Linked Data and INSPIRE – extending the benefits of data sharing

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⁶ Chief Technology Officer Council, London, UK
⁸ Epimorphics, Bristol, UK
⁹ Defra, London, UK

30 June 2010
Direction

- Open data: new UK data policy
- Linked Data & INSPIRE
- The operating infrastructure
- Current progress
- Going forward – summarise the benefits
- Conclusion & Recommendations

Linked Data is more about capability than technology
Open Data: new UK data policy
Put in your postcode, out comes the data

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

Tim Berners-Lee and Nigel Shadbolt

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
OS OpenSpace & now OS OpenData

http://openspace.ordnancesurvey.co.uk/openspace/

Welcome to the OS OpenSpace API

The OS OpenSpace API is free to access and lets developers create amazing custom applications and online projects with Ordnance Survey maps.

But OS OpenSpace API is not just for developers.

Although the API uses JavaScript to make web pages more interactive, anyone can use it to create an application by following our sample code and tutorials.

Get Ordnance Survey maps on your website to enhance the service and outstanding experience.

step 1
get started and register now for your API key

step 2
technical help is available from our developer area

step 3
join our forum and share your thoughts

OS Openspace is a registered trade mark of Ordnance Survey.

www.ordnancesurvey.co.uk/opendata

Mapping data and geographic information from Ordnance Survey

Create and support innovative, exciting ideas and applications using Ordnance Survey mapping. With OS OpenData you can access a selection of the most detailed mapping datasets available for Great Britain.

Now available - OS VectorMap™ District - a new mid-scale vector and raster dataset (alpha version)

view

• Outline of Great Britain
• Overview of Great Britain
• MinScale®
• 1:250 000 Scale Colour Raster
• OS Street View®
• Boundary-Line™
• OS VectorMap™ District - New

develop

• Create amazing web applications
• Enhance online projects
• Put Ordnance Survey maps on your website

Our API uses JavaScript to make web pages more interactive, anyone can create an application by following simple code and tutorials.

supply

Order OS OpenData on hard media or download direct to your PC, Mac or laptop (please note - you may need specialist GIS data software to view and use this data...)

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Open Government - a “right to data”

“From July 2010, government departments and agencies should ensure that any information published includes the underlying data in an open standardised format.

In advance of introducing any necessary legislation to effect our Right to Data proposals, public requests to departments for the release of government datasets should be handled in line with the principles underpinning those proposals: a presumption in favour of transparency, with all published data licensed for free reuse.”

Prime Minister David Cameron
Government's public data principles

- re-usable, machine-readable form
- online access point
- open standards
- Linked Data format
- open licence
- published in readable form
- personal, classified, commercially sensitive and 3rd party data will be protected
Information Access: common requirements

EU

Third party
Application-
Portals/Devices
- Integrated

data.gov.uk

Coordination Access Portal
Discover, Evaluate,
Download, Link & Reuse
Online

Data Publishers
(All domains)
One point of access .......

Local data
Statistical data
Health data
Statute data

Education data
Location data
Transport data
Environment data

data.gov.uk

....discover, evaluate, access, link to, reuse online
Unlocking innovation

Working with UK Public Sector information and data

Advised by Sir Tim Berners-Lee and Professor Nigel Shadbolt and others, government are 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:
- enrolment for data.gov.uk community now open
- enhancements to data.gov.uk

Read more
The Problem today: information silos

Organisation w  Organisation x  Organisation y  Organisation z

Departments a-g

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UK Compliance cost: 60m Euro
- just to do this???
INSPIRE provides the platform for Linked Data > for free!

<table>
<thead>
<tr>
<th>Mandated in INSPIRE</th>
<th>Description</th>
<th>Linked alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Objects</td>
<td>Features that you can recognise like buildings and roads (i.e. not cartographic lines)</td>
<td>We can associate other information with these objects (or aggregations of them)</td>
</tr>
<tr>
<td>Unique identifiers for these objects</td>
<td>Persistent <em>and traceable using http</em></td>
<td>Required to explicitly link data</td>
</tr>
<tr>
<td>Classification of the objects</td>
<td>Explicit type [codelist and enumerations will be mandatory]</td>
<td>Easier to relate to things you understand</td>
</tr>
<tr>
<td>All other aspects are also predefined</td>
<td>Coord Systems, Network Services Registries etc</td>
<td>Mainstream information benefits from economies of scale &amp; reuse</td>
</tr>
</tbody>
</table>
Case study: Transport Networks data specification

D2.8.1.7 INSPIRE Data Specification on Transport Networks — Guidelines

Title: D2.8.1.7 INSPIRE Data Specification on Transport Networks — Guidelines
Creator: INSPIRE Thematic Working Group Transport Networks
Date: 2009-10-02
Subject: INSPIRE Data specification for the spatial data theme Transport Networks
Publisher: INSPIRE Thematic Working Group Transport Networks
Type: Text
Description: This document presents the INSPIRE data specification for the spatial data theme Transport Networks
Contributor: Members of the INSPIRE Thematic Working Group Transport Networks
Format: Portable Document Format (PDF)
Source: Public
Rights: INSPIRE_DataSpecification_TN_v1.0.1.pdf
Language: En
Linking different things through reuse

Traffic flow data - can be linked

Designated Highway feature eg M1 Is linked (no geometry)

Physical location

Speed limit feature (linear reference) Is linked
Complementary set of standards and protocols... & capability

Linked Data

- Exploit in a cross organizational web environment integrating all kinds of data

Existing Best Practice

INSPIRE Regulations & Guidelines

- Consistent implementation profile & guidance

Standards
de jure ISO, OGC et al
de facto stds

- Foundation standards and tools
The operating infrastructure
Simple approach to information publication:

- Information is **published on the web** (valid internally as well)
- **Two items and their relationship** – location example:
  - Requires reusable **web resources to support** (eg vocabularies ~ types of relationship, types of object etc) (**INSPIRE enables much of this**)
  - Employs the **four principles** of Linked Data (**INSPIRE enables**)
  - **Users make the links** (and these **can be reused by others**)

http://linkeddata.org
Designing URI Sets for Location.

32. Each publishing authority may want or need to publish spatial-objects under its own authority, thereby retaining operational control over those that it regards itself as owning. URI for the following form:

   http://[authority]/doc{[namespace]}{[local-id]}{[version-id]}{[rendition]}

   enable references made using “location.data.gov.uk” spatial-object identifiers to be redirected or proxied to owning authority. INSPIRE namespaces are placed under the control of a single ‘owning’ authority so that redirections or proxied accesses can be accomplished by namespace based dispatch.

33. INSPIRE namespace assignment is registry based. A possible strategy for the assignment of namespace names for local authorities is to reuse ONS assigned local authority codes*

<table>
<thead>
<tr>
<th>Example Spatial Object URI</th>
<th>Owning Authority URI</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://location.data.gov.uk/doc/00EY/123456789012">http://location.data.gov.uk/doc/00EY/123456789012</a></td>
<td><a href="http://location.walthamforest.gov.uk/doc/00EY/123456789012">http://location.walthamforest.gov.uk/doc/00EY/123456789012</a></td>
<td>A UFRN defined by Waltham Forest Borough Council</td>
</tr>
</tbody>
</table>
Publishing and using Linked Data

Take a look at what has been done so far (sometimes need to dig for this)...

http://location.data.gov.uk/doc/{namespace}/{local-id}[/{version-id}][{rendition}]

**Data Provider:** publish INSPIRE compliant data - done!

**Data User:** trial web service using linked data - look at applications where you can gain early benefits and save costs
Current progress

30 June 2010
Click on a region to find linked data URLs about that region

www.johngoodwin.me.uk/boundaries/constsamesas.html
Calder Valley is a constituency represented in the House of Commons of the Parliament of the United Kingdom. It elects one Member of Parliament (MP) by the first past the post system of election.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Calder Valley is a constituency represented in the House of Commons of the Parliament of the United Kingdom. It elects one Member of Parliament (MP) by the first past the post system of election.</td>
</tr>
</tbody>
</table>
National Public Transport Access Nodes (NaPTAN)

NaPTAN is a GB national system for uniquely identifying all the points of access to public transport in GB. It is a core component of the GB national transport information infrastructure and is used by a number of other UK standards and information systems. Every GB station, coach terminus, airport, ferry terminal, bus stop, etc., is allocated at least one identifier.

Overview

- **Released**: 2010-03-17
- **Last updated**: 2010-03-17
- **Update frequency**: Quarterly
- **Tags**: local-authority-administrative-area transport-access transport airport railway-station road rail bus-station train station local-authority stop underground light-rail bus-stop tram easting-northing metro bus ferry location ordnance-survey-gnd-reference transport-access-node public-transport plane airplane osgr transport-interchange tube
- **Department**: Department for Transport
- **Wiki**: National Public Transport Access Nodes (NaPTAN)

Resources

- [XML](#)
- [Metadata](#)
<table>
<thead>
<tr>
<th>Code</th>
<th>Station Name</th>
<th>Code</th>
<th>Station Name</th>
<th>Code</th>
<th>Station Name</th>
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<tbody>
<tr>
<td>MLTHRD</td>
<td>Mauldeth Road Rail Station</td>
<td>MLFDHVY</td>
<td>Milford Haven Rail Station</td>
<td>MILFORD</td>
<td>Milford (Surrey) Rail Station</td>
</tr>
<tr>
<td>MLGV</td>
<td>Milngavie Rail Station</td>
<td>MLNB</td>
<td>Mill Hill Broadway Rail Station</td>
<td>MHB</td>
<td>Mill Hill (Lancs) Rail Station</td>
</tr>
<tr>
<td>MLM</td>
<td>Millom Millom Rail Station</td>
<td>MLSECMB</td>
<td>Moulsecoomb Rail Station</td>
<td>MLHILL</td>
<td>Mills Hill (Manchester) Rail Station</td>
</tr>
<tr>
<td>MTNSDG</td>
<td>Melton Mowbray Rail Station</td>
<td>MLVNLK</td>
<td>Malmern Link Rail Station</td>
<td>MMRIL</td>
<td>Martin Mill Rail Station</td>
</tr>
<tr>
<td>MNCRDGT</td>
<td>Deansgate Rail Station</td>
<td>MCRDLN</td>
<td>Dean Lane Rail Station (closed)</td>
<td>MCRIP</td>
<td>Manchester Airport Rail Station</td>
</tr>
<tr>
<td>MCRXR</td>
<td>Manchester Oxford Road Rail Station</td>
<td>MCRXR</td>
<td>Manchester Piccadilly Rail Station</td>
<td>MCO</td>
<td>Manchester Piccadilly Rail Station</td>
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<td>Manchester United FC Rail Station</td>
<td>MCF</td>
<td>Manchester Victoria Rail Station</td>
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<td>Moorfields Rail Station</td>
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<td>Monifieth Rail Station</td>
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<td>Morar Rail Station</td>
<td>MRM</td>
<td>Moreton (Merseyside) Rail Station</td>
<td>MTS</td>
<td>Montpellier Rail Station</td>
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<td>Metherwell Rail Station</td>
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<td>MTG</td>
<td>Nottingham Rail Station</td>
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<td>Maryport Rail Station</td>
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<td>Maryport Rail Station</td>
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<td>MRT</td>
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<td>MSL</td>
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</tr>
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<td>Market Harborough Rail Station</td>
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<td>Morden South Rail Station</td>
<td>MSF</td>
<td>Mossley (Manchester) Rail Station</td>
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<tr>
<td>MRO</td>
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<td>MSF</td>
<td>Mossley (Manchester) Rail Station</td>
<td>MTC</td>
<td>Morden South Rail Station</td>
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Going forward – the benefits
Transform the silos into ....

Organisation x  

Organisation y  

Organisation z  

Departments a-g

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…. a web of linked data
Linked Data Web

“Berners-Lee at TED”

http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html
Who is leading in this field?

- RECOVERY.gov
- garlik™ The online identity experts
- DBpedia
- BBC
- The London Gazette
- OPSI Office of Public Sector Information Part of The National Archives
- Freebase
- COI
- The National Archives
- GeoNames
- CALAIS Powered by Thomson Reuters
- Library of Congress
- Yahoo!

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Mainstream Information

- Fully integrated (spatial is NOT special)
- Location data - reusable in all kinds of applications
Benefits Summary

• New capability

• One approach for all kinds of data

• Location data is just one form of data in future - no longer special

• Common standards will be supported by common tools (growing)

• Enables cross organisational data connectivity

• Publish once and reuse – cost savings

• INSPIRE provides the platform for location data – for free
Conclusions
Conclusions

• INSPIRE and Linked Data are very complementary developments

• Timing of INSPIRE fits well with government policy:
  ● Governments now understand the value of information.
  ● We are on the verge of step change evolution with the web

• INSPIRE provides a foundation for the new environment

• With a little thought and planning we get a foundation for wider information integration – for free!

• This is where the real benefits of the investment in INSPIRE can be achieved.