A Brief Introduction to RDF/Linked Data and RDA Registered Properties

Kimmy Szeto
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We built ISBD, AACR2 and MARC when most libraries kept their own set of catalog cards.

Today, library users expect online searches to reach everywhere in the world instantaneously.
Problems with ISBD, AACR2 and MARC:

- form their own separate bibliographic universe
- not enough globally unique identifiers
- fosters inconsistencies due to insufficient control

Solution?

- design a structure that is part of the data universe
- build standards and practices around networked users
- build in increased consistency, comprehensibility and extensibility
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 directed, labeled graphs
Each thing and each relationship has a “name” in the form of

- a “reference” – uniform resource identifier (URI)
- a blank / placeholder
- a “literal” – a actual character string, only used in objects for convenience

Sample URIs

- http://www.w3.org/1999/02/22-rdf-syntax-ns
- http://RDVocab.info/roles/author
- urn:isbn:0-8389-3594-X
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/FRBentitiesRDA/Manifestation
  - refers to the FRBR class of objects “Manifestation”

- http://rdvocab.info/uri/schema/FRBentitiesRDA/Name
  - refers to the FRBR class of objects “Name”

- http://rdvocab.info/uri/schema/FRBentitiesRDA/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
URI 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
The RDF Triple

Actual data values – “literals”

“Romeo and Juliet”

“Lugwig van Beethoven”

TRUE
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>The holy sonnets of</td>
<td>Benjamin Britten</td>
<td>028941742827</td>
</tr>
<tr>
<td>John Donne</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Romeo and Juliet</td>
<td>William Shakespeare</td>
<td>0-4864-7573-5</td>
</tr>
</tbody>
</table>

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

- Title: Romeo et Juliette, The holy sonnets of John Donne, Romeo and Juliet
- Author: Peter Ilich Tchaikovsky, Benjamin Britten, William Shakespeare
- Standard ID: 0-4862-5217-5, 028941742827, 0-4864-7573-5

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Each cell is a RDF triple

<table>
<thead>
<tr>
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<tbody>
<tr>
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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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Some more properties added, using labels

- work
- has preferred title: “The holy sonnets of John Donne”
- has agent
- person
- has name: “Britten, Benjamin”
- has birth date: “1913”
- has language: “en”
- is realized through expression
- expression
- has content type: “performed music”
- has media type: “audio”
- has carrier type: “audio disc”
- manifestation
- is embodied in
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Yet more properties added – involving other works

Sonnets (work) has derivative The holy sonnets of John Donne

is realized through

Notated music (expression) is embodied in

Score (manifestation) A heritage of 20th century British song

core (manifestation)

Benjamin Britten (person) has agent

has agent

Songs and proverbs of William Blake

is realized through

Performed music (expression) is embodied in

computer file (manifestation) audio disc (CD) (manifestation)

A heritage of 20th century British song

audio disc (LP) (manifestation)

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RDA …

• is a descriptive standard
• standardizes how metadata contents are identified, transcribed, and structured
• provides for the use of controlled vocabulary
• is independent of metadata encoding

MARC and RDF…

• are encoding standards
• both can be used to encode, or “express” RDA
RDA’s RDF Properties

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>
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></td>
<td></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>
</tr>
<tr>
<td>337a</td>
<td>Media type (Manifestation)</td>
<td><a href="http://rdvocab.info/Elements/mediaTypeManifestation">http://rdvocab.info/Elements/mediaTypeManifestation</a></td>
</tr>
<tr>
<td>336a</td>
<td>Carrier type (Manifestation)</td>
<td><a href="http://rdvocab.info/Elements/carrierTypeManifestation">http://rdvocab.info/Elements/carrierTypeManifestation</a></td>
</tr>
</tbody>
</table>
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RDA in RDF: Example

- **preferred title**: “La Jolla quartet”
- **agent**: Williams, John, 1932-
- **name**: Williams, John, 1932-
- **birth date**: 02-08-1932
- **corresponding subject term or classification number**: M482.W55
- **content type**: notated music
  - **medium of performance**: “clarinet, harp, violin, violoncello”**
  - **form of musical notation**: staff notation
  - **notation type**: unmediated
  - **extent**: “1 score (82 pages) ; 43 cm”
  - **carrier type**: unmediated
  - **volume**: [2010]
  - **publisher’s name**: “Marjer Publishing”
RDA in RDF: Example

040 RBN ‡c RBN ‡d OCL ‡d IUL ‡d OCL ‡d JNA ‡d OCL ‡d NZCPL ‡d JTA ‡d BTCTA ‡d ORX ‡d YQU ‡d OCLCG ‡d OCLCA ‡d MTG ‡d OCL ‡d IK2 ‡d EUX
028 00 417 428-2 ‡b London
050 4 M1500.B827 ‡b H6
100 1 Britten, Benjamin, ‡d 1913-1976.
240 10 Vocal music. ‡k Selections
245 14 The holy sonnets of John Donne ‡h [sound recording] ; ‡b Songs and proverbs of William Blake ; Billy Budd / ‡c Britten.
260 London : ‡b London, ‡c [1989]
300 3 sound discs : ‡b digital, stereo. ; ‡c 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, ‡d 1572-1631 ‡v Musical settings.
600 10 Blake, William, ‡d 1757-1827 ‡v Musical settings.
700 10 Donne, John, ‡d 1572-1631.
700 10 Blake, William, ‡d 1757-1827.

etc.

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RDA in RDF: Example

- **expression**
  - performer: Pears, Peter, Sir
  - performer: Britten, Benjamin, 1913-1976
  - performer: Fischer-Dieskau, Dietrich, 1925-

- **manifestation**
  - is embodied in
    - form of musical notation
    - publisher’s name
    - carrier type
    - publication date

- **expression**
  - is realized through
    - preferred title
      - "Songs and proverbs of William Blake"

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