

Ontology Life Cycles and The Web's LOD Cloud

By Kingsley Idehen

Founder & CEO, OpenLink Software

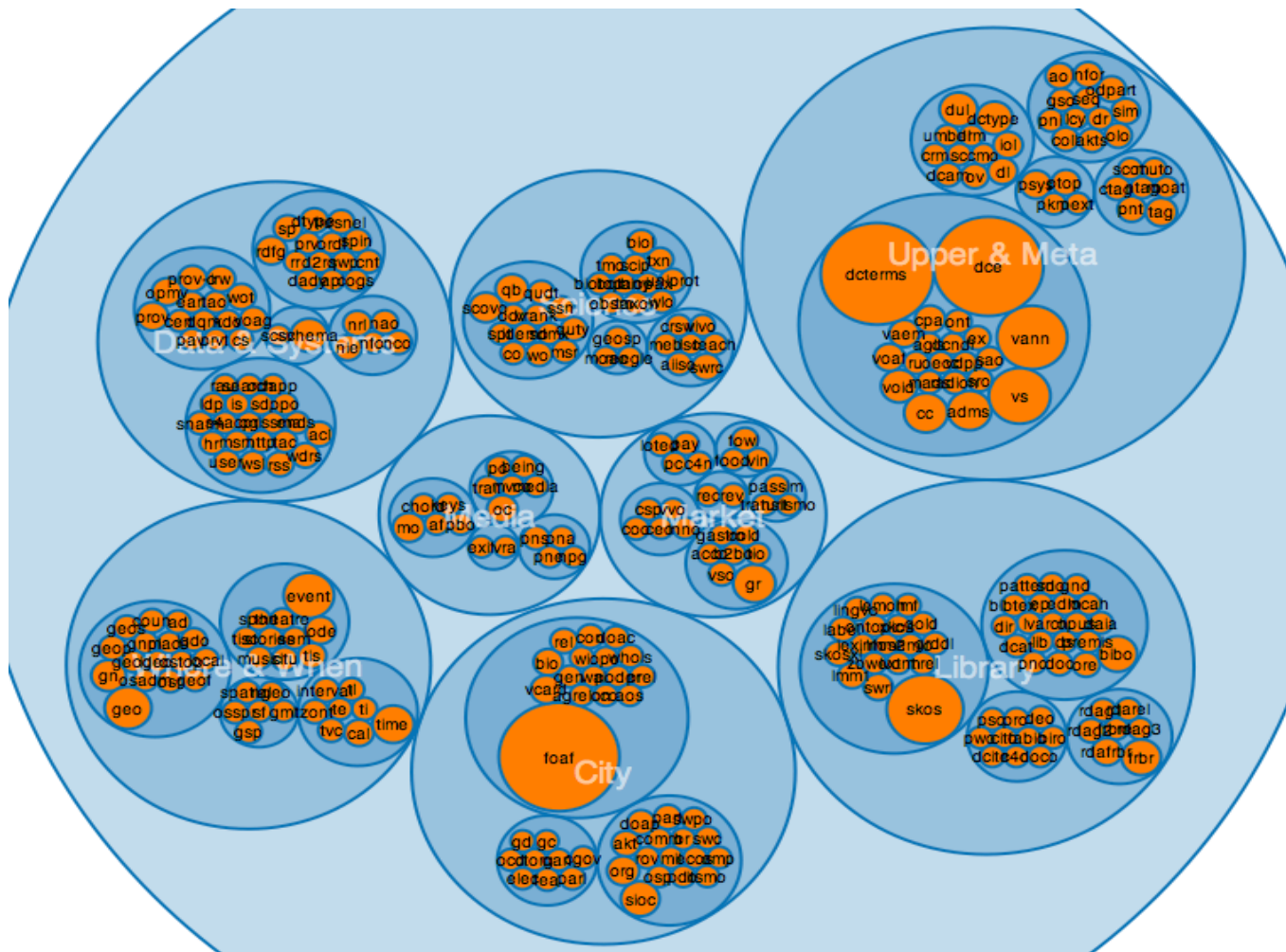


Life Cycle Challenges

- Ontology Creation
- Ontology Publication
- Ontology Discovery
- Ontology Use
- Ontology Attribution
- Ontology Problem Discovery
- Ontology Problem Resolution .



Linked Open Vocabularies (LOV) Cloud





Ontology Creation

- File Creation
- Content Created
- File Saved.



Ontology Publication

- File Published to Web Address
- Ontology Publication Announced

From: Diane Hillmann <metadata.maven@gmail.com>

Date: Tue, 12 Mar 2013 15:03:51 -0400

Message-ID: <CAEXEg8qd82TrO2t+Kn13nU6BMEWg6efQ3C7L87D6DwBj=t=Tww@mail.gmail.com>

To: Kingsley Idehen <kidehen@openlinksw.com>

Cc: public-vocabs@w3.org

Kingsley:

Thanks for your comments. We're in the process of upgrading the Open Metadata Registry, and your suggestions will be considered as we proceed with the upgrade. For the moment, we're applying our limited resources to managing the vocabularies we have, pushing on the upgrade and gathering feedback. So we thank you!

BTW, the remaining LII US Legislative Model properties and classes now appear at: <http://metadataregistry.org/schema/show/id/69.html>. All have the status of 'published', so the URIs should be considered stable.

Diane Hillmann
Metadata Management Associates





Ontology Discovery

- Tweets, G+ Posts etc.

The screenshot shows a Twitter interface with a tweet from Bill Roberts (@billroberts). The tweet text is: "#linkeddata people - anyone know any good standard-ish URIs for frequencies - eg 'annually', 'monthly' etc (inverse of year, month)". Below the text are interaction buttons for Reply, Retweet, Favorite, and More. It shows 3 retweets. A reply from Kingsley Uyi Idehen (@kidehen) is visible below, mentioning a link to bit.ly/XoSXDg and using hashtags #LOV, #LinkedData, #LOD, and #SemanticWeb.



Ontology Discovery

LOD Cloud Cache Lookup Service

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Displaying List of Distinct Entity Names ordered by Count where:

[Entity1](#) has any Attribute with Value "Frequency" [Drop](#).
[Entity1](#) is a **owl:Class** . [Drop](#)
[Entity1](#) **rdfs:isDefinedBy** [Entity2](#) . [Drop](#) [Entity2](#)

View query as SPARQL [Facet](#) [permalink](#)

Go to: Show | 8 of 8 total

Entity	Count
The Product Types Ontology for Semantic Web-based E-Commerce	Describe 342
OpenVocab	Describe 128
http://www.ontologyportal.org/SUMO.owl	Describe 11
Ontology for Biomedical Investigation	Describe 6
Dumontier Lab	Describe 6
Dumontier Lab	Describe 6
Dumontier Lab	Describe 6
SCOT Ontology Namespace	Describe 1

Go to: Show | 8 of 8 total

Complete result - 8 processed in 451 msec.
Resource utilization: 4.271M rrd 1.407M seq 3.842M same seq 335.1K same pg 77.6K same par 0 disk 0 spec disk 30.22MB / 51.27K messages 3.626K fork

Faceted Search & Find service v1.11.19

POWERED BY VIRTUOSO LINKINGOPENDATA

OpenLink Virtuoso version 07.00.3202, on Linux (x86_64-unknown-linux-gnu), Cluster Edition(12 server processes, 756 GB total memory)
Data on this page is owned by its respective rights holders.
Virtuoso Faceted Browser Copyright © 2009-2012 OpenLink Software

Entity Relations Navigation

- Types
- Attributes
- Referencing Attributes
- Show Matching Values
- Places
- Options
- Save
- Featured Queries
- New Search





Ontology Discovery

LOV Cloud Lookup Service



Linked Open Vocabularies (LOV)



developped by Pierre-Yves Vandenbussche

The "LOV Search" Features gives you the possibility to search for an existing element (property, class or vocabulary) in the Linked Open Vocabularies Catalogue. LOV Aggregator endpoint and metrics about the use of vocabularies in the Semantic Web are used to bring you some relevant results.



Frequency Search

Filter by Domain

- City (0)
- Data & Systems (2)
- Library (6)
- Market (0)
- Media (2)
- Science (2)
- Upper & Meta (2)

Filter by Type

rdfs:Class

Filter by Vocabulary (9)

- http://linguistics-ontolog
- http://purl.org/ontology/
- http://purl.org/spar/fabic

15 results in 9 vocabularies

http://purl.org/dc/terms/Frequency (rdfs:Class)	score:0.883	>>
rdfs:label Frequency @en		
http://purl.oclc.org/NET/ssnx/ssn#Frequency (owl:Class)	score:0.882	>>
rdfs:label Frequency		
http://qudt.org/schema/qudt#FrequencyUnit (owl:Class)	score:0.672	>>
rdfs:label Frequency Unit		
http://purl.org/NET/dady#UpdateFrequency (owl:Class)	score:0.625	>>
rdfs:label update frequency		
http://voag.linkedmodel.org/voag#ChangeFrequency (owl:Class)	score:0.625	>>
rdfs:label Change frequency		
http://purl.org/linked-data/sdmx#FrequencyRole (owl:Class)	score:0.588	>>
rdfs:label Frequency property @en		
rdfs:comment ...t plays the role of frequency @en		





Ontology Discovery

LOV Cloud Lookup Service

The screenshot shows a Twitter interface with a tweet from Bill Roberts (@billroberts) dated 2:03 PM - 12 Mar 13. The tweet text is: "#linkeddata people - anyone know any good standard-ish URIs for frequencies - eg 'annually', 'monthly' etc (inverse of year, month)". Below the tweet, it shows 3 retweets and a reply from Kingsley Uyi Idehen (@kidehen) dated 12 Mar. The reply text is: "@billroberts seeAlso: [bit.ly/XoSXDg](\"http://bit.ly/XoSXDg\"). This is via the #LOV (Linked Open Vocabulary) Cloud. #LinkedData #LOD #SemanticWeb".



Ontology Use

DBpedia & LOD Cloud Meshups

OPENLINK SOFTWARE Facets Description Metadata Settings

About: Barack Obama [Sponge](#) [Permalink](#)
 An Entity of Type : [yago:AmericanCivilRightsLawyers](#), within Data Space : [dbpedia.org](#) associated with source [dataset\(s\)](#)

Type: Command:

Barack Hussein Obama II is the 44th and current President of the United States. He is the first African American to hold the office. In January 2005, Obama was sworn in as a U.S. Senator in the state of Illinois. He would hold this office until November 2008, when he resigned following his victory in the 2008 presidential election. Born in Honolulu, Hawaii, Obama is a graduate of Columbia University and Harvard Law School, where he was the president of the Harvard Law Review.


Attributes	Values
rdf:type	American legal scholars American political writers Presidents of the United Nations Security Council Punahou School alumni People associated with renewable energy »more»
sameAs	http://cs.dbpedia.org/resource/Barack_Obama http://el.dbpedia.org/resource/Μπαράκ Ουμπάμα http://ko.dbpedia.org/resource/버락 오바마 http://pl.dbpedia.org/resource/Barack_Obama http://es.dbpedia.org/resource/Barack_Obama »more»
rdfs:label	Barack Obama »more»
rdfs:comment	Barack Hussein Obama II is the 44th and current President of the United States. He is the first African American to hold the office. In January 2005, Obama was sworn in as a U.S. Senator in the state of Illinois. He would hold this office until November 2008, when he resigned following his victory in the 2008 presidential election. Born in Honolulu, Hawaii, Obama is a graduate of Columbia University and Harvard Law School, where he was the president of the Harvard Law Review. »more»





Ontology Attribution

Personal URIs (WebID) for Creators.

Facets Description Metadata **Settings**

About: Ultra-simple review vocab [Sponge](#) [Permalink](#)
An Entity of Type : owl:Ontology, within Data Space : lod.openlinksw.com associated with source [dataset\(s\)](#)

Type: Command:

EXAMPLE USAGE: Super-easy method to say you like the band Coldplay: <#me> like:likes . Or providing a rating (between 0.0 and 5.0): <#me> like:opinion [a like:Opinion ; like:regarding ; rev:rating 4.5] . Here, no rating is provided, but all PositiveOpinions have a rating of more than 3.0 by definition: <#me> like:opinion [a like:PositiveOpinion ; like:regarding] . This, however, means you like the Wikipedia article about Coldplay, but doesn't indicate whether or not you like the band: <#me> like:likes . This vocab provides a "like:likes_topic_of" term for linking to articles. It's a little ambiguous - the following could mean that I like the Wikipedia article about Coldplay, or that I like the band themselves - or perhaps both! <#me> like:likes_topic_of .

Attributes	Values
<u>type</u>	<u>Ontology</u>
<u>comment</u>	EXAMPLE USAGE: Super-easy method to say you like the band Coldplay: <#me> like:likes <http://dbpedia.org/resource/Coldplay> . Or providing a rating (between 0.0 and 5.0): <#me> like:opinion [a like:Opinion ; like:regarding <http://dbpedia.org/resource/Coldplay> ; rev:rating 4.5] . Here, no rating is provided, but all PositiveOpinions have a rating of more than 3.0 by definition: <#me> like:opinion [a like:PositiveOpinion ; like:regarding <http://dbpedia.org/resource/Coldplay>] . This, however, means you like the Wikipedia article about Coldplay, but doesn't indicate whether or not you like the band: <#me> like:likes <http://en.wikipedia.org/wiki/Coldplay> . This vocab provides a "like:likes_topic_of" term for linking to articles. It's a little ambiguous - the following could mean that I like the Wikipedia article about Coldplay, or that I like the band themselves - or perhaps both! <#me> like:likes_topic_of <http://en.wikipedia.org/wiki/Coldplay> .
<u>Maker</u>	<u>Toby Inkster</u>
<u>Date Modified</u>	2010-07-26(xsd:date) 2010-12-01(xsd:date) 2011-01-10(xsd:date)
<u>Date Issued</u>	2009-05-26(xsd:date)
<u>label</u>	Ultra-simple review vocab





Ontology Problem Discovery

■ IFP example with FOAF

What is an Inverse Functional relation?

An Inverse Functional relation enables the determination (inference) of subject equivalence by property value. For instance, let's start with the following urn: scheme URIs that denote me --

- `<urn:person:Kingsley>`
- `<urn:person:kidehen>`

Each of these denotations is associated with an email address, itself denoted by a maito: scheme URI, `<mailto:kidehen@openlinksw.com>`, using the Turtle based statements --

```
<urn:person:Kingsley>  
  <http://xmlns.com/foaf/0.1/mbox>  
    <mailto:kidehen@openlinksw.com>
```

```
<urn:person:kidehen>  
  <http://xmlns.com/foaf/0.1/mbox>  
    <mailto:kidehen@openlinksw.com>
```

I explicitly add the IFP designation --

```
<http://xmlns.com/foaf/0.1/mbox>  
  a  
    <http://www.w3.org/2002/07/owl#InverseFunctionalProperty>
```



Ontology Problem Resolution

■ Local tweaks

Update Local FOAF Graph with missing IFP claim

```
## update starts
INSERT
INTO GRAPH <http://xmlns.com/foaf/0.1/>
{
  <http://xmlns.com/foaf/0.1/mbox>
    a
      owl:InverseFunctionalProperty
}
## update ends
```

Additional Information

■ OpenLink Software:

- [OpenLink Software](#)
- [OpenLink Virtuoso](#)
- [Universal Data Access Drivers](#)

■ Social Media Data spaces

- <http://www.openlinksw.com/blog/~kidehen/> (weblog)
- <https://plus.google.com/112399767740508618350/about> (Google+)
- <https://twitter.com/kidehen> (Twitter)
- Hashtag: #LinkedData (Anywhere) .