Introduction to linked open data in libraries, archives and museums (LODLAM)

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Linked Data in Cultural Institutions Workshop

May 12-13, 2016

Based on presentations given at OLITA and OLA 2014-2016 and ideas gained from many great linked data presenters and twitterers!

Introduction, assumptions, objectives

Assumptions

- many participants have little or no knowledge of linked data

- participants know a little bit about descriptive catalogue records and/or citations

- participants have some awareness of controlled vocabularies

- participants may not have knowledge of web technologies

Objectives

- participants will be motivated to learn more about LODLAM

- participants will be aware of some of the LODLAM use cases

- participants will have some understanding of human-readable vs. machine-actionable

- participants will understand some building blocks of LOD: RDF triples, URIs, linking to external datasets

Fostering a safe learning environment

- Assumptions:
  - everyone comes in with different background knowledge
  - people learn and work at different speeds
  - if you have a question chances are someone else is wondering the same thing!
- Please be respectful and encouraging of your fellow learners
- Use our helpers!
  - post a pink sticky note on your laptop to indicate that you have a question or need help
  - post a green sticky note if finished an exercise or if you had a question but figured it out

Agenda

Time (9:30-12:30)	Description
9:30-9:50 (20 min.)	Introduction; Exercise 1: Playing with Linked Data Projects
9:50-10:15 (25 min.)	LODLAM use cases and examples
10:15-10:40 (25 min.)	What is LOD
10:40-11:00 (20 min.)	Exercise 2: Structured Data and Entities
11:00-11:15 (15 min.)	BREAK
11:15-11:30 (15 min.)	RDF, Graphs, URIs
11:30-12:15 (45 min.)	Exercise 3: Yarn Game
12:15-12:30 (15 min.)	Serializations & Microdata

Exercise One

Playing with linked open data examples in libraries and archives

Linked open data in libraries, archives and museums

LAM as creators of data

LAM as consumers of data

Sharing controlled vocabularies: VIAF
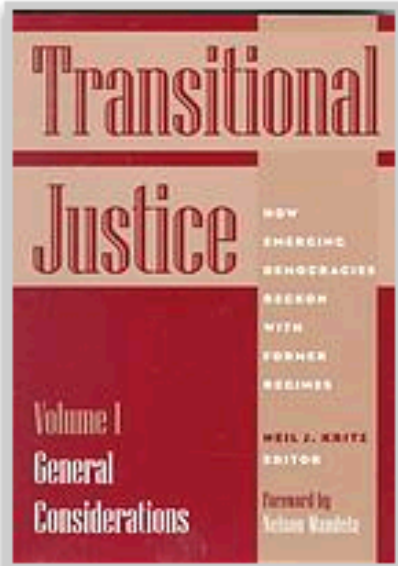
- Virtual International Authority File (VIAF)

Sharing controlled vocabularies: AAT

Click the ⛭ icon to view the hierarchy.

Semantic View (JSON, JSONLD, RDF, N3/Turtle, N-Triples)

ID: 300395634   **Record Type:** concept

⛭   **pocket statues** (statues, <sculpture by subject type>, ... Visual and Verbal Communication (hierarchy name))

Hierarchical Position:

⛭   Objects Facet
⛭   .... Visual and Verbal Communication (hierarchy name) (G)
⛭   .... Visual Works (hierarchy name) (G)
⛭   .... visual works (works) (G)
⛭   .... <visual works by material or technique> (G)
⛭   .... sculpture (visual works) (G)
⛭   .... <sculpture by subject type> (G)
⛭   .... statues (G)
⛭   .... pocket statues (P,U)

Sharing unique resources (via OCLC)

A catalogue of the Lady Aberdeen Library on the History of Women in the University of Waterloo Library

schema: name "A catalogue of the Lady Aberdeen Library on the History of Women in the University of Waterloo Library"

schema: creator http://viaf.org/viaf/265365743

        rdf:type   **schema: Organization**

    schema:Name "University of Waterloo. Library. Lady Aberdeen Collection"

Sharing holdings information

Holdings for "The unofficial Harry Potter cookbook" at Merrimack Valley Library Consortium

Available copies

- 10 copies at Merrimack Valley Library Consortium. (Show)
- 1 copy at Amesbury Public Library.

Current holds

0 current holds with 12 total copies.

Sharing holdings information

Holdings for "The unofficial Harry Potter cookbook" at Merrimack Valley Library Consortium

```
property="offers" typeof="Offer"

property="seller" typeof="Library"

<meta property="price" content="0.00">

<span property="sku">j641.59 BUC</span>

<link property="availability"
    href="http://schema.org/InStock" />Available</>
```

Imagine use of our holdings data

Inspired by a Karen Coyle [blog post](#)

The Handmaid's Tale

VINTAGE ATWOOD

Book by Margaret Atwood

★★★★☆ 4/5 - Goodreads

The Handmaid's Tale is a dystopian novel, a work of science fiction or speculative fiction, written by Canadian author Margaret Atwood and first published by McClelland and Stewart in 1985. Wikipedia

Published: 1985

Author: Margaret Atwood

Original language: English

Characters: Offred, Serena Joy, Ofglen, Professor Pieixoto, Nick, Moira, Luke

Adaptations: The Handmaid's Tale (1990), The Handmaid's Tale

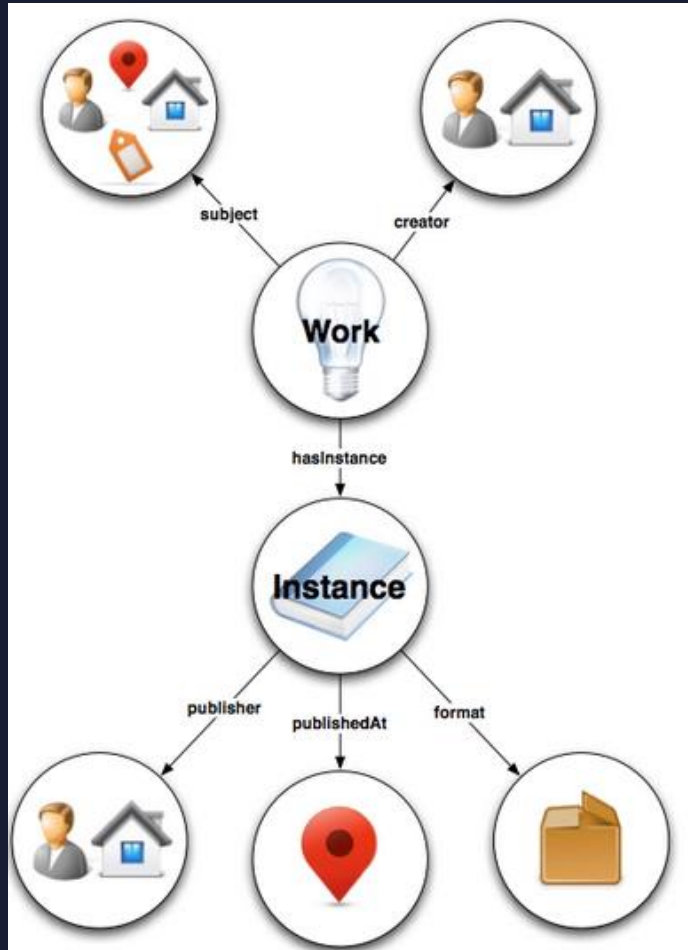**Genres:** Novel, Science Fiction, Feminist science fiction, Dystopia, Speculative fiction, Utopian and dystopian fiction

1 copy available from University of Waterloo Library

2 copies available from Laurier Library

1 copy available from Waterloo Public Library

Replacing MARC

bf:BIBFRAME

- Creative Work
- Instance
- Authority
- Annotation

Beyond metadata: sharing our documentary heritage

The Muninn Project

- millions of records pertaining to the First World War in archives around the world

- extract the written data using massive amount of computing power and turn the resulting information into structured databases

WWI Letter from Canadian Great War Project

4th Reserve

Witley Camp

Surrey , Eng

25-11-18

Dear Folks at Home:-

Well I actually got one letter last week from home dated Oct 20th . I also received the magazine and the Mt. F. papers this morning so I should be getting some more soon. I haven't received a box since leaving France and I have just heard of one box which they got at the battalion .

We are doing very little in the nature of parades etc. these days. There are many wild rumours flying around about what they are going to do with us now that the war is over. I suppose the married men and men with the longest service in France will be the first to go on the boat.

Ivy Mcfadyn[1] and Wat Buschlen left here yesterday for Liverpool. They are sending the unfit men home first whether they have been to France or not.

Harvey Davidson is here now. I saw him yesterday and he looks fine and doesn't seem to be suffering from the effects of the gas.

I was very sorry to hear about the deaths of Charlie Wilson and Russell Webster . It seems to me that nearly all the 153rd boys seem to have figured in the casualty lists.

My long overdue sick furlough is coming through at last and I expect to leave on Wednesday. Edinburgh is my destination but I intend dropping in on Bill Kerr's cousin for a day or so as she has some socks etc. of mine.

Well I must close now as there isn't much news from this place.

Hope you are all well as this leaves me.

Making library people visible on the web

Source: http://www.lib.montana.edu/people/about.php?id=99

Visualizing library people

Connecting local digital libraries

Connecting across libraries & archives

Crowdsourcing Relationships

Augment our catalogues

People page option when you search for Johann Sebastian Bach in the [Deutsche Digitale Bibliothek](#)

Augment our catalogues

Johann Sebastian Bach

Komponist, Musiker
Born: 21. März 1685, Eisenach
Died: 28. Juli 1750, Leipzig

People page option when you search for Johann Sebastian Bach in the Deutsche Digitale Bibliothek

Augment our catalogues

Johann Sebastian Bach
Source: Wikimedia

People page option when you search for Johann Sebastian Bach in the [Deutsche Digitale Bibliothek](#)

Augment our catalogues

People page option when you search for Johann Sebastian Bach in the [Deutsche Digitale Bibliothek](#)

Augment our catalogues

People page option when you search for Johann Sebastian Bach in the Deutsche Digitale Bibliothek

Mash-up external resources: FAO

What is linked open data

Understanding structured data, entities, linking to other data

What is linked data?

- method of **publishing structured data** so that it can be **interlinked** and become more useful

- builds upon **standard Web technologies** such as hyper-text transfer protocol (HTTP), resource description framework (RDF) and uniform resource identifiers (URIs)

- rather than using them to serve web pages solely for *human readers*, it extends them to share information in a way that can **be read automatically by** *computers*

Massaged from Wikipedia linked data page

Is your information machine-actionable? Web Page

Margaret Atwood

From Wikipedia, the free encyclopedia

> ⚠ This biographical article **needs additional citations** for **verification**. Please help by adding reliable sources. Contentious material about living persons that is unsourced or poorly sourced **must be removed immediately**, especially if potentially libelous or harmful. *(November 2013)*

Margaret Eleanor Atwood, CC OOnt FRSC (born November 18, 1939) is a Canadian poet, novelist, literary critic, essayist, and environmental activist. She is a winner of the Arthur C. Clarke Award and Prince of Asturias Award for Literature, has been shortlisted for the Booker Prize five times, winning once, and has been a finalist for the Governor General's Award several times, winning twice.[citation needed] She is also a founder of the Writers' Trust of Canada, a non-profit literary organization that seeks to encourage Canada's writing community.[citation needed]

While she is best known for her work as a novelist, she has also published fifteen books of poetry.[1][2] Many of her poems have been inspired by myths and fairy tales, which have been interests of hers from an early age.[3] Atwood has published short stories in *Tamarack Review*, *Alphabet*, *Harper's*, *CBC Anthology*, *Ms.*, *Saturday Night*, and many other magazines. She has also published four collections of stories and three collections of unclassifiable short prose works.

Contents [hide]

Margaret Atwood

Atwood at Eden Mills Writers' Festival 2006, Blackwattle Bay

From Wikipedia page for Margaret Atwood   LODLAMTO 2016 - Introducing LOD   29

Traditional web page mark-up (simplified)

- <p>Margaret Eleanor Atwood (born November 18, 1939) is a Canadian poet, novelist, literary critic, essayist, and environmental activist. She is a winner of the Arthur C. Clarke Award and Prince of Asturias Award for Literature, has been shortlisted for the Booker Prize five times, winning once, and has been a finalist for the Governor General's Award several times, winning twice. </p>

- <img alt="Margaret Atwood 2015.jpg" >

  - Program knows where the paragraph begins and ends
  - Program knows which words to put in bold
  - Program knows that if the user clicks on "Arthur C. Clarke Award" to take the user to another Wikipedia page at the address https://en.wikipedia.org/wiki/Arthur_C._Clarke_Award
  - Program knows where to find the image Margaret_Atwood_2015.jpg and what alternative text to display

Web page with structured data

\<div itemscope itemtype="http://schema.org/Person">

\\<div itemprop="name">\Margaret Eleanor Atwood\\</div>

\

\<div itemprop="jobtitle">Novelist\</div>

\<div itemprop="description">\Margaret Eleanor Atwood\ (born November 18, 1939) is a Canadian poet, novelist, literary critic, essayist, and environmental activist. She is a winner of the \Arthur C. Clarke Award\ and Prince of Asturias Award for Literature, has been shortlisted for the Booker Prize five times, winning once, and has been a finalist for the Governor General's Award several times, winning twice\</div>

\<div>\<meta itemprop="birthDate" content="1939-11-18">DOB: 11/18/1939\</div>

\</div>

Use structured, machine-actionable data

Identify your data

- Type of resource: person
- Name: "Margaret Atwood"
- Birth date: 19391118
- Place of birth: Ottawa, Ontario
- Occupation: novelist
- Author of: "The Handmaid's Tale"

- Margaret Atwood is a person
- Margaret Atwood's name is Margaret Atwood
- Margaret Atwood was born on November 18, 1939
- Margaret Atwood was born in Ottawa, Ontario
- Margaret Atwood's occupation is novelist
- Margaret Atwood wrote "The Handmaid's Tale"

Structured data in DBpedia

Smarter browser results

Is your information machine-actionable? Bibliographic/Authority records
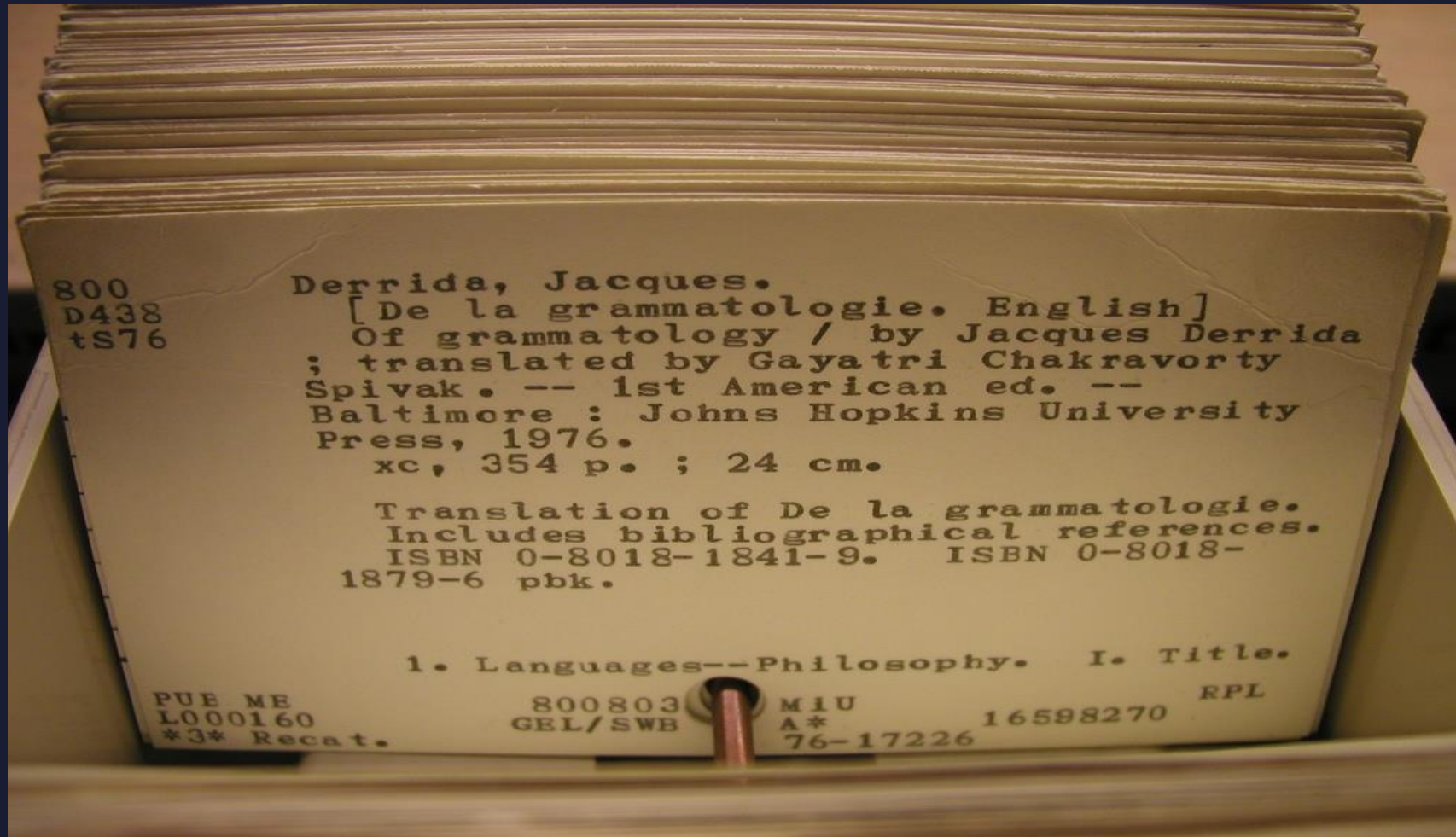
Catalogue cards - Authority

An authority record

O'Brien, Flann, 1911-1966 ← Heading

Na Gopaleen, Myles, 1911-1966
Knowall, George
Na gCopaleen, Myles, 1911-1966 ← Cross-references

← Statements of justification

His At Swim-Two-Birds ... 1939.
His The best of Myles, 1983; CIP t.p. (Myles na Gopaleen (Flann O'Brien)
His Myles away from Dublin, 1985: t.p. (Myles na Gopaleen (Flann O'Brien) selection written from the column written for ... under the name George Knowall)

Image credit: Tomwsulcer. CC0

MARC – Cataloguer View

=LDR 00766cam a2200241 a 4500

=001 2588334

=008 760618s1976\\\\mdu\\\\\\b\\\\0001\\eng\l

=010 \\$a   76017226

=020 \\$a0801818419

=040 \\$aDLC$beng$cCaOONL

=090 \\$aP105$b.D5313 1976$5CaOWtL

=100 1\$aDerrida, Jacques.

=240 10$aDe la grammatologie.$lEnglish

=245 10$aOf grammatology /$cby Jacques Derrida ; translated by Gayatri Chakravorty Spivak.

=250 \\$a1st American ed.

=260 \\$aBaltimore :$bJohns Hopkins University Press,$c1976.

=300 \\$axc, 354 p. ;$c24 cm.

=504 \\$aIncludes bibliographical references.

=650 \0$aLanguage and languages$xPhilosophy.

MARC – Machine View

00766cam a2200241 a
4500001000800000005001700008007000300025008004100028010001600
0690200015000850350013001000400021001130900030001341000022001
6424000400018624500860022625000210031226000560033330000250038
95000029004145040041004436500040004840-2588334-20060928112954.0-
ta-760618s1976   mdu   b   0001 eng l- a 76017226- a0801818419- -
9LM030272- aDLCbengcCaOONL- aP105b.D5313 19765CaOWtL-1 aDerrida,
Jacques.-10aDe la grammatologie.lEnglish. 1976-10aOf grammatology /cby
Jacques Derrida ; translated by Gayatri Chakravorty Spivak.- a1st American
ed.- aBaltimore :bJohns Hopkins University Press,c1976.- axc, 354 p. ;c24
cm.- aFirst published in 1974.- aIncludes bibliographical references.- 0-
aLanguage and languagesxPhilosophy.-

Linked Data Concepts:
Use structured data

- Type of resource: work
- Content type: text
- Creator: Jacques Derrida
- Translator: Gayatri Chakravorty Spivak
- Subject (LCSH): Language and languages—Philosophy
- Published (year): 1976

Linked Data Concepts:
Data as simple statements

- De la grammatolgie was written by Jacques Derrida
- De la grammatologie was translated into English as Of grammatology
- De la grammatologie was translated by Gayatri Chakravorty Spivak
- Of grammatology was published in Baltimore
- Of grammatology was published by John Hopkins University Press
- Of grammatology was published in 1976
- Of grammatology is about Language and languages--Philosophy

Linked Data concepts:
Join statements together; show relationships

Written by — Jacques Derrida

De la grammatologie

Gayatri Chakravorty Spivak

Translated into English as

Translated by

Has subject

Of grammatology

Language and languages--Philosophy

Published in year

1976
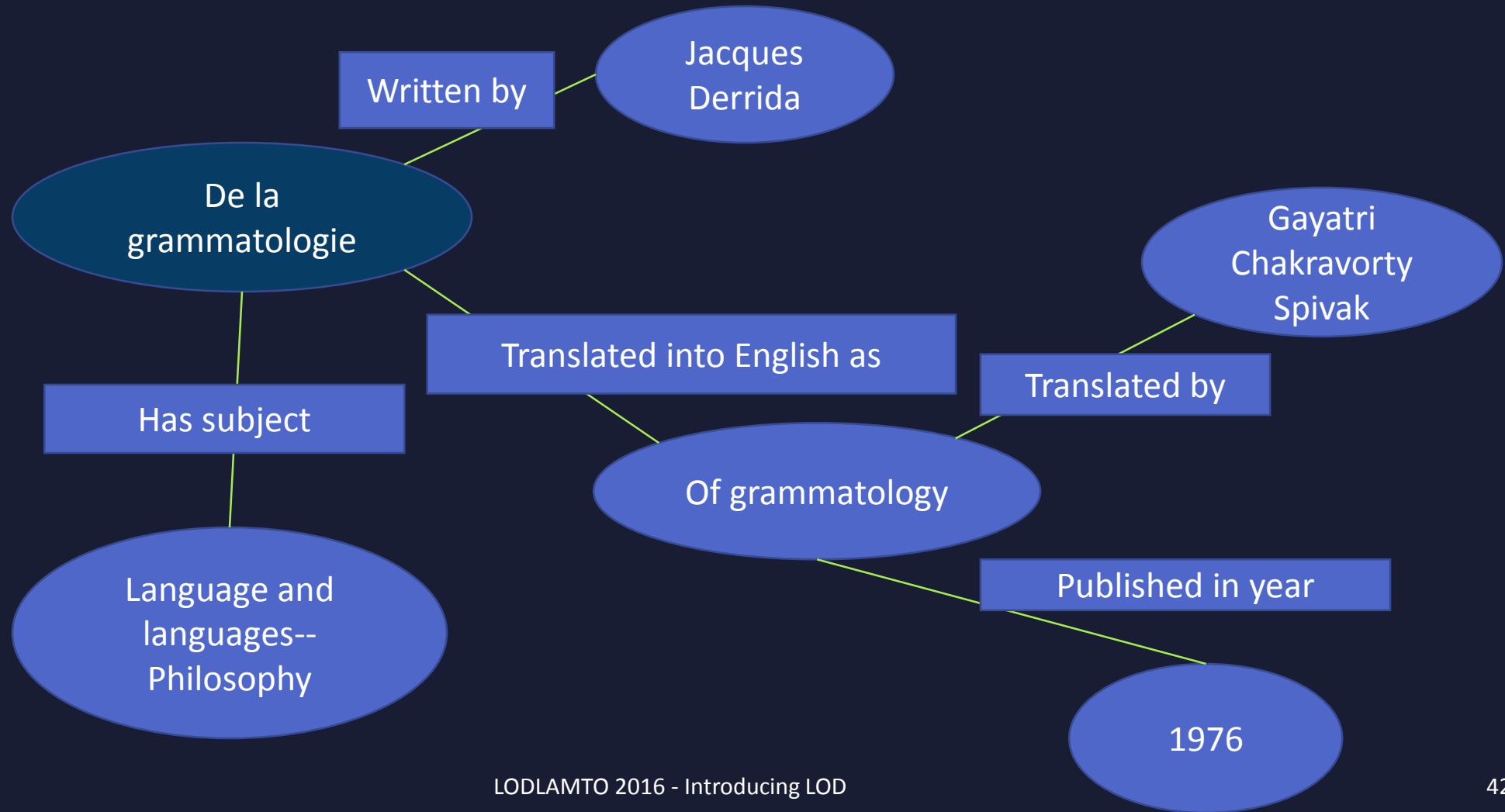
Join with authority statements
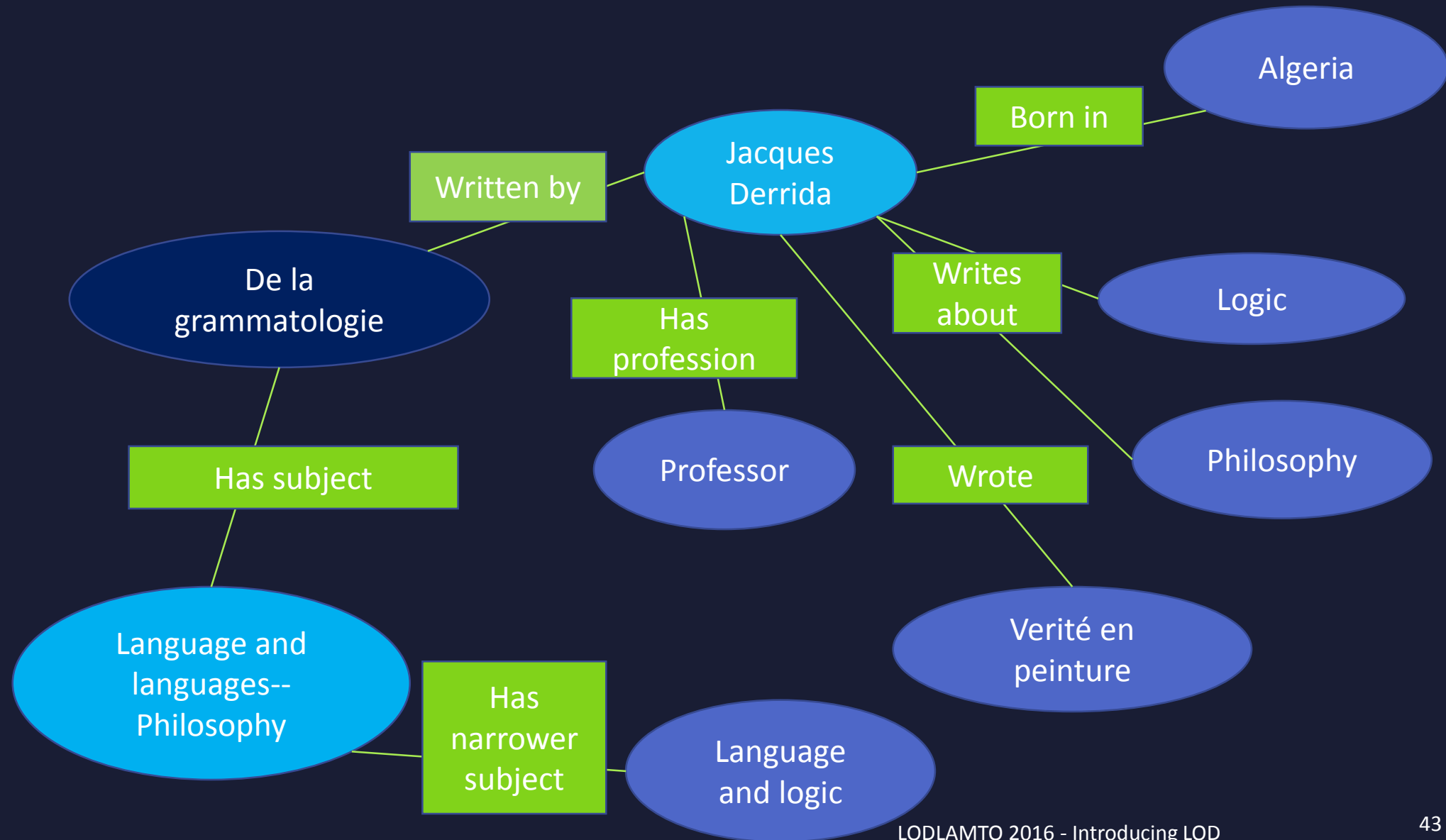
Linked data concepts:
Join with external data

Jacques Derrida

Born in → Algeria

Written by → De la grammatologie

Writes about → Logic

Influenced by → Friedrich Nietzsche

Influenced → Gayatri Chakravorty Spivak

Wrote → Verité en peinture

Philosophy
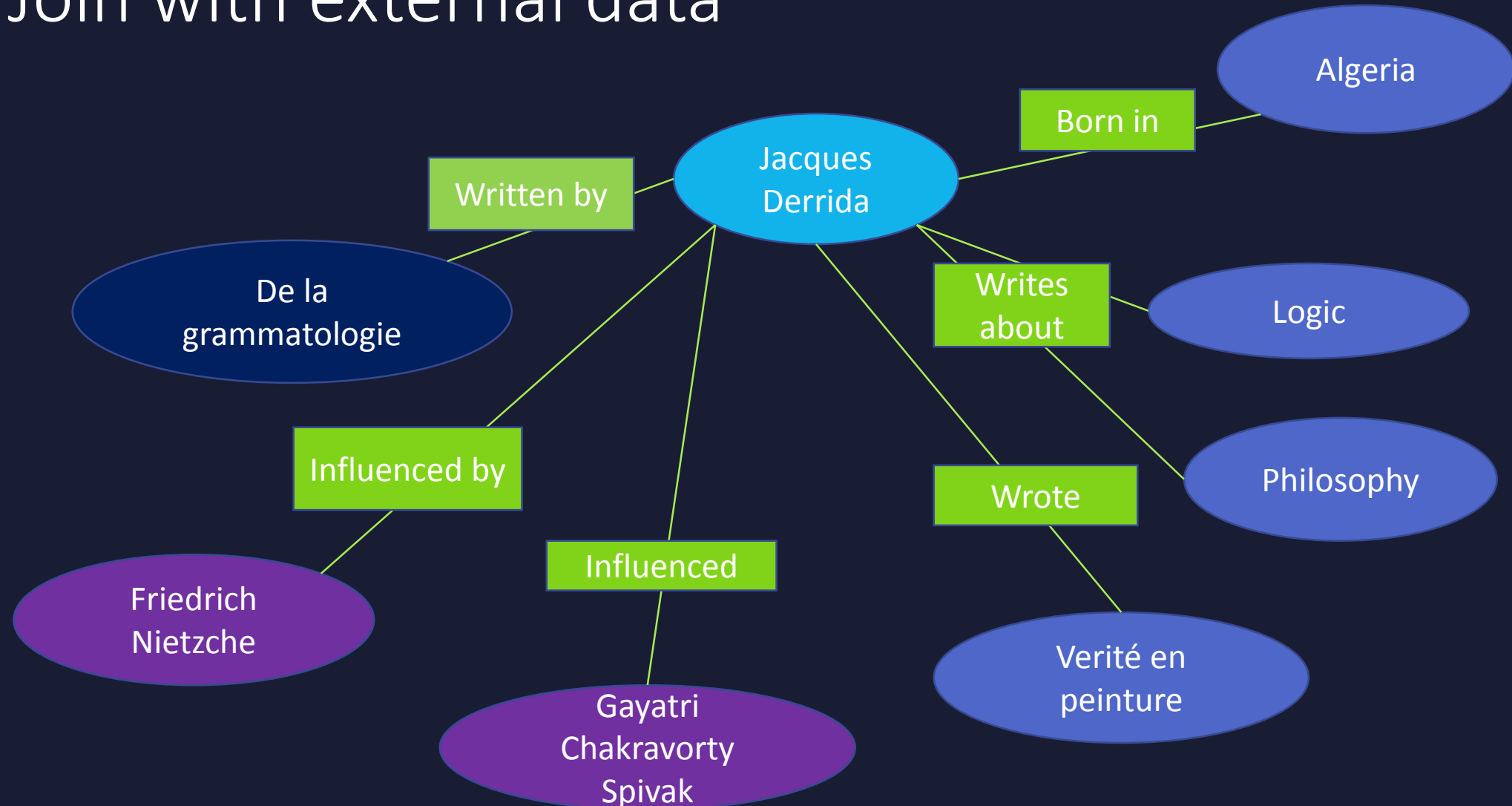
Using our Margaret Atwood example
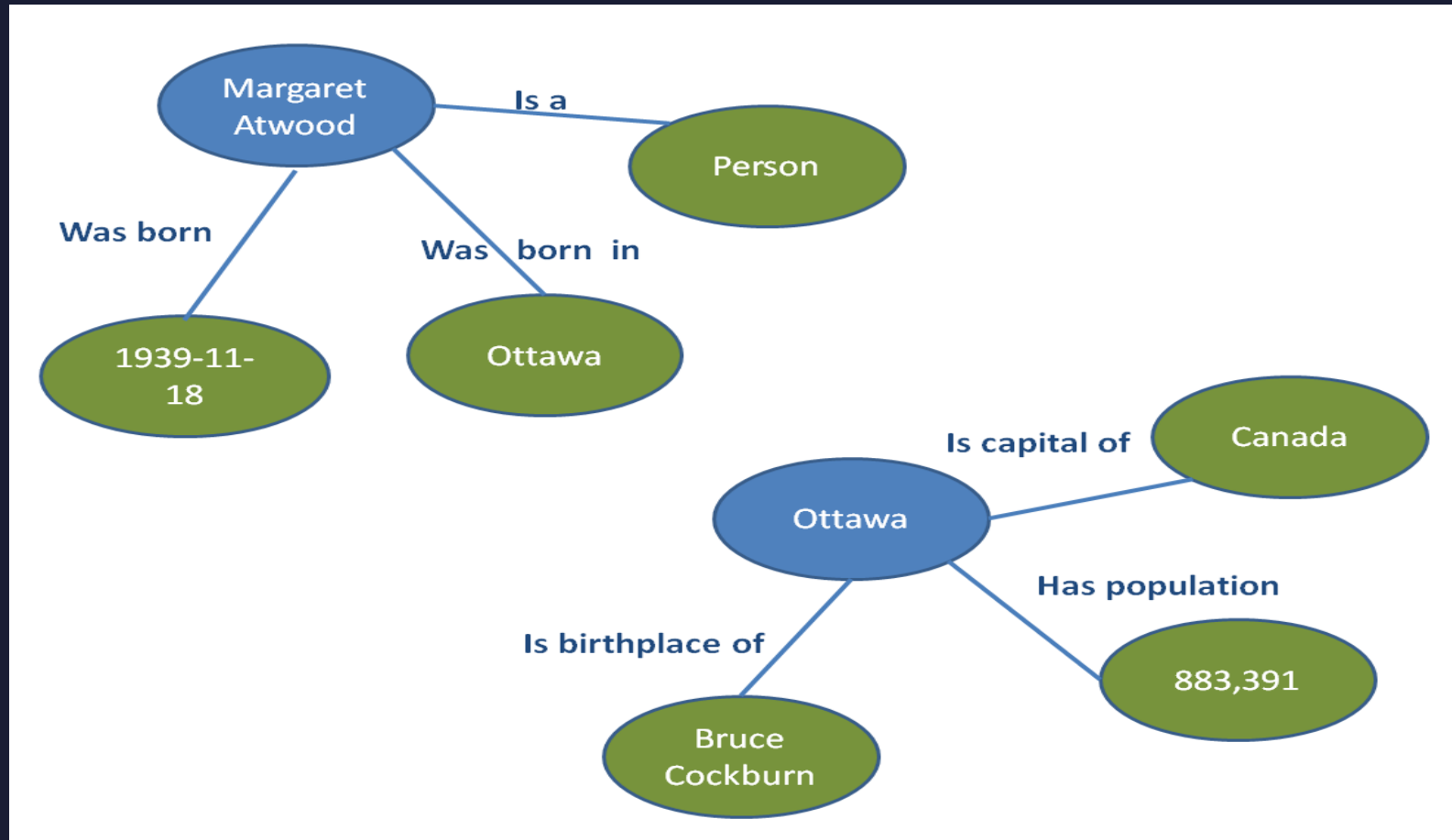
Things in our records and documents

Exercise 2

Structured data and entities

RDF, URIs, Ontologies

Building blocks of LOD

Linked data concepts: Data as simple statements

- De la grammatolgie was written by Jacques Derrida
- De la grammatologie was translated into English as Of grammatology
- De la grammatologie was translated by Gayatri Chakravorty Spivak
- Of grammatology was published in Baltimore
- Of grammatology was published by John Hopkins University Press
- Of grammatology was published in 1976
- Of grammatology is about Language and languages--Philosophy

Linked data concepts: Data in graphs
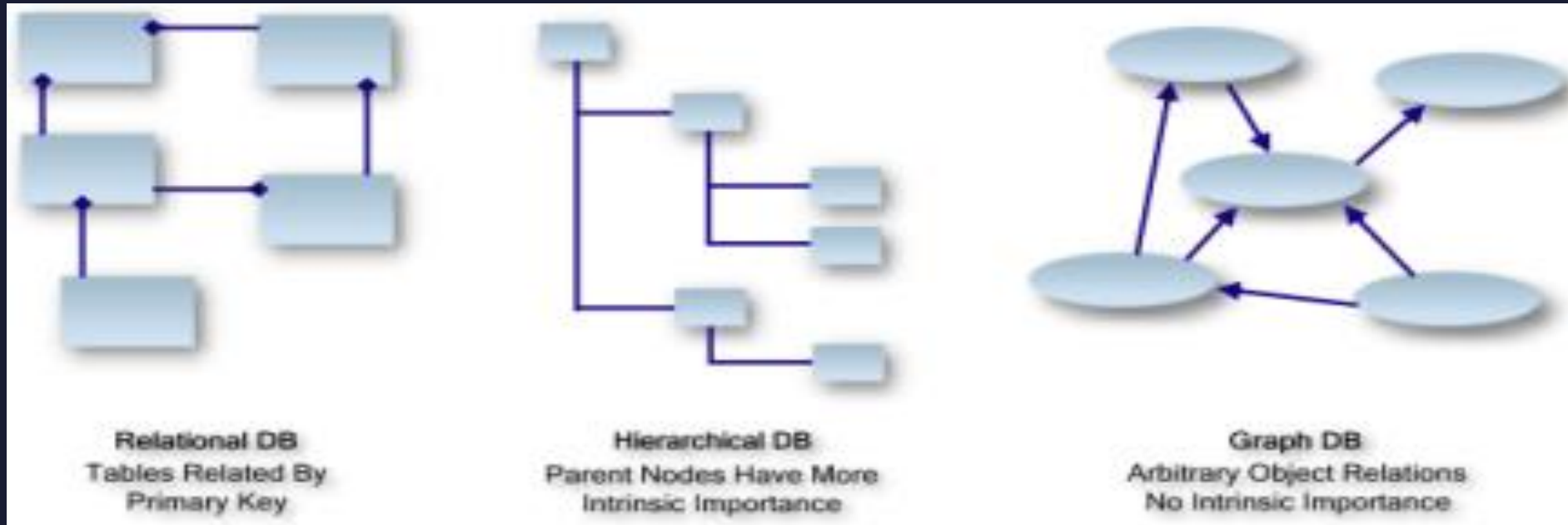
Modified slide from: Amber Billey "BIBFRAME Basics"
Image source: http://www.linkeddatatools.com/introducing-rdf/

Resource Description Framework (RDF) for statements

subject — predicate — object

De la grammatologie — is a (has type) — work

De la grammatologie — created by — Jacques Derrida
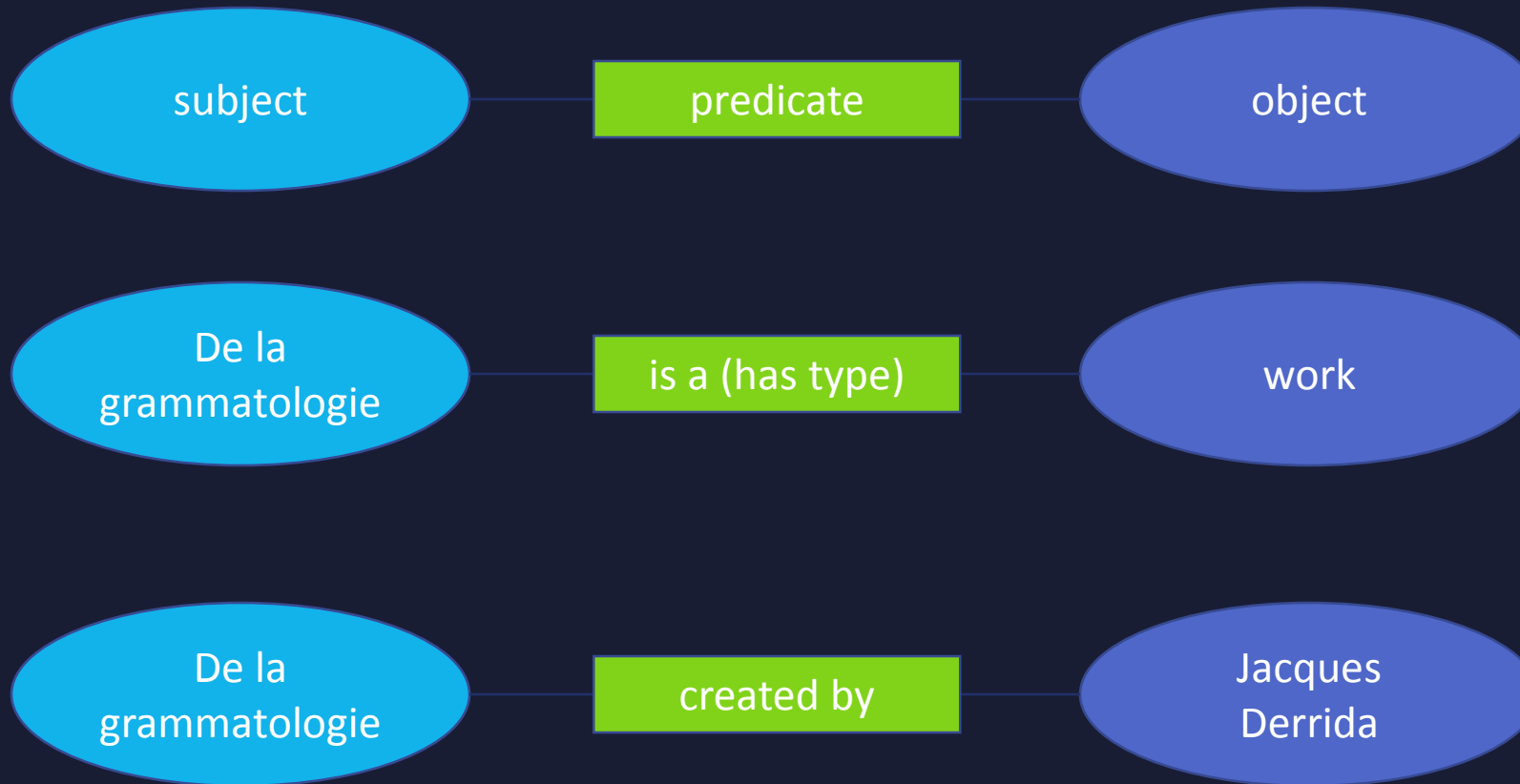
What about competing statements?

- Pluto is a planet
- Pluto is a dwarf planet
- Pluto is a dog

How account for this?

- What is the domain?
- Which plutos are the same entity?
- **Use uniform resource identifiers (URIs)!**

What are some of the (mostly uniform) identifiers we are familiar with?

- ISBN
- ISSN
- LCCN (for names, subjects, bibliographic records)
- Publisher numbers
- Manuscript numbers
- Etc.

Linked data concepts: use URIs that have a location on the web

- Identify everything with an HTTP URI, that is, a URL

- Provide useful information about things using web standards
  - For example, Pluto is a dog; Pluto is trademarked by Disney

- Include links to other URIs for expanded discovery
  - For example, link to the resource Disney

http://www.worldcat.org/oclc/172143

hhttp://purl.org/dc/elements/1.1/creator

http://viaf.org/viaf/88958529/
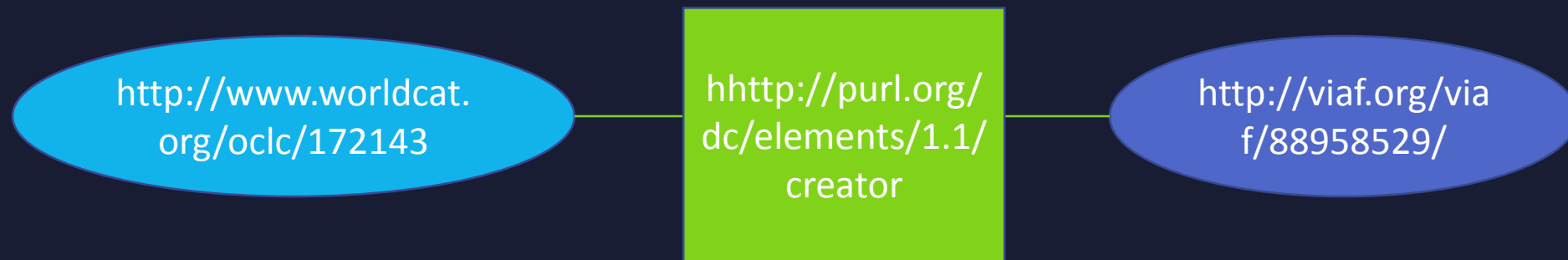
Identify everything with URI

- **WorldCat** URI for "De la grammatologie": http://www.worldcat.org/oclc/172143
- Creator URI from **Dublin Core** schema: http://purl.org/dc/elements/1.1/creator
- **VIAF** identifier for Jacques Derrida: http://viaf.org/viaf/88958529/

```
http://www.worldcat.org/oclc/172143  ──  http://purl.org/dc/elements/1.1/creator  ──  http://viaf.org/viaf/88958529/
```

Provide useful information about things (subject/object)

- Language and languages: http://id.loc.gov/authorities/subjects/sh85074518.html
- Includes:
  - Other IDs
  - Identifies it as a Concept (SKOS) and Topic (MADS/RDF)
  - Variant names, broader terms, narrower terms, related terms, scope notes
  - Dates created and revised
- For Language and languages—Philosophy, includes links to closely matching concepts in other schemes such as BNF

Sometimes our identifiers translate to URIs!

Provide useful information about things (property)

Label:	Creator
Definition:	An entity primarily responsible for making the resource.
Comment:	Examples of a Creator include a person, an organization, or a service. Typically, the name of a Creator should be used to indicate the entity.
Type of Term:	Property
Version:	http://dublincore.org/usage/terms/history/#creator-006
Note:	A second property with the same name as this property has been declared in the dcterms: namespace (http://purl.org/dc/terms/). See the Introduction to the document "DCMI Metadata Terms" (http://dublincore.org/documents/dcmi-terms/) for an explanation.

Include links to other URIs for expanded discovery

- VIAF links to [WorldCat Identities]

Derrida, Jacques

Overview

Works:	2,696 works in 6,960 publications in 14 languages and 226,802 library holdings
Genres:	Criticism, interpretation, etc Biography Interviews Conference papers and proceedings History
Roles:	Author, Interviewee, Author of introduction, Translator, Editor, Other, Director, Dedicatee, Contributor, Collaborator, Performer, Illustrator, Interviewer, Narrator, Thesis advisor, zxx, dir, Honoree, Creator, Originator, Lyricist, pre, coo, Speaker, Costume designer
Classifications:	B2430.D483,

Publication Timeline

■ By ■ Posthumously by ■ About

Re-use vocabularies/ontologies

- Need to define "person"? Friend of a Friend (FOAF) has already done that!

- Need to define "subject"? The Dublin Core Metadata Initiative (DCMI) has already done that!

- Need to define "genre"? Schema.org has already done that!

Ontologies: what is a person? (according to FOAF)

Class: foaf:Person

Person – A person.

Status: stable

Properties include: plan surname geekcode pastProject lastName family_name publications currentProject familyName firstName workInfoHomepage myersBriggs schoolHomepage img workplaceHomepage knows

Used with: knows

Subclass Of Agent Spatial Thing

Disjoint With: Project Organization

The Person class represents people. Something is a Person if it is a person. We don't nitpic about whether they're alive, dead, real, or imaginary. The Person class is a sub-class of the Agent class, since all people are considered 'agents' in FOAF.

[#] [back to top]

Ontologies: what can we infer?

Property: foaf:member

Domain: having this property implies being a Group
Range: every value of this property is a Agent

Connect your entities to matching/similar entities

owl:sameAs

Ottawa in Dbpedia =
http://dbpedia.org/page/Ottawa

Ottawa in Freebase =
http://rdf.freebase.com/ns/m.05ksh

owl:sameAs

Ottawa in GeoNames=
http://sws.geonames.org/6094817/
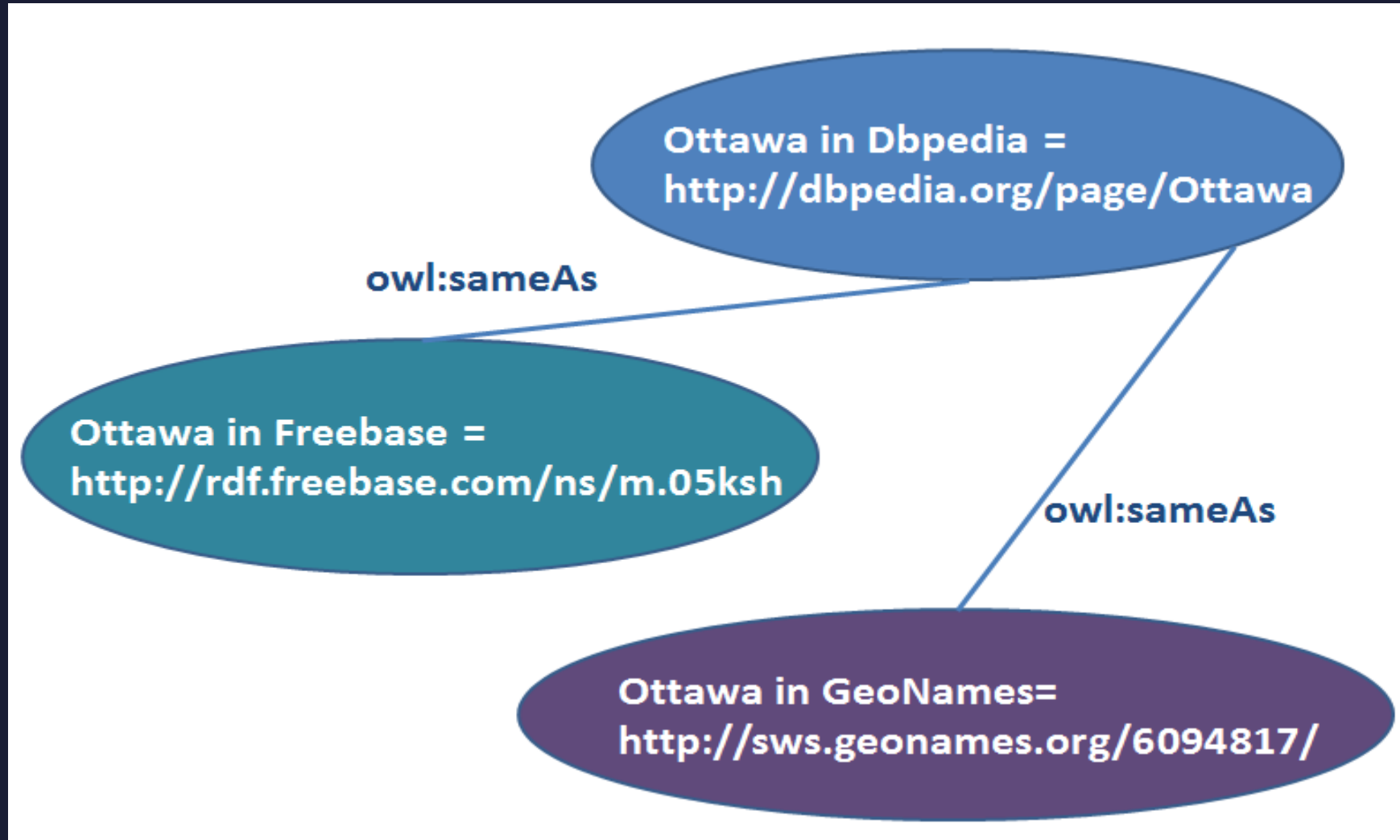
Some things don't have URIs: literals

- Dates   "1998"

- Names   "Margaret Atwood"
  - "Margaret Atwood" the name is different than Margaret Atwood the person

- Notes/Captions/Abstracts: "Here are entered works on language in general, works on the origin and history of language, and surveys of languages. Works dealing with the scientific study of human speech, including phonetics, phonemics, morphology and syntax, are entered under [Linguistics.]"

The web of data
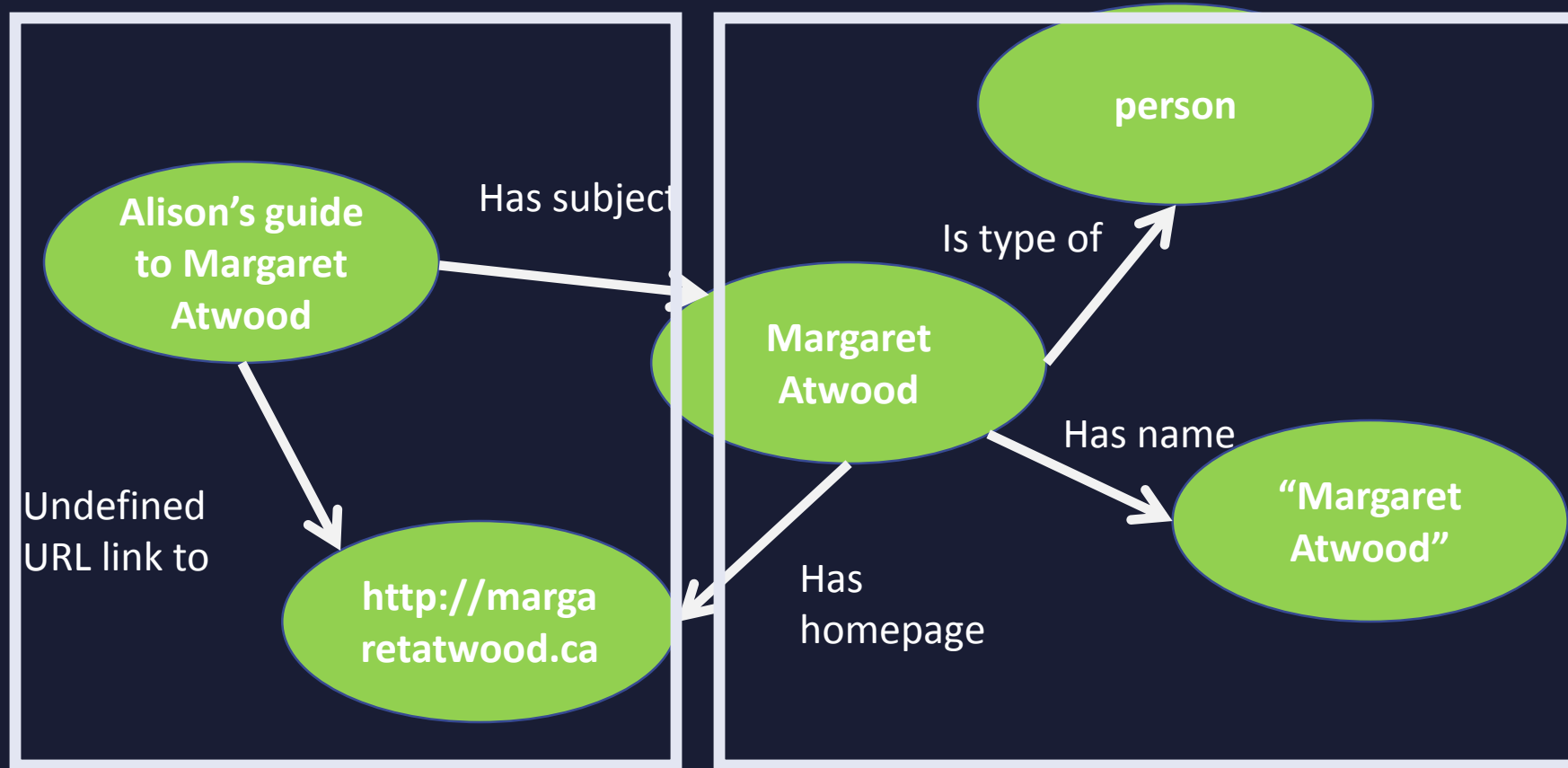
Exercise 3

The Yarn Game: An Introduction to RDF Graphs. Created by Dorothea Salo

RDF Data on the Web

Serializations, microdata, SPARQL end points

Serialization – Formatting your LOD

- From Wikipedia: In computer science, in the context of data storage, **serialization** is the process of translating data structures or object state into a format that can be stored and reconstructed later in the same or another computer environment.

- Examples:
  - XML (Extensible Mark-up Language)
  - Turtle (Terse RDF Triple Language)
  - N-Triples
  - JSON-LD (Java Script Object Notation- Linked Data)

RDF in XML

```xml
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
        xmlns:dbo="http://dbpedia.org/ontology/"
        xmlns:owl="http://www.w3.org/2002/07/owl#" >


    <rdf:Description
    rdf:about="http://dbpedia.org/resource/Margaret_Atwood">
    <rdf:type rdf:resource="http://schema.org/Person" />
    <dbo:birthPlace rdf:resource="http://dbpedia.org/resource/Ottawa" />
     <owl:sameAs rdf:resource="http://viaf.org/viaf/109322990" />
    </rdf:Description>
</rdf:RDF>
```

RDF in XML

```xml
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF  x                                    ns#"
         xm
         xml

    <rdf:Description
    rdf:about="http://dbpedia.org/resource/Margaret_Atwood">
    <rdf:type rdf:resource="http://schema.org/Person" />
    <dbo:birthPlace rdf:resource="http://dbpedia.org/resource/Ottawa" />
     <owl:sameAs rdf:resource="http://viaf.org/viaf/109322990" />
    </rdf:Description>
</rdf:RDF>
```

DBpedia resource Margaret Atwood has type Person

RDF in N3/Turtle

@prefix **dbpedia**: <http://dbpedia.org/resource/> .
@prefix **foaf**: <http://xmlns.com/foaf/0.1/> .
@prefix **ns16**: <http://en.wikipedia.org/wiki/> .

ns16:Margaret_Atwood foaf:primaryTopic dbpedia:Margaret_Atwood .

The Wikipedia *page* Margaret Atwood has as its primary topic the DBpedia *resource* Margaret Atwood.

Example from transforming MARC to BIBFRAME

@prefix bf: <http://bibframe.org/vocab/> .

@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .

<http://id.loc.gov//resources/bibs/6621574> a bf:Text,

    bf:Work ;

Resource De la grammatologie has type Text

Resource De la grammatologie has type Bibframe Work

Finding and using linked open data

- Publishers of linked data may just provide files for download

- Publishers of linked data may set up a service that accepts queries in the SPARQL query language and returns results sets
  - You can see example queries using the <u>Linked Data Fragments</u> web client

- Linked data may be embedded into websites

SPARQL Example: members of Queen and their associated bands (querying Dbpedia)

QUERY

```
SELECT DISTINCT ?artist ?band WHERE {
 {
<http://dbpedia.org/resource/Queen_(ban
d)> dbpedia-owl:bandMember ?artist. }
  UNION
 {
<http://dbpedia.org/resource/Queen_(ban
d)> dbpedia-owl:formerBandMember
?artist. }
  ?artist dbpedia-owl:associatedBand ?band.
}
```

RESULT

- ?artist: http://dbpedia.org/resource/Brian_May
- ?band: http://dbpedia.org/resource/Anita_Dobson
- ?artist: http://dbpedia.org/resource/John_Deacon
- ?band: http://dbpedia.org/resource/Queen_(band)

Microdata and RDFa

- Used to place structured data within web pages which can then be processed by search engines, web crawlers and browsers

- RDFa allows the embedding of RDF into web pages in a way that allows programs to extract the triples

Microdata in catalogue records

Holdings for "The unofficial Harry Potter cookbook" at Merrimack Valley Library Consortium

Available copies

- 10 copies at Merrimack Valley Library Consortium. (Show)
- 1 copy at Amesbury Public Library.

Current holds

0 current holds with 12 total copies.

Microdata in catalogue records

Holdings for "The unofficial Harry Potter cookbook" at Merrimack Valley Library Consortium

property="offers" typeof="Offer"

property="seller" typeof="Library"

<meta property="price" content="0.00">

j641.59 BUC

<link property="availability"
   href="http://schema.org/InStock" />Available</>

Tim Berners-Lee's 5 stars of LOD

*	make your stuff available on the web (whatever format)
**	make it available as structured data (e.g. excel instead of image scan of a table)
***	non-proprietary format (e.g. csv instead of excel)
****	use URLs to identify things, so that people can point at your stuff
*****	link your data to other people's data to provide context

The Linked Open Data Cloud Diagram
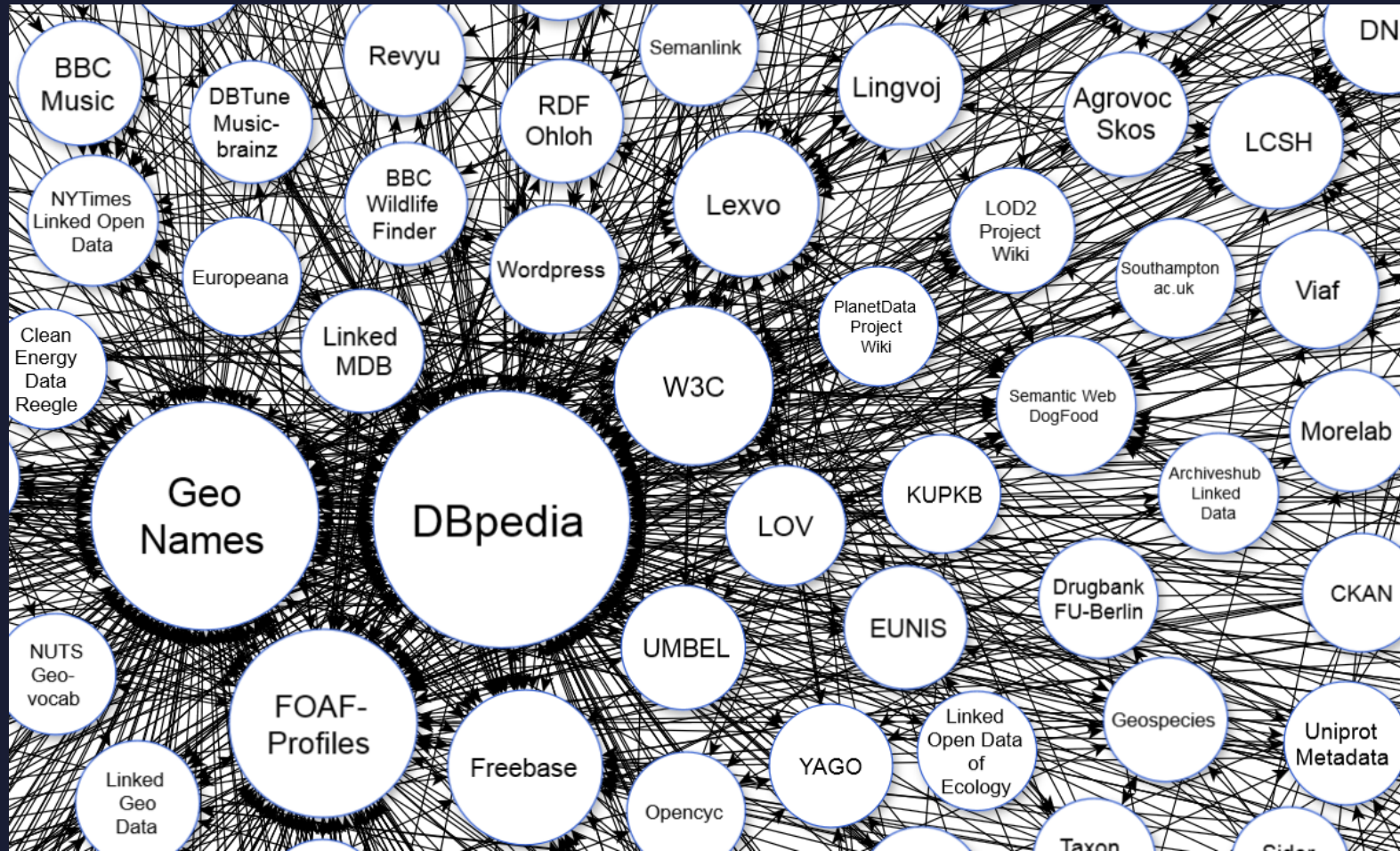
Image taken from: "Linking Open Data cloud diagram 2014,
by Max Schmachtenberg, Christian Bizer, Anja Jentzsch and
Richard Cyganiak.

What next?

- Start with what you know
- Find a partner to learn with
- Think about identifiers (URIs) for your data
- Check out existing data sets
- See what other cultural institutions are doing and see if you can collaborate
- Check if any of your existing tools support linked data
- Check out some online guides and tutorials
- Borrow some resources:
  - Semantic Web for the Working Ontologist
  - Linked Data for Libraries, Archives and Museums: How to Clean, Link and Publish your Metadata

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Some General Linked Data Resources

Tim Berners-Lee (2009) The next web. A TED talk, February 2009. access at
http://www.ted.com/talks/tim_berners_lee_on_the_next_web.html (open access)

Karen Coyle (2012). "Is linked data the answer?" Coyle's Information Thurs. Oct. 18, 2012.
http://kcoyle.blogspot.ca/2012/10/is-linked-data-answer.html (open access)

Karen Coyle (2010). Understanding the semantic web: bibliographic data and metadata. Chicago:
American Library Association (Library Technology reports ; v. 46, no. 1)
https://journals.ala.org/ltr/issue/view/177 (subscription required)

Tom Heath and Christian Bizer (2011) Linked Data: Evolving the Web into a Global Data Space (1st
edition). Synthesis Lectures on the Semantic Web: Theory and Technology, 1:1, 1-136. Morgan &
Claypool. http://linkeddatabook.com/editions/1.0/ (open access)

Linked Data: Connect Distributed Data Across the Web http://linkeddata.org/
 (open access) (includes the LOD Cloud diagram)

W3C Working Group (2014). RDF 1.1 Primer. http://www.w3.org/TR/rdf11-primer/ (open access)

Some LODLAM Projects

Sean Aery (2014) Schema.org and Google for Local Discovery: Some Key Takeaways. Blog post 2014-03-27 http://blogs.library.duke.edu/bitstreams/2014/03/27/schema-org-and-google-for-local-discovery-some-key-takeaways/ (open access)

Jennifer Bowen, Philip E Schreur (2012). Linked Data for Libraries: Why should we care? Where should we start? CNI, April 2-3 2012 Baltimore, Maryland http://www.cni.org/topics/information-access-retrieval/linked-data-for-libraries/ (open access video)

Case Study: King's College London Boosts Access to its Archives with Linked Open Data (2014) http://www.theeuropeanlibrary.org/tel4/newsitem/5700 (open access)

Jason Clark and Scott W.H. Young. Linked Data is People: using linked data to reshape the library staff directory. Presented at ACCESS 2014, Calgary, Alberta

http://slides.com/swyoung/access-2014-linked-data-is-people/embed?style=light (open access)

James Cuno. Art & Architecture Thesaurus Now Available as Linked Open Data. Blog post 2014/02/14 http://blogs.getty.edu/iris/art-architecture-thesaurus-now-available-as-linked-open-data/ (open access)

Some LODLAM Projects

Food and Agriculture Organization of the United Nations (2014). AGRIS 2.0
http://aims.fao.org/openagris (open access)

Mark Jordan. easyLOD https://github.com/mjordan/easyLOD (open access software)

IGeLU/ELUNA Special Interest Working Group on Linked Open Data http://igelu.org/special-interests/lod (partially open access)

Lukas Koster (2013). "The Poor Person's Linked Open Data Workbench: Using Discovery Tools for Presenting Integrated Information" in Commonplace.net Nov. 11, 2013
http://commonplace.net/2013/11/the-poor-persons-linked-open-data-workbench/ (open access)

Ulrike Krabo (2011). Exploiting DBPedia for use in Primo. Presentation at IGeLU 2011 Haifa
http://igelu.org/wp-content/uploads/2011/09/igelu11_dbpedia_integration_in_primo-Krabo.pdf (open access)

Some more LODLAM projects

LiAM: Linked Archival Metadata http://sites.tufts.edu/liam/2013/09/03/what-is-ld/ (open access)

Libhub http://www.libhub.org/ (open access)

Library and Archives Canada (2012). Canadian Subject Headings in SKOS/RDF Format http://www.bac-lac.gc.ca/eng/news/Pages/canadian-subject-headings-skos-rdf-format.aspx (open access)

Library of Congress. Bibliographic Framework Initiative http://www.loc.gov/bibframe/ (open access)

Library of Congress. LC Linked Data Service: Authorities and Vocabularies http://id.loc.gov/ (open access)

Even more LODLAM projects

Linked Data for Libraries (LD4L) wiki (project of Cornell, Harvard, Stanford) (2014) https://wiki.duraspace.org/pages/viewpage.action?pageId=41354028 (open access)

Linked Jazz http://vimeo.com/68308675 (open access video)

Meaningful Concept Displays http://mcd.ischool.drexel.edu/ (open access)

Erik T. Mitchell (2013). "Library Linked Data: Research and Adoption. Chicago: American Library Association. (Library Technology Reports v. 49, no. 5) https://journals.ala.org/ltr/issue/view/187 (subscription required)

H.L. Moulaison and S. N. Stanley (2013). "Beyond Failure: Potentially Mitigating Failed Author Searches in the Online Library Catalog Trough the Use of Linked Data" Journal of Web Librarianship (v. 7, no. 1) p. 37-57. http://resolver.scholarsportal.info/resolve/19322909/v07i0001/37_bfpmfattuold.xml (subscription required)

Even more LODLAM projects

The Muninn Project http://blog.muninn-project.org/node/3 (open access)

Peter Neish (2014). Linked Data: Thinking Big, Starting Small. VALA 2014 Proceedings.
http://peter.neish.net/wp-content/uploads/sites/6/2014/02/VALA2014-Session-10-Neish-Paper.pdf
(open access)

OCLC (2013). Linked Data at OCLC http://www.oclc.org/data.en.html (open access)

Pan-Canadian Documentary Heritage Network Linked Open Data Visualization "Proof-of-Concept" Out of the trenches: linked open data of the first world war: final report. http://www.canadiana.ca/sites/pub.canadiana.ca/files/PCDHN%20Proof-of-concept_Final-Report-ENG_0.pdf (open access)

Stefanie Rűhle, Francesca Schulze & Michael Bűchner. Applying a Linked Data Compliant Model: The Usage of the Europeana Data Model by the Deutsche Digitale Bibliothek. Presented at International Conference on Dublin Core and Metadata Applications DC-2014, Austin, Texas, October 2014

http://dcevents.dublincore.org/IntConf/dc-2014/paper/view/231 (open access)

And even more LODLAM projects

Dan Scott. schema.org: machine-readable cataloguing for the open web. Presented at SWIB14, Bonn, Germany, December 2014 http://swib.org/swib14/programme.php (open access slides & video)

UNLV's Linked Data Project (2014) http://www.library.unlv.edu/linked-data (open access)

VIAF: Virtual International Authority File http://viaf.org/ (open access)

Richard Wallis (2013). Linked Data Progress with OCLC and Others. At OCLC Linked Data Round Table, IFLA Conference, Aug. 19, 2013, Singapore. http://www.slideshare.net/rjw/linked-data-progress-ifla-2013 (open access)

Neil Wilson (2014) The Linked Open British National Bibliography http://data.gov.uk/blog/linked-open-british-national-bibliography blog post 22/04/2014 (open access)