Library Linked Data for the Uninitiated

Lizzy Baus & Sara Ring, Minitex

http://z.umn.edu/14cy
Library Technology Conference
March 2016
Intro/Agenda

• Linked Data
• BIBFRAME
• Workflow
• Case studies/more info
Why Linked Data?

- Linked data is the future of the web
- Data will no longer be in silos
- Relationships are powerful and worth the effort
Why Linked Data?

So what’s the problem with how things are now?
What a human sees

For readers who would like a quick reminder of the book and its main storyline, here is a summary of The Little Prince’s travels and those he met along the way.

If Saint-Exupéry is to be believed, The Little Prince is a book for children written for grown ups. It can be read on many different levels to provide pleasure and food for thought for readers of all ages.

The author, an aviator, crashes his aeroplane in the middle of the Sahara desert. While he is trying to repair his aeroplane, a little boy appears and asks him to draw a sheep. The author learns that The Little Prince comes from asteroid B-612 where he has left behind three volcanoes and a rose.

Before reaching Earth, he has visited other planets and met some very odd people: a king, a conceited man, a drunkard, a lamplighter, a geographer... Since arriving on Earth, he has spoken to a fox who has taught him that to know someone or something, you must « tame » them, and that makes them unique. « What is essential is invisible to the eye, says the fox. »

In order to return to his planet and his rose, The Little Prince allows himself to be bitten by a poisonous snake. His planet is too far away, he cannot take his « shell ». The aviator, who has succeeded in repairing his plane, also quits the desert. He still hopes The Little Prince will return one day and asks us to write and tell him if ever we should meet his friend.

More about the planets visited by the Little Prince.
Each planet the Little Prince visits can be seen as an allegory of human nature. If you have already read the book, we invite you now to take a new look at the different planets.

The king – asteroid B 325
In the book, the Little Prince meets a king who claims to rule over all with absolute power. His only “subject”, however, is an old rat that he hears at night. The king exercises his power over the sun by ordering it to set – but only at sunset. In order not to lose face, this oddity of a king gives only “reasonable” orders (“I order you to set down”) – as good a way as any to satisfy his third for power. The Little Prince is not fooled, however, and sees the monarch as no more than another odd grown-up.
What a computer sees
What is Linked Data?

A set of principles and best practices for sharing data and building relationships between data on the web so that machines can “understand” and interpret the data.
What are the principles and best practices?
Resource Description Framework (RDF)

What is it?

RDF provides a way to describe anything you encounter in the world: people, places, concepts, words, documents, etc.

RDF provides a way to describe relationships: how one thing relates to another thing.
RDF Components

**Statement:** A combination of a Resource, a Property, and a Property value

Resource $\rightarrow$ Subject

Property $\rightarrow$ Predicate

Property Value $\rightarrow$ Object

Statements are usually referred to as **triples**
Triple Example

Statement
The creator of the Little Prince is Antoine de Saint-Exupéry

Subject
Little Prince

Predicate
creator

Object
Antoine de Saint-Exupéry
<xml version="1.0" encoding="UTF-8"?>
<rdf:RDF
xmlns:rdf=http://www.w3.org/1999/02/22-rdf-syntax-ns#
xmlns:dc=http://purl.org/dc/elements/1.1/>

<rdf:Description
rdf:about=https://en.wikipedia.org/wiki/The_Little_Prince>
  <dc:creator>Antoine de Saint-Exupéry</dc:creator>
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http://schema.org/workExample
http://viaf.org/viaf/93810507
http://schema.org/name
Antoine de Saint-Exupéry
RDF Exercise

We are going to create some RDF of our own!

- Look at the Dublin Core records
- Break the data into triples in the spreadsheet (use URIs if you can find them)
- We will mark it up as RDF/XML
One of the most commonly used linked data sets is DBpedia.
https://en.wikipedia.org/wiki/The_Little_Prince
The Little Prince (French: Le Petit Prince; French pronunciation: [lə.pə.lɛ̃.pəʁz]), first published in 1943, is a novella and the most famous work of the French aristocrat, writer, poet and gastronome Antoine de Saint-Exupéry. It is both the most-read and most-translated book in the French language, and was voted the best book of the 20th century in France.

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Querying

Find all artists/bands that are originally from Wisconsin

SPARQL:

PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
PREFIX : <http://dbpedia.org/resource/>
PREFIX dbpedia2: <http://dbpedia.org/property/>
PREFIX dbpedia: <http://dbpedia.org/>
PREFIX skos: <http://www.w3.org/2004/02/skos/core#>

PREFIX dbo: <http://dbpedia.org/ontology/>

SELECT ?person ?bandname ?description WHERE {
  ?person dbo:associatedBand ?bandname
  FILTER (LANG(?description) = 'en') .
  FILTER (regex(?born, "Wisconsin", "i"))
} ORDER BY ASC(?person) ?bandname

Results: Browse ▼ Go! Reset
Query Results

```sparql
PREFIX dbpedia-owl: <http://dbpedia.org/ontology/>

SELECT ?person ?bandname ?description WHERE {
  ?person a dbpedia-owl:MusicalArtist .
  ?person dbpedia-owl:associatedBand ?bandname
  FILTER (LANG(?description) = "en") .
  FILTER (regex(?born, "wisconsin", "i"))
}
```

<table>
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<tr>
<th>person</th>
<th>bandname</th>
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| Billy_Flynn (musician)  | Jimmy_Dawkins             | "Billy Flynn (born August 11, 1956) is an American Chicago blues and electric blues guitarist, singer and songwriter. In addition to his own work, Hummel, Willie Kent, Smokey Pryor, Big Bill Morganfield, John Brim, Jody Williams, Little Arthur Duncan, Delta Far and Billy Boy Arnold."
| Billy_Flynn (musician)  | Mississippi_Heat          | "Billy Flynn (born August 11, 1956) is an American Chicago blues and electric blues guitarist, singer and songwriter. In addition to his own work, Hummel, Willie Kent, Smokey Pryor, Big Bill Morganfield, John Brim, Jody Williams, Little Arthur Duncan, Delta Far and Billy Boy Arnold."
| Billy_Flynn (musician)  | The_Legendary_Blues_Band  | "Billy Flynn (born August 11, 1956) is an American Chicago blues and electric blues guitarist, singer and songwriter. In addition to his own work, Hummel, Willie Kent, Smokey Pryor, Big Bill Morganfield, John Brim, Jody Williams, Little Arthur Duncan, Delta Far and Billy Boy Arnold."
| Bobby_Hatfield          | Bill_Medley               | "Robert Lee "Bobby" Hatfield (August 10, 1940 – November 5, 2003) was an American singer, best known as one half of the Righteous Brothers."
| Bobby_Hatfield          | The_Righteous_Brothers    | "Robert Lee "Bobby" Hatfield (August 10, 1940 – November 5, 2003) was an American singer, best known as one half of the Righteous Brothers."
| Brian_Ritchie           | Violent_Femmes            | "Brian Ritchie (born 21 November 1960) is the bass guitarist for the alternative rock band Violent Femmes. In addition to his bass playing, Ritchie holds several other positions within the band, including lead vocals."
| Brian_Ritchie           | Zen_Circuit               | "Brian Ritchie (born 21 November 1960) is the bass guitarist for the alternative rock band Violent Femmes. In addition to his bass playing, Ritchie holds several other positions within the band, including lead vocals."
| Bruce_Robb              | Art_Garfunkel             | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | Del_Shannon               | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | Harry Nilsson             | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | John_Mellencamp           | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | Ringo Starr               | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | Robert_Bradley's_Blackwater_Surprise | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | Steve Cropper             | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | The_Lemonheads            | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Bruce_Robb              | The_Robbas                | "Bruce Robb (born October 22, 1954) is an American musician, record producer, engineer, and music supervisor."
| Chris_Broach            | Braid (band)              | "Chris Broach (born Christopher Robert Broach: September 5, 1976 in Madison, WI) is one of the guitarists/vocalists in the 90’s Emo band Braid. Broach went to see Braid play a show at The Red Herring, in Urbana, Illinois. After the show, he was introduced to Bob Nanna through a mutual friend."
| Chris_Broach            | L'Spacey                  | "Chris Broach (born Christopher Robert Broach: September 5, 1976 in Madison, WI) is one of the guitarists/vocalists in the 90’s Emo band Braid. Broach went to see Braid play a show at The Red Herring, in Urbana, Illinois. After the show, he was introduced to Bob Nanna through a mutual friend."
| Chris_Broach            | Life_at_Sea               | "Chris Broach (born Christopher Robert Broach: September 5, 1976 in Madison, WI) is one of the guitarists/vocalists in the 90’s Emo band Braid. Broach went to see Braid play a show at The Red Herring, in Urbana, Illinois. After the show, he was introduced to Bob Nanna through a mutual friend."
| Chris_Broach            |                   | "Chris Broach (born Christopher Robert Broach: September 5, 1976 in Madison, WI) is one of the guitarists/vocalists in the 90’s Emo band Braid. Broach went to see Braid play a show at The Red Herring, in Urbana, Illinois. After the show, he was introduced to Bob Nanna through a mutual friend."
```
Another RDF visualization tool
en.lodlive.it
BIBFRAME Overview

Topics to cover:

• What is BIBFRAME?
• What does linked data have to do with BIBFRAME?
• How does BIBFRAME fit into the standards and best practices discussed earlier?
• How will I actually use BIBFRAME in my daily work?
Basic BIBFRAME Model
State of progress

• Vocabulary 2.0 coming soon!
• New Core class: Items
• New core class: Events
• No more Authority layer – will go straight to Subject, Person, etc.
• More information here: http://www.loc.gov/bibframe/docs/index.html
BIBFRAME and Linked Data

• How do these two concepts connect?
  – BIBFRAME plays on the ideas of linked data to connect bibliographic data across the web.
  – Use of URIs instead of strings
  – Often shown/visualized/serialized in RDF triples
  – Not just a replacement for MARC!
BIBFRAME in the Wild

So what does it really look like when someone uses BIBFRAME?
US Army Corps of Engineers
**The little SAS book: a primer: a programming approach**

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<th><strong>Title</strong></th>
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<td>a primer: a programming approach</td>
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<td>Introduces the most commonly used features of the SAS programming language, including the DATA and PROC steps, inputting data, modifying and combining data sets, summarizing data, producing reports, and debugging SAS programs. New topics in the 4th ed. include ODS graphics for statistical procedures; SGPLOT procedure for graphics; creating new variables in PROC REPORT with a COMPUTE block; WHERE=data set option; SORTSEQ=LINGUISTIC option in PROC SORT; more functions, including ANYALPHA, CAT, PROPCASE, AND YRDIF*--P. [4] of cover</td>
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The Little SAS Book: A Primer: A Programming Approach, Lora D. Delwiche and Susan J. Slaughter

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The Little SAS Book: A Primer: A Programming Approach

Title: The Little SAS Book: A Primer: A Programming Approach
Author: Delwiche, Lora D.
ISBN: 9781599947269
Personal Author: Delwiche, Lora D.
Physical Description: xx, 358 p. : ill. ; 23 cm.
General Note: Includes index.
Contents: Getting started using SAS software -- Getting your data into SAS -- Working with your data -- Sorting, printing, and summarizing your data -- Enhancing your output with ODS (Output Delivery System) -- Modifying and combining SAS data sets -- Writing flexible code with the SAS macro facility -- Using basic graphical and statistical procedures -- Exporting your data -- Debugging your SAS programs -- Where to go from here -- Coming to SAS from SPSS -- Coming to SAS from a programming language -- Coming to SAS from SQL.
Abstract: Introduces the most commonly used features of the SAS programming language, including the DATA and PROC steps, inputting data, modifying and combining data sets, summarizing data, producing reports, and debugging SAS programs. New topics in the 4th ed. include ODS graphics for statistical procedures; SGPLOT procedure for graphics; creating new variables in PROC REPORT with a COMPUTE block; WHERE-data set option; SORTSEQ=NOSTRING option in PROC SORT; more functions, including ANYALPHA, CAT, PROPCASE, and YRDFN=.P.
Title Subject: SAS (Computer file)
Subject Term: Mathematical statistics -- Data processing.
Added Author: Slaughter, Susan J.
OCLC Number: 208645648
Copies: 1

Available: 1

Library: ERDC Hanover NH
Material Type: Book
Shelf Number: QA276.4 D45 2008
Item Category 1: PRINT
Location: Standard Shelving Location
Modeling Exercise

**The little prince**

Author: Antoine de Saint-Exupéry, Katherine Woods. Harcourt, Brace & World.
Publisher: New York: Harcourt, Brace & World. ©1943.
Summary: An aviator, whose plane is forced down in the Sahara Desert, encounters a little man from a small planet who describes his adventures in the universe, seeking the secret of what is really important in life.

Subjects:
- Love
- Fairy tales
- Fantasy fiction

More like this:
- User tags
- User notes
- Similar items

**Genres/Forms:**
- Children's stories
- French
- Fiction
- Juvenile works
- Fantasy fiction
- Dust jackets (Bindings)
- Fantasy literature
- Fairy tales
- Juvenile fiction

**Material Type:** Fiction, Juvenile audience

**Document Type:** Book

**All Authors / Contributors:** Antoine de Saint-Exupéry, Katherine Woods.

**ISBN:** 0152400504, 9780152400504

**OCLC Number:** 243900

**Description:** 91, [3] pages : illustrations (chiefly color) ; 23 cm

**Other Titles:** Petit prince.

**Responsibility:** written and drawn by Antoine de Saint-Exupéry; translated from the French by Katherine Woods.

**Abstract:** An aviator, whose plane is forced down in the Sahara Desert, encounters a little man from a small planet who describes his adventures in the universe, seeking the secret of what is really important in life.
Modeling Exercise

Work Data:
- Title
- Author
- Subjects
- Date of creation

Instance Data:
- Publisher
- Date of printing
- Pagination
- Cover art
What does it mean for my library?

- Workload/workflow changes
- Connectivity
- What will the catalog/cataloging look like?
Workflow Example: BIBFRAME Editor

Create Resource

- Monograph
  - Instance
  - Work
  - Work, Instance
- Cartographic
- BluRay DVD
- Audio CD
Workflow Example: BIBFRAME Editor
Workflow Example: BIBFRAME Editor
Workflow Example: BIBFRAME Editor

Person

Search LCNAF in id.loc.gov for Authorized Access Point ...
OR ...
Record Authorized Access Point (if added to LCNAF but does not yet appear in id.loc.gov)

Applicant
Architect

Save changes
Workflow Example: BIBFRAME Editor

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<td>Other Person, Family, or Corporate Body Associated With a Work (RDA 19.3)</td>
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Workflow Example:
BIBFRAME Editor
Workflow Example: BIBFRAME Editor
Workflow Example:
BIBFRAME Editor

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Workflow Example: BIBFRAME Editor
Example Workflow
UNLV

- Exported records from CONTENTdm
- Imported data into Open Refine. Cleaned it up, created triples, and exported it as RDF.
- Used Mulgara and OpenLink Virtuoso Pivot Viewer to store and visualize their data (open source)

FUTURE GOAL: To publish all digital collections as linked data
Example Case Study
OCLC

- OCLC has been publishing bibliographic linked data since 2012
- How make use of data and demonstrate how it adds value to librarians and users?
  - Looking at Google Research Knowledge Vault model
- The Knowledge Vault will contain triples that can be used by next-generation library services and apps
Show related entities

Lincoln, Robert Todd, 1843-1926

About
Born: Aug 1, 1843
Died: Jul 26, 1926

Robert Todd Lincoln (August 1, 1843 – July 26, 1926) was an American lawyer and Secretary of War, and the first son of President Abraham Lincoln and Mary Todd Lincoln. Born in Springfield, Illinois, United States, he was one of two of Lincoln's four sons to live to adulthood, and the only one to survive into the 1900s.

Father:
Abraham Lincoln

Mother:
Mary Todd Lincoln

Spouse:
Mary Eunice Harlan

Related Works
As a Creator

Letter] 1911 April 28 [to] Mr. Starrett?


Autograph letter signed from Robert Todd Lincoln, Chicago, to Miss Post 1901 January 29.

Autograph signature of Robert Lincoln to a typewritten letter: Chicago, to Mr. Morgan, 1908 Jan. 20.

Letter : Chicago, to Belle F. Keyes, Boston, 1885 Dec. 16.

Letter : Chicago, to Clinton L. Conkling.

Related Media

Related People
Abraham Lincoln
Mary Todd Lincoln
William Eleazar Barton
Mrs. James G. Blaine

Related Organizations
William E. Barton Collection of Lincolniana (University of Chicago)
Republican Party (U.S.: 1854-)
United States. Supreme Court.
United States. War Department

Related Places
United States
Illinois.
Illinois--Chicago.
New York (State)
Example Case Study
Innovative Linked Data

Library Local Database
Extract MARC Records and Transform to MARCXML
RDF Conversion to BIBFRAME
Published on Library.Link Network
Harvesting and Linking via Web and Linked Data Applications
Thank You!

Lizzy Baus
eebaus@umn.edu

Sara Ring
ring0089@umn.edu

All handouts/resources
http://z.umn.edu/14cy