Forging New Links: Libraries in the Semantic Web

Lisa Goddard & Gillian Byrne
Memorial University Libraries
Computers in Libraries, Washington D.C.
March 23rd, 2011
The Gist

General Semantic Web
• How it works.
• A few tools.
• Who’s involved?

Libraries & Linked Data
• What it solves.
• Issues & obstacles.
• Where we are now.

Lisa

Gillian
Web Search Problems
High Recall, Low Precision
The **Semantic Web** is an evolving extension of the World Wide Web in which the semantics of information and services on the web is defined, making it possible for the web to understand and satisfy the requests of people and machines to use the web content. It derives from World Wide Web Consortium director Sir Tim Berners-Lee's vision of the Web as a universal medium for data, information, and knowledge exchange.

At its core, the semantic web comprises a set of design principles, collaborative working groups, and a variety of enabling technologies. Some elements of the semantic web are expressed as prospective future possibilities that are yet to be implemented or realized. Other elements of the semantic web are expressed in formal specifications. Some of these include Resource Description Framework (RDF), a variety of data interchange formats (e.g. RDF/XML, N3, Turtle, N-Triples), and notations such as RDF Schema (RDFS) and the Web Ontology Language (OWL), all of which are intended to provide a formal description of concepts, terms, and relationships within a given knowledge domain.

### Contents

1. Purpose
2. Relationship to the hypertext web
   2.1 Limitations of HTML
   2.2 Semantic Web solutions
3. Relationship to object oriented programming
4. Skeptical reactions
   4.1 Practical feasibility
   4.2 An unrealized idea
   4.3 Censorship and privacy
Access to Deep Web
Lisa Goddard is the Capitol Hill correspondent for CNN Radio. Goddard reports on the day-to-day congressional activity in addition to enterprise reporting. Goddard joins CNN after working as a reporter in print, television and radio.

Most recently, Goddard worked for the Associated Press in Washington, D.C. Her work included coverage of the 2004 election, two hurricane seasons and the full range of issues from the war in Iraq to Medicare.

Before that, Goddard spent five years as a reporter in South Carolina where she covered the statehouse for CNN and NBC affiliate WIS-TV. Goddard followed the Confederate flag debate in South Carolina and broke the news of a final compromise. Goddard also covered the Republican presidential primary between George W. Bush and Sen. John McCain.

Goddard speaks Russian and lived in Russia for two years, spending most of her time in St. Petersburg.

Goddard holds a bachelor of economics degree from the College of William & Mary in Williamsburg, Va.
Academic Staff Member (University College London)

Equivalent to?

Faculty Member (McGill)
Semantic Queries

Find all soccer players, who played as goalkeeper for a club that has a stadium with more than 40,000 seats and who are born in a country with more than 10 million inhabitants.
## Scopus - Affiliation Search Results: memorial university newfoundland

### Make Affiliation Selection

<table>
<thead>
<tr>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>memorial university newfoundland</td>
</tr>
</tbody>
</table>

E.g., University of Toronto

**Search** [Search] [Clear]

### Refine Results

<table>
<thead>
<tr>
<th>City</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>St John's</td>
<td>Canada</td>
</tr>
<tr>
<td>Corner Brook</td>
<td>Canada</td>
</tr>
<tr>
<td>St. John's</td>
<td>Canada</td>
</tr>
</tbody>
</table>

### Affiliation Results: 4

<table>
<thead>
<tr>
<th>Number</th>
<th>Affiliations</th>
<th>City</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Memorial University of Newfoundland</td>
<td>St John's</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Memorial University of Newfoundland</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find unmatched affiliations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sir Wilfred Grenfell College</td>
<td>Corner Brook</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Sir Wilfred Grenfell College</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find unmatched affiliations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sir Wilfred Grenfell College</td>
<td>St John's</td>
<td>Canada</td>
</tr>
<tr>
<td></td>
<td>Memorial University of Newfoundland, Faculty of Medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Memorial University of Newfoundland</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find unmatched affiliations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Page 1 of 1**
Figure 1: Entity Relationship Diagram (ERD) for the aer_sight database
The Semantic Solution

1. Structured data
2. Vocabularies & Reasoning
3. Linking
Machine-Actionable Data

@mpedson Michael Peter Edson

"Our top two users are computers." Says @udcmrk about the importance of API's and machine readable data.

24 Jan
Structured Data: RDF
Semantic Web Metadata: RDF

Data model for writing simple statements about web objects.

RDF statements are written as “triples”.

![Diagram showing RDF triples]

- Subject: Shakespeare
- Predicate: Wrote
- Object: Macbeth

Statement
## RDF Triples

<table>
<thead>
<tr>
<th>Subject</th>
<th>Predicate</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shakespeare</td>
<td>Wrote</td>
<td>King Lear</td>
</tr>
<tr>
<td>Shakespeare</td>
<td>Wrote</td>
<td>Macbeth</td>
</tr>
<tr>
<td>Anne Hathaway</td>
<td>Married</td>
<td>Shakespeare</td>
</tr>
<tr>
<td>Shakespeare</td>
<td>Lived in</td>
<td>Stratford</td>
</tr>
<tr>
<td>Stratford</td>
<td>Is in</td>
<td>England</td>
</tr>
<tr>
<td>Macbeth</td>
<td>Set in</td>
<td>Scotland</td>
</tr>
<tr>
<td>England</td>
<td>Part of</td>
<td>UK</td>
</tr>
<tr>
<td>Scotland</td>
<td>Part of</td>
<td>UK</td>
</tr>
</tbody>
</table>
RDF Graph: A Semantic Net

AnneHathaway married Shakespeare wrote

Stratford isIn England partOf

Shakespeare livedIn wrote

Macbeth wrote

KingLear wrote

Macbeth setIn Scotland partOf

Scotland partOf UK
Vocabularies: Ontologies
Controlled Vocabulary

Terms and definitions are posted online, so they can be shared by many different organizations.

http://www.mun.ca/lit.owl
Namespaces allow us to combine several vocabularies while maintaining distinct meaning of each element.

- #wrote
- #play
- #book
- #setIn
- #poem
- #narrated

http://mun.ca/lit.owl

- #country
- #isIn
- #partOf
- #region
- #city

http://mit.edu/geo.rdf

- #married
- #birthdate
- #person
- #deathdate

http://gmu.edu/bio.owl
In RDF namespace URIs always resolve.
<rdf:RDF
    xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
    xmlns:foaf="http://xmlns.com/foaf/0.1/">
<foaf:Person rdf:ID="me">
    <foaf:name>Lisa Goddard</foaf:name>
    <foaf:title>Ms.</foaf:title>
    <foaf:givenname>Lisa</foaf:givenname>
    <foaf:family_name>Goddard</foaf:family_name>
    <foaf:homepage rdf:resource="http://twitter.com/lisagoddard"/>
    <foaf:workplaceHomepage rdf:resource="http://www.library.mun.ca"/>
    <foaf:schoolHomepage rdf:resource="http://www.queensu.ca"/>
    <foaf:knows>
        <foaf:Person>
            <foaf:name>Gillian Byrne</foaf:name>
            <foaf:mbox rdf:resource="mailto:gbyrne@mun.ca"/>
        </foaf:Person></foaf:knows>
    <foaf:knows>
        <foaf:Person>
            <foaf:name>Dianne Keeping</foaf:name>
            <foaf:mbox rdf:resource="mailto:dckeep@mun.ca"/>
        </foaf:Person></foaf:knows>
</foaf:Person>
</rdf:RDF>
Resolvable URIs

xmlns:foaf="http://xmlns.com/foaf/0.1/"

<foaf:Person rdf:ID="me">
  <foaf:name>Lisa Goddard</foaf:name>
  <foaf:workplaceHomepage rdf:resource="http://www.library.mun.ca"/>
</foaf:Person>

http://xmlns.com/foaf/0.1/#term_workplaceHomepage
Resolvable URIs

Property: foaf:workplaceHomepage

workplace homepage - A workplace homepage of some person; the homepage of an organization they work for.

Status: testing
Domain: having this property implies being a Person
Range: every value of this property is a Document

The workplaceHomepage of a Person is a Document that is the homepage of a Organization that they work for.

By directly relating people to the homepages of their workplace, we have a simple convention that takes advantage of a set of widely known identifiers, while taking care not to confuse the things those identifiers identify (ie. organizational homepages) with the actual organizations those homepages describe.

For example, Dan Brickley works at W3C. Dan is a Person with a homepage of http://danbri.org/; W3C is a Organization with a homepage of http://www.w3.org/. This allows us to say that Dan has a workplaceHomepage of http://www.w3.org/.

<foaf:Person>
  <foaf:name>Dan Brickley</foaf:name>
  <foaf:workplaceHomepage rdf:resource="http://www.w3.org/"/>
</foaf:Person>

Note that several other FOAF properties work this way; schoolHomepage is the most similar. In general, FOAF often indirectly identifies things via Web page identifiers where possible, since these identifiers are widely used and known. FOAF does not currently have a term for the name of the relation (eg. "workplace") that holds between a Person and an Organization that they work for.
An ontology describes a particular domain of knowledge (e.g. bikes, whiskey).

• Establishes controlled vocabulary.
• Models relationships between entities & concepts.
• Built-in rules and datatypes that support reasoning.
Reasoning: Ontologies
OWL Reasoning: Inverse

Axiom

lit:wrote owl:inverseOf lit:writtenBy
lit:settingFor owl:inverseOf lit:setIn

Explicit Fact

bio:Shakespeare lit:wrote lit:Macbeth
lit:Macbeth lit:setIn geo:Scotland

Implicit Fact

lit:Macbeth lit:writtenBy bio:Shakespeare
geo:Scotland lit:settingFor lit:Macbeth
OWL Reasoning: Transitive

**Axiom**

```
hasParent   rdfs:subpropertyOf   hasAncestor
hasAncestor rdf:type           owl:TransitiveProperty
```

**Explicit Facts**

```
Lisa        hasParent  Geoffrey
Geoffrey    hasParent  Elizabeth
Elizabeth   hasParent  Beatrix
```

**Implicit Facts**

```
Lisa        hasAncestor  Geoffrey
Geoffrey    hasAncestor  Elizabeth
Lisa        hasAncestor  Elizabeth
Geoffrey    hasAncestor  Beatrix
Lisa        hasAncestor  Beatrix
```
OWL Reasoning: Symmetrical

Axiom

bio:married rdf:type owl:SymmetricProperty

Explicit Fact

bio:AnneHathaway bio:married bio:Shakespeare

Implicit Fact

bio:Shakespeare bio:married bio:AnneHathaway
OWL Reasoning: Equivalent

Axiom
act:borrows owl:equivalentProperty lib:checkedout
lit:WilliamShakespeare owl:sameAs bio:Shakespeare

Explicit Facts
bio:Lisa act:borrows lib:book
bio:Shakespeare lit:wrote lit:Macbeth

Implicit Facts
bio:Lisa lib:checkedout lib:book
lit:WilliamShakespeare lit:wrote lit:Macbeth
Finding Ontologies

Welcome to the Protege Ontology Library!
This page is organized into the following groupings:
- OWL ontologies
- Frame-based ontologies
- Ontologies in other formats (e.g., DAML+OIL, RDF Schema, etc.)
If your ontology is available in multiple formats, please feel free to link to it from multiple sections.

*Please make insertions in alphabetical order. Thank you!!!*

OWL ontologies

Information on how to open OWL files from the Protege-OWL editor is available on the main Protege Web site. See the Creating and Loading Projects section of the Getting Started with Protege-OWL Web page. Other ways to search for OWL ontologies include using Google: http://www.google.com/search?q=filetype:owl+owl, or the new Semantic Web search engine called Swoogle:

- AIM@SHAPE Ontologies: Ontologies pertaining to digital shapes. Source: AIM@SHAPE NoE - Advanced and Innovative Models And Tools for the development of Semantic-based systems for Handling, Acquiring, and Processing knowledge Embedded in multidimensional digital objects.
- Basic Formal Ontology (BFO)
- bhakti.owl: An OWL ontology for the transcendental states of consciousness experienced by practitioners of bhakti-yoga, a form of Vedic consciousness engineering.
- Biochemical Ontologies: Over 30 ontologies for knowledge representation and reasoning across scientific domains. Ontologies are
Tabulator RDF Browser

http://protege.cim3.net/file/pub/ontologies/family.swrl.owl/family.swrl.owl

- **http://a.com/ontology**
  - imports
  - Ontology
    - http://swrl.stanford.edu/ontologies/3.3/swrla.owl
    - http://swrl.stanford.edu/ontologies/built-ins/3.3/abox.owl
    - http://swrl.stanford.edu/ontologies/built-ins/3.3/swrlx.owl

- **A SWRL Namespace**
  - http://www.w3.org/2003/11/swrlb

- **Daugther**
  - type
  - disjointWith
  - equivalentClass

- **Son**
  - type
  - intersectionOf

- **Child**
  - type
  - intersectionOf

- **Woman**
  - type
  - equivalentClass

- **Class**
  - type
  - intersectionOf

- **Restriction**
  - type
  - minCardinality
    - 1
  - onProperty
    - Parent

- **Person**
  - onProperty
    - Sex

- **Female**
  - hasValue
Protege editor to develop Ontologies.

Free download.

Developed by Stanford
Linking Distributed Data
Linking Data
Linking Data
Linking Hubs
Semantic Linking Hubs
Link Discovery

Discover other representations of an object.
(tw:lisagoddard owl:sameas fb:lgoddard)

Discover related resources.
(e.g. Person <-> Publication)
Natural Language Processing

Identify people, places, things, concepts in unstructured text files.

Disambiguate terms. 🍌 ≠ 🍏

Suggest links to existing entities.
To win government approval to take over [[NBC Universal]] last month, cable giant [[Comcast]] Corp. agreed to let online rivals license NBC programming, including hit shows such as "[[30 Rock]]" and "[[The Office]]." Comcast also agreed not to block its 17 million broadband subscribers from watching video online through [[Netflix]], [[Apple]]'s [[iTunes]] and other rivals yet to come.
Demo

To win government approval to take over NBC Universal last month, cable giant Comcast Corp. agreed to let online rivals license NBC programming, including hit shows such as "30 Rock" and "The Office." Comcast also agreed not to block its 17 million broadband subscribers from watching video online through Netflix, Apple’s iTunes and other rivals yet to come.

Confidence: 0.5   Support: 30
Types: Place, Person, Work, Organisation, Species, all other types, untyped

version 0.1
Apple Inc. is an American multinational corporation that designs and markets consumer electronics, computer software, and personal computers. The company's best-known hardware products include the Macintosh line of computers, the iPod, the iPhone and the iPad.


- Apple Inc. is an American multinational corporation that designs and markets consumer electronics, computer software, and personal computers. The company's best-known hardware products include the Macintosh line of computers, the iPod, the iPhone and the iPad. Apple software includes the Mac OS X operating system; the iTunes media browser; the iLife suite of multimedia and creativity software; the iWork suite of productivity software; Aperture, a professional photography package; Final Cut Studio, a suite of professional audio and film-industry software products; Logic Studio, a suite of music production tools and its iOS Mobile Operating System. As of August 2010, the company operates 301 retail stores in ten countries, and an online store where hardware and software products are sold. Established on April 1, 1976 in Cupertino, California, and incorporated January 3, 1977, the company was previously named Apple Computer, Inc., for its first 30 years, but removed the word "Computer" on January 9, 2007, to reflect the company's ongoing expansion into the consumer electronics market in addition to its traditional focus on personal computers. As of September 26, 2009, Apple had 34,300 full time employees and 2,500 temporary full time employees worldwide and had worldwide annual sales of $42.91 billion in its fiscal year ending September 26, 2009. For reasons as various as its philosophy of comprehensive aesthetic design to its distinctive advertising campaigns, Apple has established a unique reputation in the consumer electronics industry. This includes a customer base that is devoted to the company and its brand, particularly in the United States. Fortune magazine named Apple the most admired company in the United States in 2008, and in the world in 2008, 2009, and 2010. The company has also received widespread criticism for its contractors' labor, environmental, and business practices.
| dbpedia-owl:keyPerson | - dbpedia:Steve_Jobs  
|                      | - dbpedia:Peter_Oppenheimer  
|                      | - dbpedia:Chief_executive_officer  
|                      | - dbpedia:Chairman  
|                      | - dbpedia:Timothy_D._Cook  
|                      | - dbpedia:Bob_Mansfield  
|                      | - dbpedia:Jonathan_Ive  
|                      | - dbpedia:IPhone  
| dbpedia-owl:locationCity | - dbpedia:Infinite_Loop_(street)  
|                          | - dbpedia:Cupertino,_California  
| dbpedia-owl:netIncome | - 8.24E9  
| dbpedia-owl:numberOfStaff | - 34300 (xsd:integer)  
| dbpedia-owl:operatingIncome | - 1.174E10  
| dbpedia-owl:product | - dbpedia:Macintosh  
|                        | - dbpedia:IPod_Touch  
|                        | - dbpedia:IPod_Nano  

RDF Publishing Tools
Structured Data Crosswalks

Ok, I'm interested, what RDFizers are there?

Here is the list of the RDFizers that we have built so far:

- **JPEG -> RDF** - scans a folder for JPEG files, parses the EXIF and IPCT metadata found in those files and dumps an RDF/N3 representation of it into a file.
- **MARC/MODS -> RDF** - transforms MARC records from Z39.2 format into MODS and then from MODS to an RDF representation of MODS.
- **OAI-PMH -> RDF** - harvests an OAI-PMH repository and transforms the captured metadata into an RDF representation through pluggable XSLT stylesheets.
- **OCW -> RDF** - harvests metadata from the MIT OpenCourseWare website and transforms it into an RDF representation of IEEE LOM.
- **EMail -> RDF** - transforms email mbox files into RDF/XML.
- **BibTEX -> RDF** - transforms BibTEX files into RDF/XML.
- **POM -> RDF** - transforms Maven POM (Project Object Model) files into RDF/N3.
- **DEB -> RDF** - extracts the metadata from a Debian software package and generates an RDF representation.
- **CRW -> RDF** - extracts the metadata from a Canon RAW image file and generates an RDF representation.
- **Flat -> RDF** - converts classic Unix text database files, like /etc/passwd, into RDF/N3.
Drupal 7 CMS

We're celebrating the launch of Drupal 7

Now easier to use, more flexible and more scalable, Drupal is an open source content management platform powering millions of websites and applications. Learn more about Drupal 7

Why Choose Drupal?

Use Drupal to build everything from personal blogs to enterprise applications. Thousands of add-on modules and designs let you build any site you can imagine.

Drupal is free, flexible, robust and constantly being improved by hundreds of thousands of passionate people from all over the world. Join us!

Get Started with Drupal

Search Drupal.org

Sites Made with Drupal

IHeartAdoption.org - Educational and social networking site on Drupal 6

Develop with Drupal

This week

23,095 Code commits
7,139 Issue comments

Drupal Core
Security Info
Developer Docs
API Docs
Testing semantic annotation features in Semantic MediaWiki

I set up this account in order to test the semantic tagging features in mediawiki. I'm going to a conference in Trondheim, Norway next week to do a presentation on semantic web/linked data in libraries. The conference is called Emerging Technologies in Academic Libraries (EMTACL). I'm a systems librarian in St. John's Newfoundland, so that's the sort of thing we do for fun.

So far mediawiki has not offered me any semantic annotations, so I will probably have to go and read the docs. Maybe I need to install some browser plugins.

What if I throw in a few phrases like the social web, natural language processing, and humanities computing? Drupal 7? Semantic web? Linked Data?

It might be better if I threw in a couple of names. Let's try Kingsley Idehen, Paul Miller, and Richard Cyganiak, all actively involved in linked data architecture and evangelism.

Biographic data for Tim Berners-Lee Click to change this...

Birth date: 1955-06-08 00:00:00.0
Education: The Queen's College, Oxford
Occupation: Computer Scientist
See also: http://en.wikipedia.org/wiki/Tim_Berners-Lee
Sir Timothy John Berners-Lee, OM, KBE, FRS, FREng, FRSA (London, 8 June 1955), is an
## Facts about Lisagoddard

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affiliation</td>
<td>Memorial University of Newfoundland</td>
</tr>
<tr>
<td>Birth date</td>
<td>30 April 1972</td>
</tr>
<tr>
<td>Current project</td>
<td>Libraries &amp; Linked Data</td>
</tr>
<tr>
<td>Firstname</td>
<td>Lisa</td>
</tr>
<tr>
<td>HasCategory</td>
<td>Category:Person</td>
</tr>
<tr>
<td>HasGeocoordinates</td>
<td>49°27’25.181”N, 48°36’42.694”W</td>
</tr>
<tr>
<td>Homepage</td>
<td><a href="http://twitter.com/lisagoddard">http://twitter.com/lisagoddard</a></td>
</tr>
<tr>
<td>Knows</td>
<td>Jennifer Lokash, Gillian Byrne, and Tim Berners-Lee</td>
</tr>
<tr>
<td>Lastname</td>
<td>Goddard</td>
</tr>
<tr>
<td>Location</td>
<td>Pedagogues Close, St. John's, Newfoundland</td>
</tr>
<tr>
<td>Mbox</td>
<td><a href="mailto:lgoddard@mun.ca">lgoddard@mun.ca</a></td>
</tr>
<tr>
<td>Name</td>
<td>Lisa Goddard</td>
</tr>
<tr>
<td>Phone</td>
<td>(555) 555-5555</td>
</tr>
<tr>
<td>User image</td>
<td><img src="image_url" alt="User image" /></td>
</tr>
</tbody>
</table>
Semantic Blogging: Zemanta

phrases like the social web, natural language processing, and humanities computing? Yup, putting in those words returned much more relevant related articles. I've inserted the top suggestions at the bottom of the post.

The suggested photos include the lovely one that I've inserted of the Nidaros Cathedral in Trondheim. I also have several photos of RDF graphs, one of developers working on the semantic version of Drupal, and several pictures of libraries. That's pretty good, right?

It might be better if I threw in a couple of names. Let's try Kingsley Idehen, Paul Miller, and Richard Cyganiak, all actively involved in linked data architecture and evangelism. I'm getting some in-text link suggestions, but only for Paul. I've added the suggested link - it's not linking to Cloud of Data as I expected, but Mr. Miller seems to have several blogs on the go right now.
Mainstream Linked Data
Usage of RDFa increased 510% between Mar 2009 and Oct 2010
Websites with RDF(a)
Fish Tacos

Food Network invites you to try this Fish Tacos recipe from Bobby Flay.
Ingredients: canola oil, lime, chili powder, jalapeño, coriander, tortillas ...
www.foodnetwork.com › ... › Kid Friendly - Cached - Similar

Fish Tacos

I'm from San Diego and these taste just like home! Chunks of cod are fried in a beer batter, and served in corn tortillas with shredded cabbage and a zesty ... allrecipes.com/recipe/fish-tacos/ - Cached

Fish Tacos with Lime-Cilantro Crema

Cumin, coriander, and paprika lend these fish tacos a delightfully warm, smoky flavor. They're the perfect foundation for the zippy sour cream sauce.
Ingredients: onion, coriander, mayonnaise, sour cream, lime, lime juice, garlic ...
find.myrecipes.com/recipes/recipefinder.dyn?action...

Fish Tacos

Find the recipe for Fish Tacos and other tortillas recipes at Epicurious.com.
Ingredients: flounder, olive oil, pepper, mayonnaise, yoghurt, chipotle ...
www.epicurious.com/.../Fish-Tacos-233251 - Cached - Similar - Add to iGoogle

Fish Taco

Food Network invites you to try this Fish Taco recipe from Alton Brown.
Ingredients: garlic, coriander, lime, cumin, pepper, tequila, tilapia, olive ...
www.foodnetwork.com › Recipes › Seafood - Cached

Fish Tacos

Find the recipe for Fish Tacos and other fish recipes at Epicurious.com.
Google Faceted Recipe Search
Google Place Pages

komi restaurant washington

Komi » Washington DC
Private Events. Contact Us. Hours. Menu. 1509 17th Street Washington DC. Private Events. Reservations (202) 332-9200 ...
komirestaurant.com/ - Cached - Similar

Komi
Place page

1509 17th St NW # 1
Washington D.C., DC 20036-6262, United States
(202) 332-9200
Subway: Dupont Circle Station
Get directions - Is this accurate?
Open Tue-Sat 5:30pm-9:45pm

5 stars 504 reviews
"One of the best dining experiences I've ever had was at Komi. I had called 3 ...
- citysearch.com
Semantic Technologies

Google

Twitter

Apple

Facebook

Cisco

Microsoft
Library Linked Data
Disconnected Data
Silos in the Library

Source: Provincial Archives of Newfoundland & Labrador
Dr. Cluny Macpherson fonds
COLL-002

TITLE: Dr. Cluny Macpherson fonds
DATES: 1881-1991; predominant 1908-1966
EXTENT: 50 cm of textual material -- 1 map -- 21 photographs

BIOGRAPHICAL SKETCH:
Cluny Macpherson (1879 - 1966), physician and soldier, was born 18 March 1879 in St. John's, Newfoundland, one of two sons (one brother, Harold) born to Campbell Macpherson and Emma Duder. He completed his early schooling at Methodist College in St. John's and then continued his education at McGill University in Montréal. There, Macpherson earned his degree in Medicine (1897 - 1901), and at the same time volunteered with the Royal National Mission to Deep Sea Fishermen, of which the Newfoundland Branch came to be known as the Grenfell Mission. Upon graduation from McGill, Dr. Macpherson began his medical career at the Royal Infirmary of Edinburgh.

In the following year Dr. Macpherson returned to Newfoundland to join Dr. Wilfred Grenfell's Labrador Mission, and was placed in charge of the hospital in Battle Harbour, Labrador. He also served as magistrate for the area. Dr. Macpherson remained there until 1904, when he returned to St. John's to begin private practice. Dr. Macpherson also received government commissions during this time, such as in 1909 when he went to the southwest coast to fight a smallpox epidemic. Dr. Macpherson also continued his involvement with the International Grenfell Association (IGA), eventually serving as a director of both the IGA and the Grenfell Association, Newfoundland. He also played a key role in the development, structuring and operation of the Seamen's Institute (later called the King George V Institute), another Grenfell project.
Weak Links
What’s our value?

- 2.0 thinking: our value is linked to our data
- 3.0 thinking: our value is linked to our (re)useable, shareable data?
Making the Connection
Enhanced Linking
Enhanced personalization

Julie

History 1012

List ID: 12

Newfoundland to confederation

@prefix aiiso: <http://purl.org/vocab/aiiso/schema#>.
@prefix resource: <http://purl.org/vocab/resourcelist/schema#>.
@prefix foaf: <http://xmlns.com/foaf/0.1/>.
@prefix bibo: <http://purl.org/ontology/bibo/>.
@prefix dcterms: <http://purl.org/dc/terms/>.
Obstacles
Competing Vocabularies

...how many ways to describe a book, journal article or a place?

Ian Millard, Hugh Glaser, Manuel Salvadores, Nigel Shadbolt
http://eprints.ecs.soton.ac.uk/21681/5/cold2010-slides.pdf
Co-referencing

4. http://rdf.freebase.com/ns/guid.9202a8c04000641f80000000005e34c1
<sameAs>
interlinking the Web of Data

The Web of Data has many equivalent URLs. This service helps you to find co-references between different data sets. Enter a known URI, or use Sindice to search first.

<sameAs> Enter a Linked Data URI...

<sindice> Enter a literal (text) search...

Why not try searching for the string "Southampton", (which we will look up for you on Sindice first) or finding other equivalent identifiers for http://statistics.data.gov.uk/id/local-authority/00MS?

Currently serving 40 169 680 URIs in 13 131 930 bundles!

about contact get the widget
Discovering

• Lots (and lots and lots) of linked data out there
• How to find it?
CKAN - the Data Hub

The easy way to get, use and share data

Search CKAN - the Data Hub

1705 registered dataset collections available.

Recently changed

Linked Scotland

This package is a collection and common access point to a group of Linked Data datasets related to Scotland. It was set up as an initiative of the Scottish Linked Data interest group and...

University of Isfahan DataSet

University of Isfahan is an educational institution in Isfahan, Iran.

Southampton Jargon Dictionary (University of Southampton)

Dataset from University of Southampton Open Data Service. This dictionary is created by a number of volunteers in iSolutions and other professional services to help people learn the terms...

UK Public Bodies

Recent Comments

MHoas He what Drug release does the package use? It that e.g. the DB entry is incomplete what can currently be found on DrugBank. E.g. the pharmacoeconomic section is... http://www.ckan.net berlin-drugbank 3 days ago

Egon Willi is unclear what data this end point is exp Not all STITCH are Open, suggests SPARQL end point exposes a sub data, rather than STITCH. http://www.ckan.net berlin-stitch 3 weeks ago
Querying

**Authority SPARQL Examples**

**Selecting an LC authority preferred label for a DBpedia entity using VIAF**

SPARQL query for selecting the Library of Congress preferred label for a person identified in DBpedia (J\_ane A\_usten):

```
SELECT ?prefLiteral
WHERE {
  ?concept foaf:focus <http://dbpedia.org/resource/Jane_Austen> ;
  skos:inScheme <http://viaf.org/vocabulary/scheme/LC> ;
  skosxl:prefLabel ?prefLabel .
}
```

**Listing available preferred labels for a DBpedia entity using VIAF**

SPARQL query for listing all available preferred labels for DBpedia's Jane Austen:

```
SELECT ?schemeName ?prefLiteral
WHERE {
  ?concept skosxl:prefLabel ?prefLabel ;
  skos:inScheme ?scheme ;
  ?scheme dcterms:title ?schemeName .
}
```
Search for list items with keywords:

- History
- Chinese History
- German History
- History methods
- The history of European integration
- What is History?
- Japanese History

Recommended reading (5 items):


Other reading (17 items):


Table of contents [show]
The largest hurdle to library adoption of Linked Data, though, may not be educational or technological ... The sticking point for librarians may be an issue of trust.

- Ross Singer, “Linked Data Now!”
Preservation

What happens when a dataset or linking hub disappears?
Data ownership

- Digital Archive
- Repository
- Library Catalogue
- Ejournal
- Database

≠
Licensing

“You shall not use the data made available through the GC Open Data Portal in any way which, in the opinion of Canada, may bring disrepute to or prejudice the reputation of Canada.”
VoID

- schema to describe linked datasets

:DBpedia a void:Dataset ;
Oh - One more thing…

“who’s minding the ranch?”
RDA

• Works with in MARC, but also works as a linked data Metadata Vocabulary
<table>
<thead>
<tr>
<th>Label</th>
<th>Type</th>
<th>URI</th>
<th>Status</th>
<th>Updated</th>
<th>Last Updated by</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>property</td>
<td>..Elements/title</td>
<td>New-Proposed</td>
<td>2009-08-06 14:45</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Place of production</td>
<td>property</td>
<td>..Elements/placeOfProduction</td>
<td>New-Proposed</td>
<td>2009-08-09 14:14</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Date of production</td>
<td>property</td>
<td>..Elements/dateOfProduction</td>
<td>New-Proposed</td>
<td>2009-08-09 14:29</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Copyright date</td>
<td>property</td>
<td>..Elements/copyrightDate</td>
<td>New-Proposed</td>
<td>2009-08-10 14:42</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Identifier for the manifestation</td>
<td>property</td>
<td>..IdentifierForTheManifestation</td>
<td>New-Proposed</td>
<td>2009-08-11 9:44</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Publisher's number for music</td>
<td>subproperty</td>
<td>..PublishersNumberForMusic</td>
<td>New-Proposed</td>
<td>2009-08-20 12:12</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Plate number for music</td>
<td>subproperty</td>
<td>..Elements/plateNumberForMusic</td>
<td>New-Proposed</td>
<td>2009-08-20 12:12</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Media type</td>
<td>property</td>
<td>..Elements/mediaType</td>
<td>New-Proposed</td>
<td>2009-08-20 9:46</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Carrier type</td>
<td>property</td>
<td>..Elements/cARRIERType</td>
<td>New-Proposed</td>
<td>2009-08-10 14:44</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Extent</td>
<td>property</td>
<td>..Elements/extent</td>
<td>New-Proposed</td>
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<td>DianeH</td>
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</tr>
<tr>
<td>Base material</td>
<td>property</td>
<td>..Elements/baseMaterial</td>
<td>New-Proposed</td>
<td>2009-08-20 14:23</td>
<td>DianeH</td>
<td></td>
</tr>
<tr>
<td>Applied material</td>
<td>property</td>
<td>..Elements/appliedMaterial</td>
<td>New-Proposed</td>
<td>2009-08-20 14:36</td>
<td>DianeH</td>
<td></td>
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<tr>
<td>Form of work</td>
<td>property</td>
<td>..Elements/formOfWork</td>
<td>New-Proposed</td>
<td>2009-09-21 13:55</td>
<td>DianeH</td>
<td></td>
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<tr>
<td>Date of work</td>
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<td>..Elements/dateOfWork</td>
<td>New-Proposed</td>
<td>2009-09-21 13:53</td>
<td>DianeH</td>
<td></td>
</tr>
</tbody>
</table>
RDF Converters

Expressing Dublin Core metadata using the Resource Description Framework (RDF)

**Creator:** Mikael Nilsson  
KMR Group, NADA, KTH (Royal Institute of Technology), Sweden  
Andy Powell  
Eduserv Foundation, UK  
Pete Johnson  
Eduserv Foundation, UK  
Ambjørn Naeve  
KMR Group, NADA, KTH (Royal Institute of Technology), Sweden

**Date Issued:** 2008-01-14

**Identifier:** [http://dublincore.org/documents/2008/01/14/dc-rdf/](http://dublincore.org/documents/2008/01/14/dc-rdf/)


**Status of Document:** This is a DCMI Recommendation.

**Description of Document:** This document provides recommendations for expressing Dublin Core metadata using RDF, the Resource Description Framework.
Where we are now
Age of Chaotic Innovation?

Virtual International Authority File
Dewey Decimal Classification
BIBSYS’ authority files
Thesaurus for Economics
Rameau
Swedish Subject Headings
German Subject Headings
Metadata Authority Description Schema (MADS)

LIBRIS (Swedish Union Catalog)
Library of Congress (LCSH, OSI)
German National Library
Hungarian National Library
British Library
Europeana
Linked Periodicals Data
The Chaos Tamers

- W3C Linked Library Data Incubator Group
- IFLA Semantic Web Interest Group
- CKAN Linked Library Data Group
- LITA/ALCTS Linked Library Data Interest Group
Questions?

Source: http://www.jenniferbetman.com