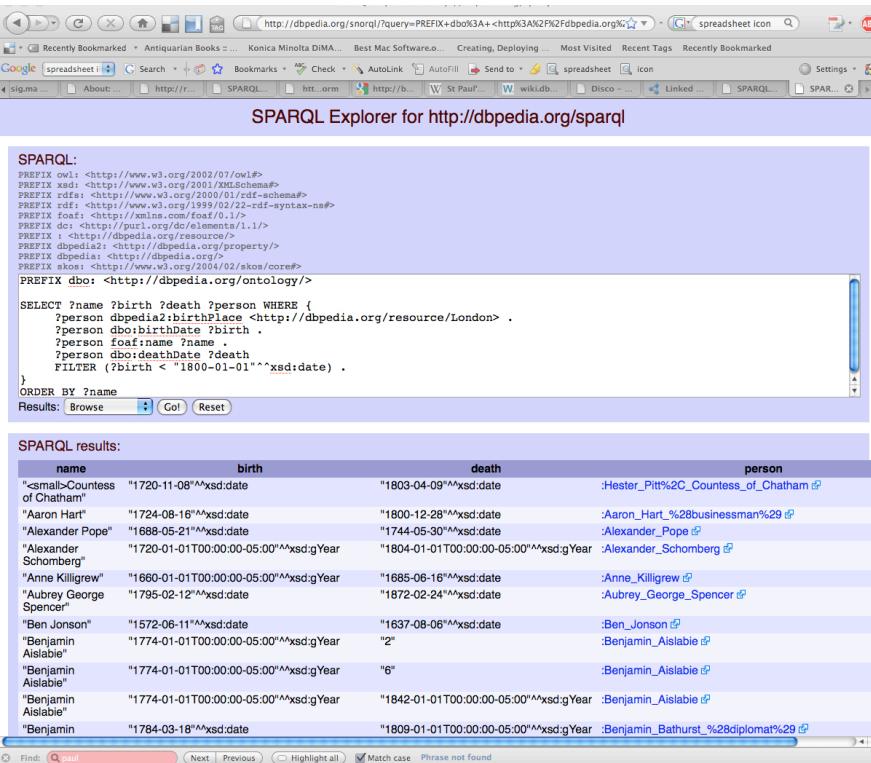
4.5 billion triples
180 million data links

60 of March 2009

Richard Cyganiak

SPARQL

- A data access language for RDF triples on the Web
- Queries across diverse data sources, whether the data is stored natively as RDF or viewed as RDF via middleware
- SPARQL contains capabilities for querying required and optional graph patterns along with their conjunctions and disjunctions



The screenshot shows a web-based SPARQL query interface. The top part is a code editor containing a SPARQL query. The bottom part is a table showing the results of the query.

SPARQL:

```

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX doi: <http://purl.org/dc/elements/1.1/>
PREFIX dbpedia: <http://dbpedia.org/resource/>
PREFIX dbpedia2: <http://dbpedia.org/resource/>
PREFIX dbpedia2a: <http://dbpedia.org/resource/>
PREFIX dbpedia2b: <http://dbpedia.org/resource/>
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:

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



Office of
PUBLIC SECTOR INFORMATION



Land Registry
Cymraeg



national **STATISTICS**

LONDON

CabinetOffice



The proof of concept

Unlocking the Potential of Public Sector Information with Semantic Web Technology

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Nigel Shadbolt¹, and Carol Tullo²

¹ Intelligence, Agents, Multimedia

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London, UK

{john.sheridan, carol.tullo}@opsi.x.gsi.gov.uk

The proof of concept



Fig. 2. Google Maps mashup of the Camden Food Premises dataset made possible by mapping the data to the OS Address Layer II and PointX dataset

The approach became embedded



The United Kingdom Implementation of
the European Directive on the Re-use of
Public Sector Information

- the first two years

A Report by the Office of Public Sector Information
July 2007

AKTive PSI: Leading by Example

- 4.20 The UK public sector is a source of rich, high quality and sought after data. While much of this information is published and available for re-use by others, it is often trapped by poor data structures, locked up in legacy data formats or in fragmented databases.
- 4.21 To explore the issues more fully, in 2005-6, OPSI worked with Advanced Knowledge Technologies (AKT),³⁶ an inter-disciplinary research project led by the University of Southampton. OPSI's work with AKT, in a research project called AKTive PSI, had two aims:
 - to raise awareness about and disseminate the capabilities of semantic web technologies amongst government departments, agencies and local authorities;
 - to show what is possible using this technology.
- 4.22 OPSI brought together a diverse collection of public sector information assets to experiment with. A number of public sector organisations were involved in the project, including Ordnance Survey, the Met Office, the Department for Communities and Local Government, the Office for National Statistics, the Department for Environment, Food and Rural Affairs, the Environment Agency and the London Boroughs of Camden and Lewisham. The project underlined the potential for the use of semantic web technology in large scale integration of public sector information and the benefits such aggregation would bring. Semantic Web technology provides the best model for a range of interoperability issues. If widely adopted it would do much to harness the re-use of public sector information.
- 4.23 AKTive PSI has spawned further work in government using Semantic Web technology³⁷. OPSI is using this technology in the following ways:

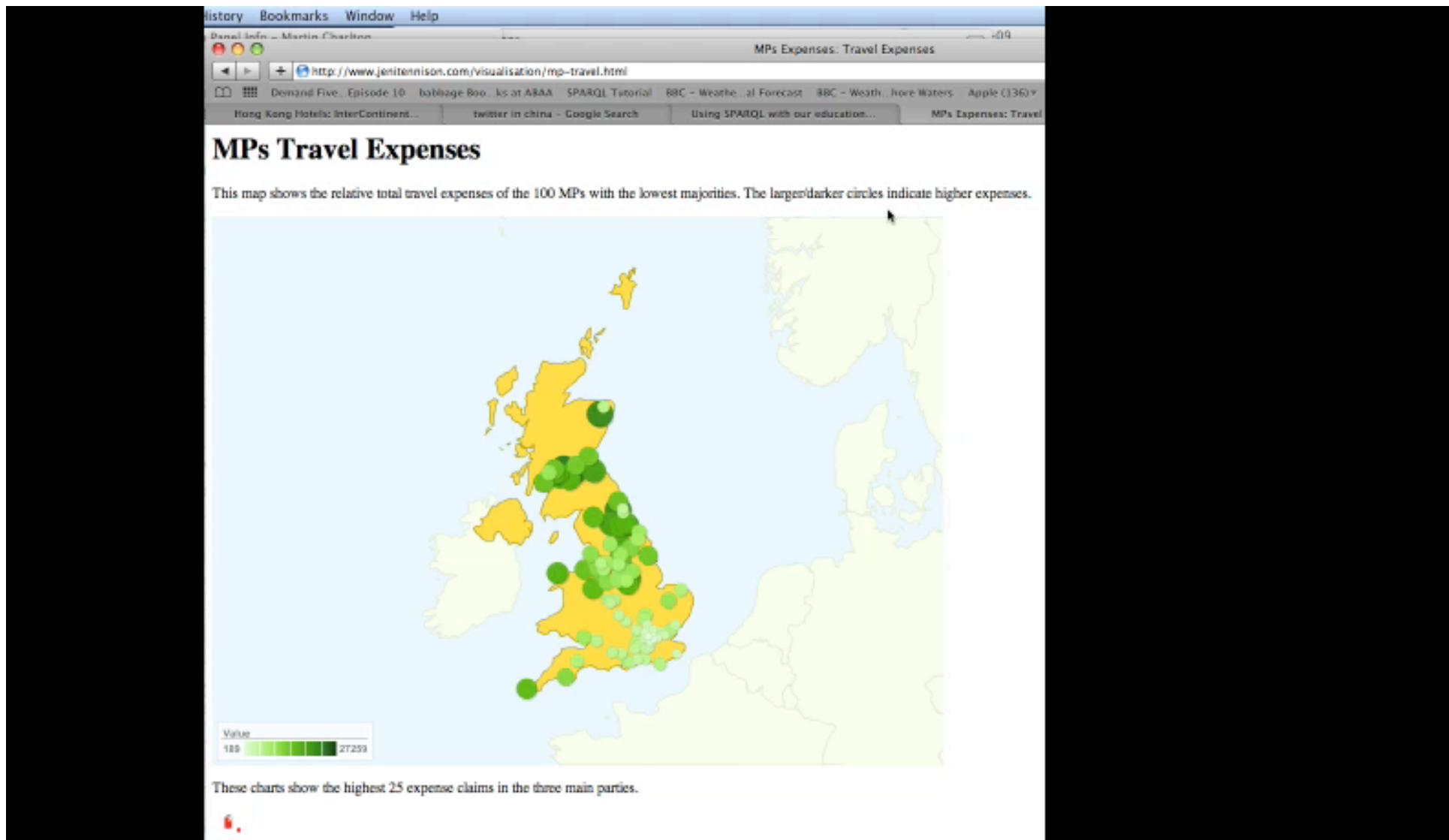
And then the unanticipated Information Advisors to HMG



The Context

- Berners-Lee and Shadbolt - Information Advisors
- Context - PoI Taskforce
- Previous work with OPSI
- Why do this?
 - Transparency and accountability
 - Economic and Social Value
 - Public Service Improvement
 - New Industries New Jobs

Transparency and Accountability



Social and Economic Value

school type: all (23161) age: - specialism: all no. schools: 20 order by: -

no	name	stage	type	age range	special	ofsted report	Key stage 2	Key stage 3	GCSE	GCE and VCE
1	3 Dimensions	Independent special school	-	11-16	-	yes	-	-	-	-
2	Ab Kettleby Community Primary School	Primary school	Community	4-11	-	yes	-	-	-	-
3	Abacus Primary School	Primary school	Community	4-11	-	yes	28.7	-	-	-
4	Abbas and Templecombe Church of England Primary School	Primary school	Voluntary controlled	4-11	-	yes	32.1	-	-	-
5	Abberley Parochial VC Primary School	Primary school	Voluntary controlled	4-11	-	yes	-	-	-	-
6	Abbey CofE Infant School	Primary school	Voluntary controlled	null	null	yes	-	-	-	-
7	Abbey College	Independent school	Other Independent	14-19	-	yes	-	-	204	669.3
8	Abbey College	Independent school	Other Independent	14-19	-	yes	-	-	83.9	759.9
9	Abbey College	Independent school	Other Independent	13-19	-	yes	-	-	-	626.3
10	Abbey College, Ramsey	Secondary school	Voluntary controlled	11-18	T	yes	-	34.9	353.5	691.9
11	Abbey Court Community Special School	Community special school	-	4-19	-	yes	-	17	-	-
12	Abbey Gate College	unknown	-	4-18	-	no	-	-	429.2	689.2
13	Abbey Gates Primary School	Primary school	Community	5-11	-	yes	28.4	-	-	-
14	Abbey Grange Church of England High School	Secondary school	Voluntary aided	11-18	H	yes	-	38.6	418	812.7
15	Abbey Hey Primary School	Primary school	Community	3-11	-	yes	25	-	-	-
16	Abbey Hill School and Performing Arts College	Community special school	-	2-19	A	yes	15.9	19	79.8	-
17	Abbey Hill School and Technology College	Community special school	-	11-19	T	yes	-	17.9	54.8	-
18	Abbey Hulton Primary School	Primary school	Community	3-11	-	yes	28.6	-	-	-
19	Abbey Infant School	Primary school	Community	null	null	yes	-	-	-	-
20	Abbey Infants' School	Primary school	Community	null	null	yes	-	-	-	-

20 / 24832 schools

Google search the map Search ©2009 Tele Atlas Terms of Use

Search find address

Layers panoramio panoramio (popular) wikipedia

Social and Economic Value

school type: Primary school (12) age: - specialism: all no. schools: 20 order by: -

no	name	stage	type	age range	special	ofsted report	Key stage 2	Key stage 3	GCSE	GCE and VCE	distance
1	Brockenhurst Church of England Primary School	Primary school	Voluntary controlled	4-11	-	yes	30	-	-	-	7.052 krr
2	Hordle CofE Primary School	Primary school	Voluntary aided	4-11	-	yes	28.8	-	-	-	6.811 krr
3	Lymington Church of England Infant School	Primary school	Voluntary aided	null	yes	-	-	-	-	-	1.124 krr
4	Lymington Junior School	Primary school	Community	7-11	-	yes	29	-	-	-	1.124 krr
5	Milford-on-Sea Church of England Primary School	Primary school	Voluntary aided	4-11	-	yes	29.2	-	-	-	7.681 krr
6	Our Lady and St Joseph Catholic Primary School	Primary school	Voluntary aided	4-11	-	yes	28.4	-	-	-	2.863 krr
7	Pennington Church of England Junior School	Primary school	Voluntary controlled	7-11	-	yes	29	-	-	-	2.662 krr
8	Pennington Infant School	Primary school	Community	null	null	yes	-	-	-	-	2.662 krr
9	South Badsey Church of England Primary School	Primary school	Voluntary controlled	4-11	-	yes	31.5	-	-	-	4.291 krr
10	St Luke's Church of England Primary School	Primary school	Voluntary controlled	4-11	-	yes	30.1	-	-	-	6.402 krr
11	William Gilpin Church of England Primary School	Primary school	Voluntary aided	4-11	-	yes	-	-	-	-	error
12	Yarmouth Church of England Aided Primary School	Primary school	Voluntary aided	null	null	yes	-	-	-	-	error

[calculate all]

12 / 12 schools

Google search the map Search ... data ©2009 Tele Atlas - Terms of Use

Search

Layers panoramio panoramio (popular) wikipedia

Social and Economic Value

The screenshot shows a web browser window with the URL <http://www.where-can-i-live.com/londonproperty/covent-garden/time-20/bedrooms-1/type-buy/maxprice-250000>. The page title is "Property in London within 20 minutes to Covent Garden, with 1 bedrooms and a maximum price of £250000". The search criteria are: "I need to commute to the London underground station" (Covent Garden), "I can afford a 1 bedroom property to buy", "For less than £250,000", and "It shouldn't take longer than 20 minutes from station to station". The search button is visible. The map of London shows the underground network with various stations marked. A green arrow points to Covent Garden on the map. The right side of the page displays a table titled "COMMUTE TO Covent Garden" with 15 rows of data. The table has columns for "Commute from (max 20 stations)", "Time in minutes", and "avg. Price".

Commute from (max 20 stations)	Time in minutes	avg. Price
Holloway Road	10	£237,072
Finsbury Park	13	£237,072
Elephant and Castle	14	£234,555
Manor House	15	£224,248
Stockwell	17	£228,897
Bethnal Green	18	£235,893
Tumpike Lane	18	£192,352
Seven Sisters	19	£186,489
Brixton	19	£221,482
Archway	20	£235,843
Wood Green	20	£179,318
Bermondsey	20	£196,830

Improving Public Services



FillThatHole
.ORG.UK



Contents

- ▼ Hazards
 - Report a hazard
 - Map
 - List
 - Monthly Totals
- ▼ Authorities
 - List
 - League Table
- Information
- Pothole News
- Search
- Help
- Contact

User login

Username:

Password:

- [Create new account](#)
- [Request new password](#)

CTC Websites

- [Main CTC Site](#)
- [Accident Line](#)
- [Cycle insurance](#)
- [Forum](#)
- [Holidays](#)
- [Maps](#)
- [Shop](#)
- [Travel Insurance](#)

Map

Click on the map to zoom in, click a hazard marker flag for more information.

Map | Satellite | Maximise

Go to: [so41 9du](#)

Map data ©2009 Tele Atlas - [Terms of Use](#)

Go To Hazard

#

Site Statistics

Total reports: 23,657
Fixed reports: 8,627
Percent fixed: 36%
Reports per day: 22.1

Contents © 2000-2007 CTC, the UK's national cyclists' organisation, All Rights Reserved.
[CTC Main Site](#) | [Contact](#)

Improving Public Services

Monthly Totals

Hazards Reported by Month

Month	2007	2008	2009
Jan	600	1100	700
Feb	800	900	1200
Mar	2200	800	1000
Apr	900	800	1200
May	700	500	900
Jun	550	450	550
Jul	550	450	500
Aug	450	450	500
Sep	350	400	450
Oct	300	350	350
Nov	250	350	400
Dec	350	350	200

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User login

Username:

Password:

- [Create new account](#)
- [Request new password](#)

CTC Websites

- [Main CTC Site](#)
- [Accident Line](#)
- [Cycle insurance](#)
- [Forum](#)
- [Holidays](#)
- [Maps](#)
- [Shop](#)
- [Travel Insurance](#)

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You spot it...

You log it...

They sort it...

Go To Hazard

#

Site Statistics

Total reports: 23,657
 Fixed reports: 8,627
 Percent fixed: 36%
 Reports per day: 22.1

Improving Public Services



FillThatHole
 .ORG.UK

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User login

Username:

Password:

• Create new account
• Request new password

CTC Websites

- Main CTC Site
- Accident Line
- Cycle insurance
- Forum
- Holidays
- Maps
- Shop
- Travel Insurance





League Table

Rank (Fixed %)	Authority	Total Reports	Open Reports	Fixed Reports	Fixed %
1	Torfaen	3	0	3	100%
2	Cumbria	225	32	188	85%
3	East Ayrshire	11	2	9	82%
4	Gateshead	17	3	13	81%
5	Clackmannanshire	16	3	13	81%
6	Newcastle	75	14	59	81%
7	Northumberland	202	39	140	78%
8	Durham	54	12	41	77%
9	Sefton	16	4	12	75%
10	Bolton	59	12	33	73%
11	Bracknell Forest	18	5	12	71%
12	North Tyneside	86	23	49	68%
13	Luton	8	3	5	63%
14	Kirklees	108	42	63	60%
15	Scottish Borders	21	8	12	60%
16	Rutland	6	2	3	60%
17	Aberdeenshire	32	13	19	59%
18	Waltham Forest	36	15	21	58%
19	Slough	14	5	7	58%
20	Hounslow	325	129	173	57%
21	Blackpool	8	3	4	57%
22	Halton	7	3	4	57%
23	Blackburn	38	16	21	57%
24	Suffolk	254	106	139	57%
25	Northern Ireland Roads Service	64	27	35	56%
26	Sunderland	19	7	9	56%
27	Powys	20	8	10	56%
28	Plymouth	60	26	31	54%

Go To Hazard

#

Site Statistics

Total reports: 23,657
 Fixed reports: 8,627
 Percent fixed: 36%
 Reports per day: 22.1



Improving Public Services

(Fixed %)	North East Local Authorities	Reports	Reports	Reports	▼ 20%
177	Wakefield	23	17	5	23%
178	Isle of Anglesey	9	7	2	22%
179	Pembrokeshire	9	7	2	22%
180	Neath Port Talbot	23	18	5	22%
181	Leeds	501	395	106	21%
182	Central Bedfordshire	19	15	4	21%
183	Rotherham	48	38	10	21%
184	Glasgow	493	384	101	21%
185	Bromley	144	110	28	20%
186	Islington	258	204	51	20%
187	Bridgend	20	16	4	20%
188	Carmarthenshire	5	4	1	20%
189	Highways Agency	38	29	7	19%
190	Havering	33	27	6	18%
191	Stockton-on-Tees	23	18	4	18%
192	Inverclyde	22	18	4	18%
193	Croydon	423	346	76	18%
194	Coventry	219	180	38	17%
195	Isle of Wight	23	19	4	17%
196	Transport for London	189	155	30	16%
197	Argyll and Bute	19	16	3	16%
198	Monmouthshire	13	11	2	15%
199	Thurrock	7	6	1	14%
200	Darlington	22	19	3	14%
201	Barnsley	37	32	5	14%
202	South Ayrshire	8	7	1	13%
203	Conwy	40	36	4	10%
204	Dumfries and Galloway	91	74	8	10%
205	West Lothian	12	11	1	8%
206	West Dunbartonshire	9	8	0	0%
207	Bedford	7	7	0	0%
208	Ceredigion	4	4	0	0%
209	Merthyr Tydfil	3	3	0	0%
210	Shetland	2	2	0	0%
211	South Tyneside	1	1	0	0%

Our ToR

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
 - Support exploitation and publication of distributed and decentralised information assets
 - Potential for reform of info regulatory framework
3. Drive use of internet to improve Gov consultation process
4. Engage with International dimension
5. Drive culture change in Whitehall - total publication of non-personal data using open standards

Progress to date

- Top down
 - Ministerial
 - CIO/CTOs
 - Engaged key data holders
- Middle Out
 - Civil Servants
 - Inventory of Information Assets
- Bottom up
 - Engaging with developer community
 - Cross Gov URI workshops
 - data.gov.uk
- Dissemination

Number10.gov.uk
The official site of the Prime Minister's Office

Home News Communicate Meet the PM History and Tour Number 10 TV Enter search terms Go

Home > Ordnance Survey to open up data - PM

News

[Latest News](#) [Speeches and Transcripts](#) [Statements and Articles](#) [Prime Minister's Questions](#) [Press Briefings](#) [Press Notices](#) [Webchats](#)

Tuesday 17 November 2009
Ordnance Survey to open up data - PM

The Prime Minister has announced that the public will have more access to Ordnance Survey maps from next year, as part of a government drive to open up data to improve transparency.

- [Communities and Local Government website](#)
- [Read more about the Make Public Data Public project](#)

Gordon Brown said the government and Ordnance Survey, Great Britain's national mapping agency, will open up the data relating to electoral and local authority boundaries, postcode areas and mapping information.

Mr Brown made the announcement at a Smarter Government seminar at Downing Street this afternoon.

He said:

"I think we're on the verge of a revolution that can transform public services and the public sector. I'm speaking very specifically about how government can change to meet the needs of the times. I think we are determined to be the first government in the world to open up public information in a way that is far more accessible to the general public."

Gordon Brown said Smarter Government will help secure necessary efficiencies while building on the public services already available.

During the Smarter Government seminar, Sir Tim Berners-Lee and Professor Nigel Shadbolt spoke about the work they have been doing on the 'Make Public Data Public' project. As part of the project, the Government has already released 1,100 datasets to the public.

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[The Cabinet in the East Midlands](#) [Thu Nov 26 2009](#)

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TIMES ONLINE

NEWS COMMENT BUSINESS MONEY SPORT LIFE & STYLE TRAVEL DRIVING ARTS & ENTERTAINMENT ARCHIVE OUR PAPERS SUBSCRIPTIONS

LEADING ARTICLES COLUMNISTS LETTERS OBITUARIES BLOGS CARTOON FAITH COMMENT CENTRAL

Where am I? Home Comment Columnists Guest contributors

From The Times November 18, 2009

Put in your postcode, out comes the data

Imagine all that information gathered by government. Soon it will be available – helpfully linked up

Tim Berners-Lee and Nigel Shadbolt
7 COMMENTS RECOMMEND? (11)

We all recognise the power of information. It guides our behaviour and decisions. It tells us when the trains run and when the roads are jammed, how schools, hospitals and police are performing. We live in an age in which the essential raw material is information; data with a context. It underpins our economy and our society.

Data has a particular value in that you can combine it with other data to discover new things. When in 1854 John Snow took the deaths from a cholera outbreak in London and plotted them on a map, he was able to illustrate the connection between the quality of the source of water and cholera — the world changed. In March the Department for Transport released three years' worth of data about the location of accidents involving cyclists. Within 24 hours someone had converted this data to create cycle-accident route planners that avoid the black spots.

Government data is a valuable resource that we have already paid for. We are not talking about personal data but data that tells us, for example, about the amount and type of traffic on our roads, where the accidents are, how much is spent on areas where these accidents occur. This is data that has already been collected and paid for by the taxpayer, and the internet allows it to be distributed much more cheaply than before. Governments can unlock its value by simply letting people use it. This is beginning to happen in a number of countries, notably in the US under the Obama Administration, and in June Gordon Brown asked us to advise the Government on how to make rapid progress here.

In our work as government information advisers we are laying out the benefits of publishing non-personal public data for reuse, in formats that computers can 'read' and without restrictive licences. Making this happen does not require a huge new IT

TIMES RECOMMENDS

- The ghost of Robin Cook haunts Chilcot's feast
- The truth shouldn't need oaths
- Violence: let's separate the men from the boys

OUR COLUMNISTS

Columnists David Aaronovitch 

Blogs Alpha Mummy 

FOCUS ZONE

Business Travel: Everything the Business Traveller needs to know to make a better trip

Need to Know Business Travel Winter Sports Mapping Business More reports

Births, deaths, marriages Place your announcement

Business Directory: Search for local businesses & services

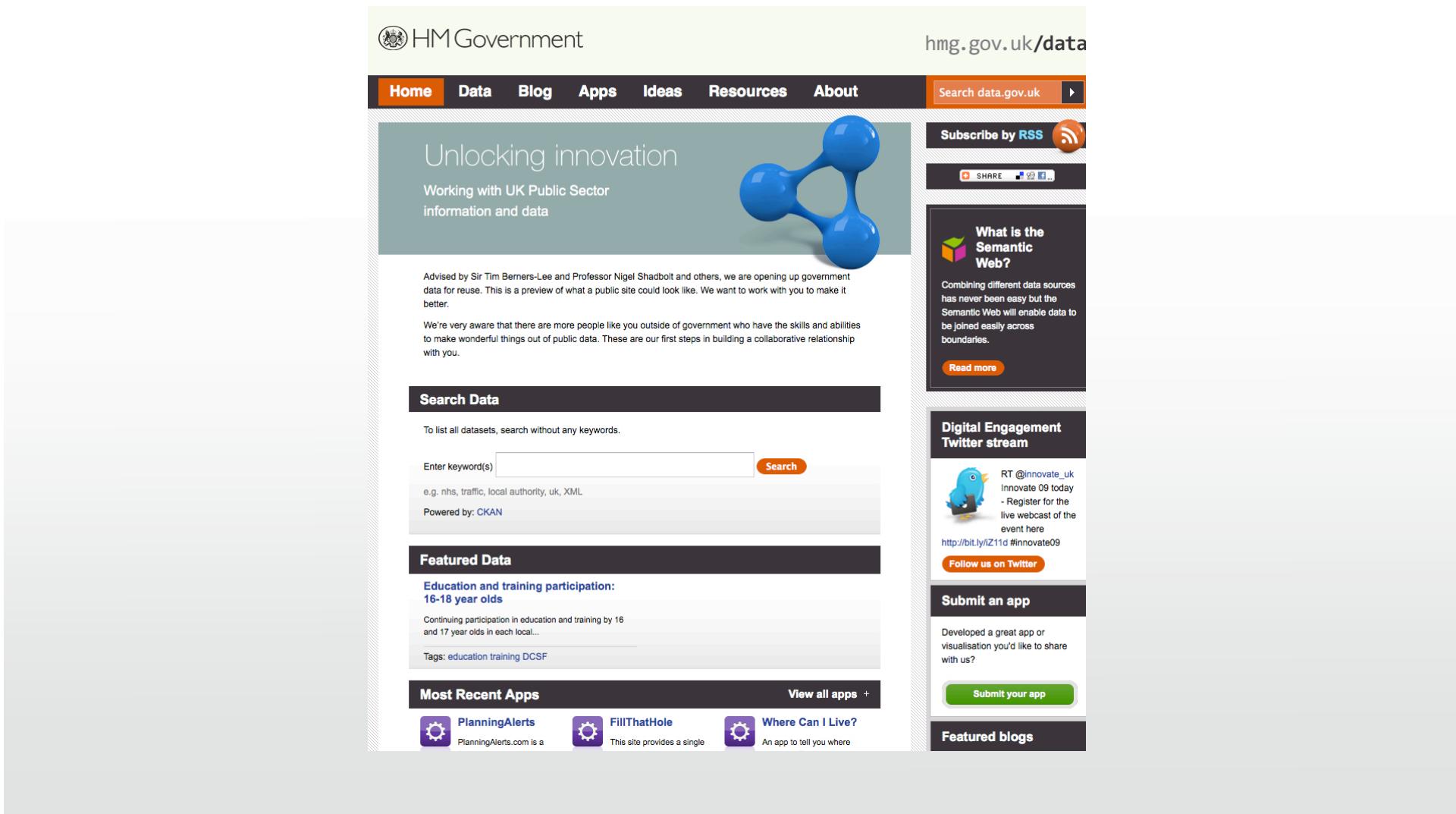
Crossword Club Sign up today or try one of our free demo crosswords

Free CV Review

data.gov.uk

- Currently under development scrutiny and extension
 - Over 1100 datasets
 - Over 1000 registered developers
 - The beginning of linked data
- Beta service to be released January 2010
- Access to OS from April 2010
- Clear schedule of release thereafter

data.gov.uk



The screenshot shows the homepage of data.gov.uk. At the top, there is a navigation bar with links for Home, Data, Blog, Apps, Ideas, Resources, and About. The Home link is highlighted in orange. To the right of the navigation bar is a search bar with the placeholder "Search data.gov.uk" and a magnifying glass icon. Below the navigation bar, there is a banner with the text "Unlocking innovation" and "Working with UK Public Sector information and data". To the right of the banner is a blue 3D molecular model icon. To the left of the banner, there is a text block that reads: "Advised by Sir Tim Berners-Lee and Professor Nigel Shadbolt and others, we are opening up government data for reuse. This is a preview of what a public site could look like. We want to work with you to make it better. We're very aware that there are more people like you outside of government who have the skills and abilities to make wonderful things out of public data. These are our first steps in building a collaborative relationship with you." Below this text is a "Search Data" section with a search input field and a "Search" button. The search input field has the placeholder "Enter keyword(s)" and examples "e.g. nhs, traffic, local authority, uk, XML". Below the search input field is a "Powered by CKAN" link. To the right of the search section is a "Digital Engagement Twitter stream" section. It features a small blue Twitter bird icon, a tweet from "@innovate_uk" about the innovate 09 event, and a "Follow us on Twitter" button. Below the Twitter stream is a "Submit an app" section with a "Submit your app" button. At the bottom of the page, there is a "Most Recent Apps" section with three app cards: "PlanningAlerts" (PlanningAlerts.com is a site that provides a single app to tell you where), "FillThatHole" (This site provides a single app to tell you where), and "Where Can I Live?" (An app to tell you where). There is also a "Featured blogs" section.

data.gov.uk

The screenshot shows the data.gov.uk website interface. At the top, there is a navigation bar with links to Home, Data, Blog, Apps, Ideas, Resources, and About. The 'Data' link is highlighted in orange. To the right of the navigation bar is a search bar with the placeholder 'Search data.gov.uk' and a magnifying glass icon. Below the navigation bar is a section titled 'Search Data Feeds' with a sub-section titled 'Search Data'. This section includes a search input field containing the word 'alcohol', a 'Search' button, and a note that says 'To list all datasets, search without any keywords.' Below this is a 'Packages' section containing several data packages, each with a title, description, and tags. The packages listed are:

- alcohol_profile_-_alcohol-attributable_hospital_admission_females_2005**
Title: Alcohol Profile: Alcohol-attributable hospital admission, females
Description: Persons admitted to hospital due to alcohol attributable conditions (females), crude rate per 100,000 population
Source: NWPHO from Hospital Episodes...
Tags: office_for_national_statistics england alcohol hospital
- alcohol_profile_-_alcohol-attributable_hospital_admission_males_2005**
Title: Alcohol Profile: Alcohol-attributable hospital admission, males
Description: Persons admitted to hospital due to alcohol attributable conditions (males), crude rate per 100,000 population
Source: NWPHO from Hospital Episodes...
Tags: office_for_national_statistics england alcohol hospital
- alcohol_profile_-_alcohol_attributable_incapacity_benefit_claimants_2005**
Title: Alcohol Profile: Alcohol attributable Incapacity Benefit claimants
Description: The number of claimants of Incapacity Benefit or Severe Disablement Allowance whose main medical reason is alcoholism per 100,000 working age populati...
Tags: department_for_work_and_pensions office_for_national_statistics england benefit alcohol
- alcohol_profile_-_alcohol-attributable_mortality_-_females_2005**
Title: Alcohol Profile: Alcohol-attributable mortality - females
Description: Deaths from alcohol-attributable conditions (all ages), directly standardised rate per 100,000 population
Source: NWPHO from Office for National Stat...
Tags: office_for_national_statistics england alcohol mortality

On the right side of the page, there are several sidebar modules:

- Subscribe by RSS** (with an RSS icon)
- SHARE** (with icons for various social media platforms)
- What is the Semantic Web?**
Combining different data sources has never been easy but the Semantic Web will enable data to be joined easily across boundaries.
[Read more](#)
- Digital Engagement Twitter stream**
RT @innovate_uk
Innovate 09 today
- Register for the live webcast of the event here
<http://bit.ly/lZ11d> #innovate09
[Follow us on Twitter](#)
- Submit an app**
Developed a great app or visualisation you'd like to share with us?
[Submit your app](#)
- Featured blogs**



Alastair Dant (left) / David McCandless (right)

£ Massive Outgoings

Cost for average British taxpayer per day

GOVERNMENTS



ESSENTIALS

NHS



£9.05

Schools



£2.56

Defence



£3.99

TRAVEL

Roads



£3.10

LRT



£0.14

BANKING CHARGES

Recapitalisations



Bradford & Bingley*

SECURITY

Police



£0.53

Prisons



£0.19

Afghanistan



£0.32

GOING OUT

Arts



£0.04

Museums



£0.03

HELPING OTHERS

Child support



£1.86

Job Seekers



£0.25

Housing benefit



£1.52

Disability benefit



£1.44

Pensions



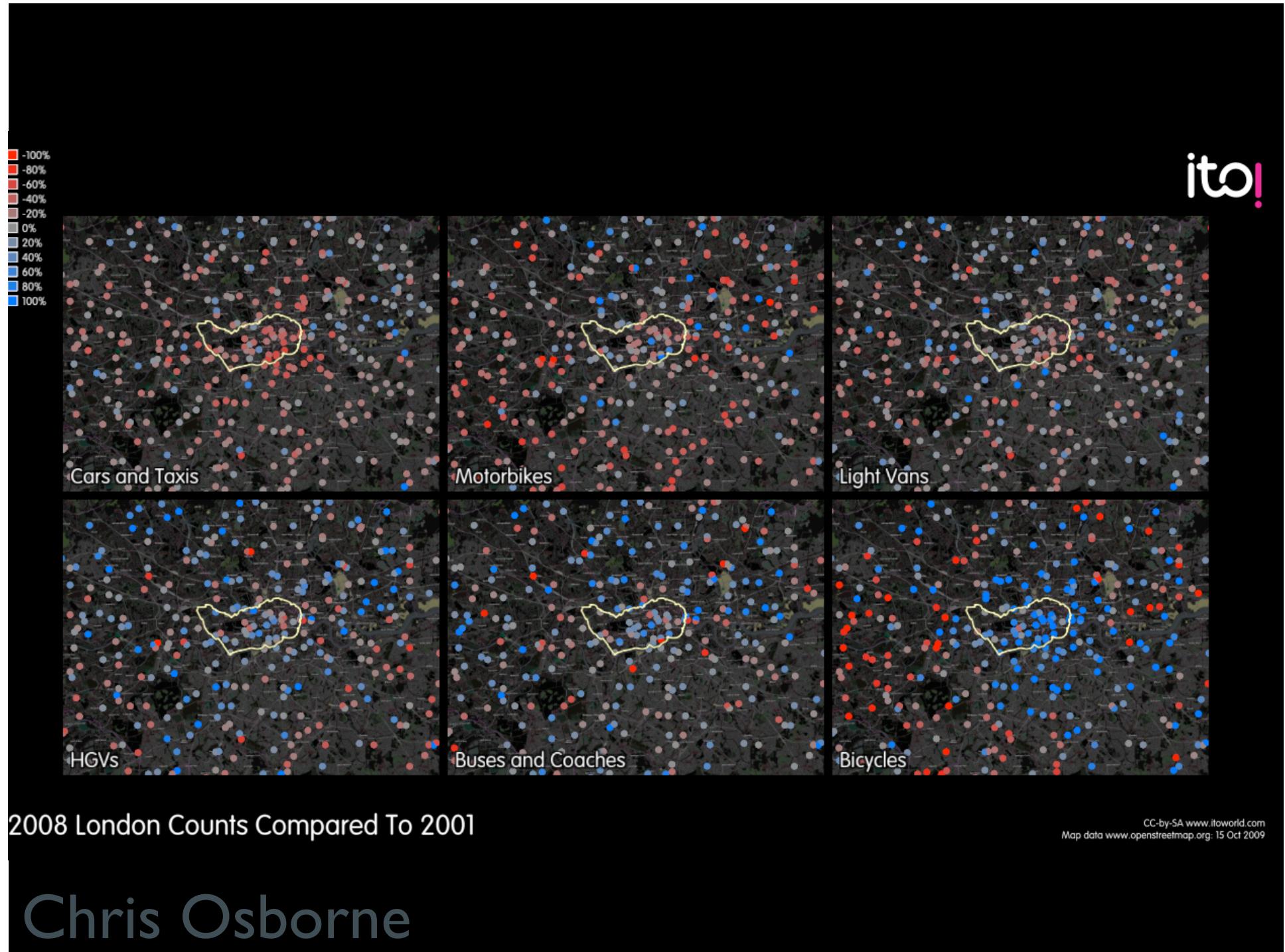
£5.55

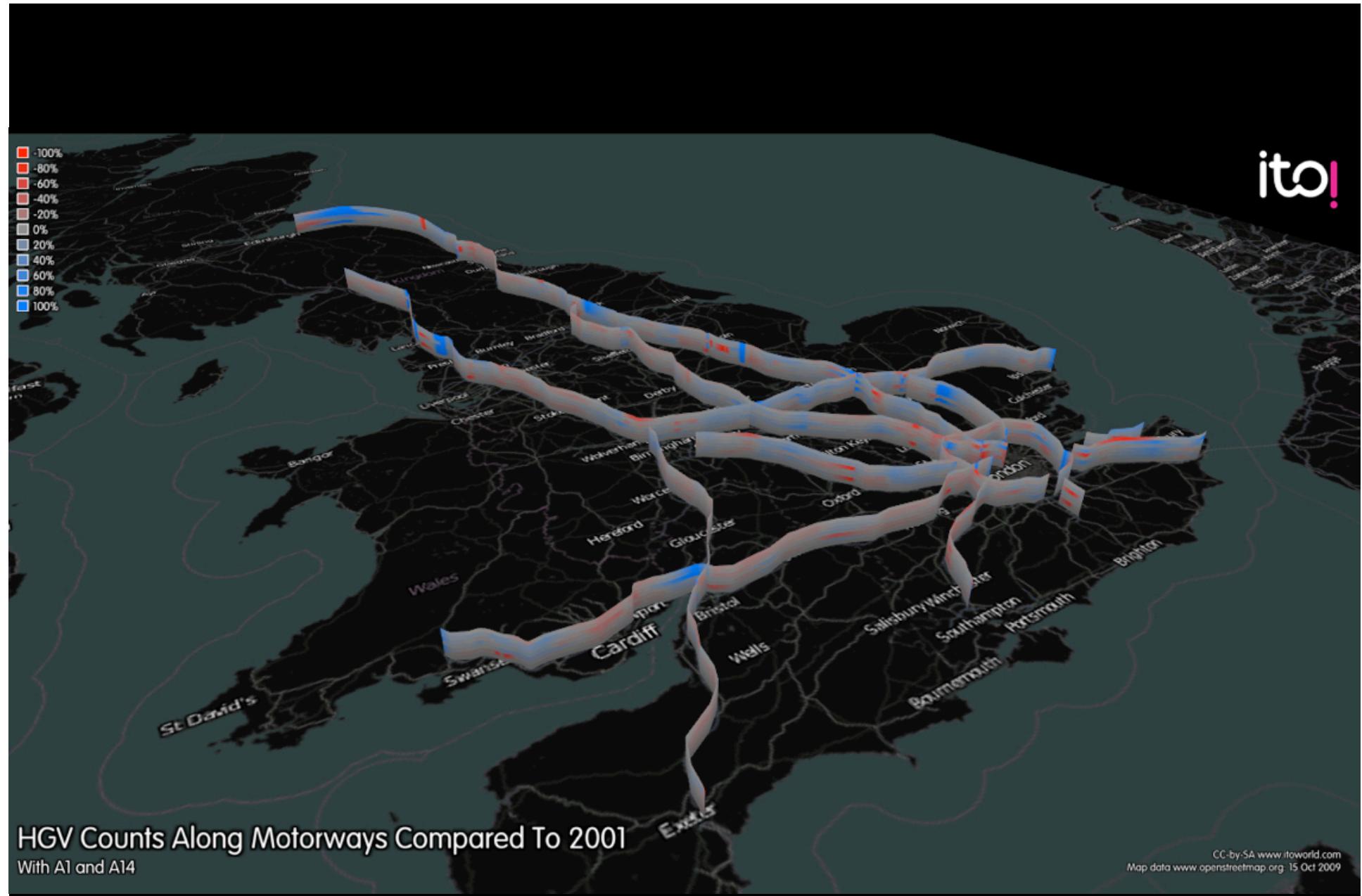
Overseas aid



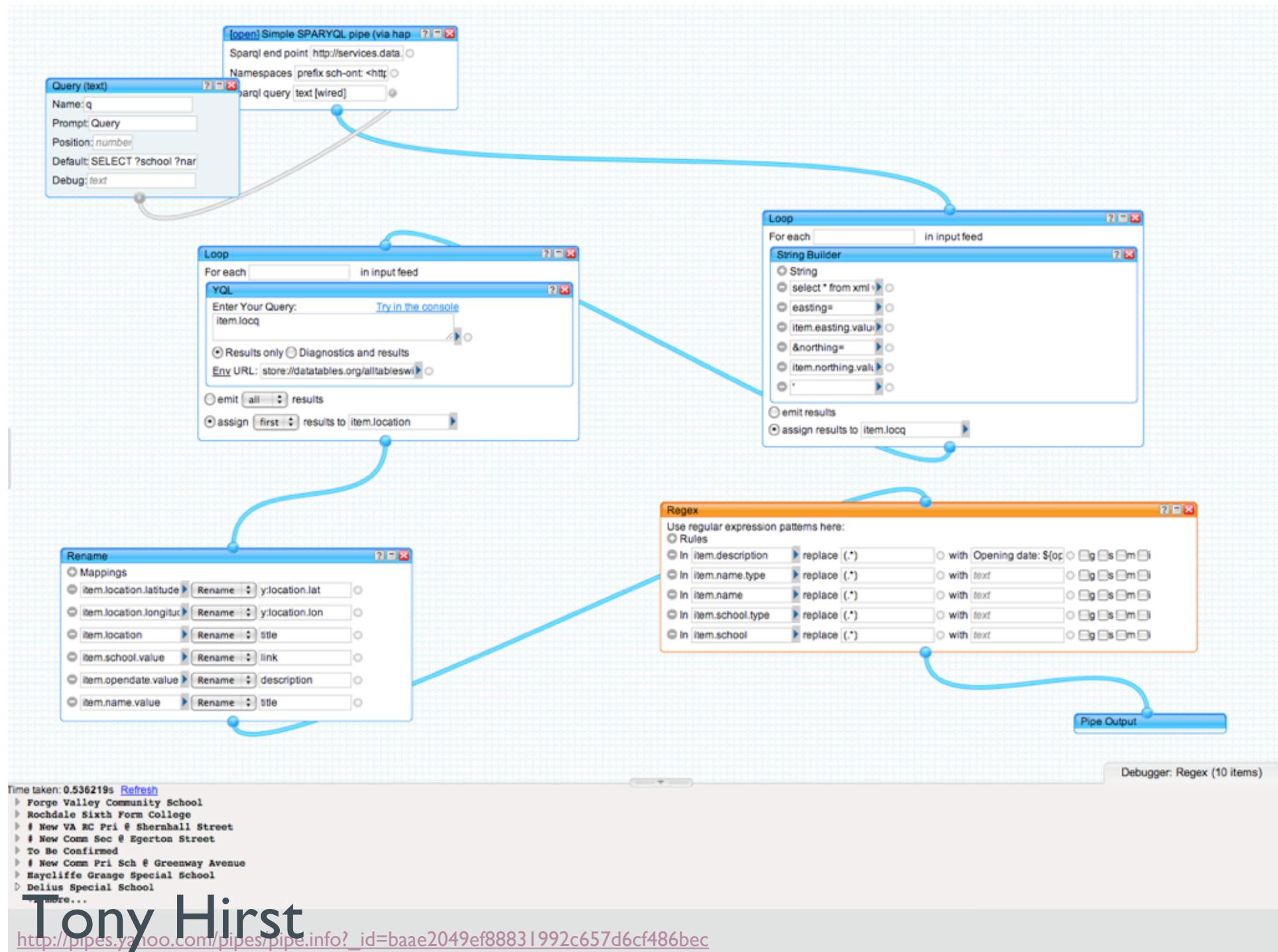
£0.43

David McCandless





Chris Osborne





Author:
Tony Hirst

Properties

Not published

0 runs

7 clones

Bookmark / Share



Modules (8)

fetchdata

regex

rename

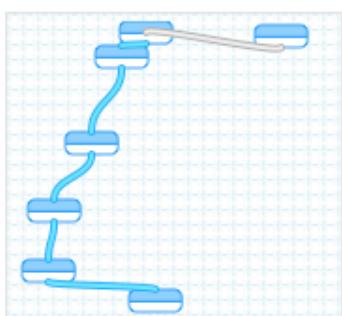
textinput

strconcat

subpipe

loop

yql



data.gov.uk Education data demo

Pipe Web Address: <http://pipes.yahoo.com/ouseful/baae2049ef88831992c657d6cf486bec>

[View Source](#) [Clone](#)

[Configure this Pipe](#)

Query `SELECT ?school ?name` [Run Pipe](#)

[Use this Pipe](#)

[Get as a Badge](#) [MY YAHOO!](#) [Google](#) [Get as RSS](#) [Get as JSON](#) [More options](#)

Map

List

10 items





NEIGHBOURHOOD

Year	Car Theft	Burglary	Overall Crime
2005	~2000	~1000	~3000
2006	~1800	~800	~2500
2007	~1500	~600	~2000
2008	~1200	~500	~1800
2009	~1000	~400	~1500

Police Confidence 77% ↓39%

Overall Crime ↓37% ↓17%

Gun Crime ↓14% ↓13%

Knife Crime ↓11% ↓10%

Robbery ↓10% ↓9%

Theft ↓8% ↓7%

Woundings ↓20% 10000 fewer crime victims

— Hackney Council

ALLOTMENTS

- 10 plots in Phase 1, near 117-119 Hackney Road
- 10 plots in Phase 2, between 117-119 Hackney Road
- 10 plots in Phase 3, between 117-119 Hackney Road
- 10 plots in Phase 4, between 117-119 Hackney Road
- 10 plots in Phase 5, between 117-119 Hackney Road
- 10 plots in Phase 6, between 117-119 Hackney Road
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- 10 plots in Phase 100, between 117-119 Hackney Road

Waiting List Time

Borough	Waiting List Time
Tower Hamlet	~1 day
Waltham Forest	~1 year
Newham	~1 year
Hackney	~5 years
Haringey	~10 years

Waiting List Length

Borough	Waiting List Length
Tower Hamlet	~10 people
Waltham Forest	~100 people
Newham	~100 people
Hackney	~1000 people
Haringey	~10000 people

GREEN SPACE

23% by land area in Hackney

% SATISFACTION WITH PARKS

Year	London (%)	Hackney (%)
2001	~75	~70
2002	~65	~60
2003	~55	~45

RECYCLING

Your nearest parks are:

- Hackney Marshes (10 mins east)
- Victoria Park (15 mins south)
- London Fields (20 mins west)

Your nearest Recycling and Reuse Center is on South Access Road, Walthamstone, E17 (via Mankhouse 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 trade waste. This site does not accept trade waste.

If you intend to use a van to bring your waste please call 020 8509 3664 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
- Household rubble
- Long life light bulbs
- Metal
- Mobile telephones
- Paper
- Plasterboard
- Plastic bottles
- Reuseable

TRAVEL TIMES

Distance from TFL Journey Planner, for a journey arriving at 8:30am

Oxford Circus

41



mins

42



mins

King's Cross

30



mins

35



mins

Manchester

2:44

hours : mins

1 2 3 4

Edinburgh

5:00

hours : mins

1 2 3 4

Tottenham Court Road

37



mins

47



mins

Victoria

51



mins

45



Paris

3:00

hours : mins

1 2 3 4

Bristol

3:00

hours : mins

1 2 3 4

LOCAL TRANSPORT



For free cycle training in Hackney, call 020 8356 2897

it's
possible

ito!

**David Peterson**

David Peterson has been a web developer since the early years - 1995. He works in the [steamy tropics](#) and is trying to kick start the Semantic Web down under. Not only that, but he is an Advisory Committee representative to the W3C, wow. His wonderful family, making lovely photographs and searching for the perfect espresso keeps him happy.

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 HTML Plain

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Any message, anywhere.
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« Microsoft SuperPreview: a New Way to Test Web Sites

[Open Source Image Editors ... for Designers?](#) »

Obama's Groundbreaking use of the Semantic Web

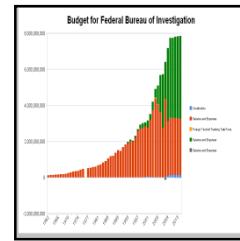
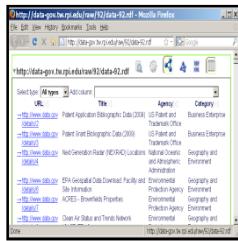
by [David Peterson](#)

In a revolutionary move, Obama's administration is set to utilise next generation web technologies to bring an unprecedented level of transparency to government. In this case it will shed light on how the roughly US \$800 billion dollar economic stimulus will be spent. The recently launched [recovery.gov](#) website (powered by nothing other than Drupal) brought with it the promise that citizens would be able to view where the money was going and how it was going to be spent.

To enable the citizen maser to do their wizardry, the administration will be opening up a veritable candy store of goodies: [Semantic Web](#), [RDF](#), [Linked Data](#), [SPARQL](#), [RDFa](#), [SIOC](#), [ATOM](#), [RESTful APIs](#), [JSON](#), [Widgets](#), [Wikis](#), [XForms](#), [P2P Networks](#). Wow. They only forgot the lions and tigers and bears oh my... This is an unbelievable stack of technology. I didn't think the government even knew what an RSS feed was :)

Semantic Web Architecture for Government Data

View & Use Data



↑ Sem Wiki

↑ Tabulator

↑ Google Viz

↑ MIT Exhibit

↑ RSS 1.0

↑ tagCloud

Link & Enrich Data

XSLT Service

Diff Service

Link Annotator

RSS Generator

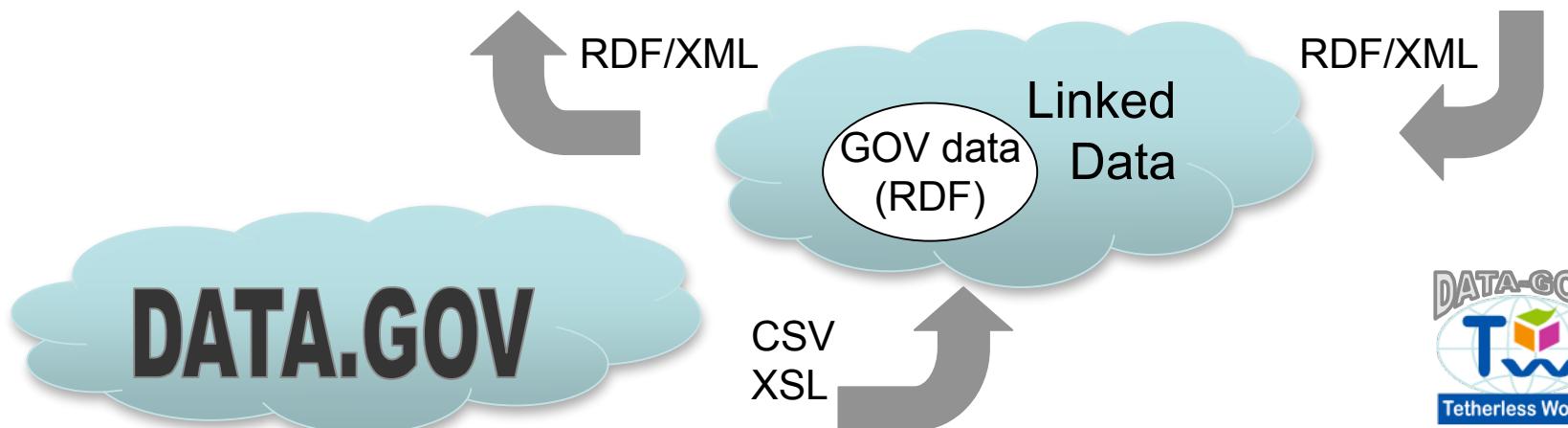
...

 Data Processors
(Web Services & Analyzers)

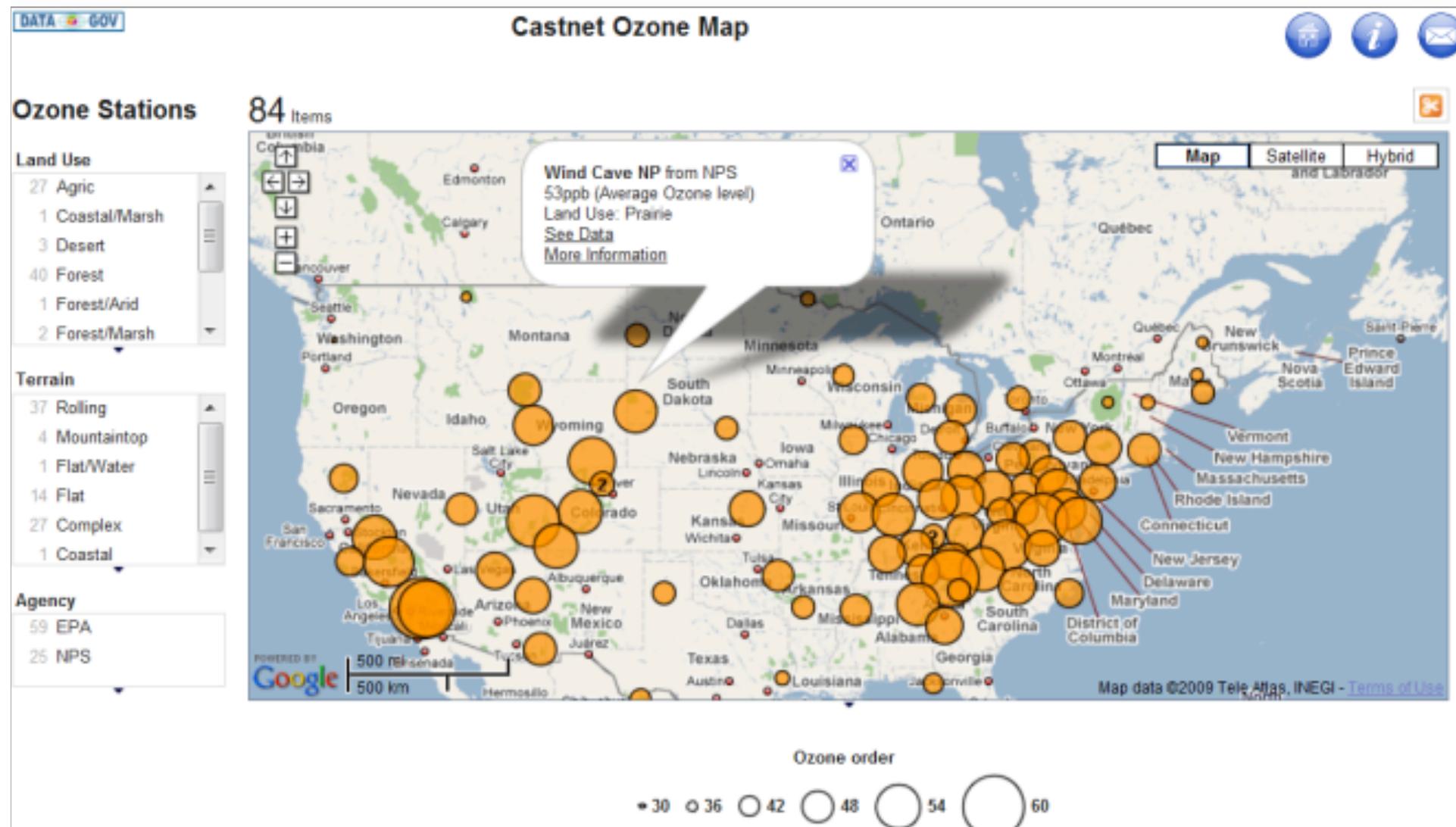
SPARQL End Point

SPARQL Web Service

Convert Data

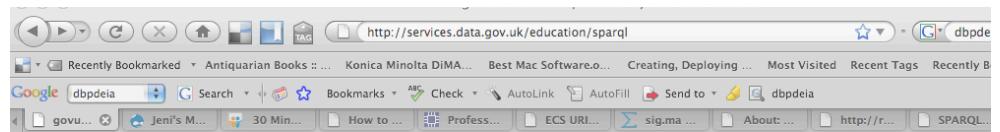


Data.gov + epa.gov



Linking outside data.gov.uk

- Example from one of our education datasets
- A SPARQL query against data.gov.uk
- A transformation into KML
- A representation on Google Maps
- A link to the dbpedia URI for one of our schools
- This is information enrichment



govuk-education

Run SPARQL query against this store

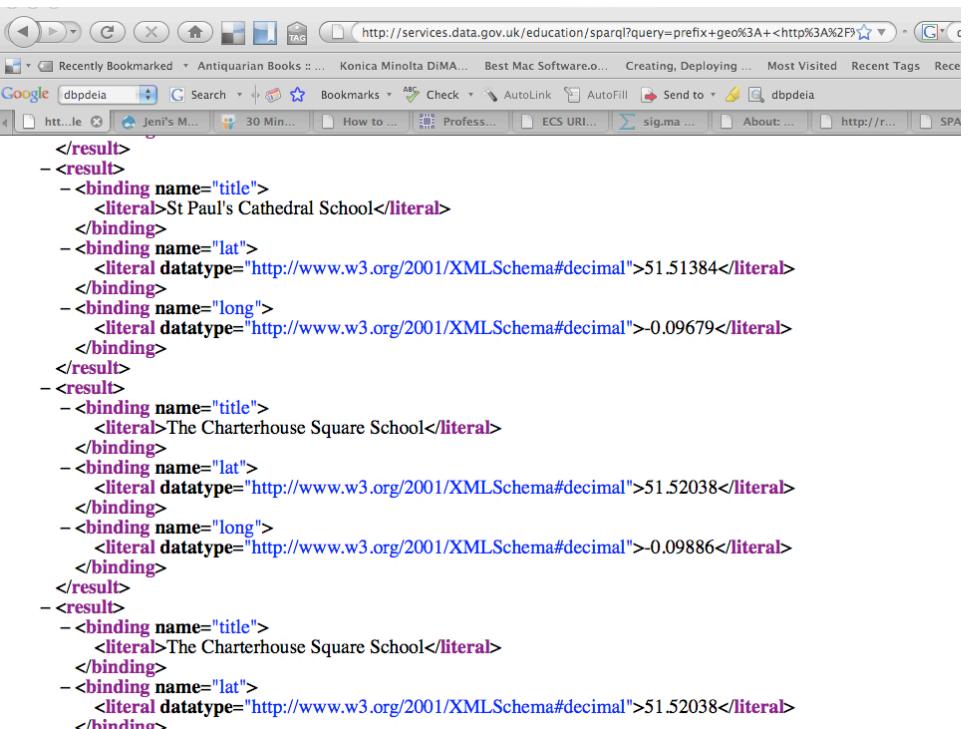
SPARQL query:

```
prefix geo: <http://www.w3.org/2003/01/geo/wgs84_pos#>
prefix sch-ont: <http://education.data.gov.uk/def/school/>
SELECT ?title ?lat ?long WHERE {
  ?school a sch-ont:School;
  sch-ont:establishmentName ?title;
  sch-ont:districtAdministrative
    <http://statistics.data.gov.uk/id/local-authority-district/00AA> ;
  geo:lat ?lat;
  geo:long ?long.
}
ORDER_BY ?title
[Search]
```

Bigfoot/30.1258.56780

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The screenshot shows a web browser window with the URL <http://services.data.gov.uk/education/sparql?query=prefix+geo%3A+<http%3A%2F%2Fdbpedia.org%2Fresource%2F%22+&format=application%2Fxml>. The page displays the results of a SPARQL query in XML format. The results are grouped into three `<result>` blocks, each containing a `<binding name="title">` block with a `<literal>` value, and a `<binding name="lat">` and `<binding name="long">` block, both with `datatype="http://www.w3.org/2001/XMLSchema#decimal"` and `<literal>` values.

```
</result>
- <result>
- <binding name="title">
  <literal>St Paul's Cathedral School</literal>
</binding>
- <binding name="lat">
  <literal datatype="http://www.w3.org/2001/XMLSchema#decimal">51.51384</literal>
</binding>
- <binding name="long">
  <literal datatype="http://www.w3.org/2001/XMLSchema#decimal">-0.09679</literal>
</binding>
</result>
- <result>
- <binding name="title">
  <literal>The Charterhouse Square School</literal>
</binding>
- <binding name="lat">
  <literal datatype="http://www.w3.org/2001/XMLSchema#decimal">51.52038</literal>
</binding>
- <binding name="long">
  <literal datatype="http://www.w3.org/2001/XMLSchema#decimal">-0.09886</literal>
</binding>
</result>
- <result>
- <binding name="title">
  <literal>The Charterhouse Square School</literal>
</binding>
- <binding name="lat">
  <literal datatype="http://www.w3.org/2001/XMLSchema#decimal">51.52038</literal>
</binding>
```

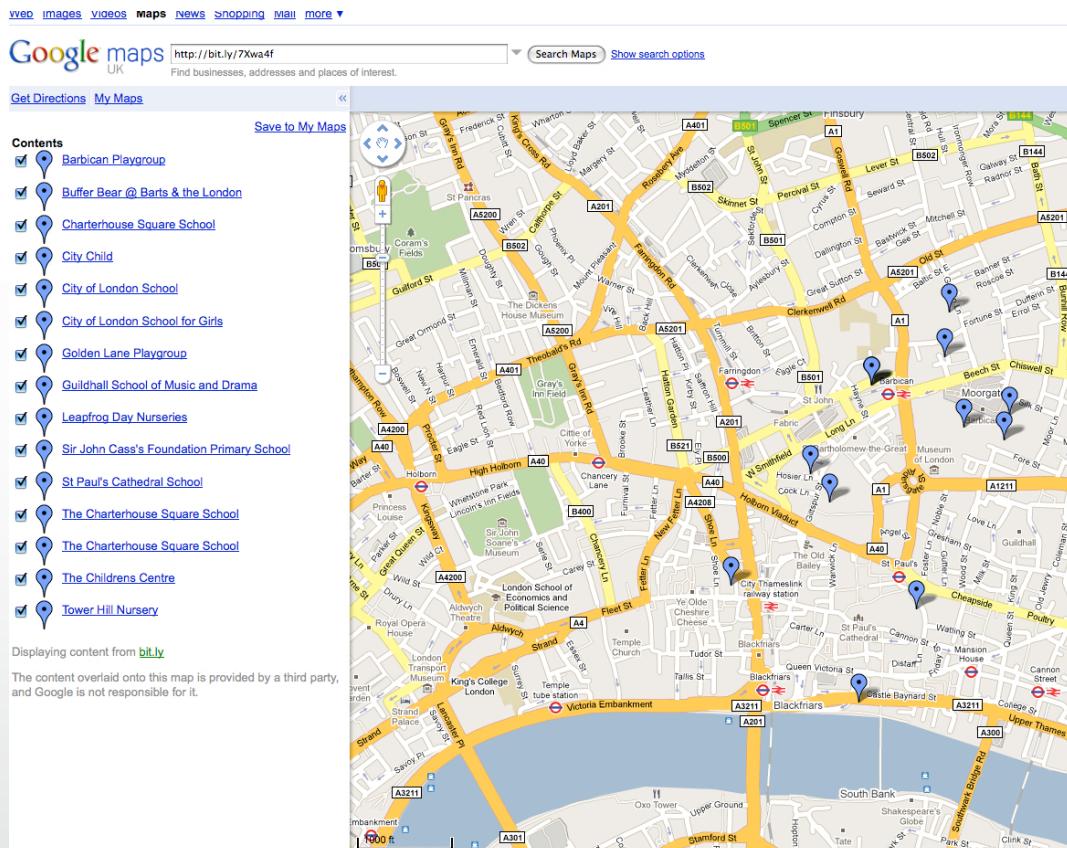
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```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://www.opengis.net/kml/2.2">
  <Placemark>
    <description/>
    <name>Barbican Playgroup</name>
    <Point>
      <coordinates>-0.09267,51.51879</coordinates>
    </Point>
  </Placemark>
  <Placemark>
    <description/>
    <name>Buffer Bear @ Barts & the London</name>
    <Point>
      <coordinates>-0.10086,51.51697</coordinates>
    </Point>
  </Placemark>
  <Placemark>
    <description/>
    <name>Charterhouse Square School</name>
    <Point>
      <coordinates>-0.09886,51.52038</coordinates>
    </Point>
  </Placemark>
  <Placemark>
    <description/>
    <name>City Child</name>
    <Point>
      <coordinates>-0.09546,51.52122</coordinates>
    </Point>
  </Placemark>
  <Placemark>
    <description/>
    <name>City of London School</name>
    <Point>
      <coordinates>-0.09949,51.51112</coordinates>
    </Point>
  </Placemark>
  <Placemark>
    <description/>
    <name>City of London School for Girls</name>
    <Point>
      <coordinates>-0.09454,51.51915</coordinates>
    </Point>
  </Placemark>
  <Placemark>
```

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About: St Paul's Cathedral School

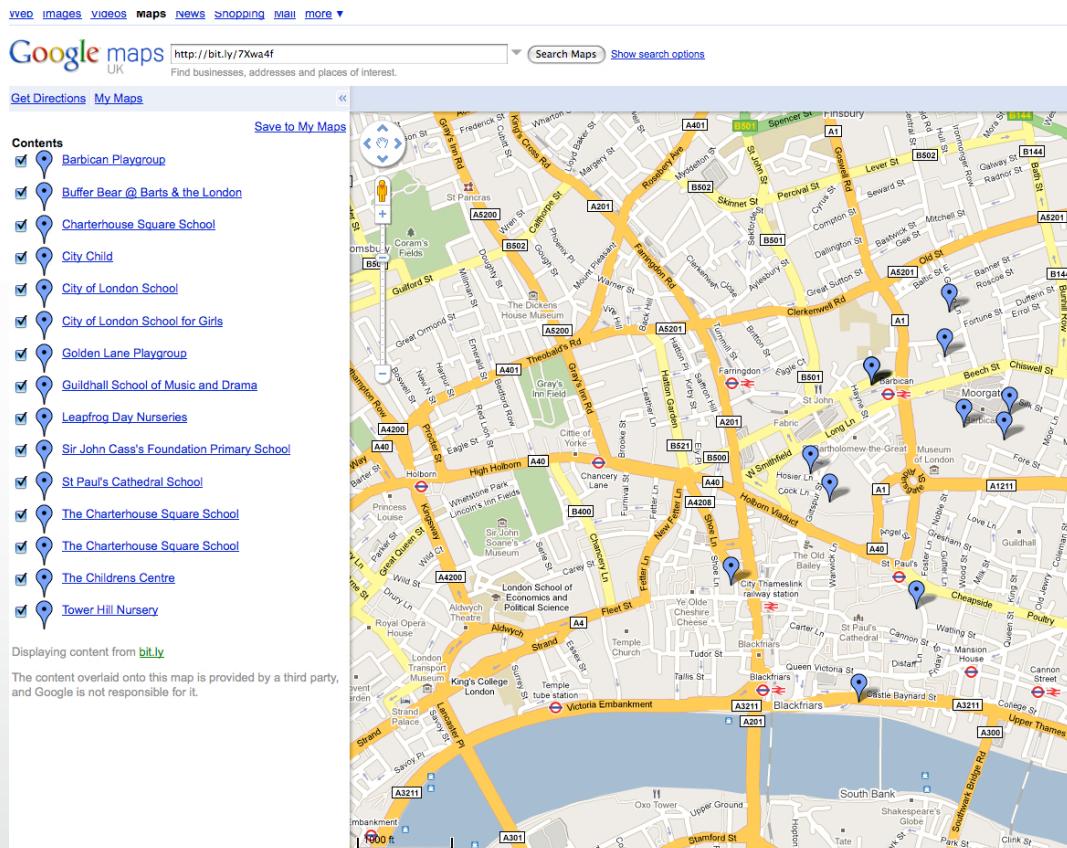
An Entity in Data Space: dbpedia.org

St. Paul's Cathedral School is a school associated with St Paul's Cathedral in London. Its curriculum focuses on singing and choral music. The school currently enrolls approximately 200 students, and its choristers sing evensong in the Cathedral six times a week. Until 1989, the school had all choristers and all boarders; the school now has day pupils as well as boarders.

Property	Value
dbpedia-owl:EducationalInstitution/city	▪ dbpedia:City_of_London
dbpedia-owl:EducationalInstitution/colours	▪ Burgundy and White ▪ publication =
dbpedia-owl:EducationalInstitution/county	▪ dbpedia:London
dbpedia-owl:EducationalInstitution/established	▪ 1123-01-01 00:00:00 (xsd:date)
dbpedia-owl:EducationalInstitution/staff	▪ 40 (xsd:integer)
dbpedia-owl:EducationalInstitution/students	▪ 240 (xsd:integer)
dbpedia-owl:Organisation/motto	▪ (By Faith and By Learning)
dbpedia-owl:Organisation/postalCode	▪ EC4M 9AD
dbpedia-owl:Organisation/type	▪ dbpedia:Independent_School
dbpedia-owl:School/headLabel	▪ Headmaster
dbpedia-owl:School/lowerAge	▪ 4 (xsd:integer)
dbpedia-owl:School/upperAge	▪ 13 (xsd:integer)
dbpedia-owl:city	▪ dbpedia:City_of_London
dbpedia-owl:colours	▪ Burgundy and White ▪ publication =
dbpedia-owl:county	▪ dbpedia:London
dbpedia-owl:established	▪ 1123-01-01 00:00:00 (xsd:date)
dbpedia-owl:headLabel	▪ Headmaster
dbpedia-owl:lowerAge	▪ 4 (xsd:integer)

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Challenges to free Public Data

- The ubiquity of spreadsheets
 - Large amount of data is in spreadsheets
 - The challenge of implicit and variable semantics in these
- The importance of good URI schemes
- Publish the raw data
 - The perfect is the enemy of the good
 - Don't get into format wars
- Praise the data holders and appreciate their challenges
- The importance of location and time

Challenges to free Public Data

- Cultural & Organisational
 - Data hugging
 - We have released it - sort of...
 - License impediments
- Worries about
 - Confidentiality
 - How it will be Interpreted
 - QoI
 - Lost value
 - Disrupted workflow
 - New IT procurement
- Importance of local authority and other public bodies
- Capability
 - What assets have we got (no duty to hold register of public non-personal datasets)
 - Who can do this work
 - How to share best practice
 - Minting URIs
- Policy
 - Extending the principle to all public sector bodies
 - Consistency in what is published, how it is licensed and its format
 - Range of exceptions do need to be appreciated
 - Confidentiality, accuracy, liability and reputation

Why this matters to us

- More governments, municipalities, cities and media getting machine readable mark up
- The sum is greater than the parts
- Exploitation of
 - open data
 - open standards
- Can apply to data intranets as well as extranets
- Government linked data is showing how heterogeneous information can be shared, linked, mapped and enriched

