Linked Data Cataloging Workflows

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Overview

- Background: BIBFLOW Project
- Cataloging workflows with BIBFRAME
  - Copy cataloging
  - Original cataloging
  - Creation of authority and minting URI
- Skills and training
Part I: Background
What Is BIBFLOW?

BIBFLOW = BIBframe + workFLOW

• a 2-year project of the UC Davis University Library and Zepheira, funded by Institute of Museum and Library Sciences (May 2014 – April 2016)

• a research project designed to address questions like “What impact will adoption of BIBFRAME have on technical services workflows in an academic library”?

• Its primary purpose was to understand ecosystem, test solutions, and provide a roadmap of how libraries can iteratively migrate to linked data without disrupting patron or business services

https://www.library.ucdavis.edu/bibflow/
Library Congress' project started in 2011. It's the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages the current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

Roadmap: Primary Stakeholders

- Triplestore
- Human Discovery
- Machine Discovery
- Vendors
- Linked Data Editor
- ILs
Library Congress' project started in 2011. It's the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages the current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

Roadmap: Ecosystem

- Human Discovery Interface
- Machine Discovery
- Triplestore
- OCLC Authorities
- Linked Data Editor
- ILS
- MARC URI
- Catalogue / Ingest URI Based Marc
- Exchange Circulation Data
- Pull Triples
- Push Triples
- Pull User Contributions
- Push Triples
- Respond to Machine Queries
- Pull AUTHORITY Data
- Pull Schema
- Pull AUTHORITY
- Pull
- Push
- Native Operation or Ingest
- Script / Tool (All other transactions are via API / Endpoint)
Library Congress' project started in 2011. It's the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages the current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

Roadmap: Pathway #1 – MARC Records Only
Library of Congress' project started in 2011

It's the replacement for MARC

It can and will serve as an encoding standard for RDA and other content standards

AND

It leverages current web technology (Semantic Web/Linked Data)

and uses Resource Description Framework (RDF) modeling practice.

Roadmap: Pathway #2 – Linked Data Only

Linked Data for Production (LD4P)

https://wiki.duraspace.org/pages/viewpage.action?pageId=74515029
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**Roadmap: Pathway #1 + Pathway #2**

- **Human Discovery Interface**: Pull Triples
- **Triple-store**: Pull Triples, Push User Contributions, Respond to Machine Queries, Push Triples
- **Linked Data Editor**: Pull Schema, Pull Authorities, Pull Triples
- **OCLC Authorities**: Pull Authorities
- **ILS**: Catalogue / Ingest URI Based Marc
- **MARC URI**: Pull Authority Data
- **Script / Tool (All other transactions are via API / Endpoint)**
The Library of Congress' project started in 2011. It's the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

**Roadmap: Pathway #3 – Hybrid (MARC + BIBFRAME)***

- **Human Discovery Interface**
  - Push Triples
  - Pull Triples
  - Push User Contributions
  - Exchange Circulation Data
- **Triplestore**
  - Push Triples
  - Pull Triples
  - Respond to Machine Queries
- **Machine Discovery**
  - Pull Authority Data
  - Push Triples
- **OCLC**
  - Pull Schema
  - Pull Authorities
- **Authorities**
  - Pull
  - Push
  - Native Operation or Ingest
  - Script / Tool (All other transactions are via API / Endpoint)
- **Linked Data Editor**
  - Pull
  - Push
- **ILS**
  - Catalogue / Ingest URI Based Marc
  - Push Thin MARC
  - Pull Triples
- **MARC URI**
  - Catalogue / Ingest URI Based Marc
  - Script / Tool (All other transactions are via API / Endpoint)
Library of Congress' project started in 2011
It's the replacement for MARC
and will serve as an encoding standard for RDA and other content standards.

AND
It leverages the current web technology (sematic web/Linked Data)
and uses Resource Description Framework (RDF) modeling practice.

Focus of Today’s Presentation

- Human Discovery Interface
  - Pull Triangles
  - Exchange Circulation Data
  - Push Thin MARC

- Triplestore
  - Pull Triangles

- Machine Discovery
  - Respond to Machine Queries
  - Pull Authority Data

- Linked Data Editor
  - Pull Schema
  - Pull Authorities
  - Push User Contributions

- OCLC
  - Pull Authority Data

- Authorities
  - Pull User Contributions
  - Schema

- ILS
  - Pull
  - Push
  - Native Operation or Ingest
  - Script / Tool (All other transactions are via API / Endpoint)
Library Congress' project started in 2011
It's the replacement for MARC
can and will serve as an encoding standard for RDA and other content standards
AND
It leverages the current web technology (semantic web/Linked Data)
and uses Resource Description Framework (RDF) modeling practice.

Cataloging Portion of the Roadmap

Human Discovery Interface

Exchange Circulation Data

Pull Triples

Push User Contributions

Machine Discovery

Respond to Machine Queries

Push Triples

Pull Triples

Triplestore

Pull Authority Data

Pull Triples

Push Triples

Push Thin MARC

Linked Data Editor

OCLC

 Authorities

Script / Tool (All other transactions are via API / Endpoint)
Part II: Cataloging Workflows
- UC Davis’ BIBFRAME Scribe (http://jarjar.lib.ucdavis.edu:8888/static/)
- LC’s BIBFRAME Editor (http://bibframe.org/tools/editor/)
http://jarjar.lib.ucdavis.edu:8888/static/
1. Copy Cataloging - Autofill Data Elements Retrieved from OCLC

(BIBFRAME Scribe)
Auto Fill Data Elements Retrieved from OCLC
<table>
<thead>
<tr>
<th>Media Category</th>
<th>Type to search</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Code</td>
<td>(OCoLC)8818399397 Add</td>
</tr>
<tr>
<td>ISBN</td>
<td>Add</td>
</tr>
<tr>
<td>LCCN</td>
<td>2016- Add</td>
</tr>
<tr>
<td>URI</td>
<td>URL Add</td>
</tr>
<tr>
<td>Dimensions</td>
<td>24 cm Add</td>
</tr>
<tr>
<td>image</td>
<td>URL Add</td>
</tr>
<tr>
<td>Federal or State Government Document Call Number</td>
<td>Add</td>
</tr>
<tr>
<td>UC Davis Library Call Number</td>
<td>Z666.73.L56 H66 2014 Set</td>
</tr>
<tr>
<td>National Library of Medicine Call Number</td>
<td>Set</td>
</tr>
<tr>
<td>Library of Congress Call Number</td>
<td>Set</td>
</tr>
</tbody>
</table>

[Buttons: Clear, Save, Export]
2. Original Cataloging - Using Lookup Services

(BIBFRAME Editor)
This site contains v1.0 of the BIBFRAME vocabulary.
For v2.0, please visit http://www.loc.gov/bibframe/docs/index.html

Create Resource

Monograph
Notated Music
Serial
Cartographic
BluRay DVD
35mm Feature Film
Audio CD
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)

**LCNAF**

Austen, Jane, 1775-1817

**Cancel**  **Save changes**
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)

Austen, Jane, 1775-1817

Save changes
### Principal Creator

<table>
<thead>
<tr>
<th>Search LCNAF for Creator</th>
<th>Person</th>
<th>Family (NAR)</th>
<th>Jurisdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Body</td>
<td></td>
<td>Meeting</td>
<td></td>
</tr>
<tr>
<td>Austen, Jane, 1775-1817</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### RDA-Relators

- **Author**
- Author in quotations or text abstracts
- Author of afterword, colophon, etc.
- Author of dialog
- Author of introduction, etc.

[Save changes]
ID: http://bibframe.org/resources/works/aAa1478634112
  bf:relator
    _:bnodeQVG1478650509

ID: _:bnodebUo1478650599
  Type(s)
    http://bibframe.org/vocab/Person
  bf:hasAuthority
    http://id.loc.gov/authorities/names/n79032879
  bf:authorizedAccessPoint
    Austen, Jane, 1775-1817
  bf:label
    Austen, Jane, 1775-1817

ID: _:bnodeQVG1478650509
  Type(s)
    http://bibframe.org/vocab/Relator
  bf:relatedTo
    _:bnodebUo1478650599
  bf:relatorRole
    http://id.loc.gov/vocabulary/relators/aut

ID: http://id.loc.gov/vocabulary/relators/aut
  bf:label
    Author
<table>
<thead>
<tr>
<th>RDA Work</th>
<th>View Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator of Work (RDA 19.2)</td>
<td>Principal Creator, Other Creators</td>
</tr>
<tr>
<td>Preferred Title for the Work (RDA 6.2.2)</td>
<td>Title, Title</td>
</tr>
<tr>
<td>Variant Title for the Work (RDA 6.2.3)</td>
<td>Title, Title</td>
</tr>
<tr>
<td>Form of Work (RDA 6.3)</td>
<td>Form of Work</td>
</tr>
<tr>
<td>Date of Work (RDA 6.4)</td>
<td>Date of Work (RDA 6.4)</td>
</tr>
<tr>
<td>Place of Origin of the Work (RDA 6.5)</td>
<td>Place, Place</td>
</tr>
<tr>
<td>Other Distinguishing Characteristic of the Work (RDA 6.6)</td>
<td>Other Distinguishing Characteristic of the Work (RDA 6.6)</td>
</tr>
<tr>
<td>Nature of the Content (RDA 7.2)</td>
<td>Nature of the Content (RDA 7.2)</td>
</tr>
<tr>
<td>Coverage of the Content (RDA 7.3)</td>
<td>Coverage of the Content (RDA 7.3)</td>
</tr>
<tr>
<td>Intended Audience (RDA 7.7)</td>
<td>Intended Audience (RDA 7.7)</td>
</tr>
<tr>
<td>Dissertation or Thesis Information (RDA 7.9)</td>
<td>Dissertation or Thesis Information (RDA 7.9)</td>
</tr>
<tr>
<td>Other Person, Family, Corporate Body Associated With a Work (RDA 19.3)</td>
<td>Other Person, Family, Corporate Body Associated With a Work, Expression, Manifestation</td>
</tr>
<tr>
<td>Subject of the Work (RDA Chapter 23)</td>
<td>Subjects, RDA Work</td>
</tr>
</tbody>
</table>
Subject of the Work (RDA Chapter 23)

ID: http://bibframe.org/resources/work/aAa1478634112
bf:subject
  _:bnodeEKD1478639746

ID: _:bnodeEKD1478639746
Type(s)
  http://bibframe.org/vocab/Topic

bf:hasAuthority
  http://id.loc.gov/authorities/subjects/sh00006052

bf:authorizedAccessPoint
  History and criticism--Theory, etc

bf:label
  History and criticism--Theory, etc
Enter Publication Information

Place of Publication (RDA 2.8.2)
Santa Barbara, California

Publisher's Name (RDA 2.8.4)
Libraries Unlimited

Date of Publication (RDA 2.8.6)
2011

Cancel    Save changes
Publication Statement (RDA 2.8)

ID: http://bibframe.org/resources/instances/UAX1478653954
  bf:publication
    _:bnodeIJ11478654392

ID: _:bnodeIJ11478654392
  Type(s)
    http://bibframe.org/vocab/Provider
  bf:providerPlace
    Santa Barbara, California
  bf:providerName
    Libraries Unlimited
  bf:providerDate
    2011
3. Creation of Authority and Minting URIs
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)

Li, Xiaoli

Type(s)
http://bibframe.org/vocab/Person
bf:authorizedAccessPoint
Li, Xiaoli

Cancel  Save changes
## New Person

Properties marked with * are required.

<table>
<thead>
<tr>
<th>Property</th>
<th>Input Type</th>
<th>Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name*</td>
<td></td>
<td>Set</td>
</tr>
<tr>
<td>Alternative Name</td>
<td></td>
<td>Add</td>
</tr>
<tr>
<td>Birth Date</td>
<td></td>
<td>Add</td>
</tr>
<tr>
<td>Death Date</td>
<td></td>
<td>Add</td>
</tr>
<tr>
<td>Identity Service Link</td>
<td>URL</td>
<td>Add</td>
</tr>
<tr>
<td>Home Page</td>
<td>URL</td>
<td>Add</td>
</tr>
<tr>
<td>E-mail Address</td>
<td></td>
<td>Add</td>
</tr>
<tr>
<td>Same As</td>
<td>URL</td>
<td>Add</td>
</tr>
</tbody>
</table>

### Other Properties

- **Electronic Article**
- **Print Article**
- **Audio**
- **Vinyl Record**
- **Bibliography**
- **Electronic Bibliography**
- **Print Bibliography**
- **Book**
- **E-book**

### Detailed Properties

- **ISBN**
- **Title**
- **Title Remainder**
- **Alternative Title**
- **Date**
- **Author**
- **Library of Congress Classification**
- **Editor**
- **Contributor**
- **Translator**
- **Illustrator**
- **Description**
- **Content Type**

---

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UCDAVIS University Library
Questions?

1. Instead of creating new name authority, would it make sense for the library community to start using other authoritative URI enabled name identifiers, such as:

   - ORCID ID (researchers)  [http://orcid.org/0000-0001-5362-2151](http://orcid.org/0000-0001-5362-2151) (Xiaoli Li)
   - ISNI (individuals and organizations)

2. Should we start using authority data from national libraries outsides of the U.S? For example:

   - 황석영 黃皙暎 1943-  [http://viaf.org/viaf/49439184](http://viaf.org/viaf/49439184)
     instead of this:
   - Hwang, Sŏg-yŏng, 1943-  [http://id.loc.gov/authorities/names/n82000928](http://id.loc.gov/authorities/names/n82000928)
Subjects

Search Subject (LCSH and the Name Authority File)

Input Subject (For example, when an LCSH free-floating construction is not represented by an authorized heading)

Georgia -- History -- Civil War, 1861-1865 -- Fiction

Type(s)
http://bibframe.org/vocab/Topic
bf:authorizedAccessPoint
Georgia -- History -- Civil War, 1861-1865 -- Fiction

MADS Authority
New Concept (Place)

Properties marked with * are required.

Place*: Georgia

General subdivision: History

Form subdivision: Fiction

Geographic subdivision:

Temporal subdivision: Civil War, 1861-1865
Quick facts about LCSH at ID.LOC.GOV:

- Available since 2009
- Approximately 415,000 resources

Quick facts about LCSH usage in LC's Voyager database:

- 24,893,391 total LCSH headings
- 5,692,450 unique LSCH headings

- 5,692,450 (million) > 415,000 (thousand)

LCSH – because of pre-coordination (which is a good thing) is basically an infinite system

ID.LOC.GOV has, at best, a subset of the possible.
ID.LOC.GOV does have the data from which one creates headings (well, mostly).

ID.LOC.GOV is missing, however, at least, about 5.3 MILLION known concepts

## LCSH Usage Stats

More about actual subject usage in the catalog:

<table>
<thead>
<tr>
<th>Subfield usage</th>
<th>No. of subject headings using the same pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>6,781,717</td>
</tr>
<tr>
<td>ax</td>
<td>4,883,546</td>
</tr>
<tr>
<td>az</td>
<td>3,096,913</td>
</tr>
<tr>
<td>av</td>
<td>2,042,296</td>
</tr>
<tr>
<td>azx</td>
<td>1,046,032</td>
</tr>
<tr>
<td>axz</td>
<td>887,856</td>
</tr>
<tr>
<td>azv</td>
<td>773,085</td>
</tr>
<tr>
<td>axy</td>
<td>762,346</td>
</tr>
<tr>
<td>axx</td>
<td>709,172</td>
</tr>
<tr>
<td>azz</td>
<td>679,781</td>
</tr>
<tr>
<td>axv</td>
<td>458,786</td>
</tr>
<tr>
<td>ay</td>
<td>301,921</td>
</tr>
<tr>
<td>azzx</td>
<td>285,397</td>
</tr>
<tr>
<td>azzv</td>
<td>218,017</td>
</tr>
<tr>
<td>ayx</td>
<td>183,559</td>
</tr>
</tbody>
</table>
Questions?

1. Is pre-coordinated subject string still useful in linked data environment? If so, should we create a URI for every known concept (string)?

2. Would we be willing to consider to separate form subdivision(s) from an LCSH string to increase the likelihood of finding a URI?

3. Would it make sense to start using other linked data thesauri (instead of creating new ones). Below are some examples:
   - MeSH (National Library of Medicine Medical Subject Headings)
   - National Agricultural Library’s Agricultural Thesaurus
   - Getty vocabularies
     - TGN (Thesaurus of Geographic Names)
     - AAT (Arts and Architecture)
     - ULAN (Union List of Artist Names)
4. Roles Cataloging Data Plays

(BIBFLOW Roadmap)
Library Congress' project started in 2011. It's the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages the current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

Where Does Cataloging Data Go?

- **Triplestore**: Pull Triples, Push Triples
- **Linked Data Editor**: Pull Triples, Pull Schema, Pull Authorities
- **OCLC**: Pull Authorities
- **Authorities**: Pull Authorities

Options:
- Pull
- Push
- Native Operation or Ingest
- Script / Tool (All other transactions are via API / Endpoint)
Library Congress' project started in 2011. It’s the replacement for MARC and will serve as an encoding standard for RDA and other content standards. It leverages the current web technology (semantic web/Linked Data) and uses Resource Description Framework (RDF) modeling practice.

Cataloging Data Supports Library’s Internal Operations
Cataloging Data Supports the Discovery by Human

Library Congress' project started in 2011
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Cataloging Data Supports the Discovery by Human with Additional Circulation and Location Information from ILS.
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Cataloging Data Supports the Discovery by Machine

**Human Discovery Interface**
- Push Triangles
- Pull Authority Data
- Pull User Contributions
- Respond to Machine Queries
- Push Triangles

**Triplestore**
- Pull Triangles
- Push Triangles

**ILS**
- Exchange Circulation Data
- Pull

**OCLC**
- Pull Schema
- Pull Authorities

**Authorities**
- Pull User Contributions

**Linked Data Editor**
- Pull User Contributions

**Script / Tool (All other transactions are via API / Endpoint)**
Part III: Skills and Training
Skills Needed for the Future

Metadata practitioners:

- You have ALL knowledge needed to create linked data with good tools (like BIBFRAME editor): understanding of cataloging rules, good judgement, ability to analyze relationships and to make connections (links)

- Basic understanding of linked data and Resource Description Framework (RDF) terms, such as URI, triple, graph, predicate, class, literal, etc. (do not need to be an linked data expert)

be flexible and positive, able to deal with ambiguity, patient and resilient, and able to think outside the box. Be curious and willing to learn.

Metadata policymakers:

- Understand library applications of the linked data technology, such as data modeling, RDF, ontology development, SPARQL, API, etc.
Training

Report on Available Linked Data Training Resources: Environmental Scan Summary, By PCC Standing Committee on Training, September 9, 2015 (Revised April 22, 2016)

– 37 resources identified and most of them are freely available

https://www.loc.gov/aba/pcc/sct/documents/PCCSCTFinalReportonAvailableLinkedDataTrainingResources.docx
BIBFRAME Training at the Library of Congress

The Library of Congress is testing BIBFRAME for bibliographic description through a pilot project that will begin in August 2015. Forty Library of Congress catalogers will participate in the Pilot, with instruction by four Library of Congress staff members in the Cooperative and Instructional Programs Division (COIN). The LC BIBFRAME Pilot will test bibliographic description in multiple formats and in multiple languages. Training for the Pilot participants consists of the three modules described below.

<table>
<thead>
<tr>
<th>Module</th>
<th>Slides, Manuals, Exercises, Online Quizzes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 1: Introduction to the Semantic Web and Linked Data</strong></td>
<td></td>
</tr>
<tr>
<td>Classroom instruction</td>
<td></td>
</tr>
<tr>
<td><strong>Course Summary:</strong></td>
<td>Part 1: The Semantic Web and Linked Data Concepts: A Basic Overview (PPT: 1.5 MB)</td>
</tr>
<tr>
<td>The purpose of this module is to introduce the Semantic Web, linked data concepts, and some basic tools.</td>
<td>Part 1: Quiz A (SWF: 1.35 MB)</td>
</tr>
<tr>
<td>The course will discuss the role of semantically linked data in creating useful web services and connecting datasets on the web. The module will provide a very basic overview of the terminology, terms, and tools used for Semantic Web applications.</td>
<td>Part 1: Quiz B (SWF: 973 KB)</td>
</tr>
<tr>
<td>The module will contrast the limits of our current MARC based environment with the promise of integrating our data more fully with Semantic Web resources to enhance user services.</td>
<td>Module 1 Part 1 Assignments (PDF: 10KB)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Part 2: Semantic Data Model: Basic Overview (PPT: 3807 KB)</td>
</tr>
<tr>
<td></td>
<td>Part 2: Quiz (SWF: 1.06 MB)</td>
</tr>
</tbody>
</table>
Theory & Background
The primary goal of the RDF-modeled Competency Index for Linked Data is to provide a means for mapping learning resource descriptions to the competencies those resources address to assist in finding, identifying, and selecting resources appropriate to specific learning needs. – Learn More ·

Featured Resource
Learn About SPARQL 1.1
This S5 format slideshow details the changes made to the query language in SPARQL 1.1 - it is not a basic introduction to SPARQL and assumes that the reader is already familiar with the basic functions of SPARQL 1.0.

Recent Updates
Help us improve usability on the LD4PE website & Competency Index
(11/10/2016)
Updated version (May 2016) of the LD4PE Competency Index available for review and feedback
Competency Index for Linked Data

The Competency Index for Linked Data (CI) is a set of topically arranged assertions of the knowledge, skills and habits of mind required for professional practice in the area of Linked Data. Its primary goal is to provide a means for mapping learning resource descriptions to the competencies those resources address to assist in finding, identifying, and selecting resources appropriate to specific learning needs.

- Learn More

- New Comp Index (395)
  - Fundamentals of Resource Description Framework (159)
  - Fundamentals of Linked Data (62)
  - RDF vocabularies and application profiles (92)
  - Creating and transforming Linked Data (33)
  - Interacting with RDF data (263)
  - Creating Linked Data applications (0)
Acknowledgements

Carl Stahmer, UC Davis Library

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Paul Frank, Library of Congress
QUESTIONS?