RDA in RDF:
Transitioning to the FRBR Catalog
and the Semantic Web

Kimmy Szeto
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Half a century ago…we built ISBD, AACR2 and MARC…

for transmitting and printing catalog cards
Problems with ISBD, AACR2 and MARC:

- own, separate bibliographic universe
- not enough globally unique identifiers
- insufficient control; fosters inconsistencies

Solution?

- communicate to the broader data universe
- standards and practices built for networked users
- increase consistency, comprehensibility and extensibility
Linked Data Environment

- use URIs as identifiers
- use HTTP URIs to look up identifiers
- Provide standardized information for each URI
- Reference other URIs

RDA data elements as Linked Data

- Project of the JSC and DCMI since 2007
- Serve as basis for machine interoperation
- Expose library data into Linked Data environment
- Developed independently using RDF
Resource Description Framework is

- an abstract data model
- domain-neutral and application-neutral
- provides structure to draw relationships between things
In RDF...
- a statement, a “triple” is made of three ordered parts
- triples are “directed” and “labeled”
- triples are best visualized as graphs
The RDF Triple

URI references can refer to a thing, a class of things, or a property

http://id.loc.gov/authorities/names/n79107741.html

refers to the name authority file for “Beethoven, Ludwig van, 1770-1827”

http://rdvocab.info/uri/schema/FRBRentitiesRDA/Manifestation

refers to the FRBR class of objects “Manifestation”

http://rdvocab.info/uri/schema/FRBRentitiesRDA/Name

refers to the FRBR class of objects “Name”

http://rdvocab.info/uri/schema/FRBRentitiesRDA/Name

refers to RDA property “Name”

http://marc21rdf.info/elements/1XX/M10_01_a

refers to the MARC 21 property labeled “Personal name in Main Entry-Personal Name (Surname)” i.e. Field 100 1# subfield a
URIs have human-readable “Labels”

- Ludwig van Beethoven refers to the name authority file for “Beethoven, Ludwig van, 1770-1827”
- Manifestation refers to the FRBR class of objects “Manifestation”
- Name refers to the FRBR class of objects “Name”
- Name refers to RDA property “Name”
- Personal name in Main Entry-Personal Name (Surname) refers to the MARC 21 property labeled “Personal name in Main Entry-Personal Name (Surname)” i.e. Field 100 1# subfield a
RDA elements are expressed in RDF as “properties”
RDA properties are designed to work with FRBR entities

Some FRBR entities for RDA

<table>
<thead>
<tr>
<th>FRBR</th>
<th>RDF Label</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work</td>
<td><a href="http://rdvocab.info/uri/schema/FRBRentitiesRDA/Work">http://rdvocab.info/uri/schema/FRBRentitiesRDA/Work</a></td>
<td></td>
</tr>
<tr>
<td>Expression</td>
<td><a href="http://rdvocab.info/uri/schema/FRBRentitiesRDA/Expression">http://rdvocab.info/uri/schema/FRBRentitiesRDA/Expression</a></td>
<td></td>
</tr>
<tr>
<td>Manifestation</td>
<td><a href="http://rdvocab.info/uri/schema/FRBRentitiesRDA/Manifestation">http://rdvocab.info/uri/schema/FRBRentitiesRDA/Manifestation</a></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td><a href="http://rdvocab.info/uri/schema/FRBRentitiesRDA/Item">http://rdvocab.info/uri/schema/FRBRentitiesRDA/Item</a></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td><a href="http://rdvocab.info/uri/schema/FRBRentitiesRDA/Subject">http://rdvocab.info/uri/schema/FRBRentitiesRDA/Subject</a></td>
<td></td>
</tr>
<tr>
<td>etc…</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RDA’s RDF Properties

Some RDA properties are specific to the FRBR entity

Note correspondence with MARC

<table>
<thead>
<tr>
<th>MARC</th>
<th>RDF Property</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>245a</td>
<td>Title (Manifestation)</td>
<td><a href="http://rdvocab.info/Elements/titleManifestation">http://rdvocab.info/Elements/titleManifestation</a></td>
</tr>
<tr>
<td>245a</td>
<td>Title of the work</td>
<td><a href="http://rdvocab.info/Elements/titleOfTheWork">http://rdvocab.info/Elements/titleOfTheWork</a></td>
</tr>
<tr>
<td>240a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>245b</td>
<td>Parallel title proper (Manifestation)</td>
<td><a href="http://rdvocab.info/Elements/parallelTitleProperManifestation">http://rdvocab.info/Elements/parallelTitleProperManifestation</a></td>
</tr>
<tr>
<td>245c</td>
<td>Statement of responsibility relating to title proper</td>
<td><a href="http://rdvocab.info/Elements/statementOfResponsibilityRelatingToTitleProper">http://rdvocab.info/Elements/statementOfResponsibilityRelatingToTitleProper</a></td>
</tr>
<tr>
<td>246a</td>
<td>Variant title (Manifestation)</td>
<td><a href="http://rdvocab.info/Elements/variantTitleManifestation">http://rdvocab.info/Elements/variantTitleManifestation</a></td>
</tr>
</tbody>
</table>
Some are more straightforward …

<table>
<thead>
<tr>
<th>MARC</th>
<th>RDF Label</th>
<th>URI</th>
</tr>
</thead>
<tbody>
<tr>
<td>336a</td>
<td>Content type (Expression)</td>
<td><a href="http://rdvocab.info/Elements/contentTypeExpression">http://rdvocab.info/Elements/contentTypeExpression</a></td>
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<td>337a</td>
<td>Media type (Manifestation)</td>
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<td>336a</td>
<td>Carrier type (Manifestation)</td>
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</tr>
</tbody>
</table>
Imagine a spreadsheet with information about books. The rows and columns represent classes of things.

Each row is a “resource”

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Standard ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romeo et Juliette</td>
<td>Peter Ilich Tchaikovsky</td>
<td>0-4862-5217-5</td>
</tr>
<tr>
<td>Romeo and Juliet</td>
<td>William Shakespeare</td>
<td>0-4864-7573-5</td>
</tr>
<tr>
<td>The holy sonnets of</td>
<td>Benjamin Britten</td>
<td>028941742827</td>
</tr>
<tr>
<td>John Donne</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each column header is a “property” followed by a list of “values”

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Kimmy Szeto :: SUNY Maritime College :: June 24, 2012
Each cell is a RDF triple

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<td>William Shakespeare</td>
<td>0-4864-7573-5</td>
</tr>
</tbody>
</table>

This work

has title

“The holy sonnets of John Donne”

has author

“Benjamin Britten”
RDF graph for a work, showing labels

- work
  - has preferred title
    - "The holy sonnets of John Donne"
  - has author
    - person
      - has name
        - "Britten, Benjamin"
      - has birth date
        - 1913

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RDA in RDF: Example

040  RBN ǂc RBN ǂd OCL ǂd IUL ǂd OCL ǂd JNA ǂd OCL ǂd NZCPL ǂd JTA ǂd BTCTA ǂd ORX ǂd YQU ǂd OCLCG ǂd OCLCA ǂd MTG ǂd OCL ǂd IK2 ǂd EUX
028 00 417 428-2 ǂb London
050 4 M1500.B827 ǂb H6
100 1 Britten, Benjamin, ǂd 1913-1976.
240 10 Vocal music. ǂk Selections
245 14 The holy sonnets of John Donne ǂh [sound recording] ; ǂb Songs and proverbs of William Blake ; Billy Budd / ǂc Britten.
300 3 sound discs : ǂb digital, stereo. ; ǂc 4 3/4 in.
500  Compact discs; analog recordings.
505 0 The holy sonnets of John Donne, op.35 -- Songs and proverbs of William Blake, op.74 -- Billy Budd, op.50.
650 0 Songs (High voice) with piano.
650 0 Songs (Medium voice) with piano.
650 0 Operas.
600 10 Donne, John, ǂd 1572-1631 ǂv Musical settings.
600 10 Blake, William, ǂd 1757-1827 ǂv Musical settings.
700 10 Donne, John, ǂd 1572-1631.
700 10 Blake, William, ǂd 1757-1827.
etc.
**RDA in RDF: Example**

- **preferred title**: "The holy sonnets of John Donne"
- **agent**: Britten, Benjamin, 1913-1976
- **name**: "Britten, Benjamin, 1913-1978"
- **birth date**: "1913"
- **content type**: Songs (High voice) with piano
- **performed music**: tenor, piano
- **corresponding subject term or classification number**: "M1500.B827 H6"
- **form of musical notation**: analog
- **extent**: "3 sound discs" "417 428-2"
- **media type**: audio
- **carrier type**: audio disc
- **carrier type**: audio disc
- **publication date**: [1989]
- **publisher's location**: London**

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“Songs and proverbs of William Blake”
The RDF Graph Model

- conceptual framework that enables Linked Data
- independent of any specific syntax or metadata encoding
- encourages the use of controlled vocabulary

RDA in RDF – The End Result…

- many inter-connected controlled vocabularies
- no fixed bibliographic “records”
- data gathered from unbounded range of sources…
Implementation

- identify trusted data sources
- manipulate external objects, properties, and classes
- intelligent data caching
- globally shared cataloging
- enforce (!?) best practices in the library community
  - metadata creation
  - metadata management
  - resource sharing
  - exposure and discovery systems
<table>
<thead>
<tr>
<th>Label</th>
<th>Owner</th>
<th>Last Updated</th>
<th>Updated by</th>
<th>Actions</th>
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<tbody>
<tr>
<td>RDA Relationships for Works, Expressions, Manifestations, Items</td>
<td>Metadata Management Associates</td>
<td>2009-11-08</td>
<td>DianeH</td>
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<td>RDA Roles</td>
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<td>RDF</td>
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<td>Rising Stars</td>
<td>Necula Sabina</td>
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<td>sabinanecula</td>
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<td>SAAP Vocabulary</td>
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<td>2010-11-07</td>
<td>mbbons</td>
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<td>SKOS Community Extensions</td>
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<td>test</td>
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<td>gmdr</td>
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<td>Damian Iseminger</td>
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<tr>
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<td>chancana</td>
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<tr>
<td>Trials and Tests</td>
<td>Chris</td>
<td>2011-12-05</td>
<td>ChrisC</td>
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<tr>
<td>z test</td>
<td>Richard F</td>
<td>2011-07-07</td>
<td>Richard F</td>
<td></td>
</tr>
</tbody>
</table>

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Current Linked Data Projects

What the Library Community has done…

• RDA as registered properties in the Open Data Registry
• Library of Congress Bibliographic Framework Transition Initiative
• W3C Library Linked Data Incubator Group
• Stanford University Linked Data Workshop Technology Plan
• PCC Acceptable Headings Implementation Task Group - LC/NACO authority file conversion
• LC Genre/Form Headings
• Harvard Library Bibliographic Dataset