

Web Science: Why Study the Web?

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Royal Society
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The Challenge

the elephant in the room

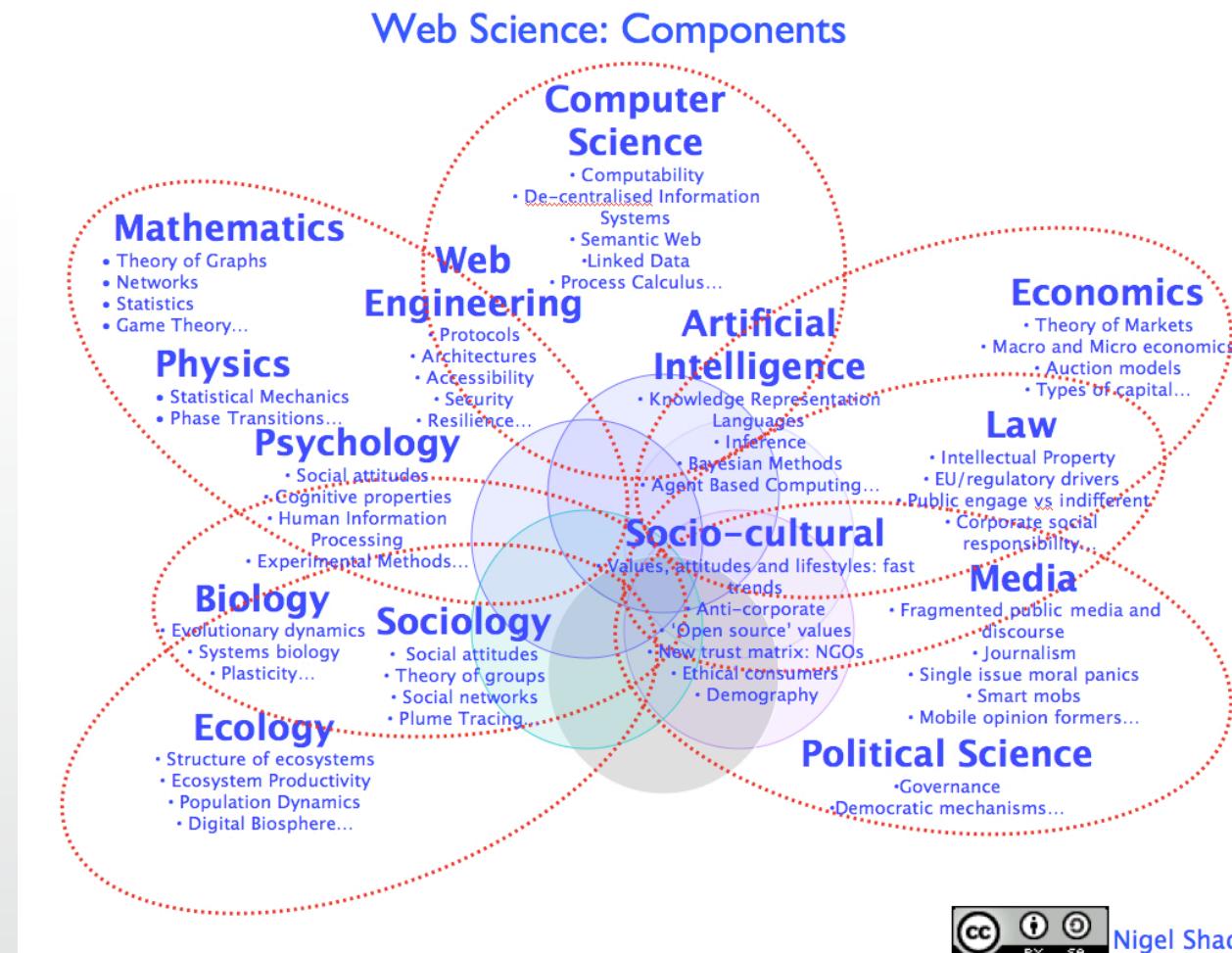
- The Internet and the Web have been transformational
- we need to understand them
- anticipate future developments
- identify opportunities and threats



Web Science is about additionality

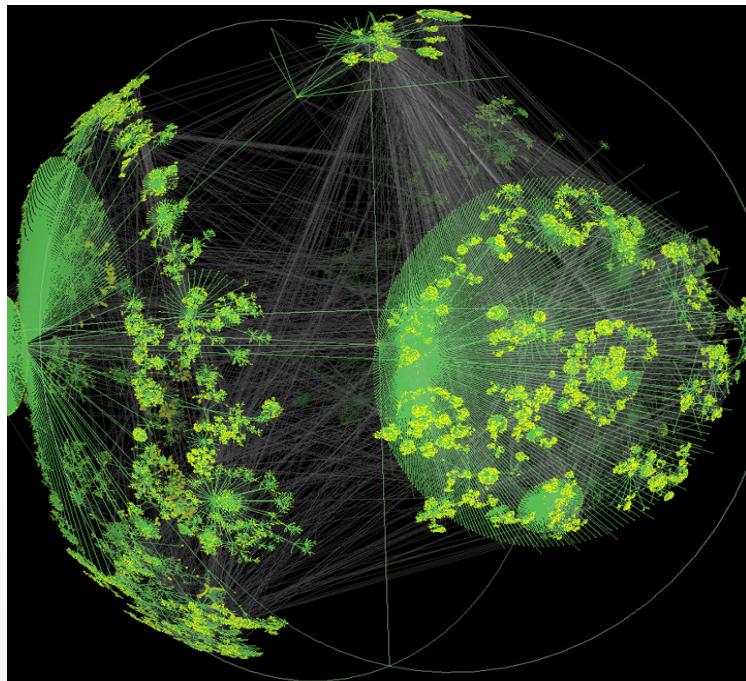
Not the union of the
disciplines

But more than their
intersection

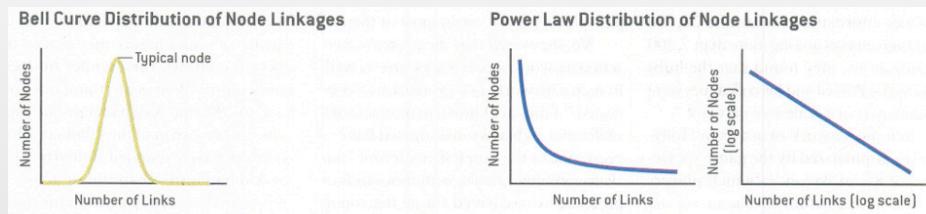


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existing insights



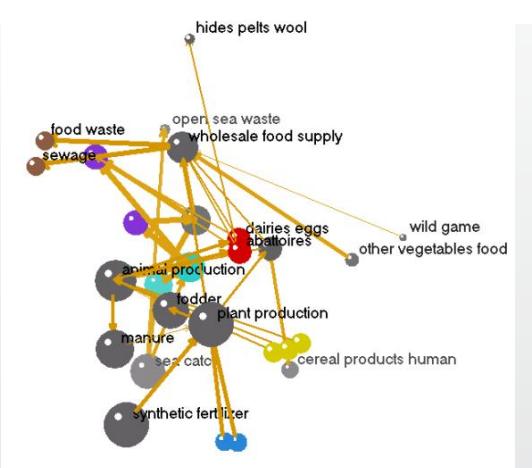
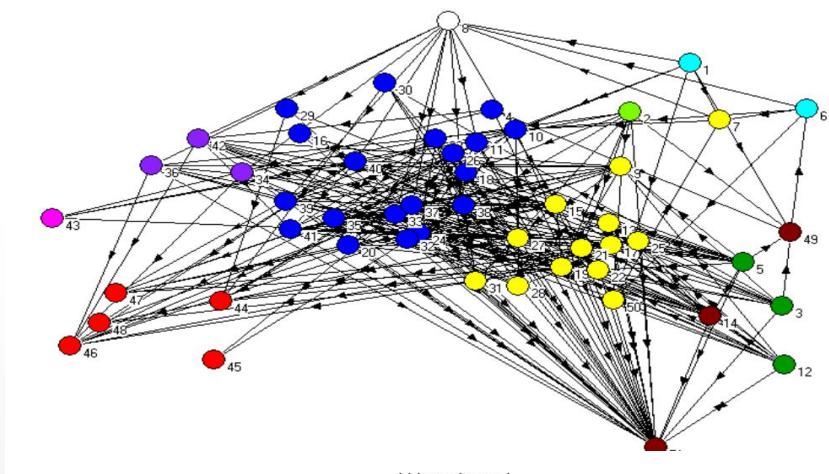
- Scale-free
- Power laws
- Small worlds
- Hubs and authorities



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where additionality helps

- Ubiquity of Scale Free Networks
- Stability of networks
- Elimination and addition
- Issues of sampling and modelling
- Robert M. May “Network structure and the biology of populations” *TRENDS in Ecology and Evolution* Vol.21 No.7 July 2006



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an example: the dynamic Web

- Is the Web changing faster than our ability to observe it?
- How to measure or instrument the Web?
- How to identify behaviours and patterns ?
- How to analyse the changing structure of the Web?



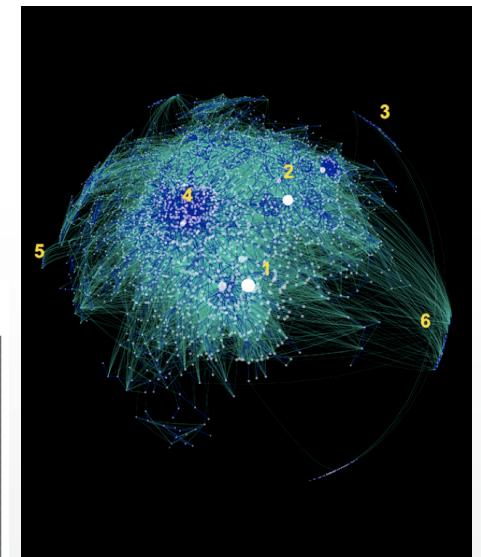
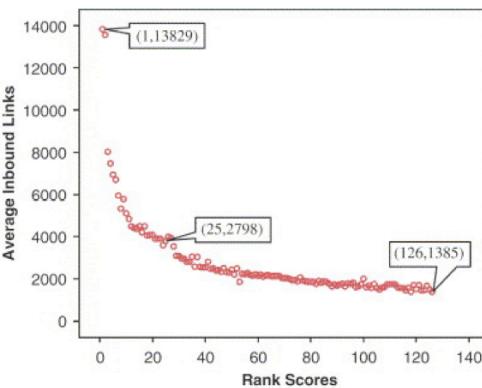
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an example: understanding blogs

- When and why did the blogosphere take off?
- Who blogs and how much?
- Why do they blog?
- Is it the same everywhere?



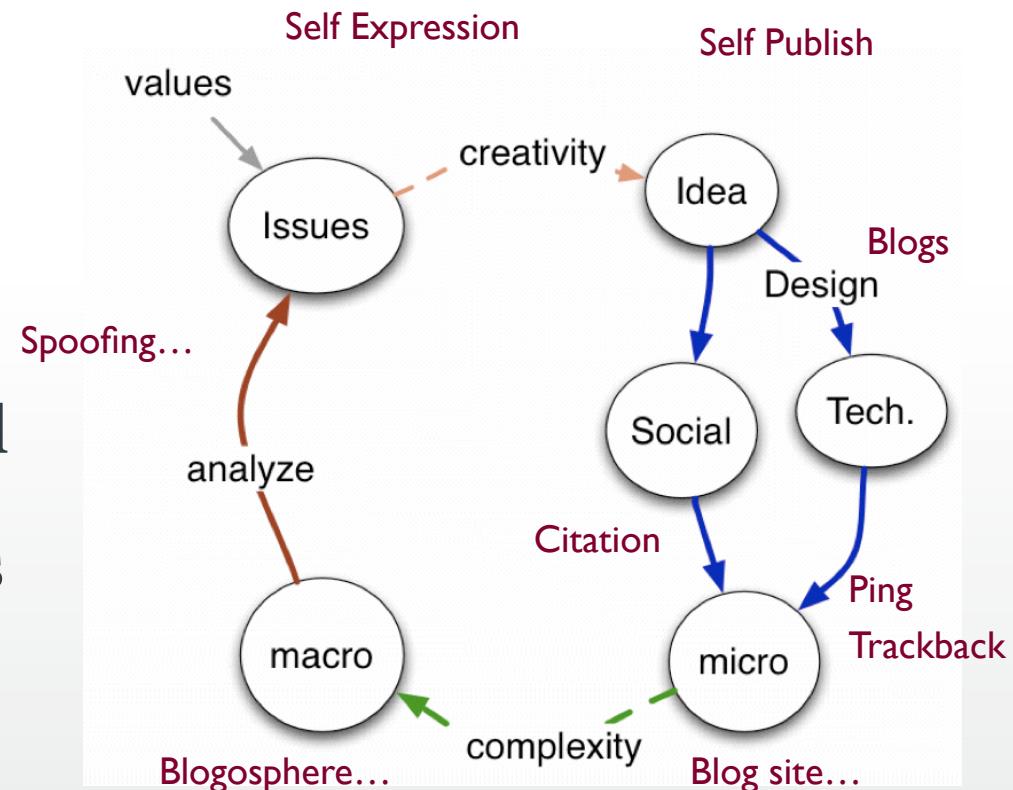
Top Blog sites



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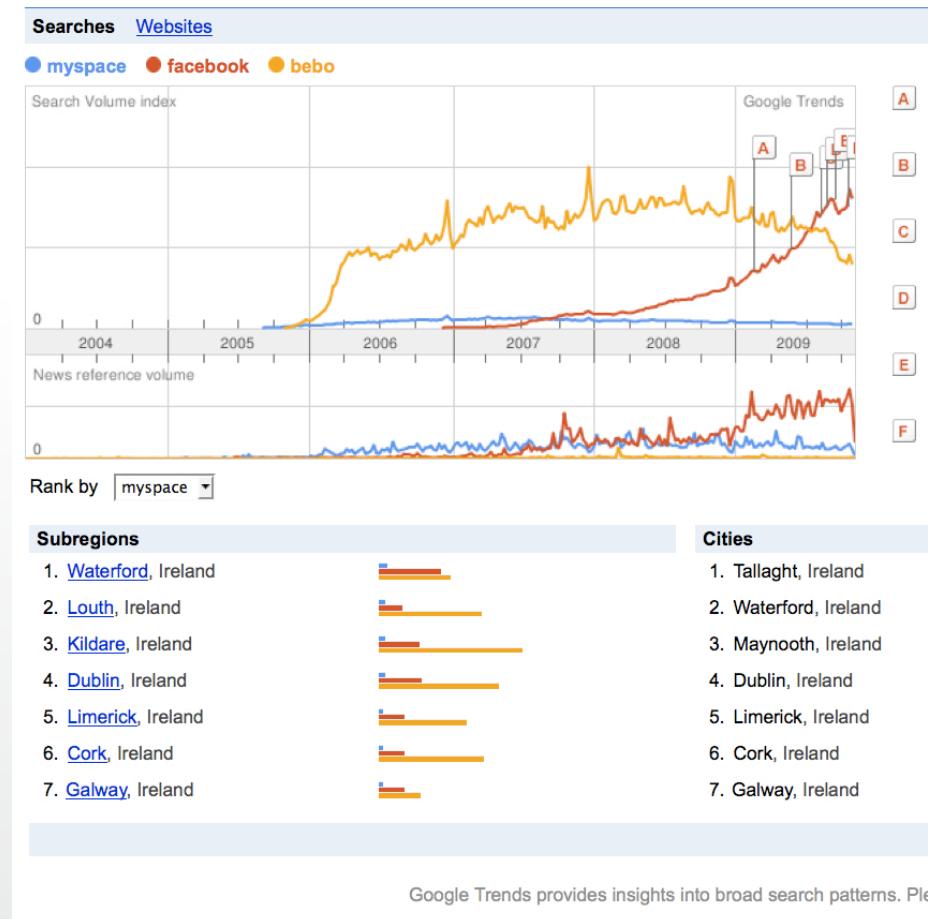
an example: understanding blogs

- creative innovation
- design and engineering
- the social and the technical
- interpretation and analysis



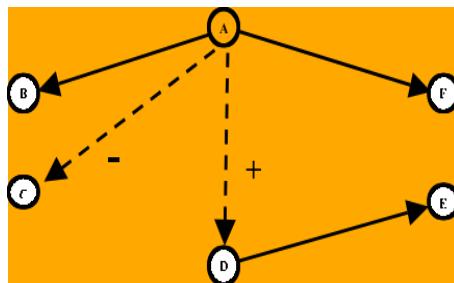
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an example: Social Networks

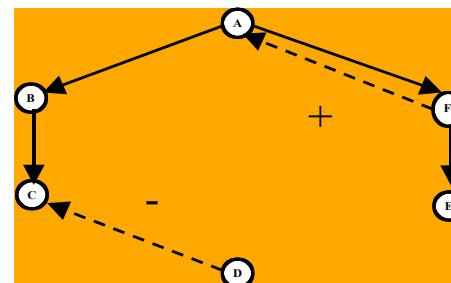


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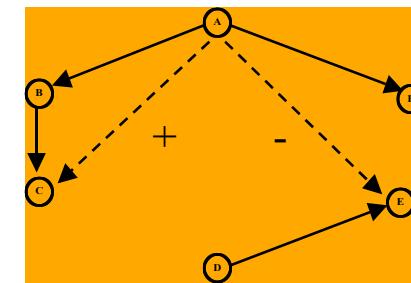
an example: Social Networks



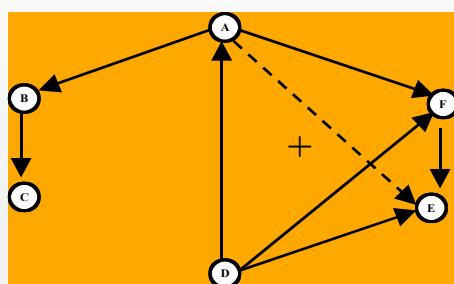
Theories of Self interest



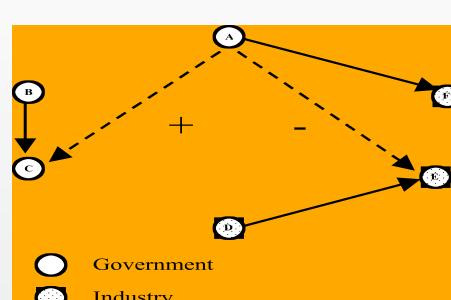
Theories of Exchange



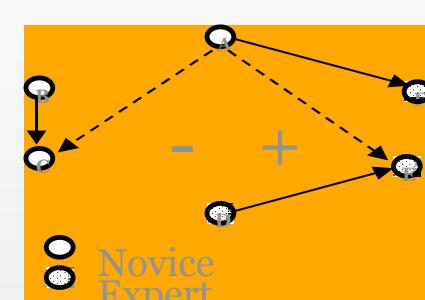
Theories of Balance



Theories of Collective Action



Theories of Homophily



Theories of Cognition

Sources:

Contractor, N. S., Wasserman, S. & Faust, K. (2006). Testing multi-theoretical multilevel hypotheses about organizational networks: An analytic framework and empirical example. *Academy of Management Review*.

- Shape and structure
- Scale free
- Preferential attachment
- Communities
- Values and obligations
- Incentives

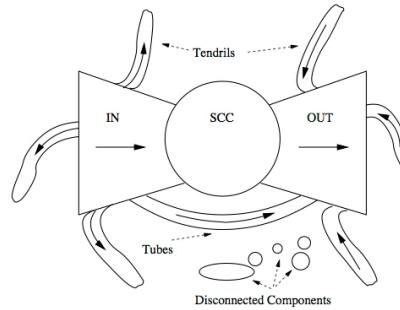
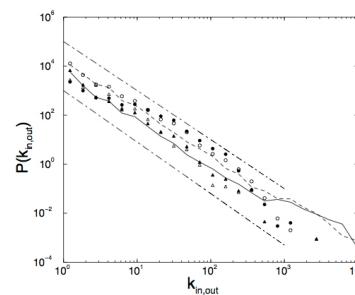


FIG. 1: The shape of the Wikipedia network



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an example: collective intelligence

- Shape and structure
- Scale free
- Preferential attachment
- Communities
- Values and obligations
- Incentives

Motivation	Mean
Fun	6.10 (1.15) [0.322***]
Ideology	5.59 (1.71) [0.110]
Values	3.96 (1.55) [0.175*]
Understanding	3.92 (1.48) [0.296***]
Enhancement	2.97 (1.39) [0.313***]
Protective	1.97 (1.05) [0.306***]
Career	1.67 (0.94) [0.185*]
Social	1.51 (0.92) [0.027]

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."

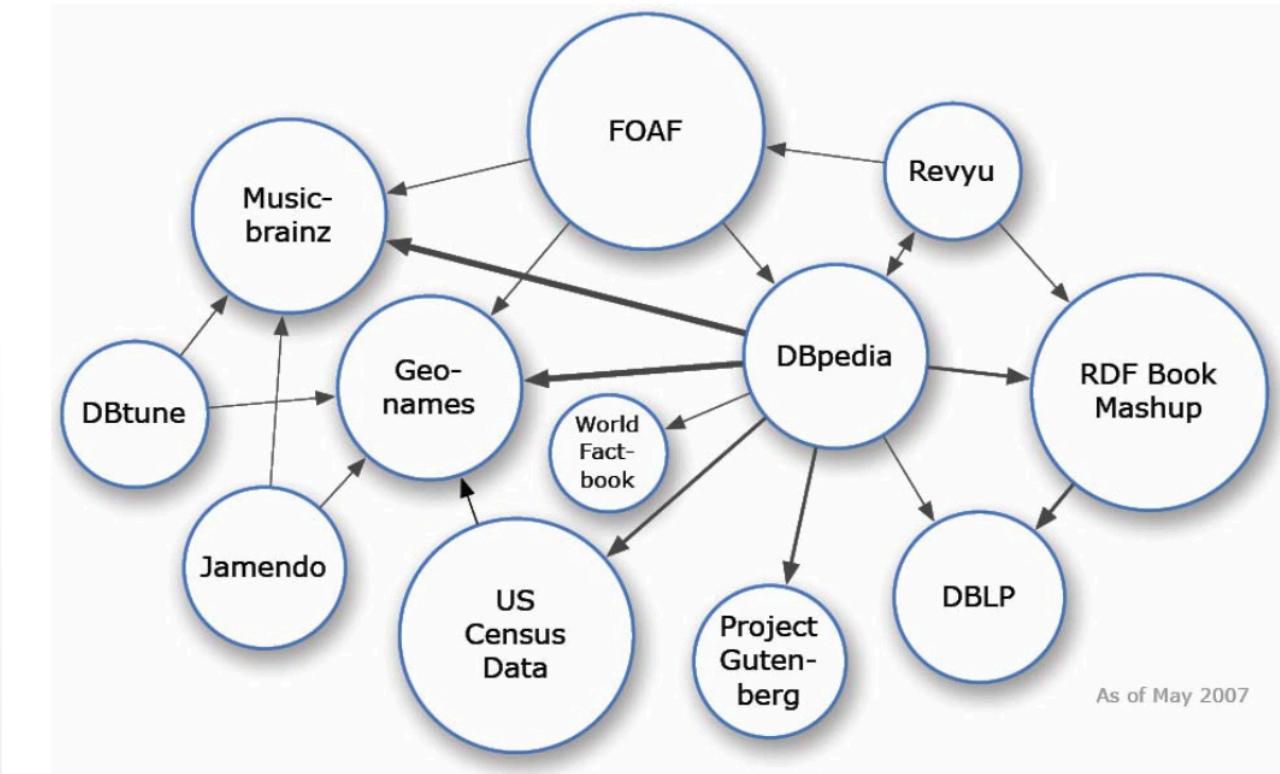
*significant at 0.05 level

**significant at 0.01 level

***significant at 0.001 level

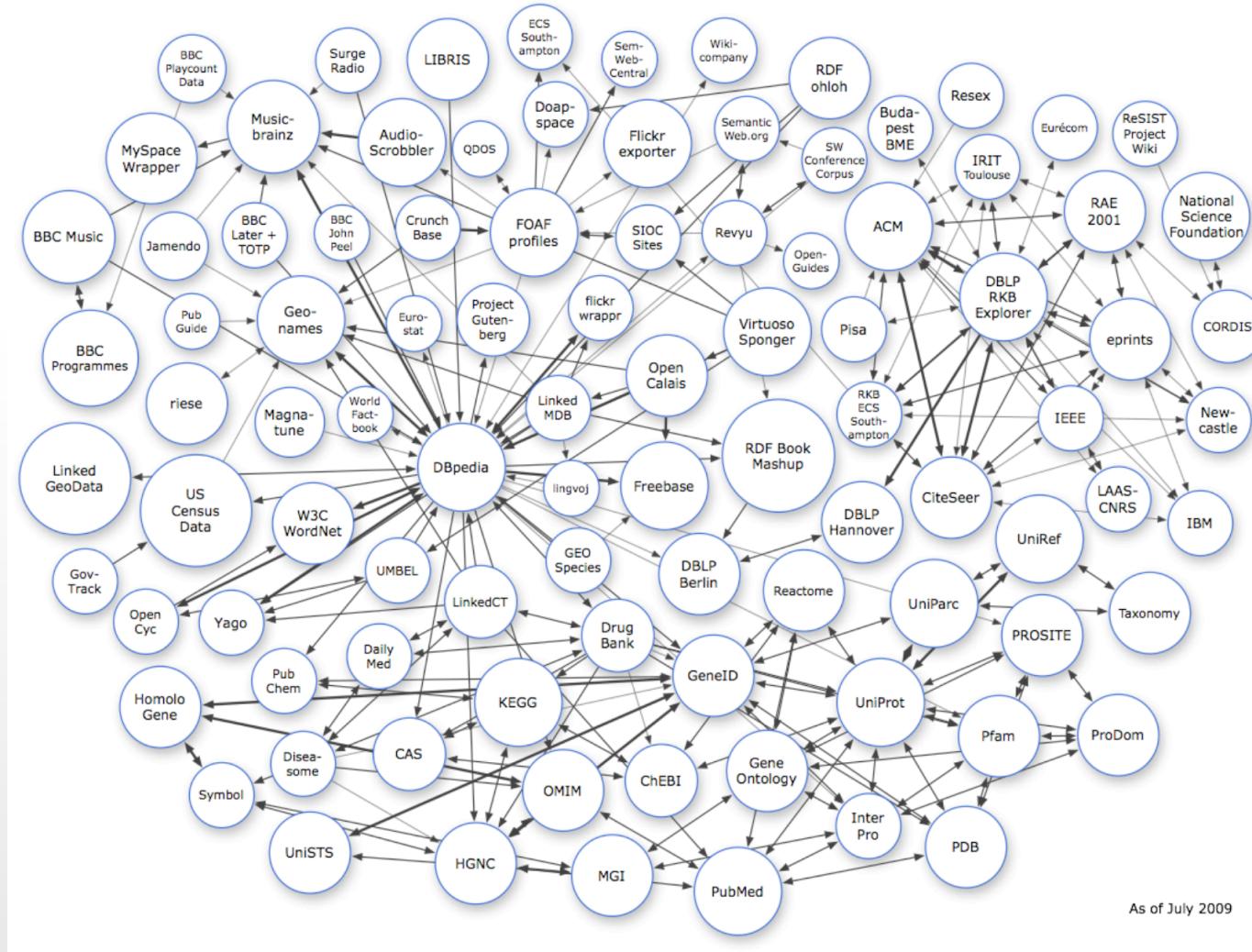
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an example: linked data



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an example: linked data



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an example: government linked data



HM Government data.gov.uk

Home Blog Data SPARQL Apps Ideas Forum Wiki Resources About

Unlocking innovation

Working with UK Public Sector information and data

Advised by Sir Tim Berners-Lee and Professor Nigel Shadbolt and others, government is opening up data for reuse. This site seeks to give a way into the wealth of government data and is under constant development. 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.

Latest news:

- Read about our latest site changes
- information about the Local Data Panel
- applications in the news

Search Data

Enter keyword(s) Search

e.g. education, NHS, crime, transport, environment

Powered by: CKAN

Browse for Data

List all datasets

By Public Body

Common tags

Most Recent Apps

SaferMK

This is a crime reduction application that has two key functions: 1. simple interface

EnAKTing UK Public Sector Information Data Mashup

Map application that uses OpenSpace

OpenGeoscience

Discover if you live on rocks from an extinct volcano, in the middle of an ancient river or deep under a

Subscribe by RSS

Community

Log in / Sign up

Local Data Panel

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

@stephenctimms: #digitalbritain Announced in House today establishment of Broadband Delivery UK, chief executive Adrian Kamellard

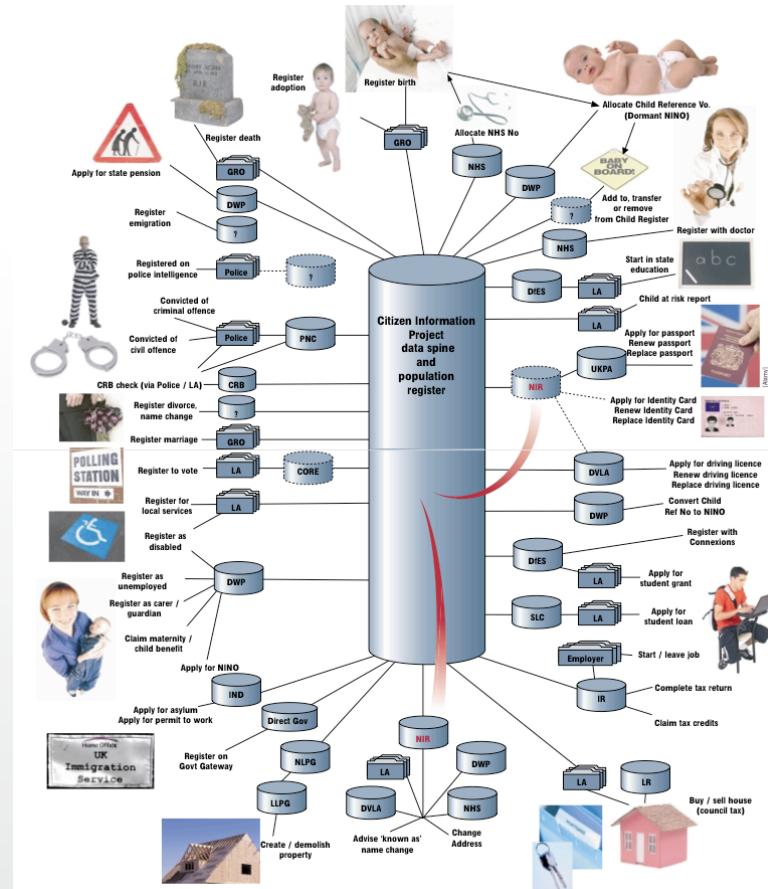
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an example: trust and privacy

- What is the nature of trust relations between individuals, groups and organizations in the Web
- How and why do trust and privacy and break down?
- How does it change the Web if they do?
- What is the balance between social and technical solutions to these problems?
- Can we develop appropriate legal frameworks and institutions



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an example: life logging

- 75 years of awake experience
 1.5610×10^9 secs
- 2.5 Mb/sec for digital video
- 7.3195×10^{13} for a year of digital video awake life ~ 73 terabytes
- 5.4896×10^{15} for entire awake life ~ 5.5 petabytes



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an example: the mobile Web



Web Science

why this matters

- the Web matters
- an essential part of humanity
- An essential part of the current and future economy
- understanding the Web is a major challenge as big as any other global cause

