

# Linking data

using Semantic Web technology

**John Sheridan**

March 2009

## The Wealth of Networks

Benkler (2006) writes:

- *Information, knowledge and culture are core inputs into human welfare...*
- *... Literacy and education are central to individual growth, to democratic self governance, and to economic capabilities. Economic growth itself is crucially dependent upon innovation and information. **For all these reasons information policy has become a critical element of development policy and the question of how societies attain and distribute human welfare and well being.** Access to knowledge has become central to human development.*

## **“Everything is deeply intertwined”**

- Economic growth & knowledge
- Knowledge & codification
- Codification & information
- Information & sharing
- Sharing & innovation
- Innovation & the web
- The web & networks
- Networks & public policy
- Public policy & society
- Society & economic growth
- ...

## “Everything is deeply intertwined”

- Economic growth & knowledge

- Knowledge & codification
- Codification & information
- Information & sharing
- Sharing & innovation
- Innovation & the web
- The web & networks
- Networks & public policy

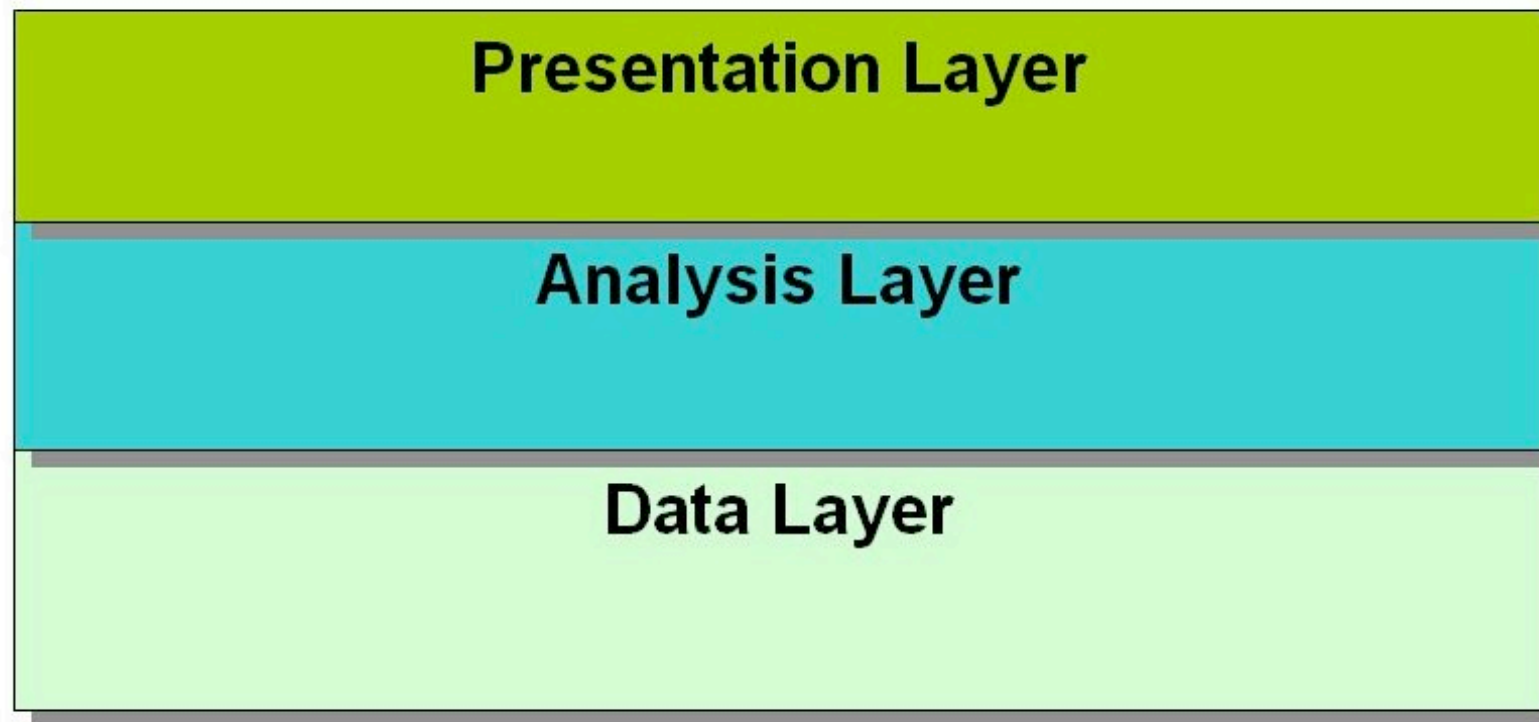
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policy and  
the web

- Public policy & society
- Society & economic growth
- ...

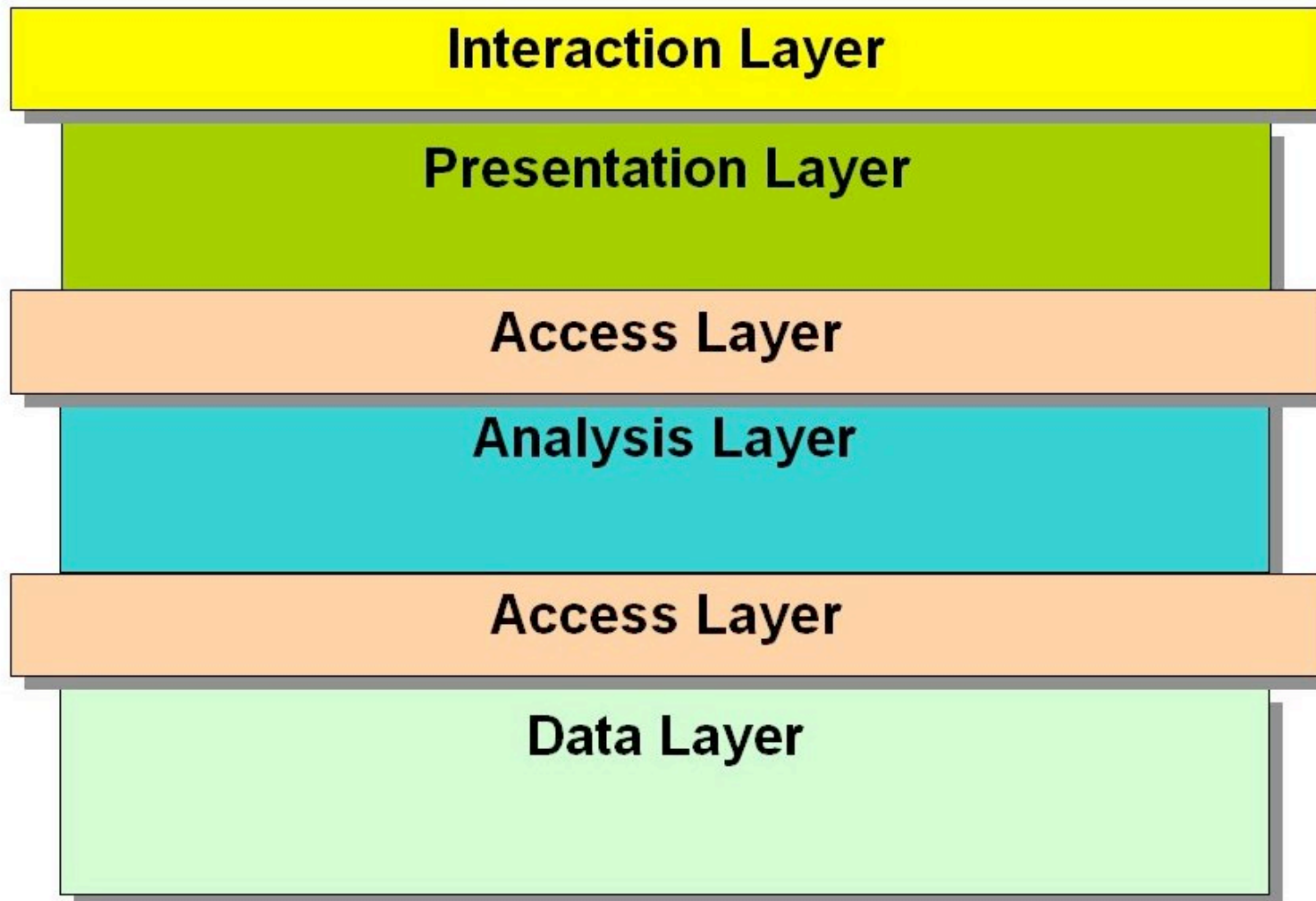
## Key challenges identified by the POI Taskforce

- **Discovery** – can I find the data that I want?
- **Legal** – am I allowed to use the data?
- **Technical** – is the data in the right format?
- **Commercial** – can I afford the data that I need?
- **Intelligibility** - can I easily interpret the data that I am accessing?
- **Dependencies** - does this data depend on anything else that could affect my use of it?

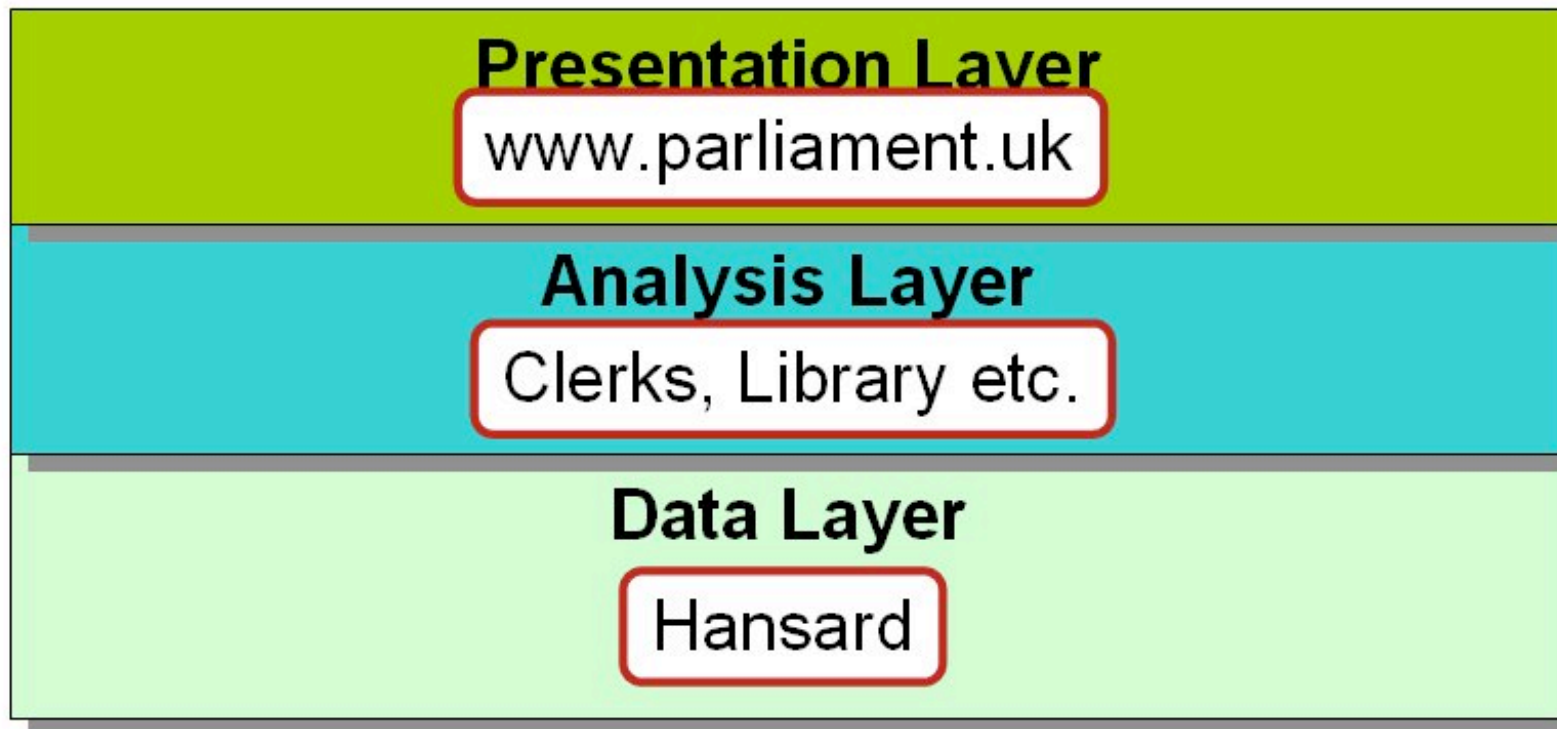
## The traditional approach to websites



## A Power of Information architecture

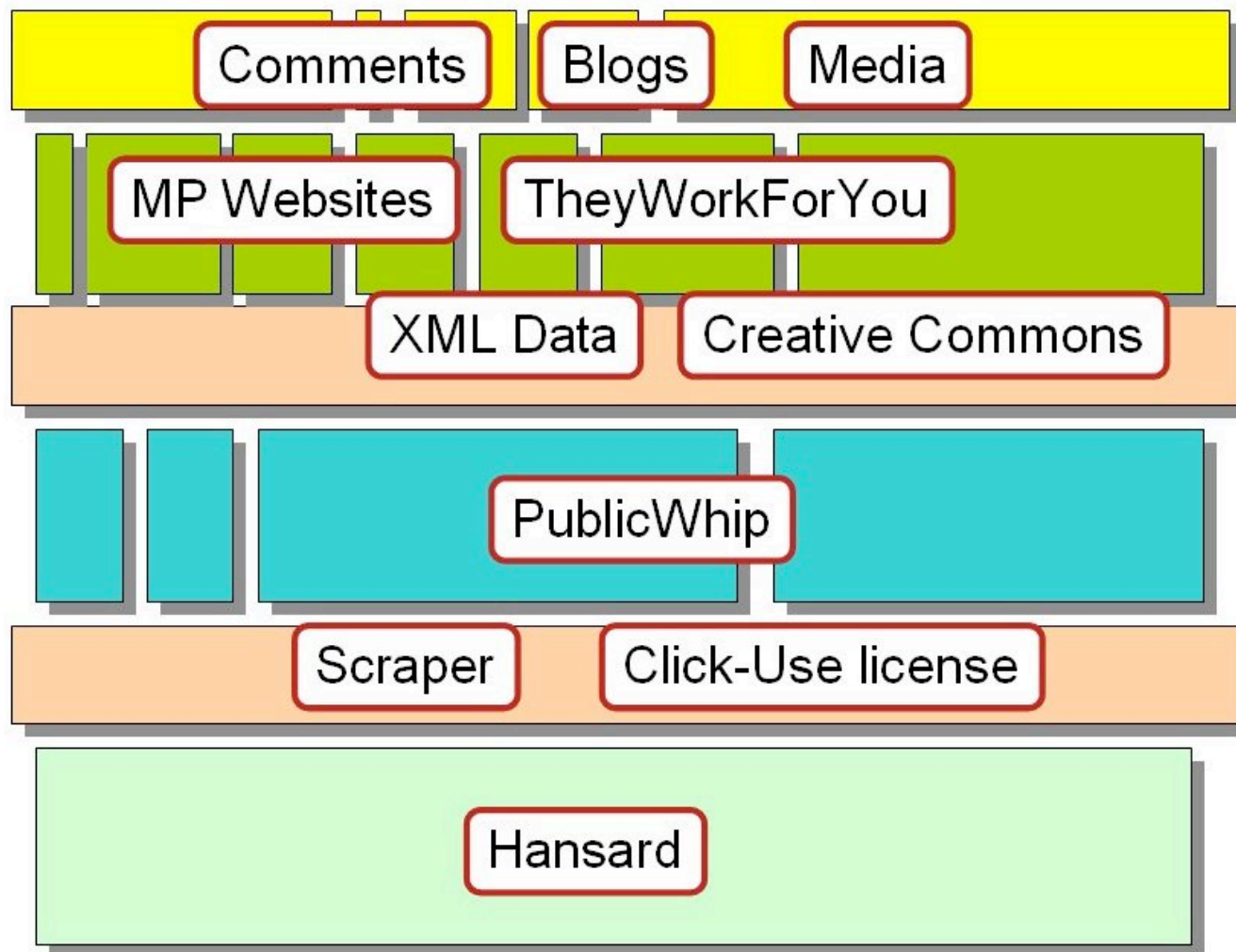


## Example: Hansard in the old world

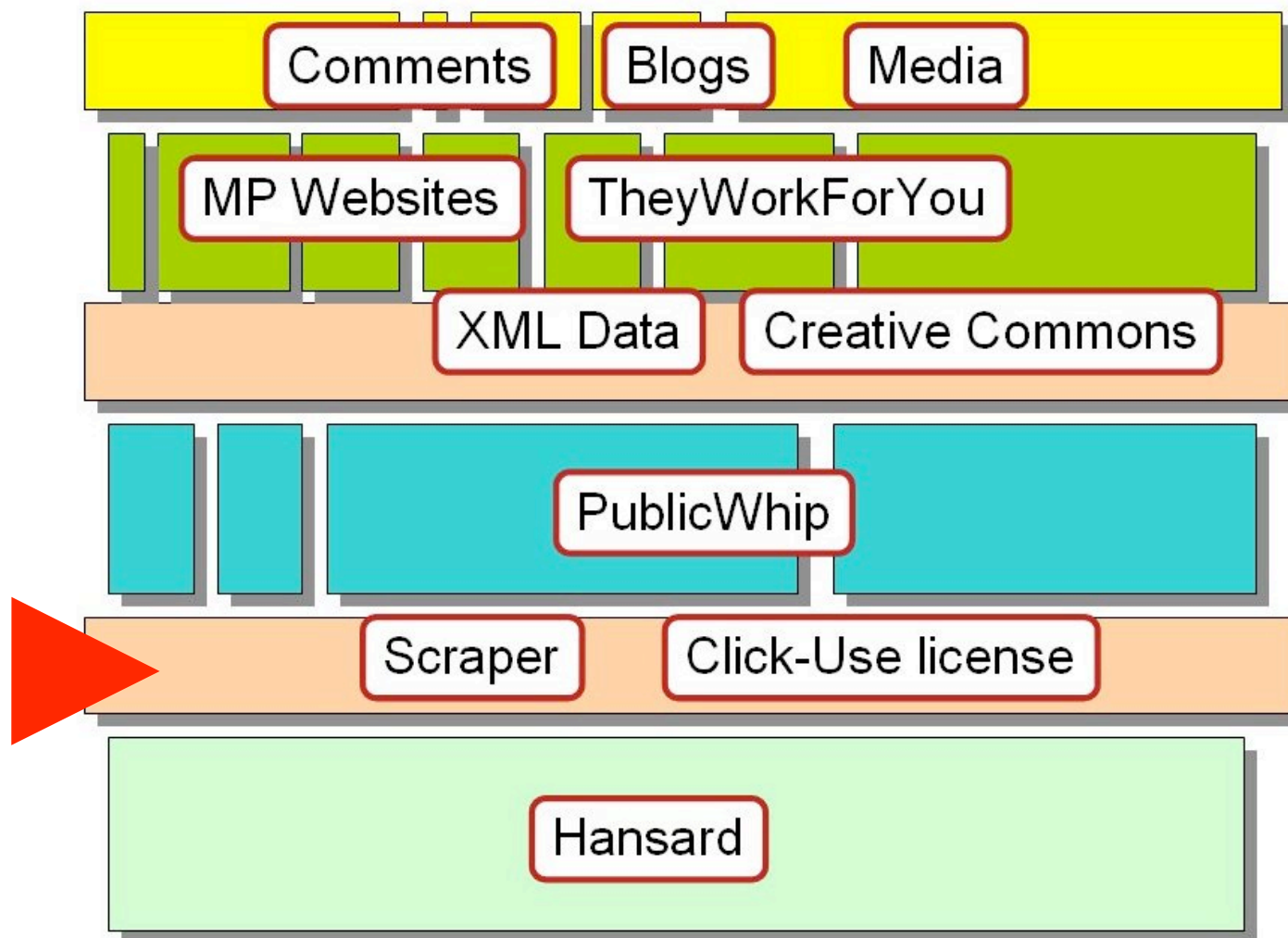




## Example: Hansard in the new world



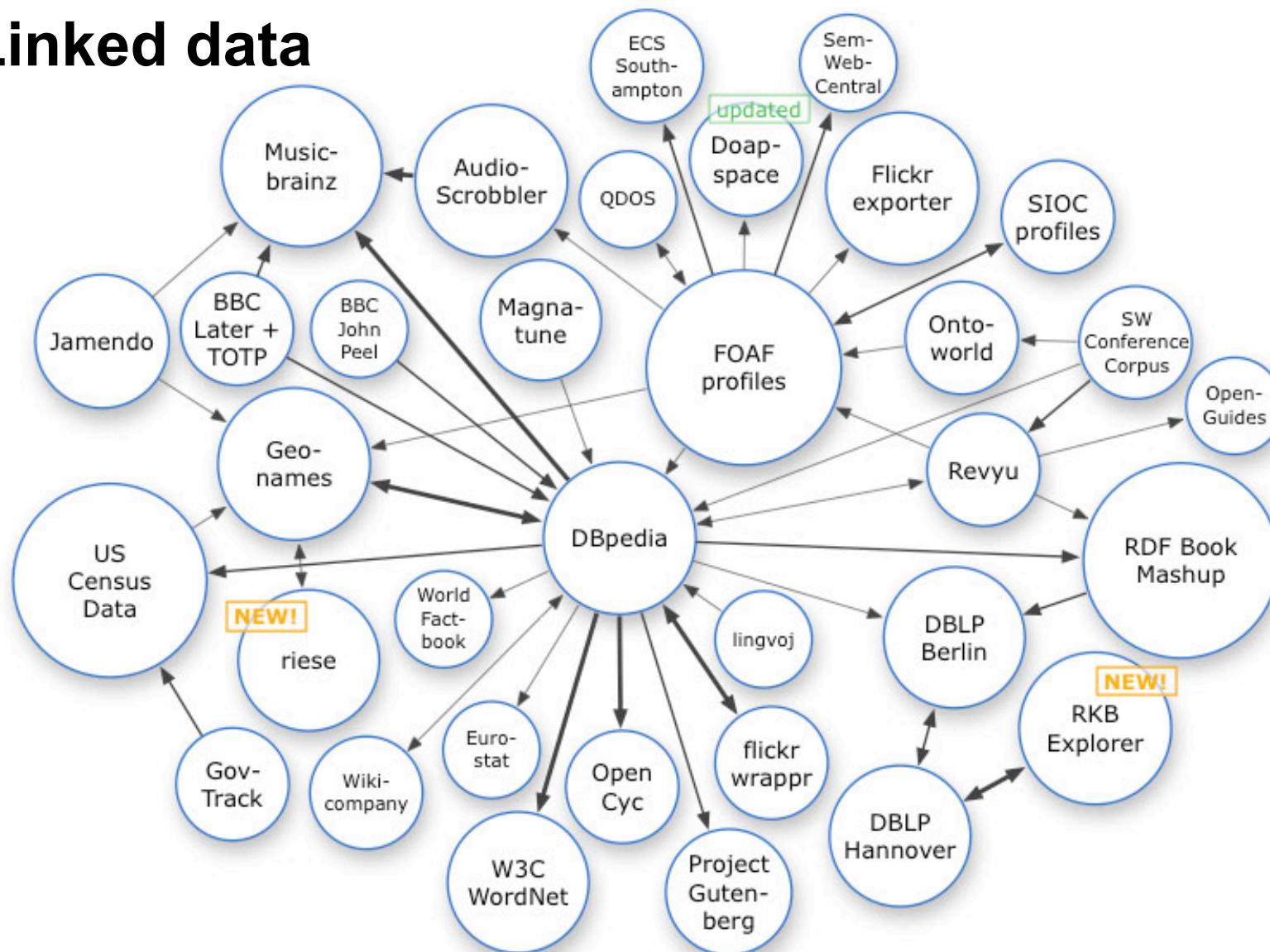
## But why scrape when you can parse?



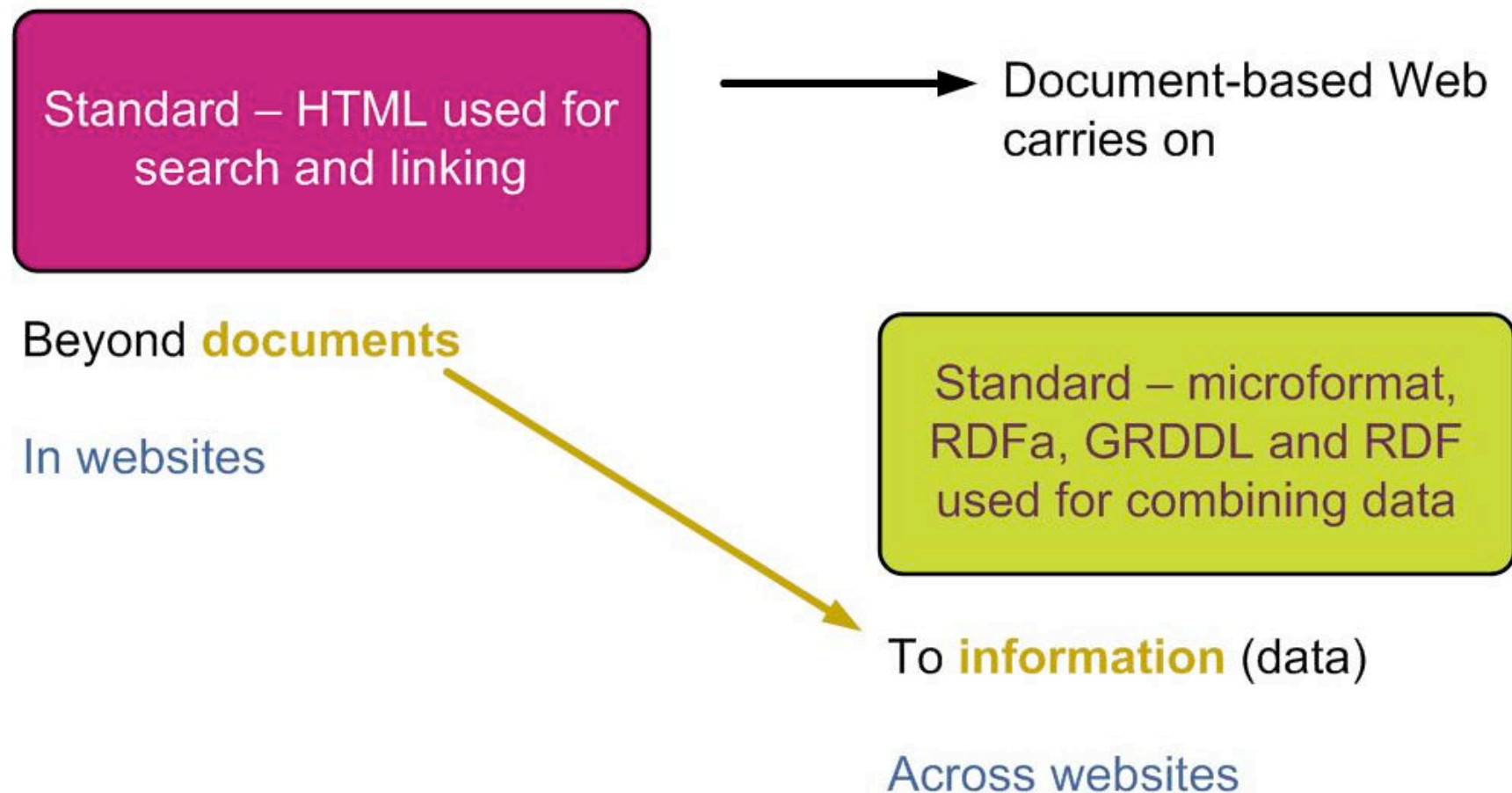
# The Semantic Web

- A collective endeavour, by academics, standards bodies and, latterly, by companies and governments, to create a richer and more useful web.
- Not an artificial intelligence dream, rather an evolution of the Web we have today, achievable using current technology.

## Linked data



## The web of documents and the web of data



# The chasm

## Headline

### Subheadline

*Italics*

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## Title

### Author

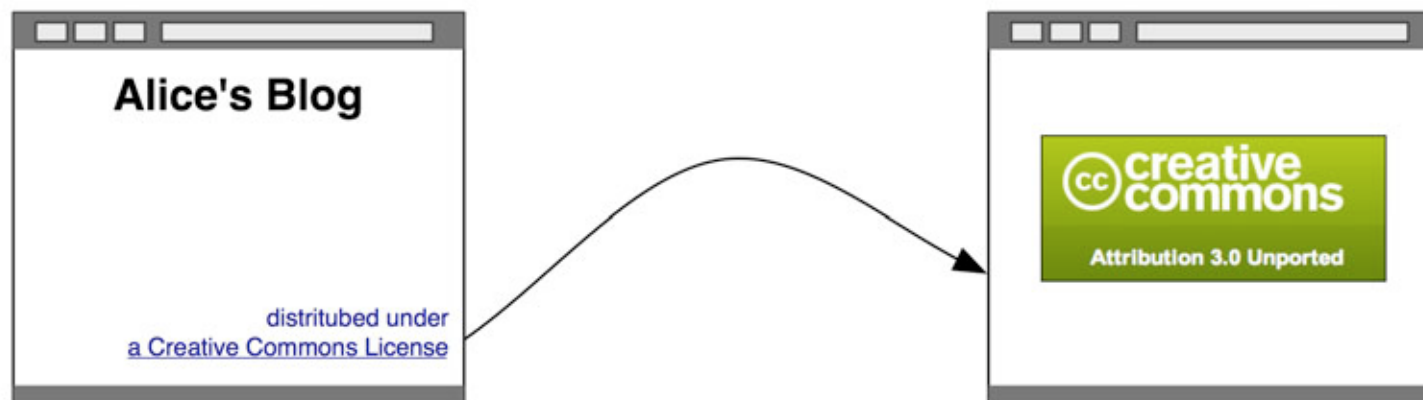
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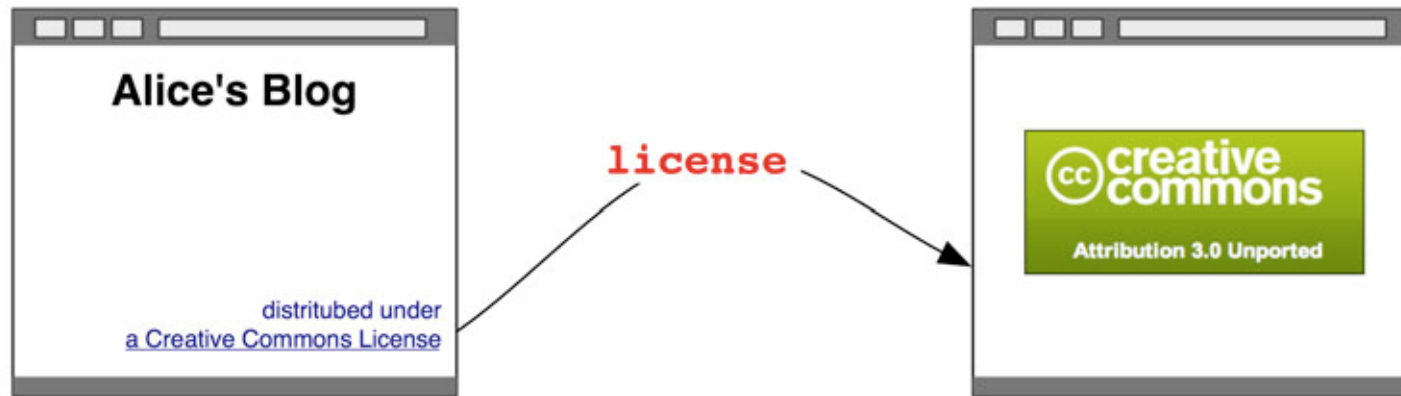
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## Links with flavour



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## Microformats and your mobile phone

- <http://www.youtube.com/watch?v=azoNnLoJi-4>  
Export a contact from a webpage to your phone
- <http://www.youtube.com/watch?v=Kjp4BaJOd0M>  
Export restaurants from Google Maps
- [http://uk.youtube.com/watch?v=Z9X-vHJ\\_Z-I](http://uk.youtube.com/watch?v=Z9X-vHJ_Z-I)  
Bill Gates (!! ) on why we need Microformats

## RDFa: “Microformats for Government?”

- A **standard for data**, not just for Web pages
- **Producer led**, so that whenever content is available it is usable
- **Machine processable**, so that it can be extracted easily
- **Human viewable** and not impacting on W3C accessibility etc.
- Able to **tweak existing systems** to deliver

## Examples - jobs and consultations (COI)

- Need central places for public sector jobs and consultations.
- Want to allow each department to publish their own information.
- Also want to enable third parties to 'consume' government information

## Jobs

- Many job openings across diverse departments, such as army, health, schools, etc.
- No single place for specific jobs, such as electricians.
- Many third-party sites exist, but they have to 'scrape' the government sites.

## Consultations

- Requests for comments from public or interested parties.
- No single place to find all consultations.
- Also have third-party sites that use 'scraping' to get the data.

## Centralised and decentralised

- Can see that it's a mix of seemingly competing requirements ...
- ... we want all data in one place, but we also want it to be decentralised.

facilities management london fco - Yahoo! Search Results

http://search.yahoo.com/search;\_ylt=A0geu9kvQnVlyj0AV1RXNyoA?p=fac RSS fco logo

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1 - 10 of 352,000 for facilities management london fco (About) - 0.02 s | SearchScan<sup>BETA</sup> On

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Outsourced **facility management** and Energy **Management** Solutions from...  
[www.dalkia.co.uk](http://www.dalkia.co.uk)


**FCO vacancy: Facilities Management Senior Commercial Manager**



... individual to lead, develop and motivate the Commercial **Management** Team responsible...  
Location: **London**  
Salary: £63000

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**FCO vacancy: Facilities Management Director**



This is a new role to build, develop and maintain the FCO's **Facilities Management (FM)**...  
Location: **London**  
Salary: £80000

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## Vacancy search

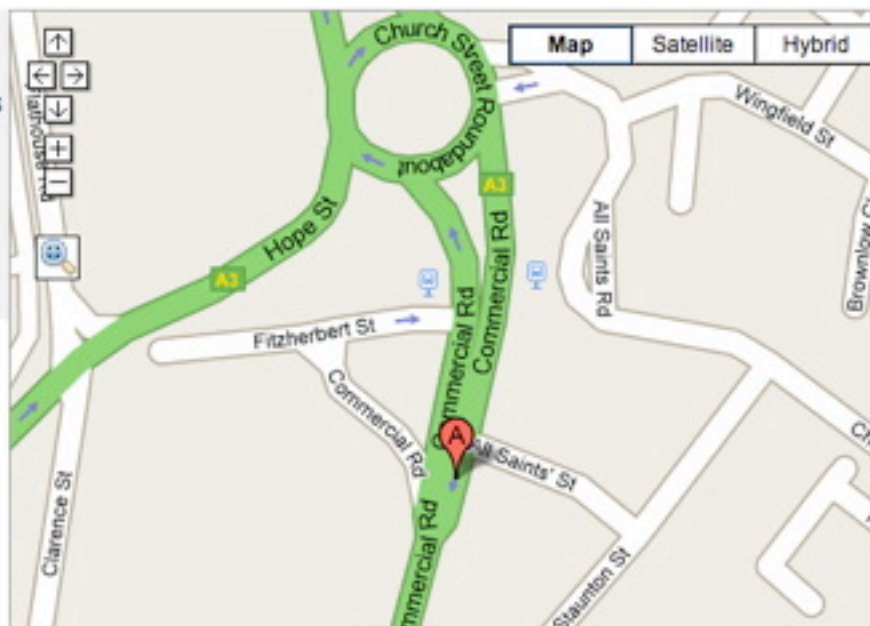
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### Assistant Officer

To analyse data and process applications in given timescales, liaising with customers and their representatives, working with colleagues to achieve tea...





## Vacancy search

Search for  near  Order by   ☒ Show on map

 Save my search as an RSS feed

### Assistant Officer

To analyse data and process applications in given timescales, liaising with customers and their representatives, working with colleagues to achieve tea...



### Administrative Assistant

To provide a range of processing and support functions to the business - maintaining databases, dealing with departmental and business queries, genera...



## Consultations search

Search for

Order by Relevance

Search ➔



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**HMI/080195(Indicators of a school's contribution to well-being)**

- HMI/080195(Indicators of

### Biodiesel glycerol and the Renewables Obligation



[View original](#)  
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Ofgem

**Abstract:** This document sets out the issues relating to Biodiesel and glycerol and seeks views on the way Ofgem should treat these fuels for the purposes of producing eligible renewable electricity under the Renewables Obligation.

**Audience:** Generators using Biodiesel and glycerol, trade associations, fuel suppliers and other interested parties.

Ref: 129/08      Available: 2008-09-03      Valid: 2008-10-14

### Indicators of a school's contribution to well-being



[View original](#)  
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Ofsted

**Abstract:** As signalled in the Children's Plan and in the well-being guidance, the DCSF and Ofsted have been working to develop strong school-level indicators of pupils' well-being. These indicators will improve

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## Add datasource

**View** **Edit**

New datasource url:

Available datasources

- <http://psv.webbackplane.com/node/14>
- <http://psv.webbackplane.com/node/23>
- <http://psv.webbackplane.com/node/22>
- <http://psv.webbackplane.com/node/21>
- <http://psv.webbackplane.com/node/12>
- <http://psv.webbackplane.com/node/13>
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- <http://psv.webbackplane.com/node/26>
- <http://psv.webbackplane.com/node/30>
- <http://psv.webbackplane.com/node/35>

## Remove datasource

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under sections 6 and 124 and part IV of Schedule 9 of the Road Traffic Regulation Act 1984, as amended by section 8 and Schedule 5 of the Local Government Act 1985 and the Traffic Management Act 2004.  
2. The general effect of the Disabled Persons Parking Places Order would be to further amend the Hounslow (Free Parking Places) (Disabled Persons) (No.1) Order 2008 to—

- (i) designate parking places in the streets detailed in Schedule 1 to this Notice;
- (ii) provide that the parking places will operate “at any time” throughout the week;
- (iii) specify, in respect of the parking places, that a disabled persons’ vehicle displaying in the relevant position a disabled person’s badge (commonly referred to as “the Blue Badge”) issued by any local authority under the provisions of the Disabled Persons (Badges for Motor Vehicles) Regulations 1982 may be left therein;
- (iv) provide that certain vehicles may wait in the parking places in certain circumstances e.g., to allow persons to board or alight (maximum 20 minutes), to load or unload (maximum 20 minutes) etc; and

NOTICE IS HEREBY GIVEN that the Council of the London Borough of Barnet propose to make the above-mentioned Order under Sections 45, 46, 124 and Part IV of Schedule 9 of the Road Traffic Regulation Act 1984 and all other enabling powers.

In order to help enable access to off-street parking facilities via existing vehicle crossovers the general effect of the above Order would be to modify the existing parking layout at the following locations, with a resultant loss of parking spaces as follows:

Location	Parking bay type	No. of spaces removed
Outside No. 26 The	Resident permit bay	One

Location	Parking bay type	No. of spaces removed
Outside No. 26 The Vale NW11	Resident permit bay	One
Outside No. 30 The Vale NW11	Resident permit bay	One

Copies of the proposed Order, plans of the relevant areas and the Council’s Statements of Reasons for proposing to make the Order can be inspected between 9am and 5pm on Mondays to Fridays (Bank Holidays and Public Holidays excepted) inclusive for a period of 21 days from the date on which this notice is published by contacting:

- (a) the Design Team, 2nd Floor, Building 4, North London Business Park, Oakleigh Road South, London N11 1NP;
- (b) Hendon Library (Information Desk 1st Floor), The Burroughs, London NW4 4BQ.

Further information may be obtained by telephoning the Design Team on 020 8359 7548.

Any person wishing to object to the proposed Order should send a

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Notice: 699826 (Issue: 58942) - Mozilla Firefox


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## Notice: 699826 (Issue: 58942)

Date: 6 January 2009 Issue Number: 58942 Page number: 133

Publication Date: *Tuesday, 6 January 2009*



Notice Code: *2433*

**Notices to Creditors**

**AERFUNDING LEASING UK LIMITED**

(Company Number 05994728)

I, Jeremy Willmont of Moore Stephens LLP, 1-3 Snow Hill, London, EC1A 2DH give notice that on 22nd December 2008 I was appointed joint liquidator of Aerfunding Leasing UK Limited by resolution of the members. Please note that this is a solvent liquidation. Notice is further given pursuant to Rule 4.182A of the Insolvency Rules 1986 that I intend to make distribution to creditors. Creditors of the Company are required, on or before 30th January 2009 to send their full forenames and surnames, their addresses and descriptions, full particulars of their claims, the names and addresses of their solicitors (if any), to the undersigned at the address above. The undersigned is the joint liquidator of the said company and is acting in that capacity. Creditors are required to send their claims in writing from the said joint liquidator, and prove their debts or claims at such meeting of creditors as shall be called in respect of a debt not already proved.



## Validation Results

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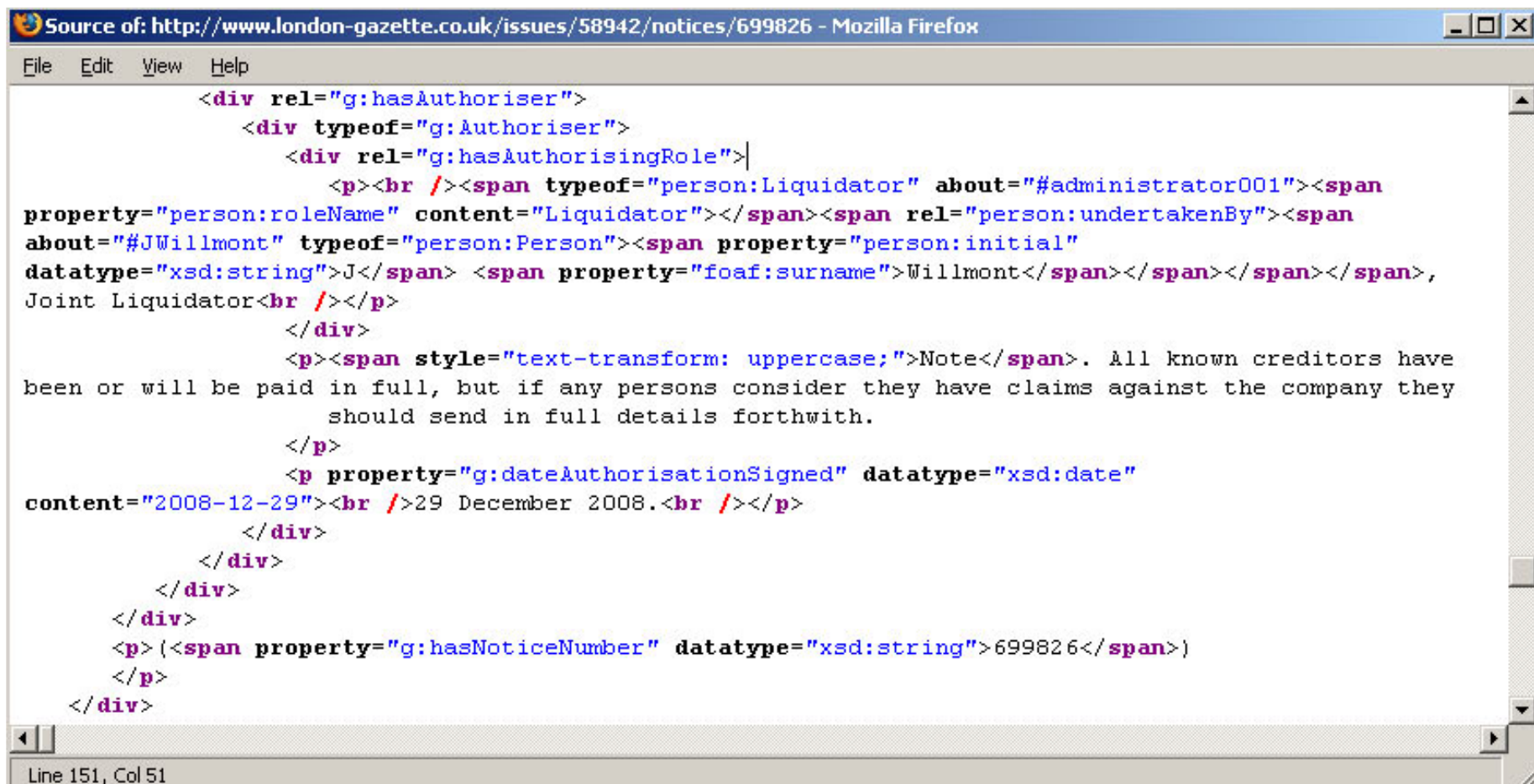
### Triples of the Data Model

Number	Subject	Predicate	Object
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4	genid:A24738	<a href="http://purl.org/dc/dcam/memberOf">http://purl.org/dc/dcam/memberOf</a>	<a href="http://www.esd.org.uk/standards/egms/3.0/egms-schema#IPSV">http://www.esd.org.uk/standards/egms/3.0/egms-schema#IPSV</a>
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6	<a href="http://www.london-gazette.co.uk/id/issues/58942/notices/699826">http://www.london-gazette.co.uk/id/issues/58942/notices/699826</a>	<a href="http://www.gazettes-online.co.uk/ontology#isInIssue">http://www.gazettes-online.co.uk/ontology#isInIssue</a>	<a href="http://www.london-gazette.co.uk/id/issues/58942">http://www.london-gazette.co.uk/id/issues/58942</a>
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8	<a href="http://www.london-gazette.co.uk/id/issues/58942/notices/699826">http://www.london-gazette.co.uk/id/issues/58942/notices/699826</a>	<a href="http://www.gazettes-online.co.uk/ontology#hasPublicationDate">http://www.gazettes-online.co.uk/ontology#hasPublicationDate</a>	"58942"^^ <a href="http://www.w3.org/2001/XMLSchema#date">http://www.w3.org/2001/XMLSchema#date</a>



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82:   <dc:identifier rdf:datatype="http://www.w3.org/2001/XMLSchema#anyURI">http://www.london-gazette.co.uk/id/issues/58942/notices/699826</dc:identifier>
83:   <dc:language>en</dc:language>
84:   <rdf:Description>
85:     <rdf:value>en</rdf:value>
```

## How its done

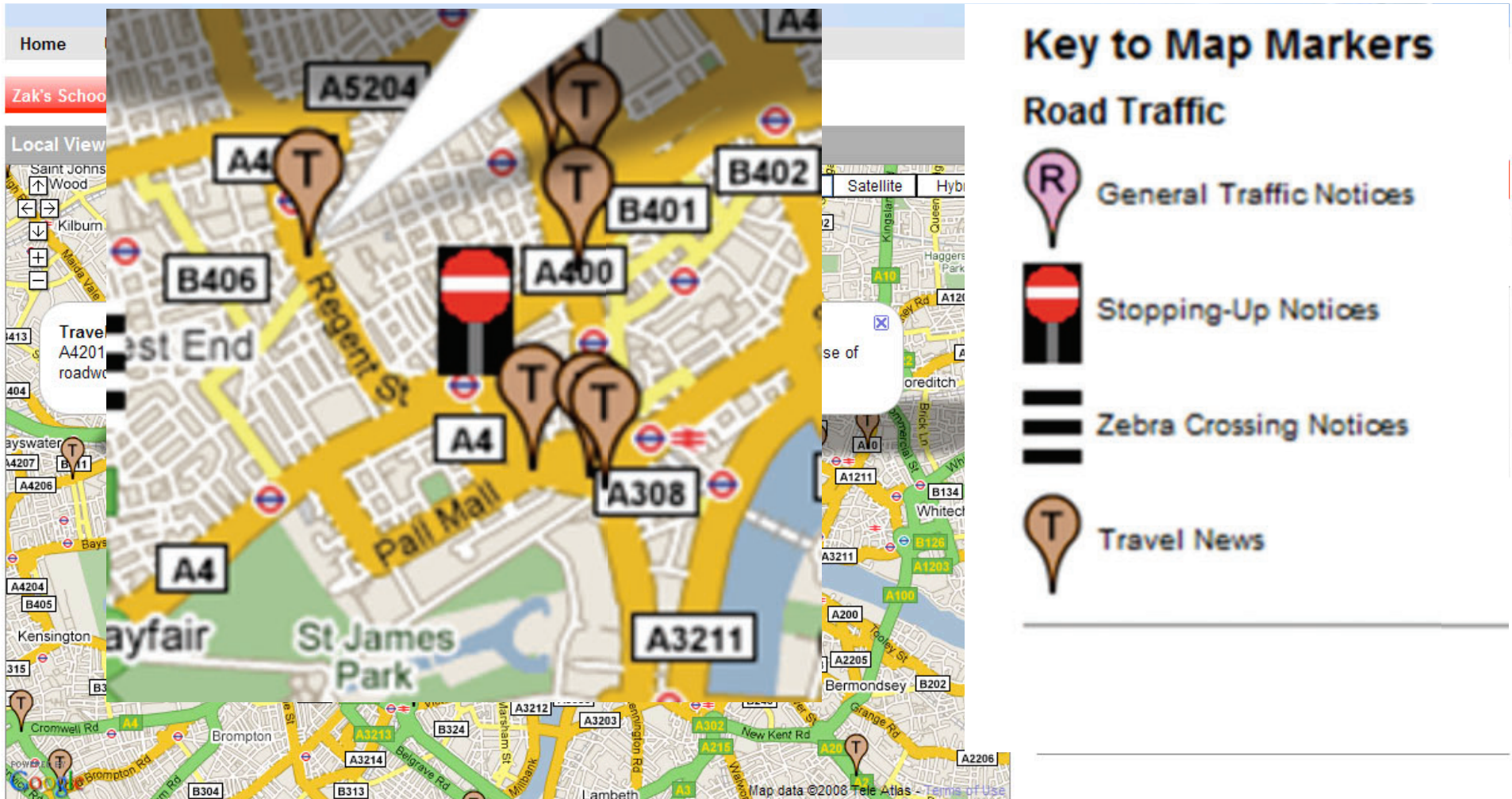


Source of: <http://www.london-gazette.co.uk/issues/58942/notices/699826> - Mozilla Firefox

```
<div rel="g:hasAuthoriser">
  <div typeof="g:Authoriser">
    <div rel="g:hasAuthorisingRole">
      <p><br /><span typeof="person:Liquidator" about="#administrator001"><span
property="person:roleName" content="Liquidator"></span><span rel="person:undertakenBy"><span
about="#JWillmont" typeof="person:Person"><span property="person:initial"
datatype="xsd:string">J</span> <span property="foaf:surname">Willmont</span></span></span></span>,
Joint Liquidator<br /></p>
    </div>
    <p><span style="text-transform: uppercase;">Note</span>. All known creditors have
been or will be paid in full, but if any persons consider they have claims against the company they
should send in full details forthwith.
    </p>
    <p property="g:dateAuthorisationSigned" datatype="xsd:date"
content="2008-12-29"><br />29 December 2008.<br /></p>
  </div>
</div>
</div>
</div>
<p>(<span property="g:hasNoticeNumber" datatype="xsd:string">699826</span>)
</p>
</div>
```





Line 151, Col 51

## The leap from notice to map



**Key to Map Markers**

**Road Traffic**

-  General Traffic Notices
-  Stopping-Up Notices
-  Zebra Crossing Notices
-  Travel News

## Benefits of RDFa

- **Flexibility** in how information is presented, while ensuring consistency of content
- Improving **finding** the location of relevant data
- A means of creating **comprehensive** access to data
- **Immediate** data access when published
- Allowing others to extract and **re-use easily**
- Means to **join up** previously separated information and services
- Possibility of **creating new services**, including personalised
- **Spin-off benefits** from structuring information, such as lists



## RDFa solves them all (almost!)

- **Discovery** – can I find the data that I want? **Solved**
- **Legal** – am I allowed to use the data? **Solved**
- **Technical** – is the data in the right format? **Solved**
- **Commercial** – can I afford the data that I need?
- **Intelligibility** - can I easily interpret the data that I am accessing? **Solved**
- **Dependencies** - does this data depend on anything else that could affect my use of it? **Solved**