

# The Semantic Web Revolution - Unleashing the World's most Valuable Information

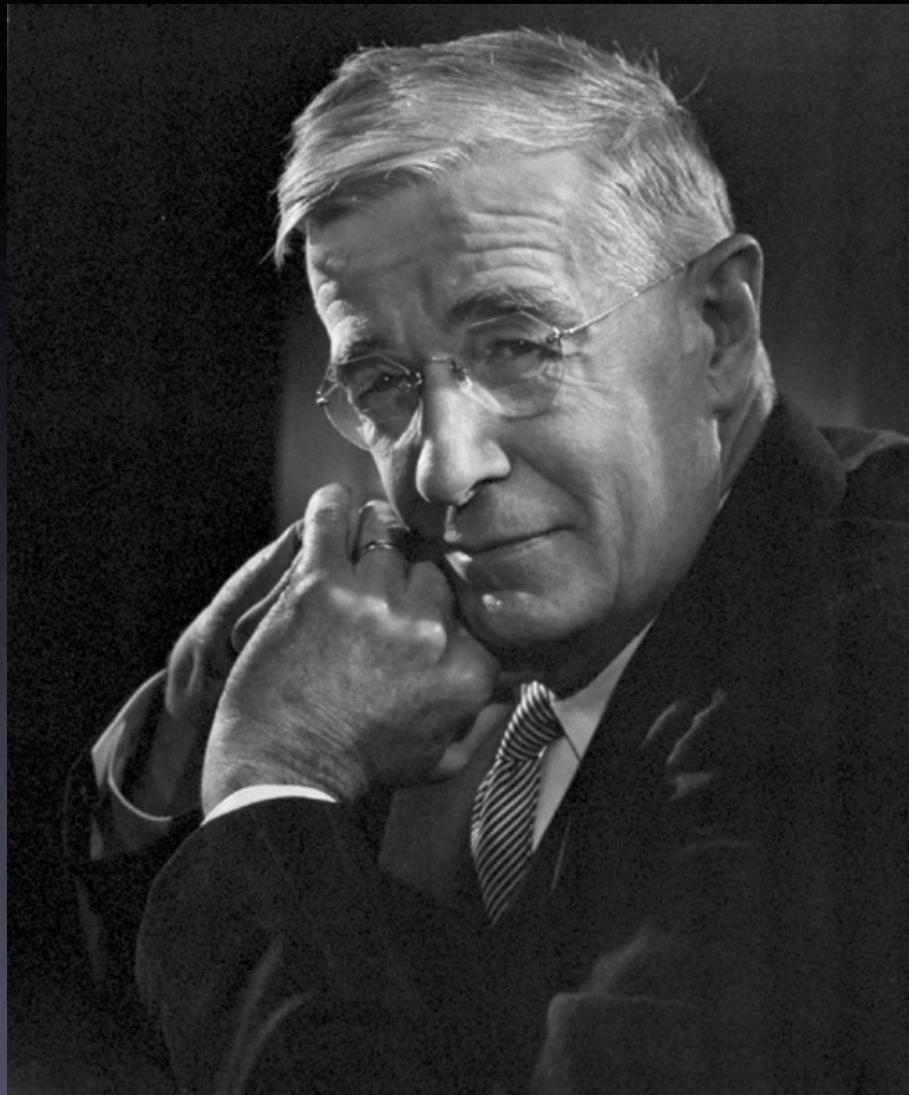
Wendy Hall  
Nigel Shadbolt

Online Information Conference  
Olympia, London  
1 December 2009

# The Ever Evolving World of the Web

Professor Wendy Hall  
University of Southampton

<http://www.ecs.soton.ac.uk/~wh>



“As we may think”

Vannevar Bush

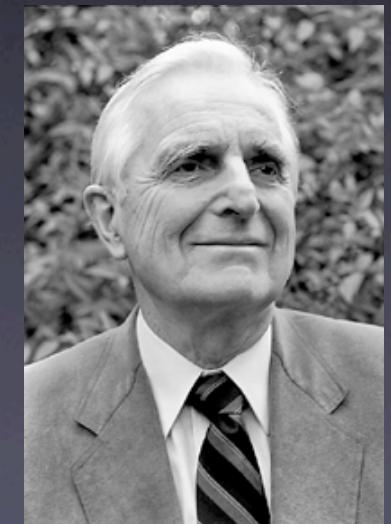
Atlantic Monthly  
July 1945



Everything is deeply intertwined

# Ted Nelson and Doug Engelbart

Augmenting human intellect

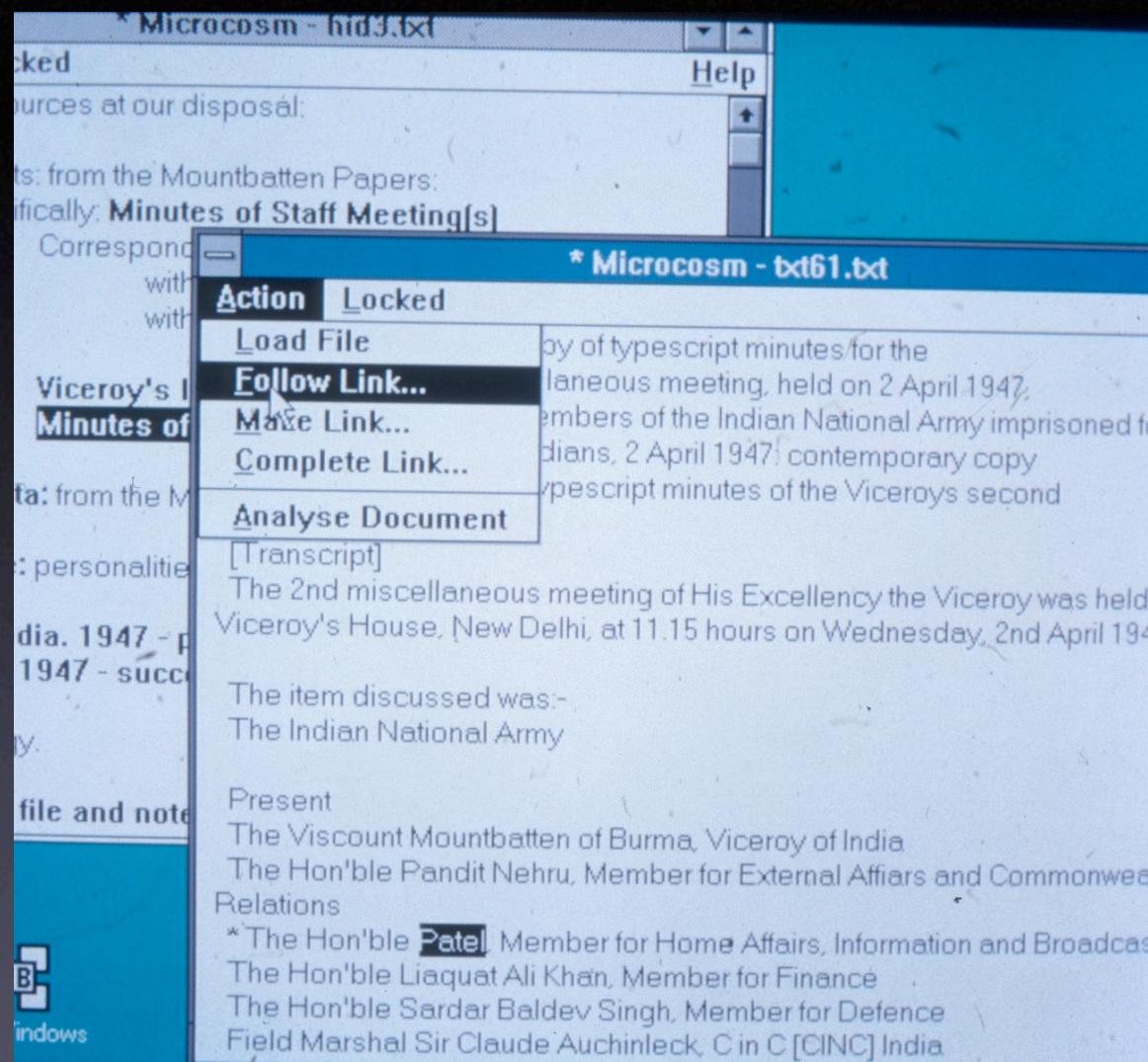




What is the connection  
between Earl Mountbatten of  
Burma, the University of  
Southampton, and my  
research career?



# Microcosm: Mountbatten archive application



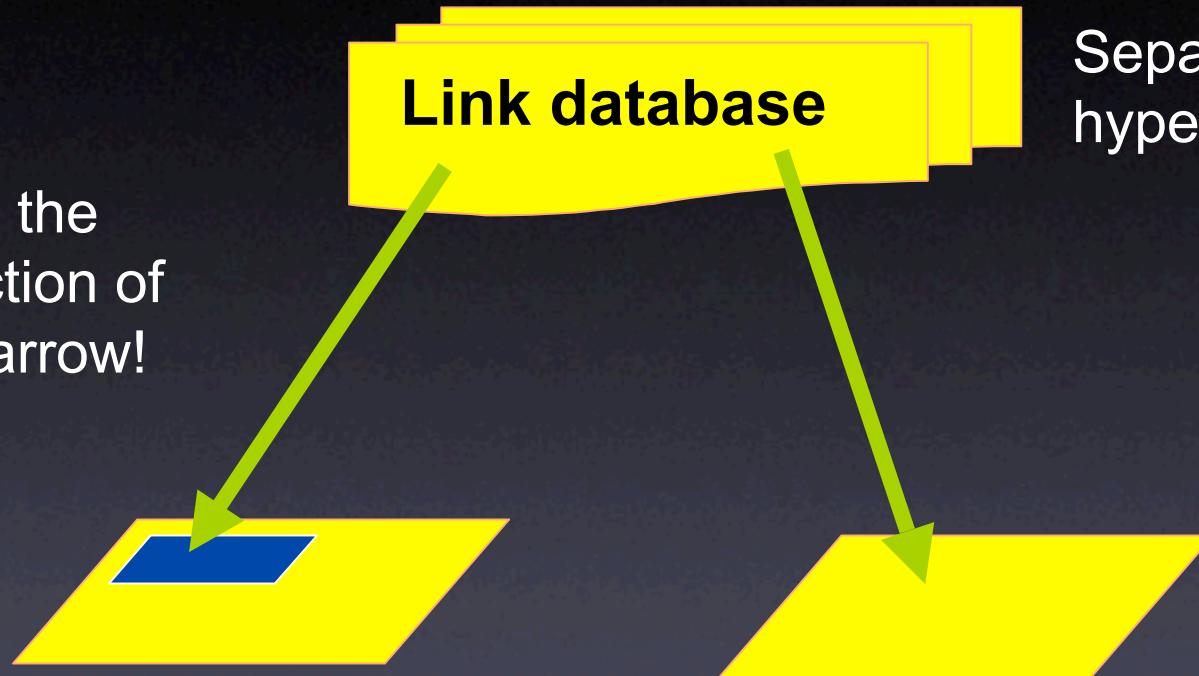
# Linkbases

Note the  
direction of  
this arrow!

Link database

Separable  
hyperstructure

Documents



# Links in Microcosm

source, destination, description

source: object | concept | context

We generated links based on metadata  
description of documents in docuverse  
and “it all falls out”



ECHT'90





ACM Hypertext'91

Lessons learnt:

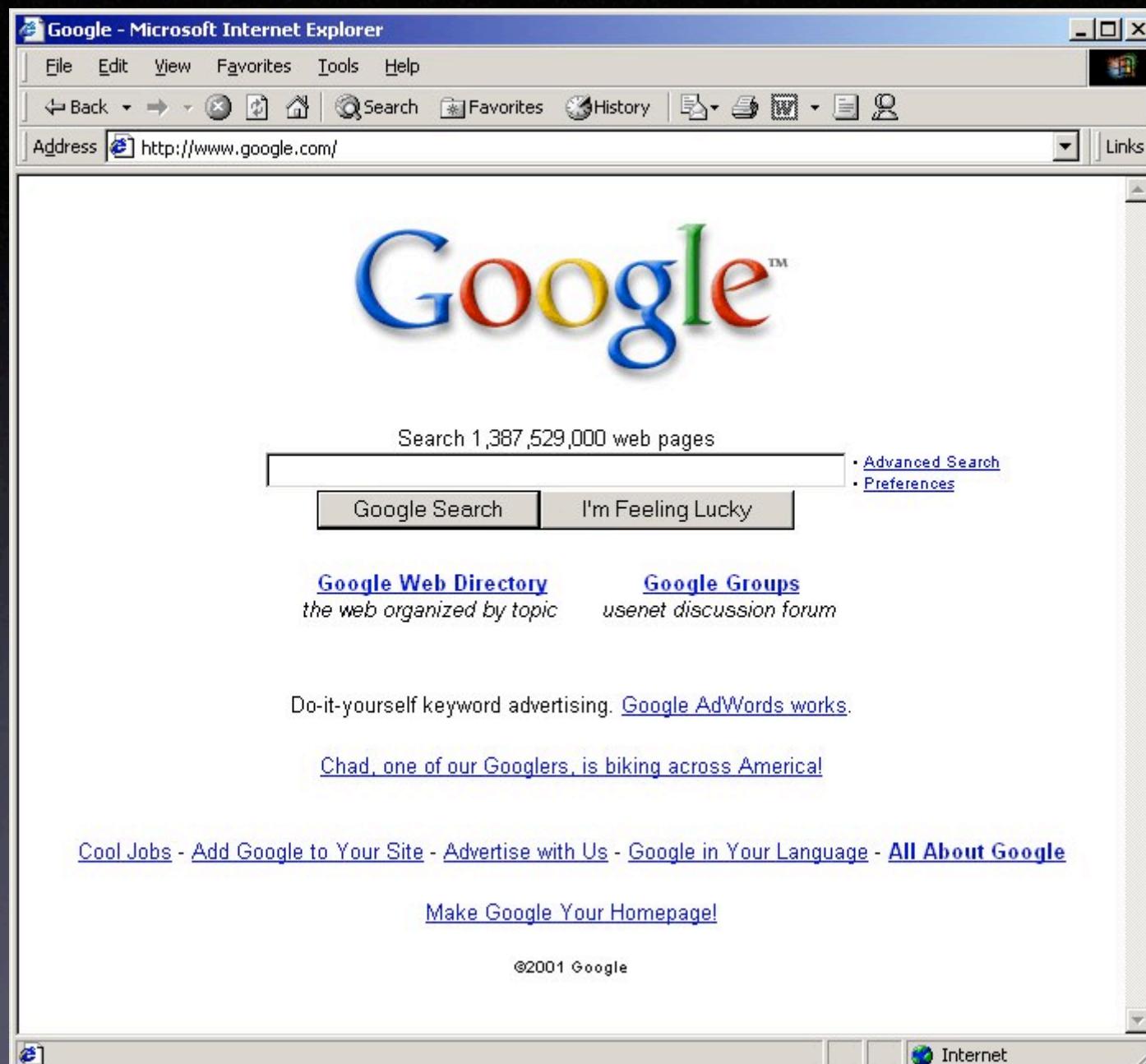
Big is beautiful:  
the network is everything (tbl)

Scruffy works: let the links fail to make it scale (tbl)

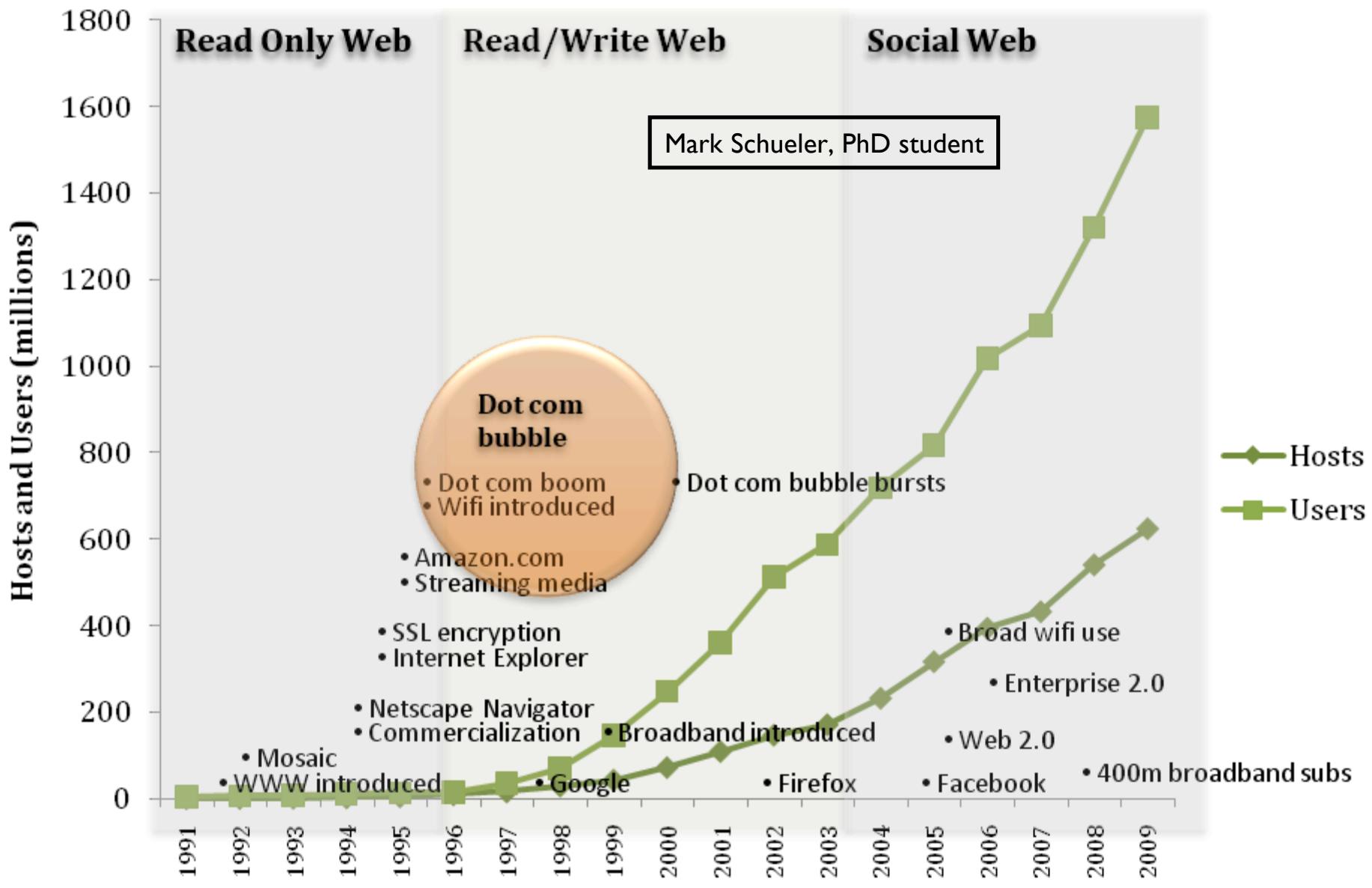
Democracy rules: open and free (tbl)

But we lost (for a time) conceptual and contextual linking – the  
Web is a strangely linkless world

Missing links – search engines fill the gap

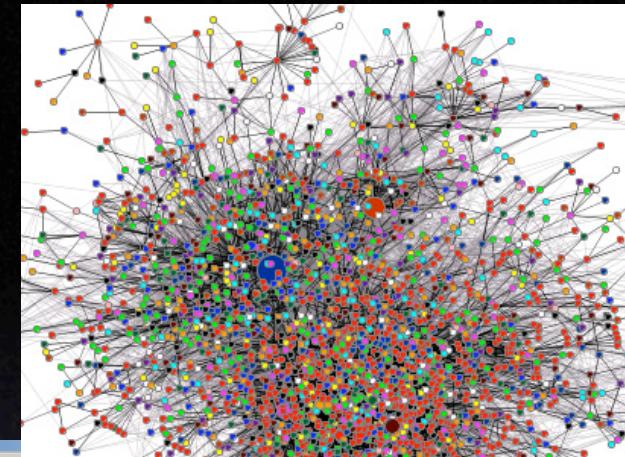


# Internet Growth - Usage Phases - Tech Events

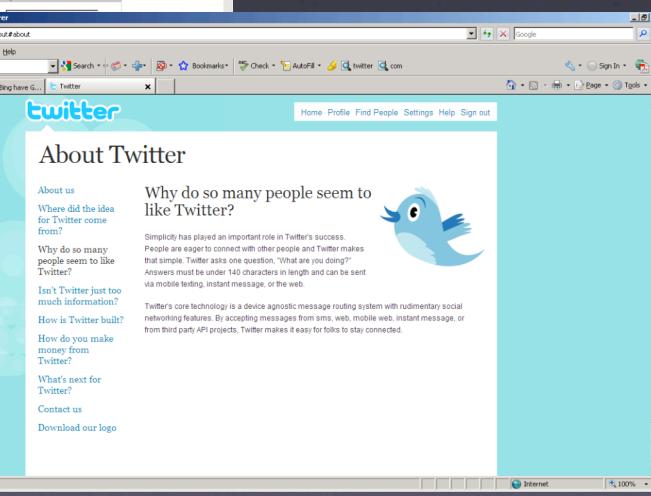
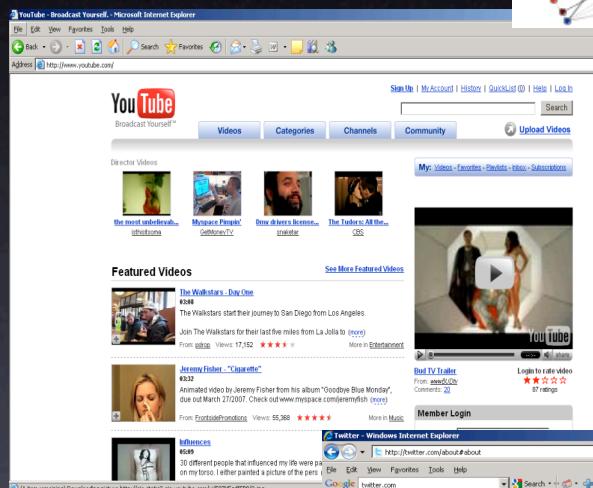


# Web 2.0

- Wiki's
- Blogs
- Folksonomies
- Flickr
- YouTube
- MySpace
- Facebook
- Second Life
- Twitter



Blogosphere



**About Twitter**

Why do so many people seem to like Twitter?

Twitter has played an important role in Twitter's success. People are eager to connect with other people and Twitter makes that simple. Twitter asks one question: "What are you doing?" Answers must be under 140 characters in length and can be sent via mobile texting, instant message, or the web.

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**Who is tweeting this morning?**

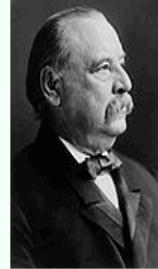
Arts History Society

Biography Mathematics Technology

Geography Science All portals

Contents · Categories · Featured content · A-Z index

**Today's featured article**

 **Grover Cleveland** (1837–1908) was both the 22nd and 24th President of the United States. Cleveland is the only President to serve two non-consecutive terms (1885–1889 and 1893–1897) and therefore is the only individual to be counted twice in the numbering of the presidents. He was the winner of the popular vote for President three times—in 1884, 1888, and 1892—and was the only Democrat elected to the Presidency in the era of Republican political domination that lasted from 1860 to 1912. Cleveland's admirers praise him for his honesty, independence, integrity, and commitment to the principles of classical liberalism. As a leader of the Bourbon Democrats, he opposed imperialism, taxes, subsidies and inflationary policies, but as a reformer he also worked against corruption, patronage, and bossism. Critics complained that he had little imagination and seemed overwhelmed by the nation's economic disasters—depressions and strikes—in his second term. Even so, his reputation for honesty and good character survived the troubles of his second term. (more...)

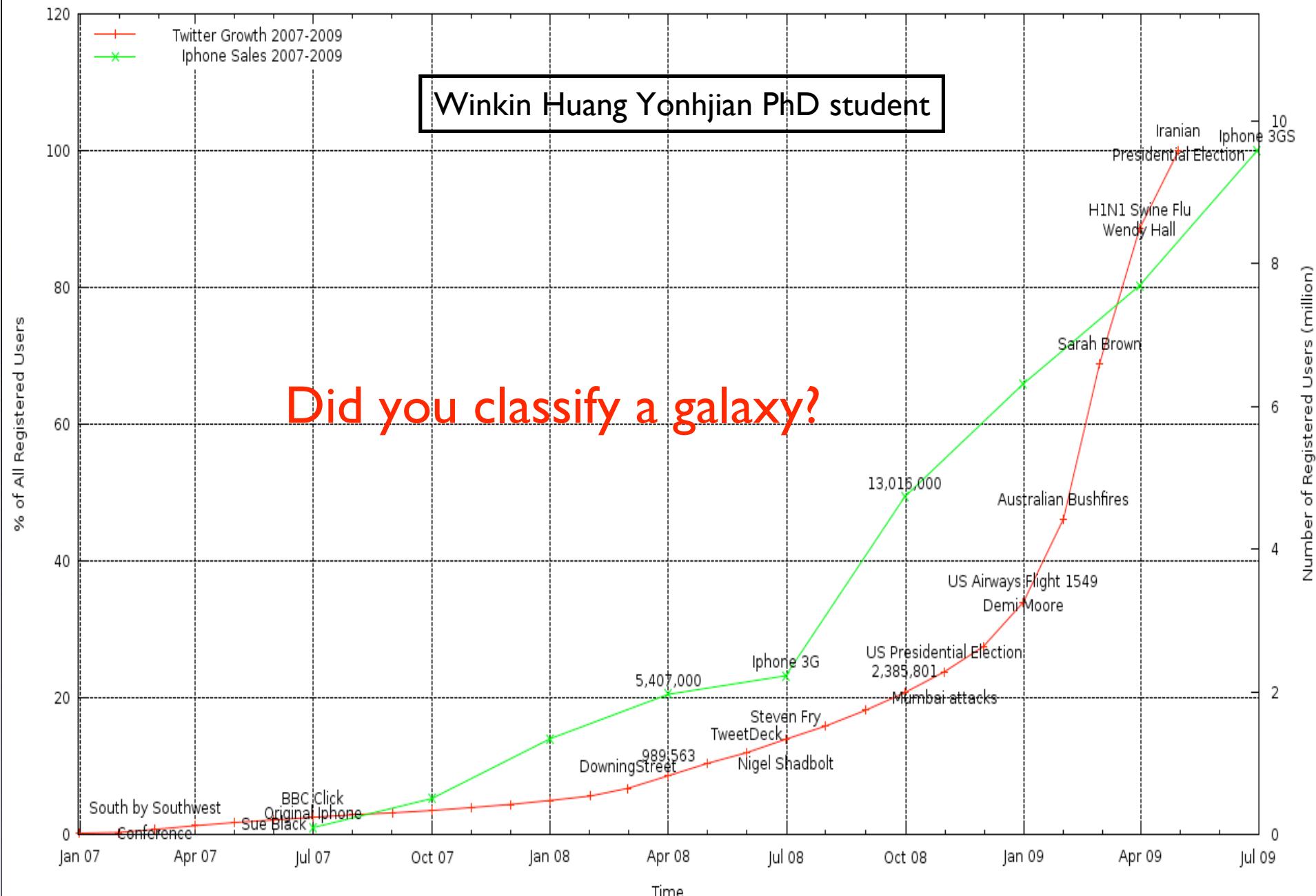
Recently featured: Werner Mölders – Electron – Han Dynasty

**In the news**

- At least 104 people are killed in a mine explosion in Heilongjiang, People's Republic of China.
- Continued flooding affecting Great Britain and Ireland (affected areas pictured) results in two deaths.
- Egypt recalls its ambassador to Algeria in a dispute following a qualifying match between the nations for the 2010 FIFA World Cup.
- Prime Minister of Belgium Herman Van Rompuy is chosen as the first permanent President of the European Council.
- British politician Catherine Ashton is selected as the first High Representative of the European Union for Foreign Affairs and Security Policy.
- A United States district court finds the Army Corps of Engineers was negligent in maintaining New Orleans levees that contributed to flooding during Hurricane Katrina.

Internet 100%

Timeline of Twitter Growth



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Galaxy Zoo Galaxy Zoo 2

# GALAXY ZOO 2

**GALAXY ZOO**  
UNDERSTANDING COSMIC MERGERS

We're hungry to share data

By colliding galaxies on your computer, you can help us trace the past, present and future of Galaxy Zoo mergers

How Do Galaxies Merge?

HELP US SOLVE THE PUZZLE

Home The Story So Far The Science How To Take Part Classify Galaxies Forum Zoo Media Blog FAQ Contact Us

Welcome to Galaxy Zoo, where you can help astronomers explore the Universe

New, more detailed images added - see here for details

The Galaxy Zoo files contain almost a quarter of a million galaxies which

Classifier Log In

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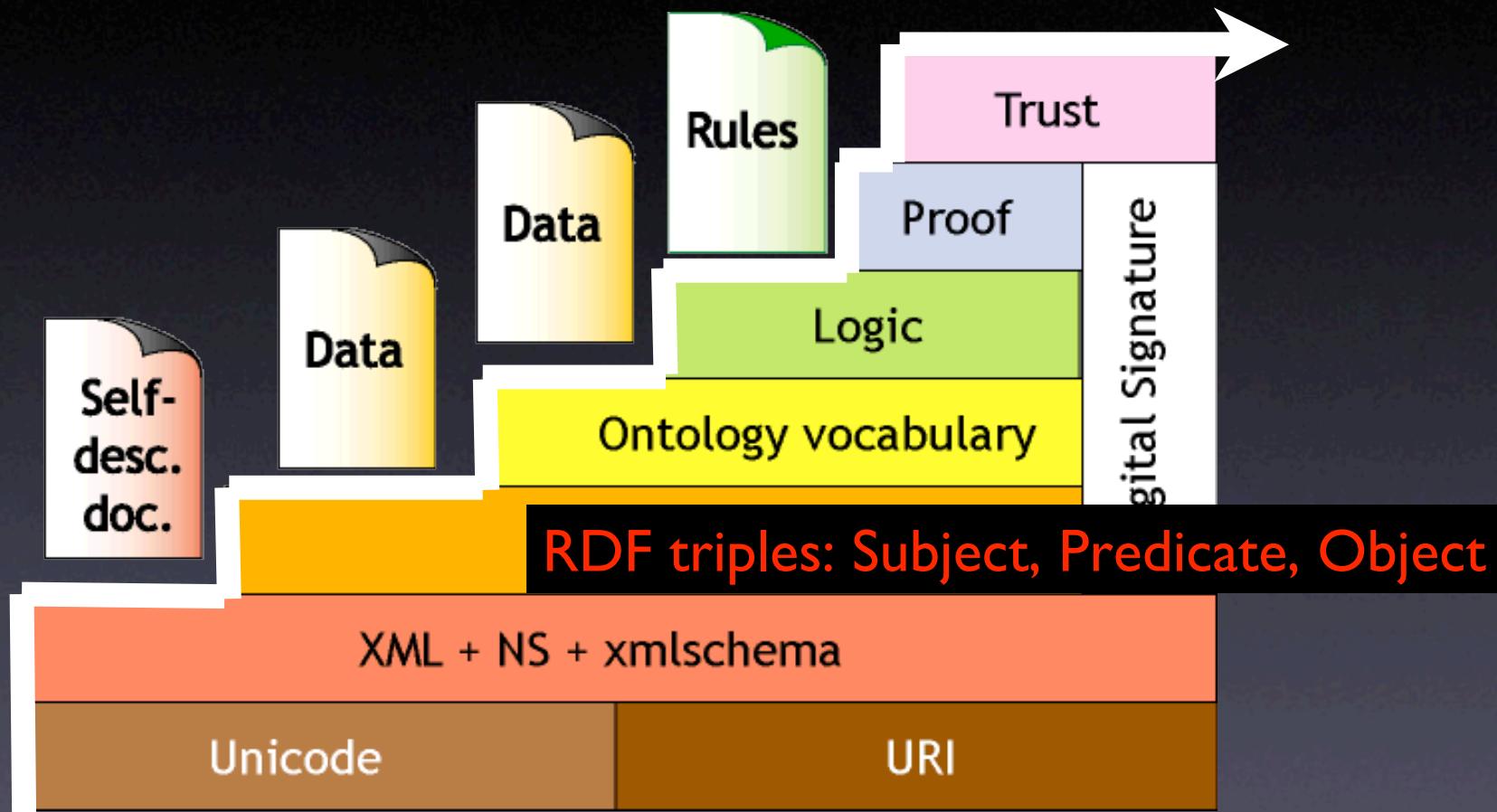
Register  
 Forgotten Password?

Done

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# The Semantic Web: A Web of Linked Data

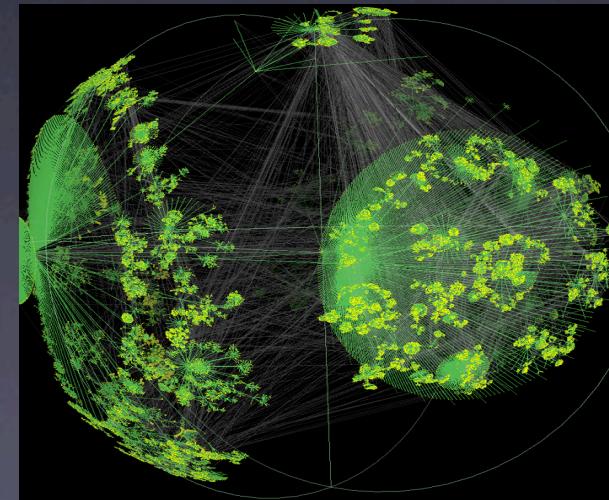
# The Semantic Web



Semantic Web LayerCake (Berners-Lee, 99; Swartz-Hendler, 2001)

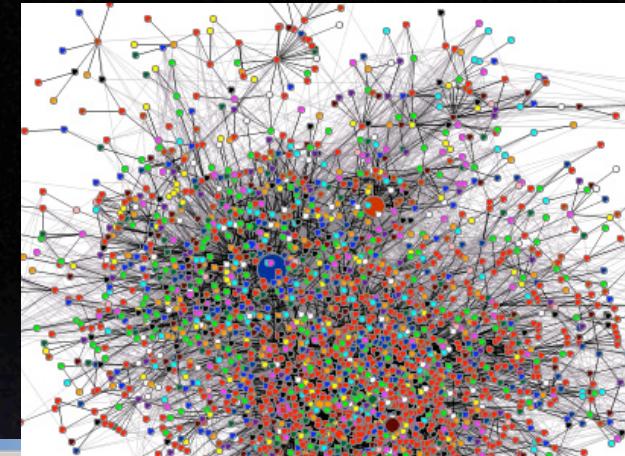
# Web 1.0

## A Web of Documents

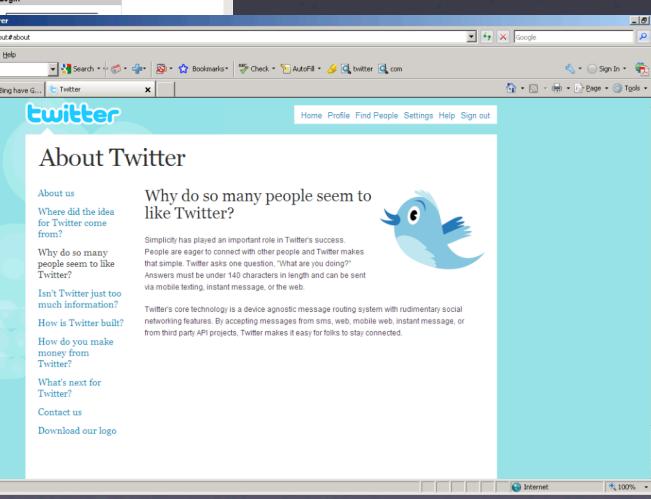
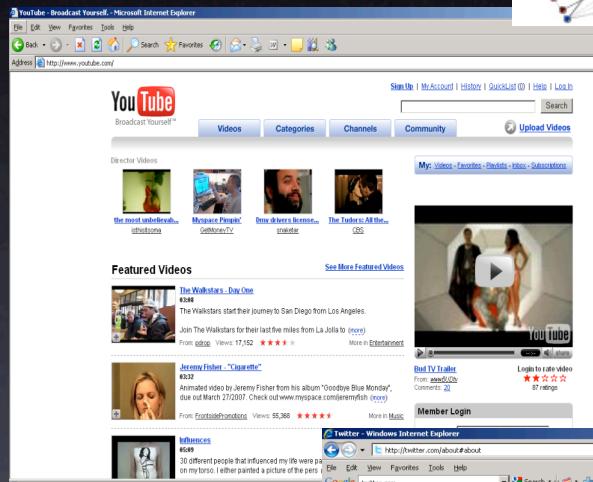


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How is Twitter built?  
How do you make money from Twitter?  
What's next for Twitter?  
Contact us  
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# Tomorrow the Web of Linked Data

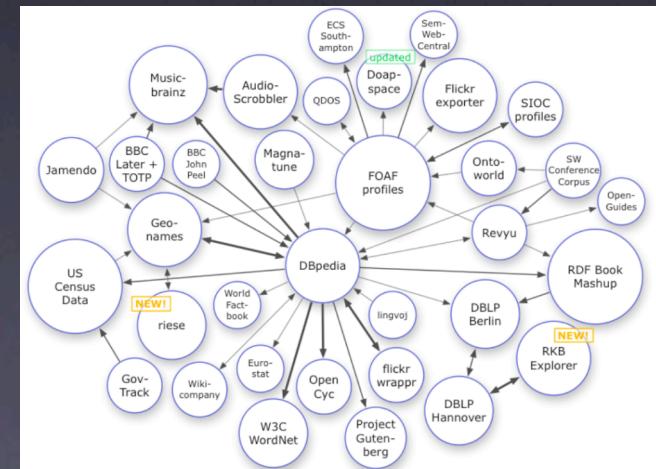
We're eager to share data for all sorts of reasons

What are the implications for business?

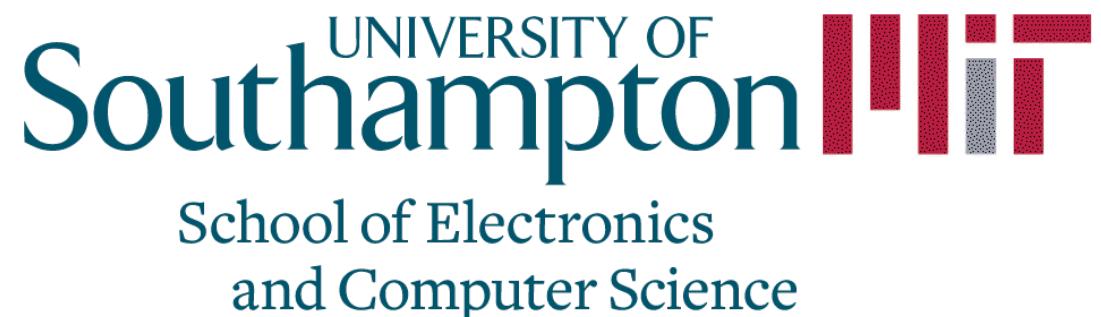
What are social and policy implications?

What will we do with it?

Web 3.0?



Can we develop a  
theory of tipping  
points?



**WSRI**  
web science research initiative

# Introduction

## our motivation

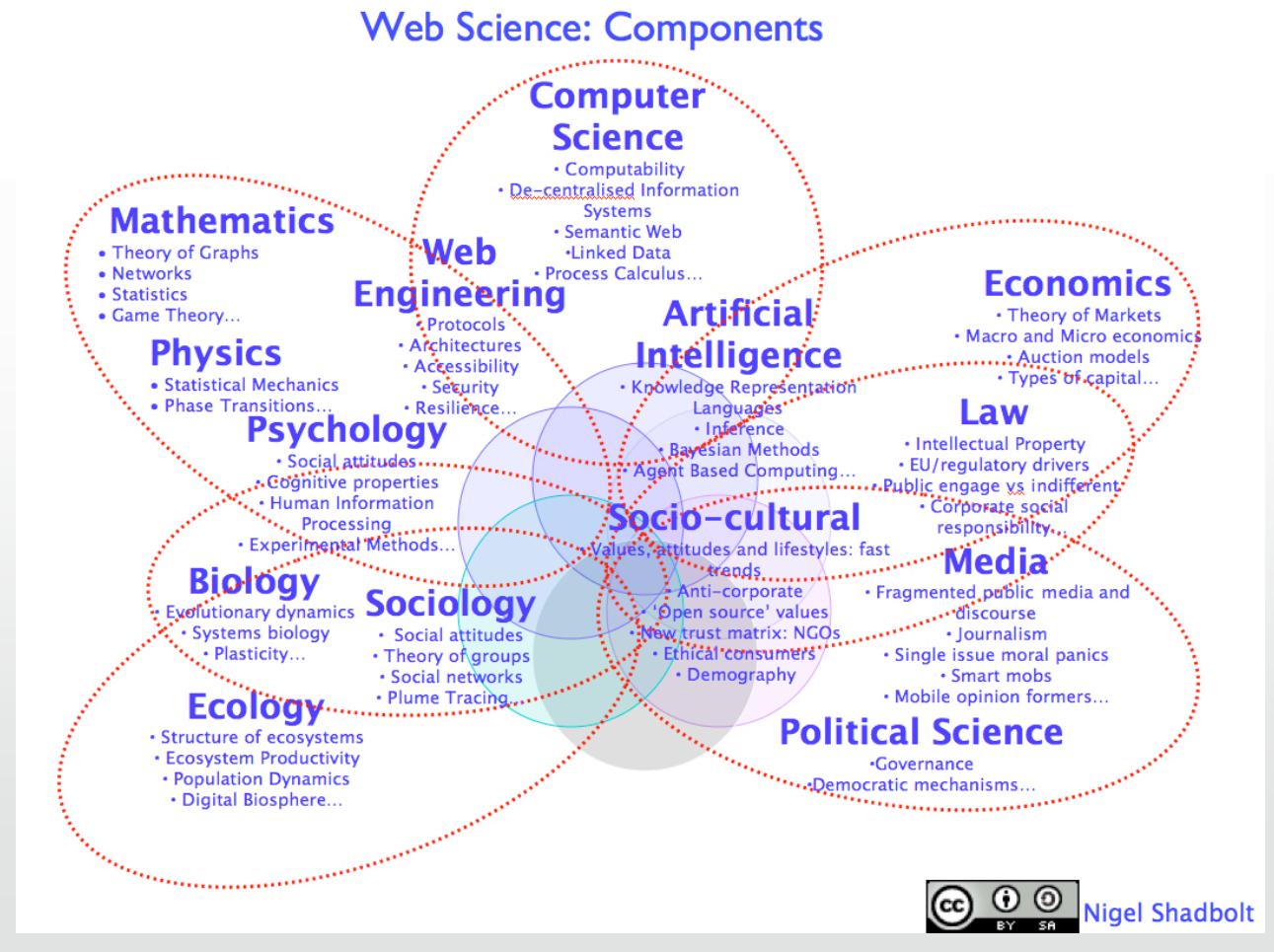
- the Web has been transformational
- we need to understand it
- anticipate future developments
- identify opportunities and threats
- we have established a new discipline: **Web Science**



research / thought leadership / insight

# Web Science

## is {inter|multi|trans}disciplinary

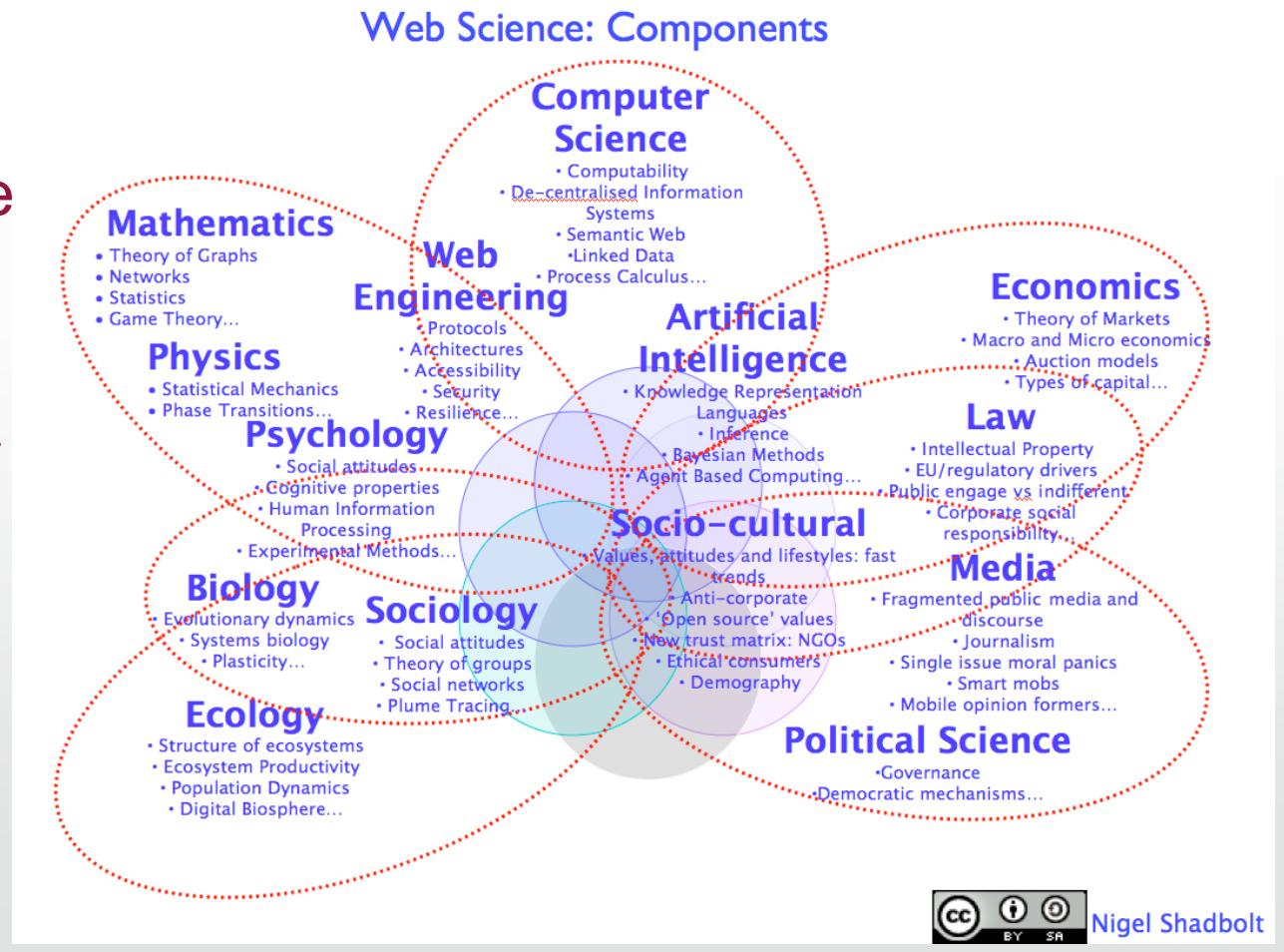


# Web Science

## is about additionality

Not the union of the disciplines

But more than their intersection



# Web Science - Examples

## Wikipedia - Collective Intelligence

- What is its structure?
- How stable is it?
- Why do people contribute?
- What lessons does it offer?

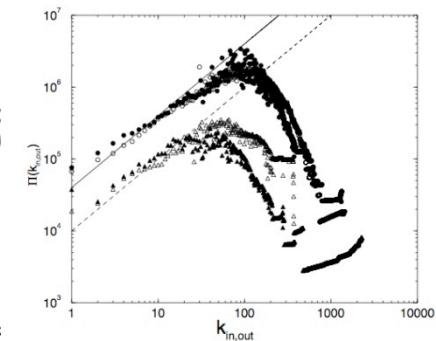
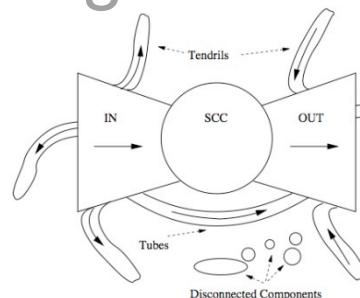


FIG. 1: The shape of the Wikipedia network

Motivation	Question example
Protective	"By writing/editing in Wikipedia I feel less lonely."
Values	"I feel it is important to help others."
Career	"I can make new contacts that might help my business or career."
Social	"People I'm close to want me to write/edit in Wikipedia."
Understanding	"Writing/editing in Wikipedia allows me to gain a new perspective on things."
Enhancement	"Writing/editing in Wikipedia makes me feel needed."
Fun	"Writing/editing in Wikipedia is fun."
Ideology	"I think information should be free."

research / thought leadership / insight

# Web Science - Examples

## Linked data

- Adding a Web of data to the Web of documents
- Methods for linking data
- Role of the Semantic Web
- Micro principles to macro macro phenomena
- Unanticipated reuse

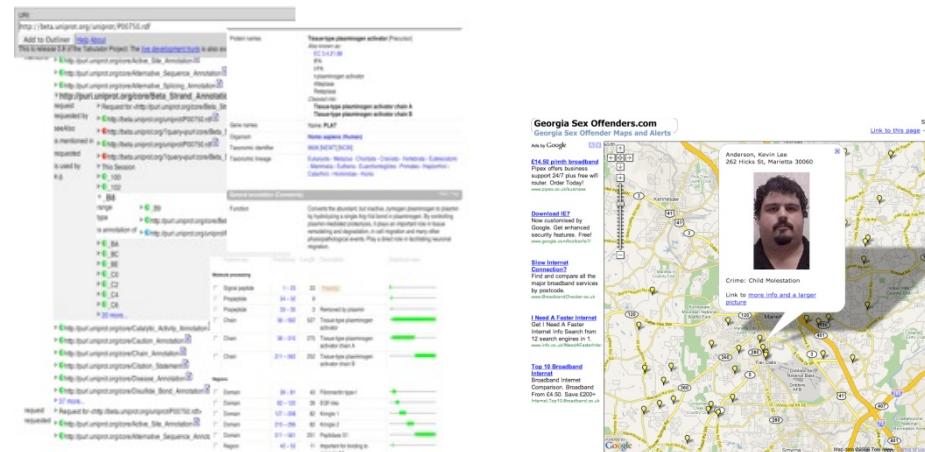


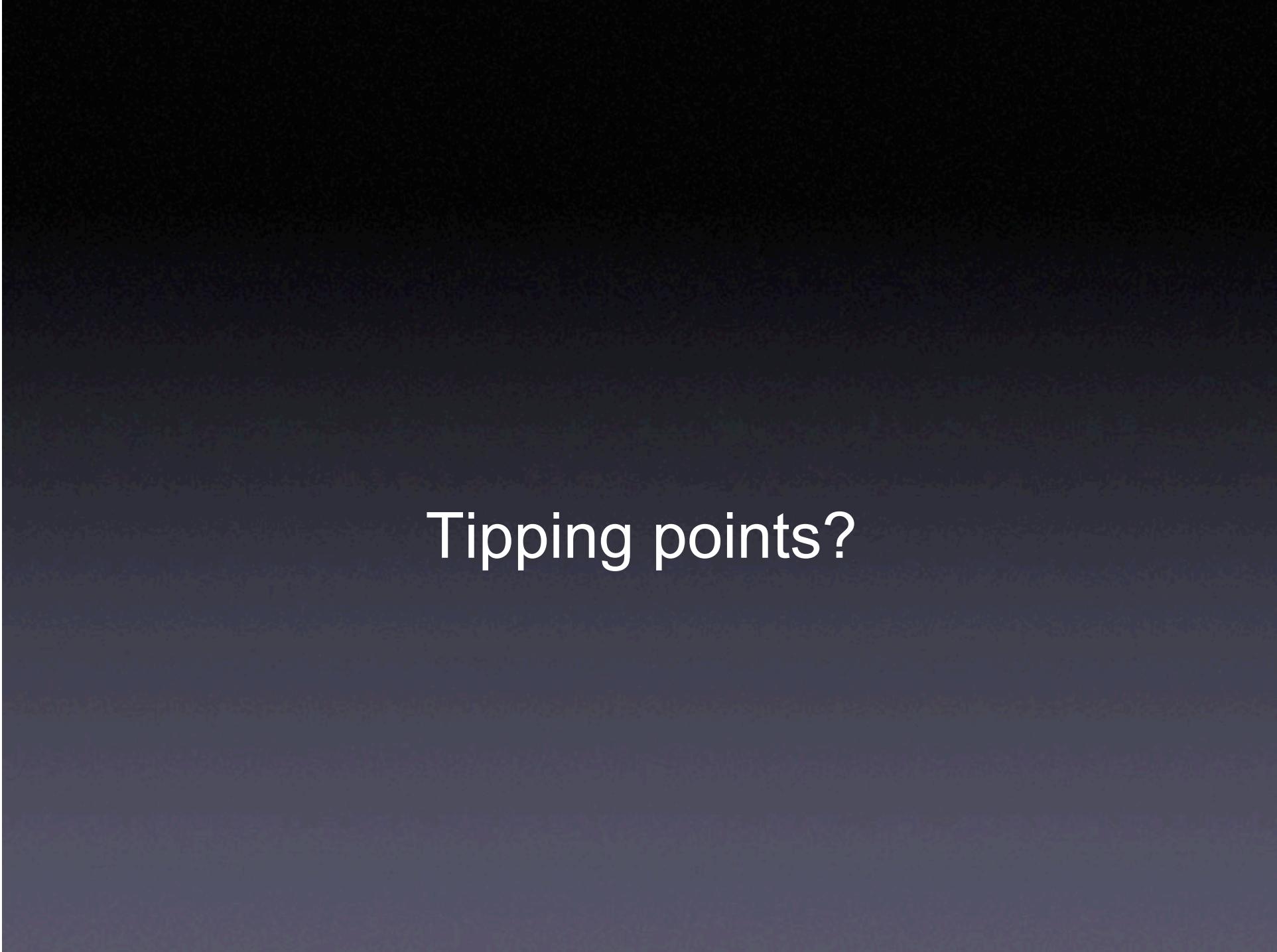
Figure 8 Browsing the Structured Data Web for Proteomics

research / thought leadership / insight



webscience  
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[www.webscience.org](http://www.webscience.org)



Tipping points?

**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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# 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 :)

PM welcomes Sir Tim Berners-Lee to Downing Street | Number10.gov.uk - Windows Internet Explorer

http://www.number10.gov.uk/Page20595

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Google number 10

PM welcomes Sir Tim Berners-Lee to Downing Street | ...

# Number10.gov.uk

The official site of the Prime Minister's Office

10

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Enter search terms Go

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Tuesday 15 September 2009

### PM welcomes Sir Tim Berners-Lee to Downing Street

The Prime Minister welcomed the creator of the World Wide Web, Sir Tim Berners-Lee, and Professor of Artificial Intelligence at the University of Southampton, Nigel Shadbolt, to Downing Street this morning.

Mr Berners-Lee and Mr Shadbolt presented an update to Cabinet on their work advising the Government on how to make data more accessible to the public.

Gordon Brown has already spoken publicly about his aim of making the UK a world leader in opening up government information on the internet, an important element of Building Britain's Future.



October 2009

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
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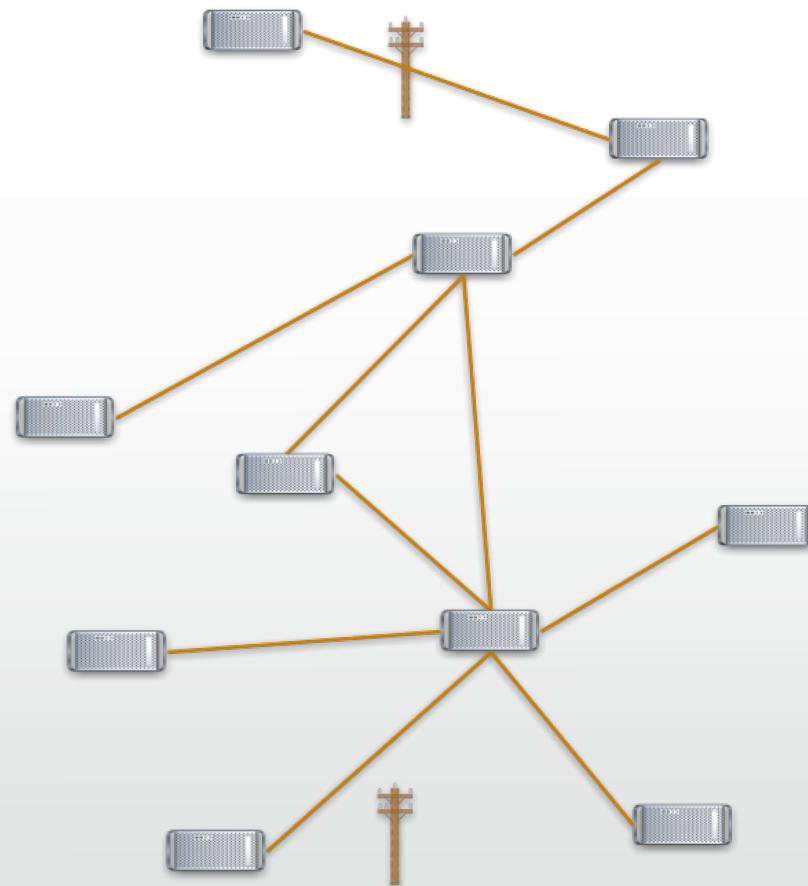
Internet 100%

# The Pragmatic Semantic Web: The Emergence of the Linked Web of Data

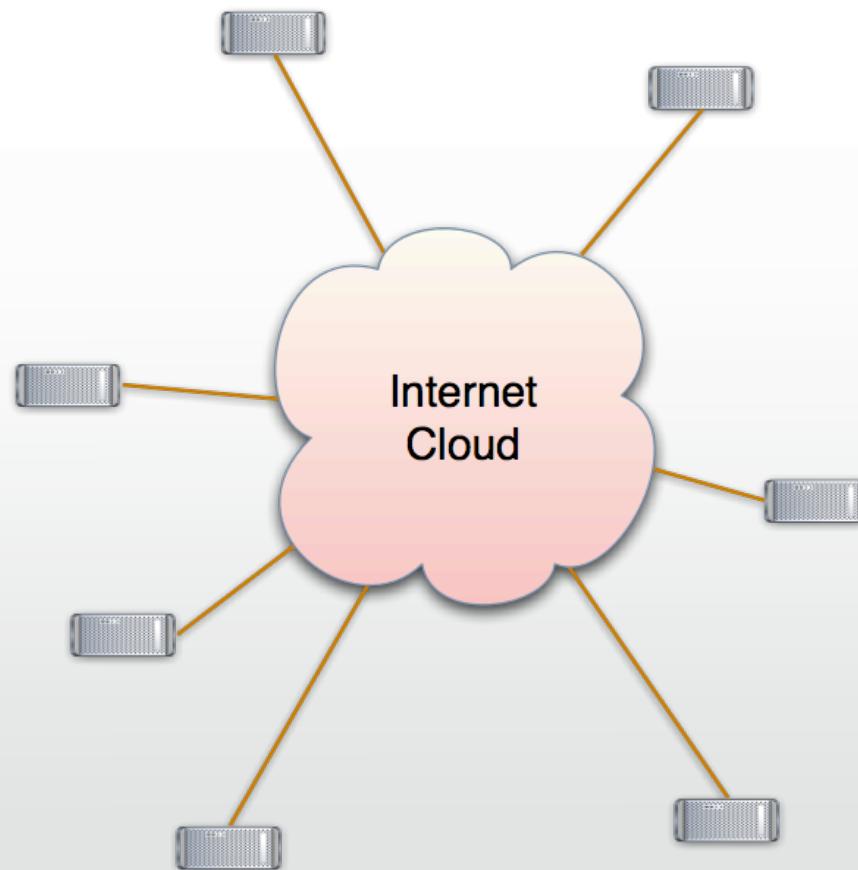
Nigel Shadbolt

Online Information Conference  
Olympia, London  
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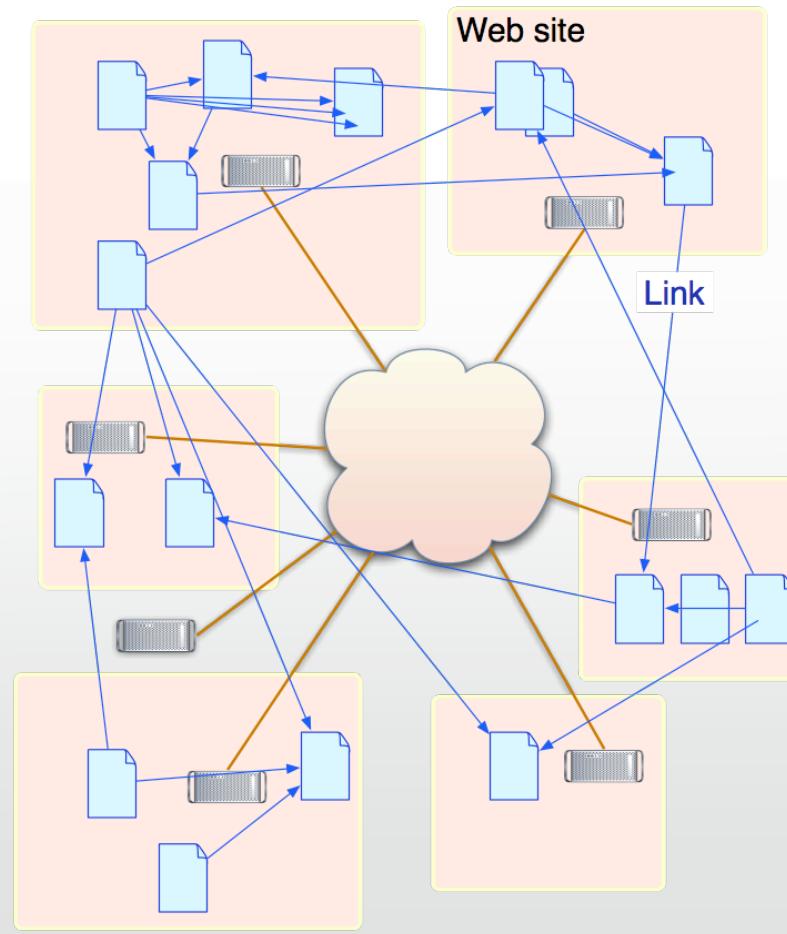
# When the Network was Physical



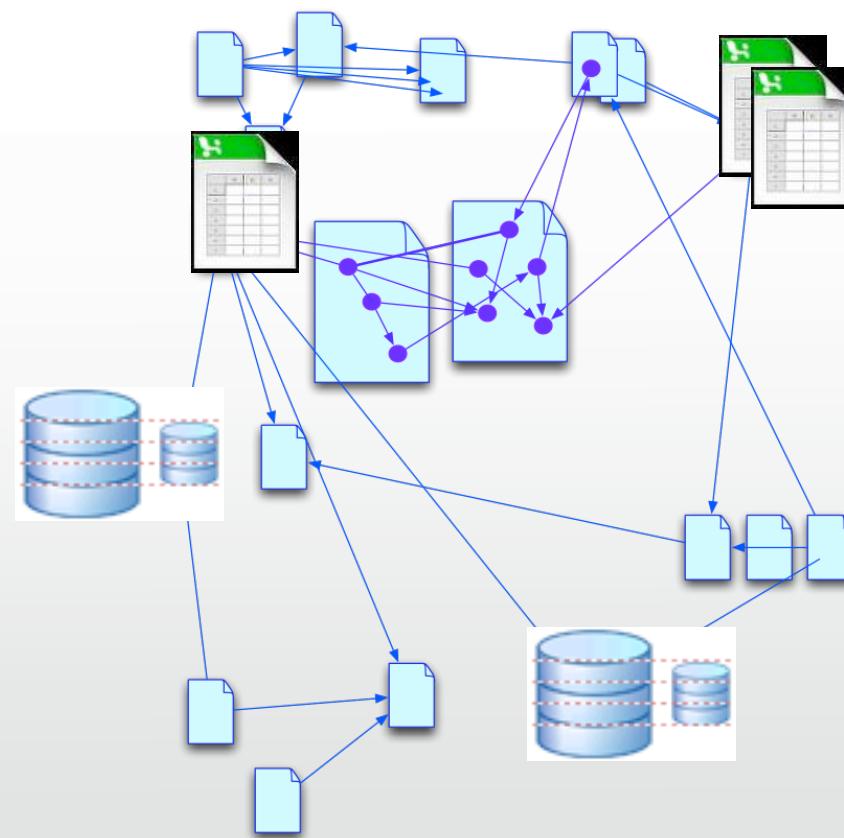
# When the Network was Abstracted



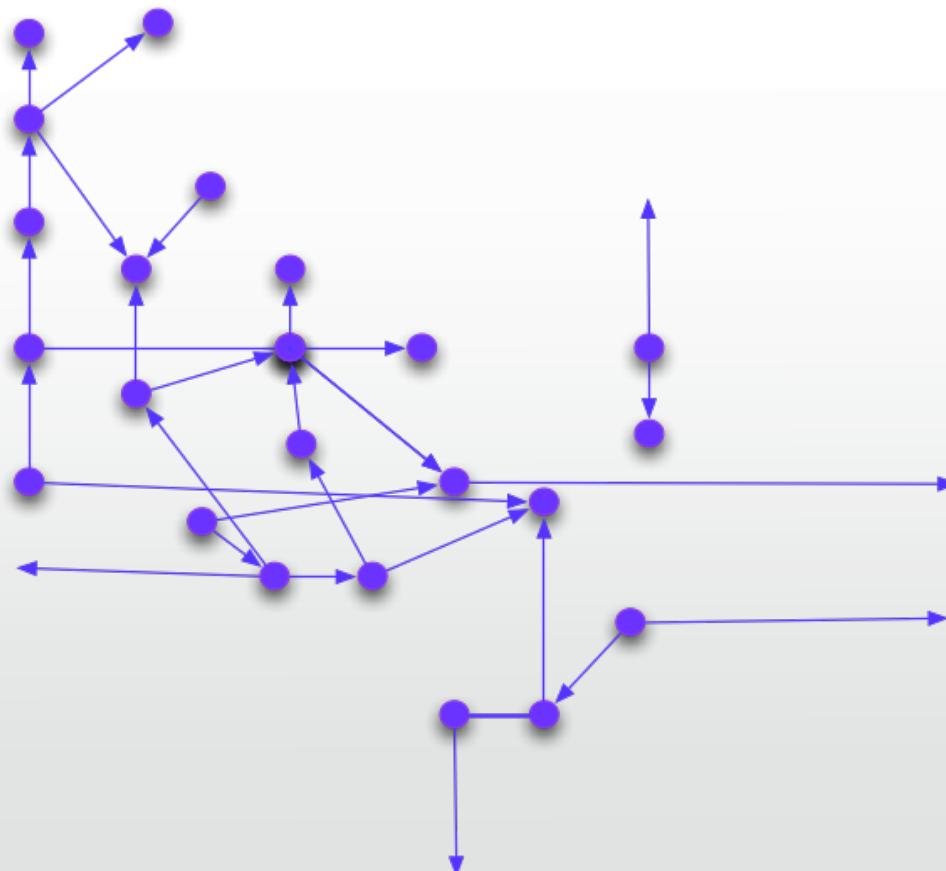
# When the Network was Abstracted Again



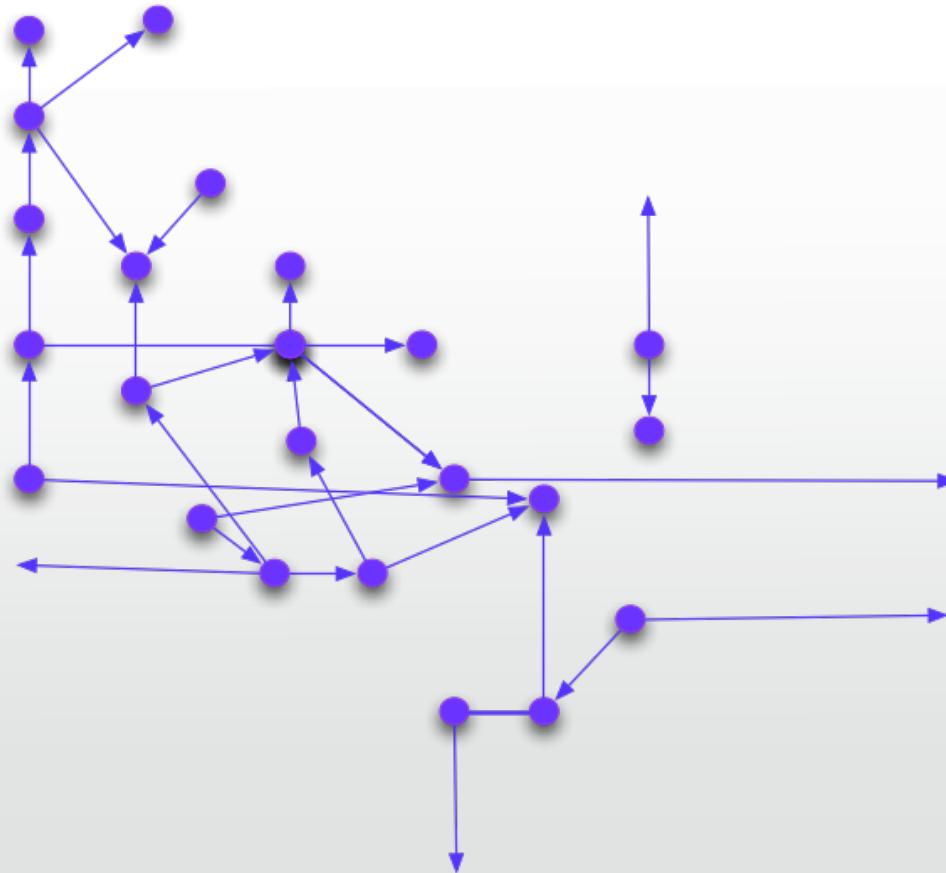
# When the Network is Abstracted Again



# This is the Web of Linked Data



# This is the Pragmatic Semantic Web



# Linking Data

<http://www2002.org>



**W W W 2 0 0 2**

THE ELEVENTH INTERNATIONAL  
WORLD WIDE WEB CONFERENCE

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7-11 May 2002

CONFERENCE ORGANIZERS



International World Wide Web Conference Committee

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On 7-11 May 2002, Honolulu, Hawaii will provide the backdrop for The Eleventh International World Wide Web Conference. This prestigious series of the International World Wide Web Conference Committee (IW<sup>3</sup>C<sup>2</sup>) attracts participants from around the world, and it provides a public forum for the World Wide Web Consortium (W3C) through the annual W3C track.

The conference is being organized by the International World Wide Web Conference Committee (IW<sup>3</sup>C<sup>2</sup>), the University of Hawaii and the Pacific Telecommunications Council (PTC).

**FEATURED SPEAKERS (CONFIRMED)**



Tim Berners-Lee, inventor of the World Wide Web and Director of the W3C who now holds the 3Com Founders chair at the Laboratory for Computer Science (LCS) at the Massachusetts Institute of Technology (MIT).



Richard A. DeMillo, vice president and chief technology officer for Hewlett-Packard Company.



Ian Foster, guru of "Grid Computing", associate



# In a way that machines can “understand”....

[http://  
www2002.org](http://www2002.org)

**W W W 2 0 0 2**

THE ELEVENTH INTERNATIONAL  
WORLD WIDE WEB CONFERENCE

This is a type of object event and this is  
its title

This is the URL of the web page for the  
event

This is a type of object photograph and  
the photograph is of Tim Berners-Lee

Tim Berners-Lee is an invited speaker at  
the event

Conference  
Committee

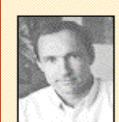
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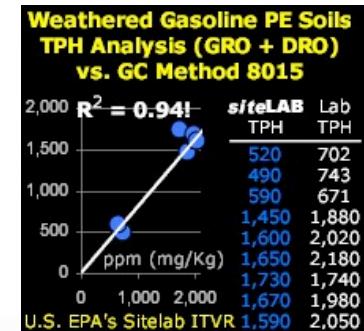
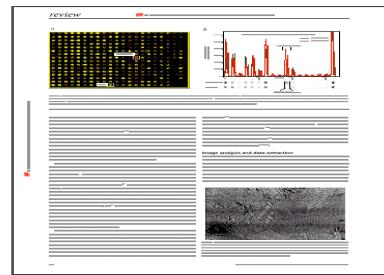
Richard A. DeMillo, vice president and chief technology officer for Hewlett-Packard Company.



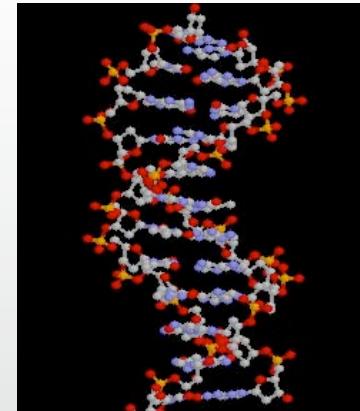
McArthur Prize Winner,

# Can mark up and link any resource...

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



Web data set (XHTML)



# 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](mailto: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](mailto: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](mailto:wh@ecs.soton.ac.uk).

# 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](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. <a href="http://www.ecs.soton.ac.uk/people/nrs">http://www.ecs.soton.ac.uk/people/nrs</a>
	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	<a href="http://id.ecs.soton.ac.uk/role/2686">http://id.ecs.soton.ac.uk/role/2686</a>
	Role	<a href="http://id.ecs.soton.ac.uk/project/221">http://id.ecs.soton.ac.uk/project/221</a>
	member Of	<a href="http://id.ecs.soton.ac.uk/project/293">http://id.ecs.soton.ac.uk/project/293</a>
		<a href="http://id.ecs.soton.ac.uk/project/312">http://id.ecs.soton.ac.uk/project/312</a>
		<a href="http://id.ecs.soton.ac.uk/project/353">http://id.ecs.soton.ac.uk/project/353</a>
		<a href="http://id.ecs.soton.ac.uk/project/361">http://id.ecs.soton.ac.uk/project/361</a>
		<a href="http://id.ecs.soton.ac.uk/project/381">http://id.ecs.soton.ac.uk/project/381</a>
		<a href="http://id.ecs.soton.ac.uk/project/395">http://id.ecs.soton.ac.uk/project/395</a>
		<a href="http://id.ecs.soton.ac.uk/project/443">http://id.ecs.soton.ac.uk/project/443</a>
		<a href="http://id.ecs.soton.ac.uk/project/44">http://id.ecs.soton.ac.uk/project/44</a>
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		<a href="http://id.ecs.soton.ac.uk/project/629">http://id.ecs.soton.ac.uk/project/629</a>
		<a href="http://id.ecs.soton.ac.uk/project/630">http://id.ecs.soton.ac.uk/project/630</a>
	type	Person
	family name	Shadbolt
	givenname	Nigel R
	homepage	<a href="http://users.ecs.soton.ac.uk/nrs/">http://users.ecs.soton.ac.uk/nrs/</a>
	img	<a href="http://www.ecs.soton.ac.uk/image.php?id=person_268">http://www.ecs.soton.ac.uk/image.php?id=person_268</a>
		<a href="http://www.ecs.soton.ac.uk/image.php?id=person_268&amp;checksum=6c2158b33a0c10e328ec62f9ed1cc73">http://www.ecs.soton.ac.uk/image.php?id=person_268&amp;checksum=6c2158b33a0c10e328ec62f9ed1cc73</a>
	mbox	<a href="mailto:nrs@ecs.soton.ac.uk">mailto:nrs@ecs.soton.ac.uk</a>
	name	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. <a href="http://www.ecs.soton.ac.uk/research/projects/4">http://www.ecs.soton.ac.uk/research/projects/4</a>
<a href="http://id.ecs.soton.ac.uk/project/443">http://id.ecs.soton.ac.uk/project/443</a>	Source	Southampton ECS Projects: MIMEX: Multivariant Information Management and Exploitation
	Title	2009-11-26T10:58:31Z
	Date Created	
	type	
	label	
	associated With	
	associated With Unit	
	Name	<a href="http://id.ecs.soton.ac.uk/UoS/ECS">http://id.ecs.soton.ac.uk/UoS/ECS</a>
	Theme	MIMEX: Multivariant Information Management
		<a href="http://id.ecs.soton.ac.uk/theme/106">http://id.ecs.soton.ac.uk/theme/106</a>
		<a href="http://id.ecs.soton.ac.uk/theme/127">http://id.ecs.soton.ac.uk/theme/127</a>
		<a href="http://id.ecs.soton.ac.uk/theme/130">http://id.ecs.soton.ac.uk/theme/130</a>
		<a href="http://id.ecs.soton.ac.uk/theme/38">http://id.ecs.soton.ac.uk/theme/38</a>
		<a href="http://id.ecs.soton.ac.uk/theme/66">http://id.ecs.soton.ac.uk/theme/66</a>
	Web Page	<a href="https://www.edefence.org/mimex">https://www.edefence.org/mimex</a>
	run By Group	<a href="http://id.ecs.soton.ac.uk/group/iam">http://id.ecs.soton.ac.uk/group/iam</a>
	begins	in Calendar Clock
		day
		hour
		minute
		month
		year
		type
	ends	2006-07-03T00:00:00Z
		Instant
		in Calendar Clock
		day
		hour
		minute
		month
		year
		type
		2009-03-31T00:00:00Z
		Instant
		in Calendar Clock

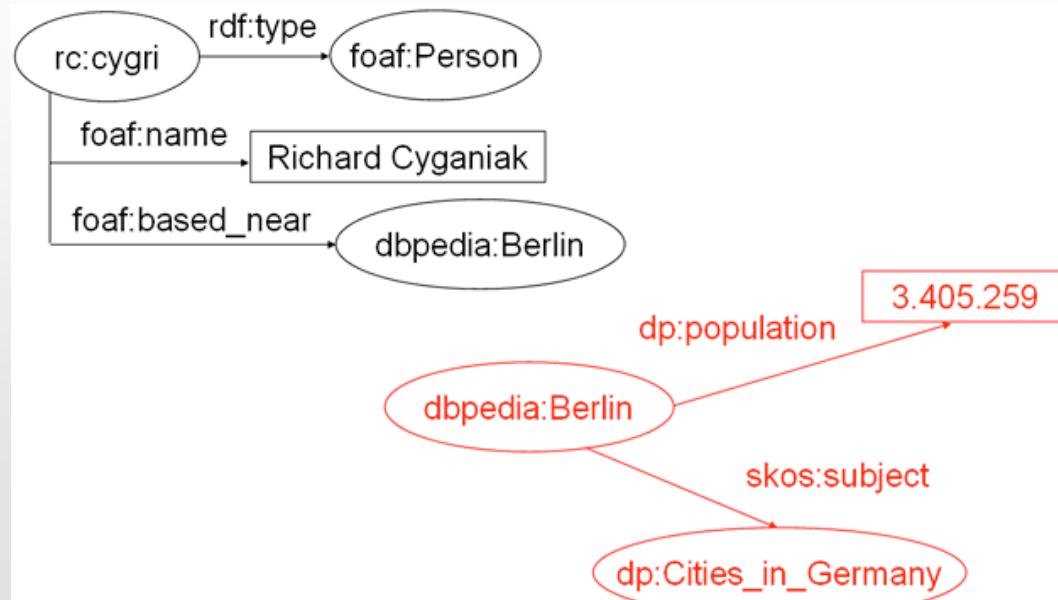
# What is a RDF?

- 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

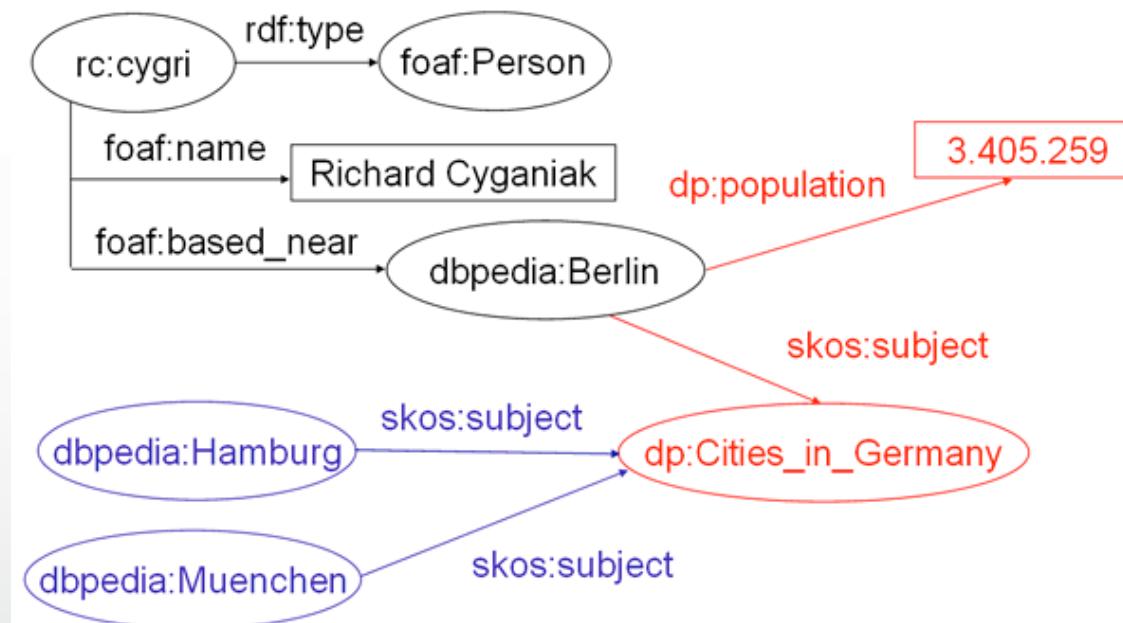
rc:cygri	rdf:type	foaf:Person.
rc:cygri	foaf:name	"Richard Cyganiak" .
rc:cygri	foaf:based_near	dbpedia:Berlin .
dbpedia:Berlin	dp:population	"3,405,259"
dpedia:Berlin	skos:subject	dp:Cities_in_Germany.

# What is a RDF?

- Statements about resources in the from of subject-predicate-object
- A knowledge representation language for the Web
- Represents information as sets of triples
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# Principle 4: Link data



# 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](http://dbpedia.org/resource/Nigel_Shadbolt)

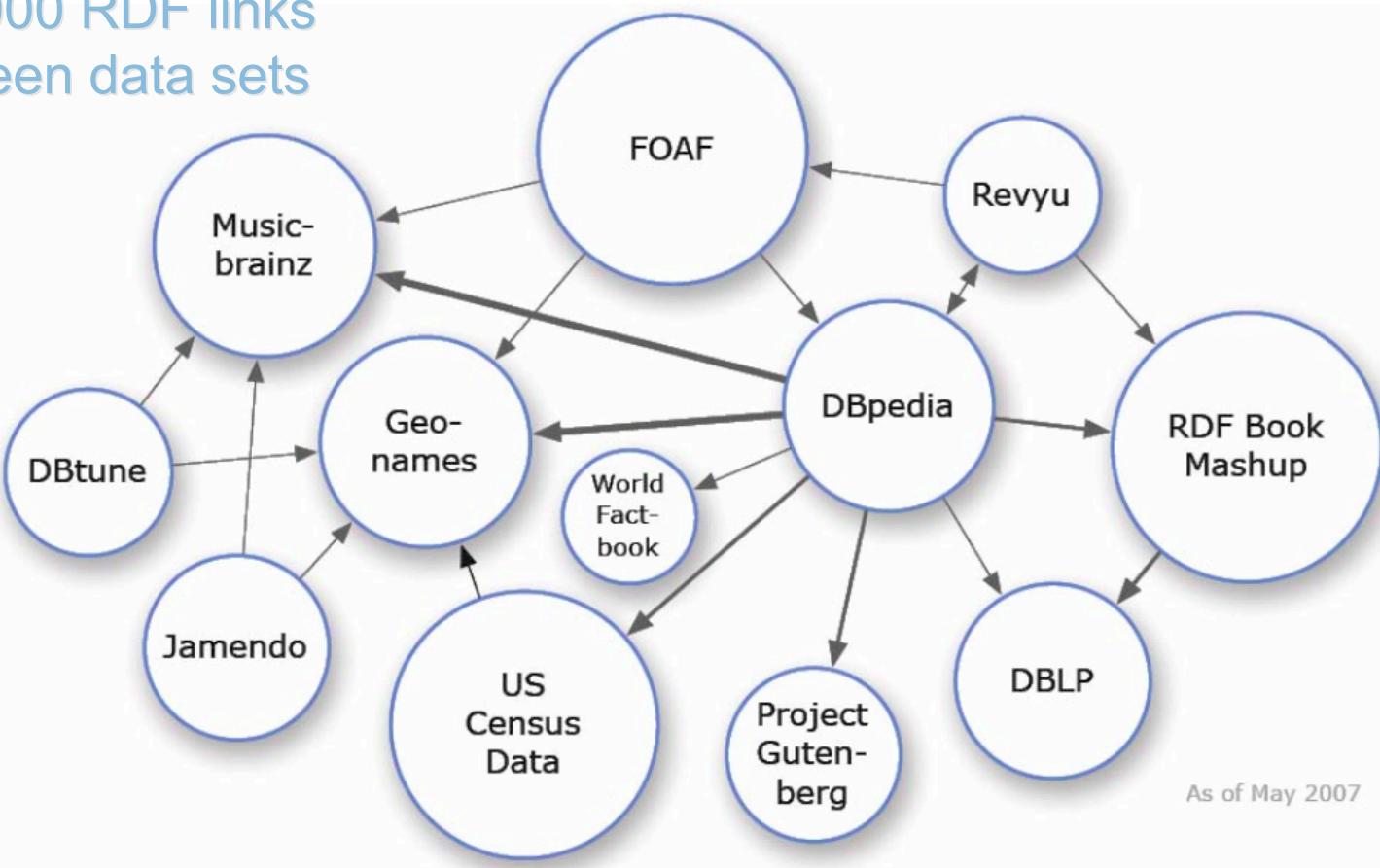
The screenshot shows the SIGMA semantic informa MASHUP interface with three tabs open, each displaying linked data for the same entity: Nigel Shadbolt.

- SIGMA Tab:** Shows a list of 20 facts about Nigel Shadbolt, including his name, family name, and various publications and roles. For example, it lists "given name: Nigel R [1]" and "is creator of: AKT Selected Papers 2004 [2]".
- ANTIC INFORMA HUP Tab:** Shows a list of 20 facts, including "given name: Nigel R [1]" and "is creator of: AKT Selected Papers 2004 [2]".
- dbpedia.org Tab:** Shows a list of 20 facts, including "given name: Nigel R [1]" and "is creator of: AKT Selected Papers 2004 [2]".

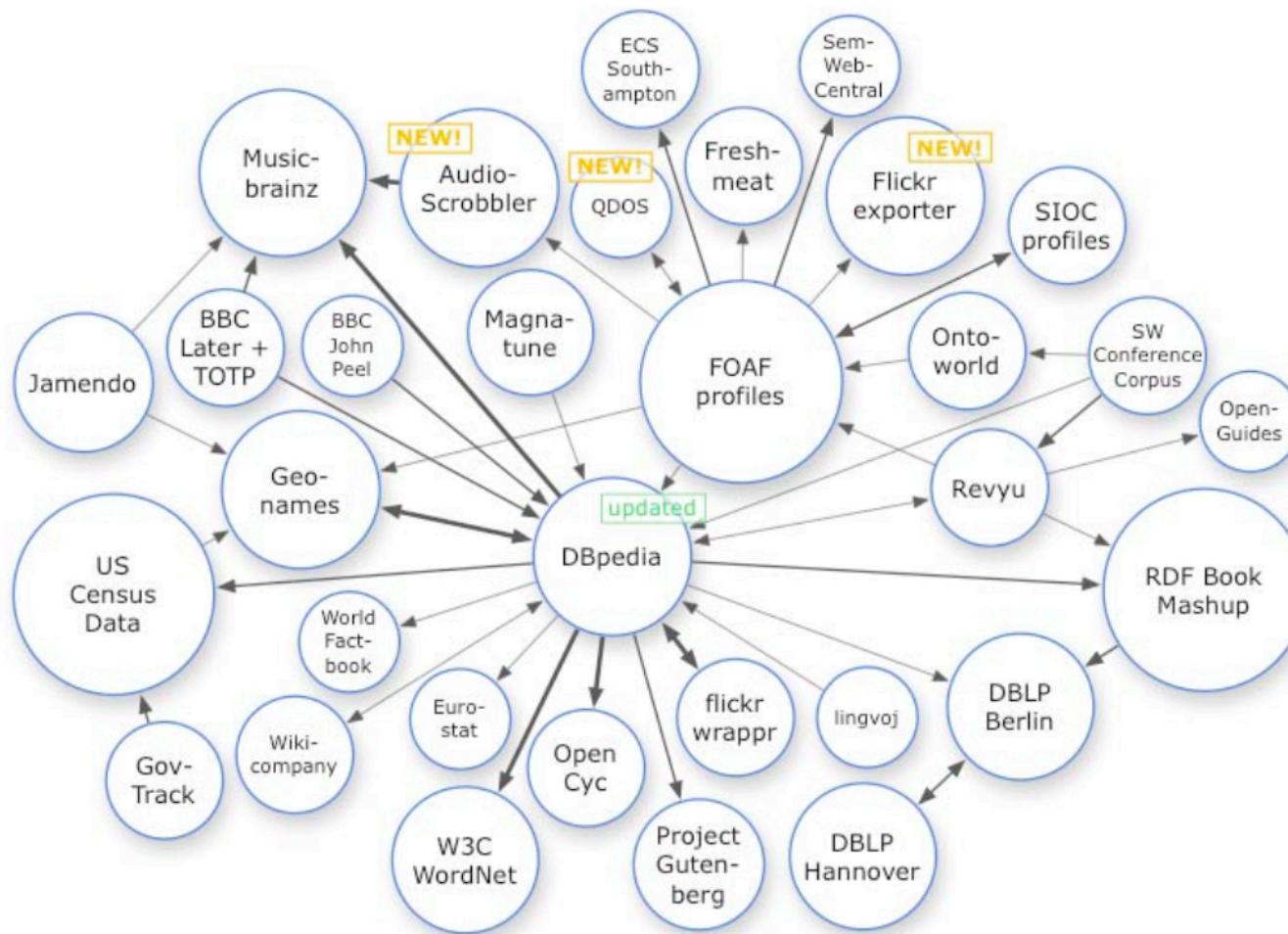
Each tab has a "Sources (20)" button, an "Approved (0)" button, and a "Rejected (0)" button. The bottom of the interface includes a "reject all" and "approve all" button, and a "http://example.loc/document.rdf" link.

# Linked Data on the Web: May 2007

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

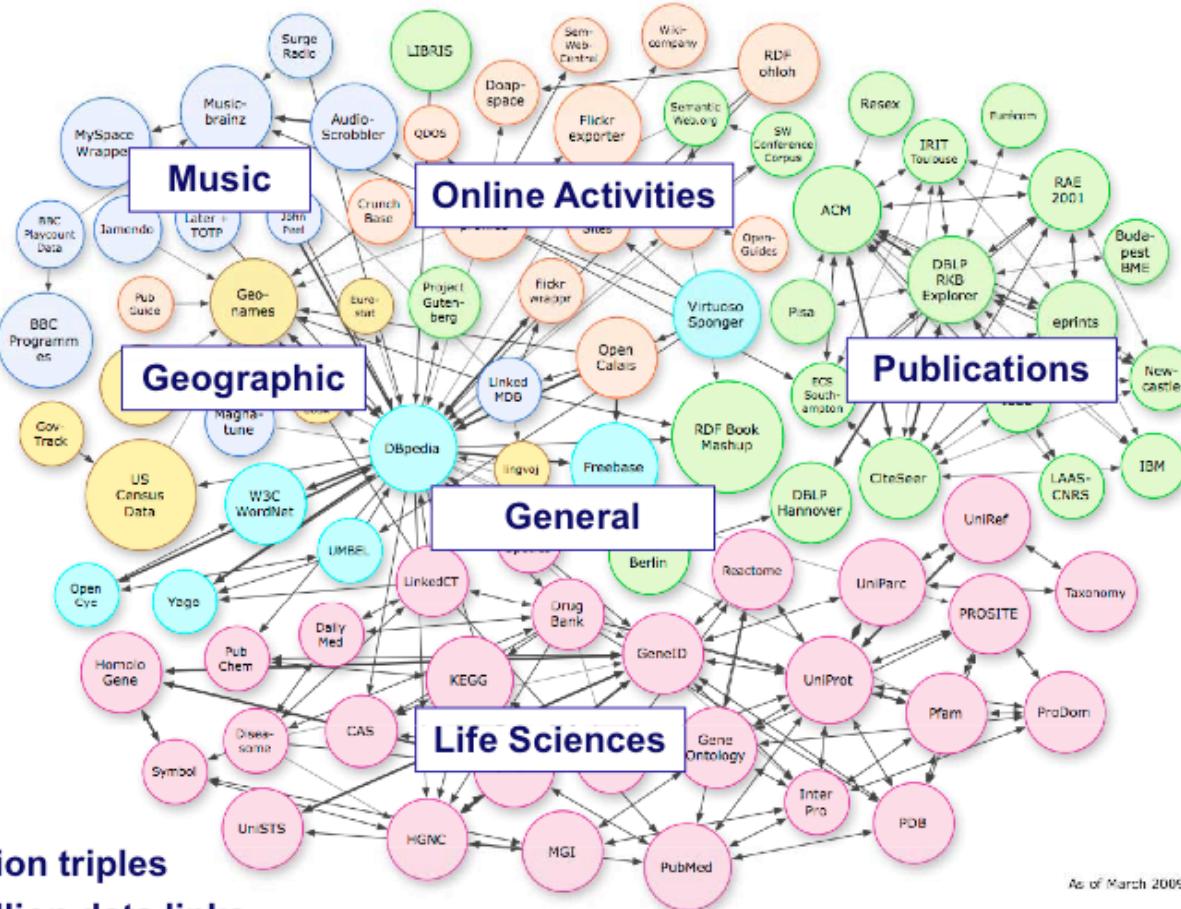


# Linked Data on the Web: February 2008



# Linked Data on the Web: March 2009

## LOD Datasets on the Web: March 2009

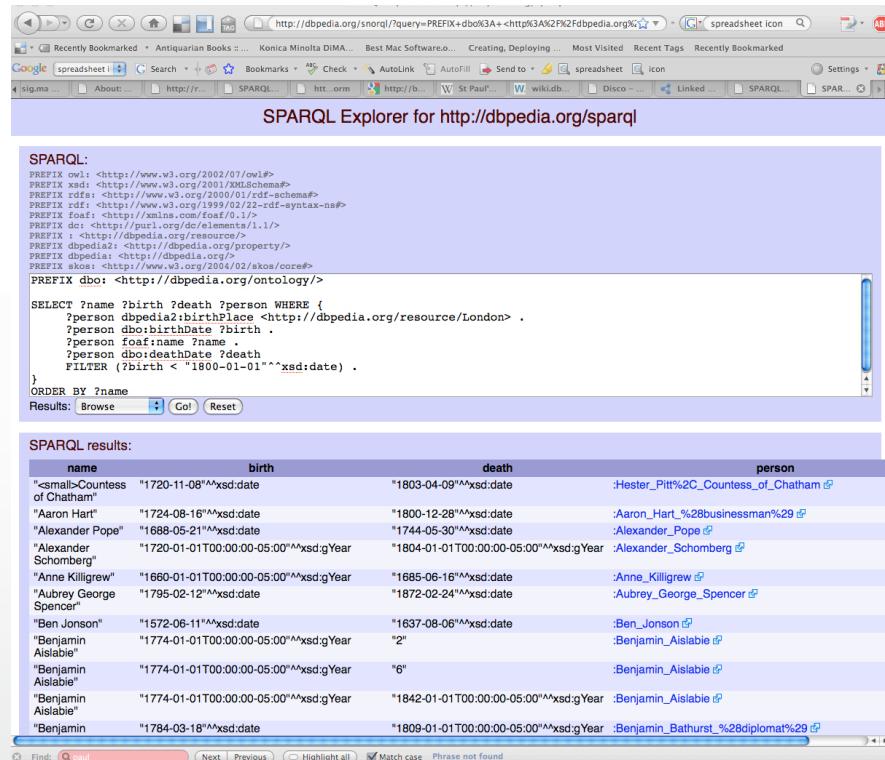


4.5 billion triples  
180 million data links

60 of March 2009

# What is a 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 browser window with the URL <http://dbpedia.org/sparql>. The title bar says "SPARQL Explorer for http://dbpedia.org/sparql". The main content area is divided into two sections: "SPARQL:" and "SPARQL results:". The "SPARQL:" section contains the following query:

```

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 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 dbpedia2i: <http://dbpedia.org/resource/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
PREFIX dbo: <http://dbpedia.org/ontology/>

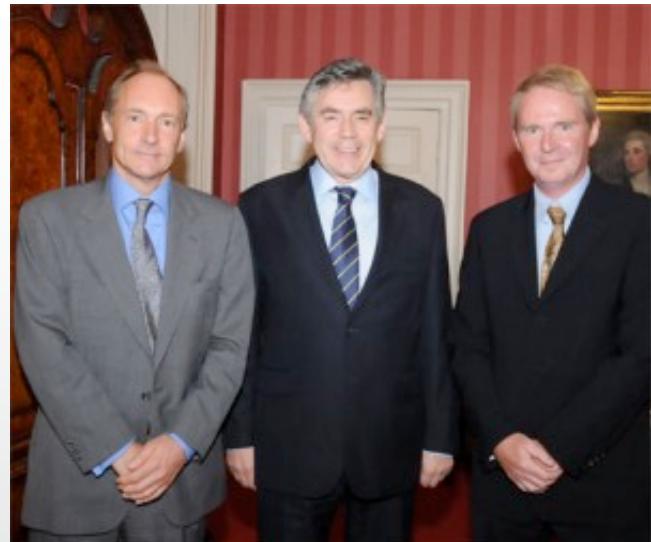
SELECT ?name ?birth ?death ?person WHERE {
  ?person dbpedia2:birthPlace <http://dbpedia.org/resource/London> .
  ?person dbo:birthDate ?birth .
  ?person foaf:name ?name .
  ?person dbo:deathDate ?death
  FILTER (?birth < "1800-01-01"^^xsd:date) .
}
ORDER BY ?name
  
```

The "Results:" section shows a table with the following data:

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

# Linked Data in Government: A Tipping Point?

- 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



# Key Elements of 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

# 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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**YouTube**   
**Latest Videos**  
  
[The Cabinet in the East Midlands](#) [Thu Nov 26 2009](#)

# Progress to date

- Top down
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  - Engaging with developer community
  - Cross Gov URI workshops
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- Dissemination

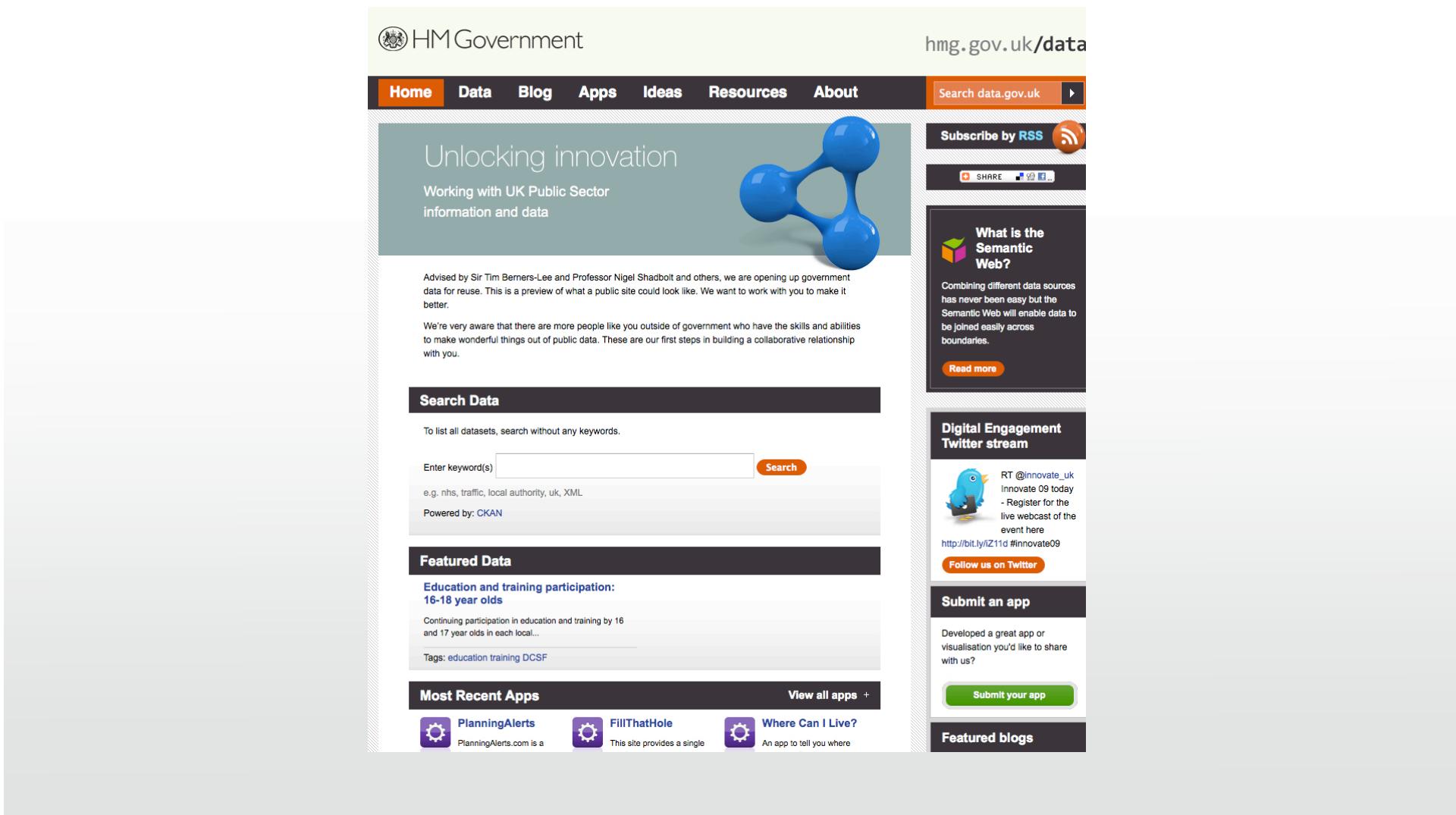


The screenshot shows the homepage of **TIMES ONLINE**. At the top, there is a quote from David Aaronovitch: "I don't think Lord Lawson accepts the science of climate change at all". The main article, by Tim Berners-Lee and Nigel Shadbolt, is titled "Put in your postcode, out comes the data" and discusses how government data is becoming more accessible. The sidebar features sections like "TIMES RECOMMENDS", "OUR COLUMNISTS" (with a photo of David Aaronovitch), "FOCUS ZONE" (Business Travel), "Births, deaths, marriages" (with a photo of a couple), "Business Directory" (with a photo of a document), and "Crossword Club" (with a photo of a crossword puzzle). Other links in the sidebar include "Need to Know", "Winter Sports", "Mapping Business", "The Future of Energy", "Europe by Train", "My Dinner Party", and "More reports".

# 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 from Gov Depts thereafter

# data.gov.uk



The screenshot shows the homepage of data.gov.uk. At the top, the HM Government logo and the URL hmg.gov.uk/data are visible. The main header features a blue 3D molecular model icon and the text "Unlocking innovation" and "Working with UK Public Sector information and data". Below this, a message from Sir Tim Berners-Lee and Professor Nigel Shadbolt is displayed, followed by a section on the Semantic Web. The page includes a search bar, a "Featured Data" section with a "PlanningAlerts" app, a "Most Recent Apps" section with "PlanningAlerts", "FillThatHole", and "Where Can I Live?", and a "Digital Engagement Twitter stream" section.

HM Government

hmg.gov.uk/data

Home Data Blog Apps Ideas Resources About

Search data.gov.uk

Subscribe by RSS

SHARE

Unlocking innovation

Working with UK Public Sector information and data

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.

Search Data

To list all datasets, search without any keywords.

Enter keyword(s)  Search

e.g. nhs, traffic, local authority, uk, XML

Powered by CKAN

Featured Data

Education and training participation: 16-18 year olds

Continuing participation in education and training by 16 and 17 year olds in each local...

Tags: education training DCSF

Most Recent Apps

PlanningAlerts

PlanningAlerts.com is a

FillThatHole

This site provides a single

Where Can I Live?

An app to tell you where

View all apps

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/iZ11d> #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

# data.gov.uk

The screenshot shows the data.gov.uk homepage. At the top, there is a navigation bar with links to Home, Data (which is highlighted in orange), Blog, Apps, Ideas, Resources, and About. To the right of the navigation bar is a search bar with the placeholder "Search data.gov.uk" and a "Search" button. Below the navigation bar is a section titled "Search Data Feeds". This section contains a search form with a "Search Data" button and a "Packages" section. The "Packages" section lists several datasets, each with a title, description, and tags. The datasets 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. One module is titled "What is the Semantic Web?" with a description of how it combines different data sources. Another module is titled "Digital Engagement Twitter stream" with a link to a live webcast. There is also a "Submit an app" button and a "Featured blogs" section.



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



Lloyds TSB



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



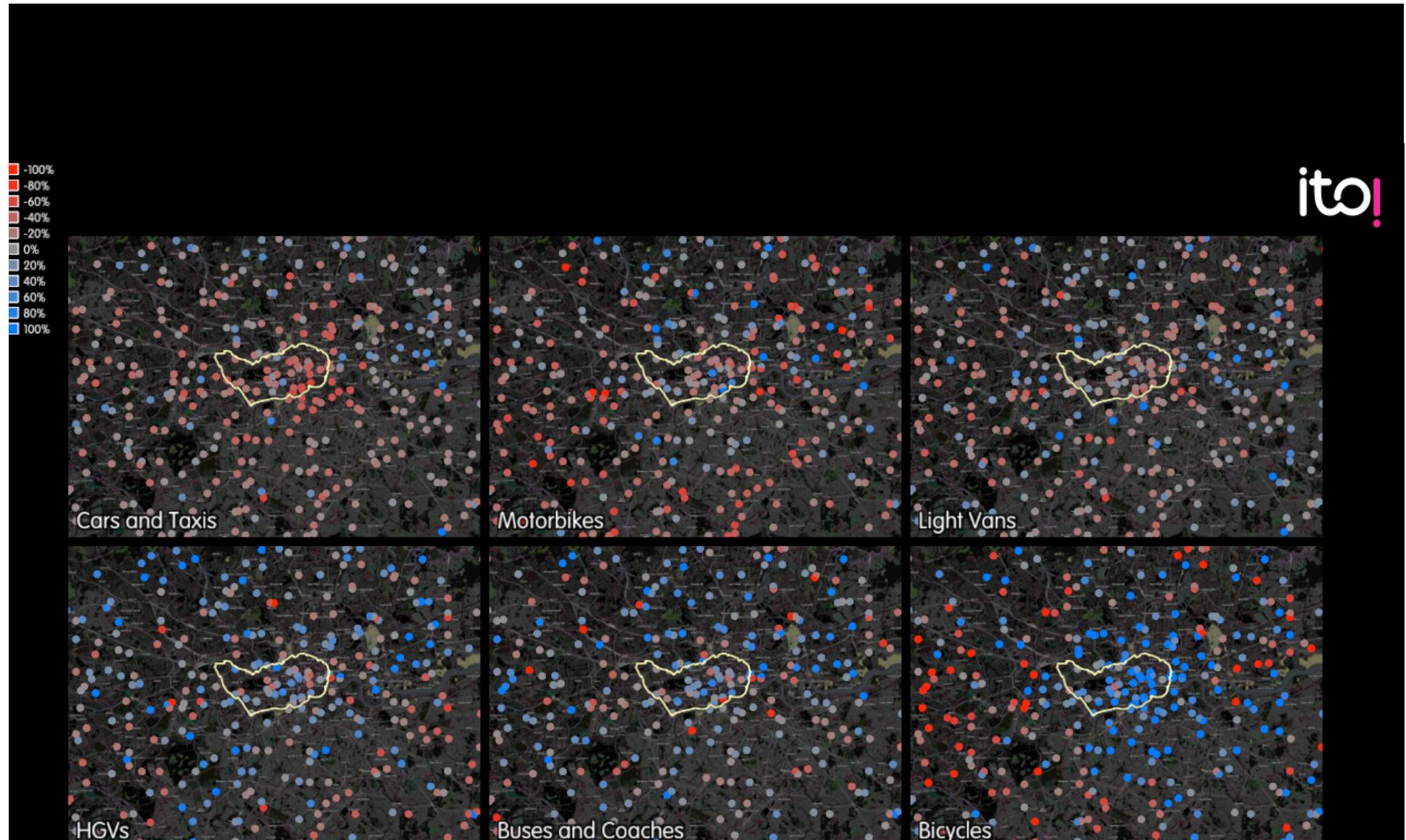
£5.55

Overseas aid



£0.43

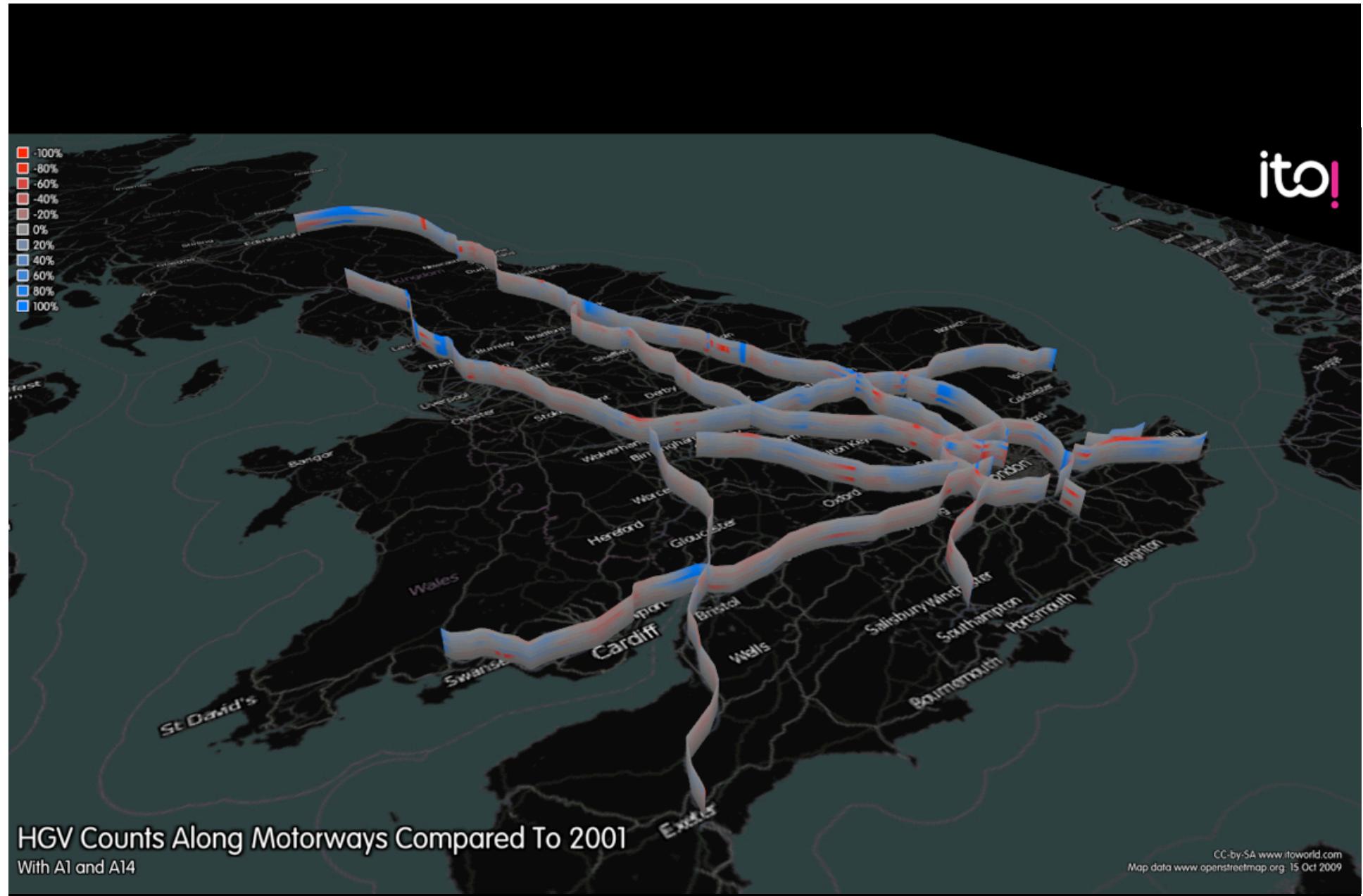
David McCandless



2008 London Counts Compared To 2001

CC-by-SA [www.ito-world.com](http://www.ito-world.com)  
Map data [www.openstreetmap.org](http://www.openstreetmap.org): 15 Oct 2009

Chris Osborne



Chris Osborne



**NEIGHBOURHOOD**

Year	Police Confidence (%)	Overall Crime (approx. cases)
2005	77	2000
2006	77	1500
2007	77	1000
2008	77	800
2009	77	600

**Police Confidence** 77% ↓39%

**Overall Crime** ↓37% ↓17%

**Gun Crime** ↓14% ↓13%

**Knife Crime** ↓11%

**Robbery** ↓10%

**Theft** ↓9%

**Woundings** ↓20% 10000 fewer crime victims

**Summary**  
Hackney Police and the Council work very closely to tackle and prevent crime in the borough. Seventy seven percent 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 38 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**

- 100 Hobbs Place, E8 3PL (near of 117-119 Hobbs Place)
- Acorn Avenue, E8 3PL (near of 117-119 Hobbs Place)
- Almond Road, E8 3PL (between 40 and 42 Springfield Road)
- Church Walk, E8 3PL (between 40 and 42 Springfield Road)
- Queensbridge Road, E8 3PL (near of 303 Queensbridge Road)
- Marie Davies, Waltham Forest
- Chisbury Street, Corner of Chisbury Street and Plumtree Road
- Leaside Road, E8 3PL (near side of railway bridge under Leaside Road)
- Spring Lane, E8 3PL (near south side of railway bridge under Leaside Road)
- Spring Hill, E8 3PL (North west corner of sports field)

**Waiting List Time**

Borough	Waiting List Time (weeks)
Tower Hamlets	282
Waltham Forest	1,382
Newham	415
Hackney	113
Haringey	1,715
Camden	195

**Waiting List Length**

Borough	Waiting List Length (weeks)
Tower Hamlets	282
Waltham Forest	1,382
Newham	415
Hackney	113
Haringey	1,715
Camden	195

**GREEN SPACE** 23%

Your nearest parks are:

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

**RECYCLING**

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 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 bags.

If you intend to use a van to bring your waste please call 020 8509 3864 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 batteries
- Long life light bulbs
- Metal
- Mobile telephones
- Paper
- Plasterboard
- Plastic bottles
- Reusable bags

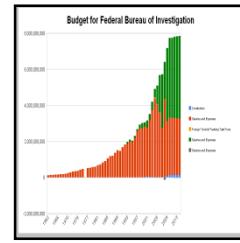
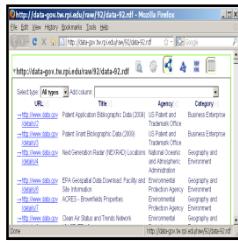
**% SATISFACTION WITH PARKS**

Year	London (%)	Hackney (%)
2001	65	70
2002	60	65
2003	55	60
2004	50	55
2005	45	50
2006	40	45
2007	35	40
2008	30	35



# Semantic Web Architecture for US Gov Data

View &amp; Use Data



Sem Wiki

Tabulator

Google Viz

MIT Exhibit

RSS 1.0

tagCloud

Link &amp; Enrich Data

XSLT Service

Diff Service

Link Annotator

RSS Generator

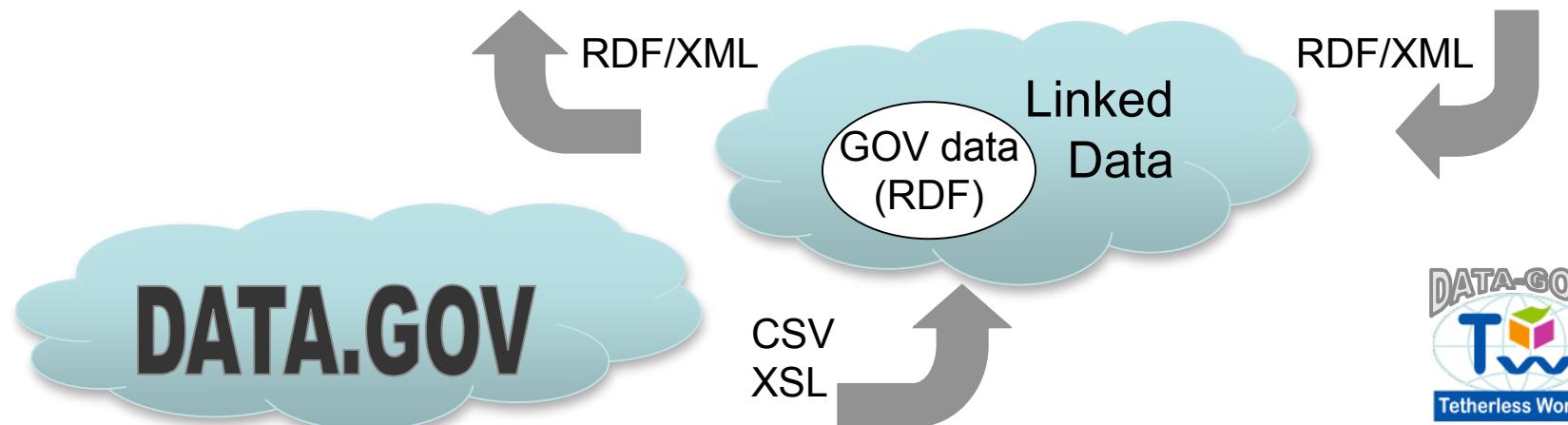
...

 Data Processors  
(Web Services & Analyzers)

SPARQL End Point

SPARQL Web Service

Convert Data



# 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 does this matter to you

- Supports information interoperability
- The Sum is greater than the parts
- Exploitation of
  - open data
  - open standards
- Can apply to data intranets as well as extranets
- Publishing, news, media, content services all classic examples where there is heterogeneous information that could be shared, linked, mapped and enriched using this approach



# Thank you

- Any further information or follow up on the research questions please email [nrs@ecs.soton.ac.uk](mailto:nrs@ecs.soton.ac.uk) or [wh@ecs.soton.ac.uk](mailto:wh@ecs.soton.ac.uk)
- For advice and help on applied and practical linked data projects see also

[www.seme4.com](http://www.seme4.com)

