# Moving to Linked Data: Cataloguing Outside the (MARC) Box Ian Bigellow (Georgian College), Stacey Boileau (OCLS), Danielle Emon (Loyalist College), Rosina Leung (Seneca College)

## INTRODUCTION

Linked data for libraries has been getting a lot of attention lately. Linked data offers the promise to free library metadata from its existing silos, making it available where our users are (the search engines). At the same time, linked data will incorporate the sharing of metadata in ways MARC has never allowed, bringing the opportunity for richer description, while simultaneously enhancing information retrieval through serendipitous browsing or semantic search.

With its underlying FRBR model, Resource Description and Access (RDA) places an emphasis on describing discrete metadata elements rather than records, using authorized access points, identifiers, and above all, joining them with relationships. Through this approach RDA provides a bridge for libraries to move towards linked data, however, libraries need to embrace these concepts, and many of us still exist in a MARC vacuum. Linked data and the semantic web are on the horizon for libraries, but how do cataloguers plan for this change?

Following RDA implementation, Ontario Colleges and the Bibliographic Standards Working Group (BSWG) set about updating local standards, working on an awareness campaign, training, and developing the OCLS Cataloguing Workflow to replace an existing manual.

While the OCLS Cataloguing Workflow's primary purpose is to adapt documentation for RDA, throughout the development of the workflow there was a certain tension evident between detailing current practice and planning for future changes. Ultimately it only seemed prudent to also take some small steps in adapting practice for linked data. This poster aims to outline several steps that can be taken now to prepare for linked data through the creation of descriptive metadata.

## **CONTEXT: RDA & LINKED DATA**



RDA is here and linked data will be a new reality for libraries. This may be through BIBFRAME, or other applications (Schema.org, ALIADA, or local development).

"RDA represents a revision to AACR2 that implements FRBR concepts and incorporates FRBR terminology. The convergence of RDA and FRBR will focus cataloging, or resource description, on the resources' relationships with each other and steer the process of retrieval and access toward navigating links through a hierarchy of relationships. This change in emphasis positions libraries to participate in the emerging Semantic Web." (Szeto, 2013, p. 306)

However, RDA will only position libraries to participate in the semantic web if we embrace these aspects of RDA. Consequently, the OCLS Cataloguing Workflow was developed with future data needs in mind, in order to help us move ou metadata from closed database silos,



### To linked data on the semantic web



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Create Resour

Marina Morgan (Mohawk College), & Irene Sillius (Sheridan College)

THE TRANSITION

## AACR2 in MARC/RDA in MARC/RDA in RDF

In order to prepare for future bibliographic metadata needs, we need to: 1. Acknowledge that MARC will be here for some time by continuing to provide instruction on using RDA in a MARC environment. 2. Ensure that our minimum content standards stay robust in the new linking and encoding environments.

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=245 10\$aFunctional requirements for bibliographic records :\$bfinal report /\$clFLA Study Group or

- =504 \\\$alncludes bibliographical references and index. 520 \\\$a"FRBR (Functional Requirements for Bibliographic Records) is a 1998 recommendation RBR uses an entity-relationship model of metadata for information objects, instead of the single f
- produce the biggest change cataloging has seen in the last century." (OCLC Research: http://www. =530 \\\$aAlso available in print.
- =538 \\\$aMode of access: World Wide Web =538 \\\$aSystem requirements: Adobe Acrobat Reader.

=650 \0\$aFRBR (Conceptual model

=538 \\\$aAvailable in PDF (1.2 MB) or HTML formats. =546 \\\$aText in English with some publication information in German, French and Spanish

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sl:systemDetails "Available in PDF (1.2 MB) or HTML formats.", "Mode of access: World Wide Web." "System requirements: Adobe Acrobat Reader."....

### MARC (present)

### MARC transformed into RDF

s1:mediaCategory "computer"

Library metadata in closed databases - very useful for resource discovery, but effectively invisible on the web.

- =024 7\\$ahttp://experiment.worldcat.org/entity/work/data/1840249565\$2uri
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- =264 \1\$aChicago :\$bNeal-Schuman, an imprint of the American Library Association,\$c2014.

### MARC living in parallel to linked data: through processes such as that used by the LibHub initiative, MARC data is transformed into RDF, making collection visible online through search engines.



Library metadata native to the web (Future)

An example of the BIBFRAME editor: library metadata native to the web, with RDA content standards preserved. This will allow for more visibility of library data, along with the potential to enrich resource discovery through linking of data sets and semantic search

RDA Work Elements - Monographs			
Creator of Work (RDA 19.2)	Principal Creator Other Creators		
Preferred Title for the Work (RDA 6.2.2)	Title		
Variant Title for the Work (RDA 6.2.3)	Title		
Form of Work (RDA 6.3)	Form of Work		
Date of Work (RDA 6.4)	Date of Work (RDA 6.4)	+	
Place of Origin of the Work (RDA 6.5)	Place		
Other Distinguishing Characteristic of the Work (RDA 6.6)	5) Other Distinguishing Characteristic of the Work (RDA 6.6)		
Nature of the Content (RDA 7.2)	2) Nature of the Content (RDA 7.2)		
Coverage of the Content (RDA 7.3)	.3) Coverage of the Content (RDA 7.3)		
Intended Audience (RDA 7.7)	7.7) Intended Audience (RDA 7.7)		
Dissertation or Thesis Information (RDA 7.9)	Dissertation or Thesis Information (RDA 7.9)	+	
Other Person, Family, or Corporate Body Associated With a Work (RDA 19.3)	Other Person, Family, Corporate Body Associated With a Work		
Subject of the Work (RDA Chapter 23)	Topic         Place         Person         Corporate Body         Family (LCSH)         Meeting         RDA Work Elements - Monographs		
DDC Classification (RDA Chapter 23)	Dewey Classification Information		
Related Works (RDA Chapter 25 and Appendix J)	RDA Work Elements - Monographs		
Contents Note (LC-PCC PS 25.1)	Contents Note (LC-PCC PS 25.1)	+	
Related Expressions (RDA Chapter 26 and Appendix J)	Related Expression		
Authorized Access Point Representing the Work (RDA 6.27.1)	Authorized Access Point Representing the Work (RDA 6.27.1)	+	
LC Control Number for the Work (RDA 6.8)	LCCN		
Your Cataloger Code and Comments	Your Cataloger Code and Comments	+	
	RDA Work Elements - Monographs Creator of Work (RDA 19.2) Preferred Title for the Work (RDA 6.2.3) Variant Title for the Work (RDA 6.3) Form of Work (RDA 6.3) Date of Work (RDA 6.4) Place of Origin of the Work (RDA 6.6) Other Distinguishing Characteristic of the Work (RDA 6.6) Nature of the Content (RDA 7.3) Coverage of the Content (RDA 7.3) Intended Audience (RDA 7.3) Dissertation or Thesis Information (RDA 7.9) Other Person, Family, or Corporate Body Associated With a Work (RDA 19.3) Subject of the Work (RDA Chapter 23) DDC Classification (RDA Chapter 23) Related Works (RDA Chapter 25 and Appendix J) Contents Note (LC-PCC PS 25.1) Related Expressions (RDA Chapter 26 and Appendix J) Authorized Access Point Representing the Work (RDA 6.27.1) LC Control Number for the Work (RDA 6.27.1)	Creater of Work (RDA 192)       Import Creater of Work (RDA 192)         Preferred Tils for the Work (RDA 202)       Till         Variant Tils for the Work (RDA 202)       Till         Creater of Work (RDA 202)       Till         Dater of Work (RDA 202)       Till         Creater of Work (RDA 202)       Till         Dater of Work (RDA 202)       Till         Other Distinguisting Creater of Work (RDA 202)       Till         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Distinguisting Creater of Work (RDA 202)       Till Monther of Work (RDA 202)         Creater Note (RDA Creater work (RDA 202))       Cill Monther of Work (RDA 202)	

RDA, with its underlying FRBR model, addressed the description of standard elements for library metadata. In a linked environment this means that key FRBR elements (Work, Expression, Manifestation, et cetera) can be more readily collocated for enhanced resource discovery and facetting, and linked to other data sets that can further enhance the research process. In this light, the OCLS Cataloguing Workflow uses a FRBR WEMI (Work, Expression, Manifestation, Item) structure to outline the process of resource description, while covering the description of FRBR group 1,2, & 3 entities throughout.

WHAT CAN WE DO NOW: A NEW APPROACH TO WORKFLOW

## **Step 1: Content First**

RDA with underlying FRBR outlines critical content for resource description, which lends itself to usage with many metadata formats. Libraries have been using MARC for a very long time, but the future may hold the potential for library metadata in many forms, stressing the importance for content driven workflows - cataloguing outside the (MARC) box!

While previous manuals have focused on a MARC driven approach (sometimes to the point that AACR was marginalized), the OCLS Cataloguing Workflow instead directs the user on how to record the requisite content. MARC instruction and examples are provided, reflecting our current operating environment, but in a more modular way so it can be lifted out of the workflow in future.

### 5.1 Construct the Authorised Access Point Representing a Work RDA 6.27.1 (1XX, 240, 245, 7XX MARC Fields)

This is a **requirement for the Minimum Standard** of the College Union Catalogue

- Definition: An Authorized Access Point is defined as "the standardized access point representing an entity". It is not an RDA element, but a name, term, code, etc., representing a specific entity and is reated by linking relevant components.
- Authorised access point for works include the following components: 1. Authorised access point for the preferred title RDA 6.2.2 2. Additions to the preferred title as instructed under RDA 6.27.1.9 3. Authorised access point for the creator RDA 19.2.1.1
- Note: In order to construct the authorised access point for works, you will need to first develop AAPs fo creators/preferred title

Tools like RIMMF (RDA in many metadata formats) highlight how FRBR can help organize our data and the focus on a content driven approach RIMMF data can be exported into several formats as illustrated below.

Relationship	∀ Heading	4	
B. Manifestation	Linked data for libraries, archives and museums : how to clean, link and publish your metadata. Facet Publishing. 2014. Online resource		
Expression manifested	Hooland, Seth van. Linked data for libraries, archives and museums. Text		
Given Work expressed	Hooland, Seth van. Linked data for libraries, archives and museums		
Related work	Hooland, Seth van. Linked data for libraries, museums, and archives		
Author	Verborgh, Ruben		
Author	Hooland, Seth van		
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Remove entity coloring   Remove entity coloring	Image: Close selected     Export       To use this form to delete records, launch it from     Select an exp       1     Select an exp       1     Online resource       0nline resource     RDF (Simple)       Access restricted to     RDF (Rimmf)	3 port format	

Key Workflow FRBR Elements				
Step 5. Work	Authorized Access Point for Work	Group 1 & 2		
	Record Other Creators responsible for Work	Group 2		
	Other persons, families, corporate bodies associated with work	Group 2		
	Related works	Group 1		
-	Relationships to concepts, objects, events and places	Group 3		
Step 6. Expression	Authorized access point for expression	Group 1		
	Record AAP for contributors to expression, e.g.,	Group 2		
-	Related expressions	Group 1		
Step 7.	p 7. Title and statement of responsibility			
Manifestation	Publication/Distribution/Manufacturing/Production and Copyrig	Group 2		
-	Record manifestation level relationships as needed	Group 2		
Step 8. Item	ep 8. Item Local practices as needed.			
Group 1 Entities:	Work, Expression, Manifestation, Item			
Group 2 Entities:	Person, Corporate Body			
Group 3 Entities:	oup 3 Entities: Concept, Object, Event, Place			

### Step 2: WEMI

Initial efforts in the development of the OCLS Cataloguing Workflow focused on describing the manifestation in hand first, however, the workflow was changed to a WEMI order so that:

I. Describing the work first requires the cataloguer to ask some of the big questions about a resource upfront, describing AAP and relationships for the work, then Expression, that are often neglected in a manifestation driven approach. 2. A WEMI approach is in close alignment with the development of BIBFRAME



Step 5: Record Attributes of Work (Distinct intellectual or artistic creation)	Create Authorized Access Point (AAP) for work Section 5.1 Record other creators responsible for work Section 5.1.2
	Record identifier for work Section 5.2
	Record notes for work Section 5.3
	Record relationships to persons, families, corporate bodies associated with work Section 5.4
	Record others associated with the work Section 5.5
	Record related works Section 5.6
	Create relationships to concepts, objects, events and places – Section 5.7
Step 6:	Create Authorized Access Point (AAP) for expression—Sections 6.1-6.5
(Intellectual/	Identifier for expression Section 6.6
that a work	Describe content Section 6.7
text, music,	Record Accessibility Content – Section 6.7.8
image, spoken word, <u>etc</u> )	Record expression level relationships of persons, families or corporate bodies associated with expression Section 6.8
3	Record related expressions Section 6.9
Step 7: Manifestation	Title Section 7.1
(Physical	Statement of responsibility Section 7.2
housing the	Edition, revision, or unpublished version of a resource Section 7.3
book, video, audio tane	Publication/Distribution/Manufacture/Production Section 7.4:
ebook, etc.)	Copyright date Section 7.5
	Issuing body Section 7.6
	Numbering and Frequency of serials Section 7.7
	Series Section 7.8:
	Identifiers of manifestation Section 7.9
	Extent Section 7.10
	Dimensions – Section 7.11
	Media and carrier type Sections 7.12 – 7.13
	System details - Section 7.14-7.17
	Manifestation level relationships Section 7.18

Step 8: Item Record attributes of the item – Section 8

Overall, the focus on describing resources needs to shift to describing a number of related elements, rather than bibliographic records. 1. Emphasize the use of authorized access points 2. Use identifiers whenever possible 3. Leverage the use of relationships in RDA and MARC wherever possible

As a result, the OCLS Cataloguing Workflow is driven by FRBR Group 1 elements (WEMI), and seeded with ample opportunity to build relationships with group 2 and 3 elements at every stage. By outlining the description of AAP, identifiers and relationships relevant to each respective WEMI element set, the cataloguer will begin to see resource description as a set of interrelated elements joined by relationships, rather than as a record. AIR elements are emphasized throughout the OCLS Cataloguing Workflow as outlined below:

BIGELOW, I., BOILEAU, S., EMON, D., LEUNG, R., MORGAN, M., & SILLIUS, I. (2015). OCLS CATALOGUING WORKFLOW. TORONTO, ON: OCLS. RETRIEVED FROM: https://www.ocls. ca/sites/default/files/attachments/OCLS CAT Workflow 23Oct 1.pdf CLARKE, R. I. (2015). BREAKING RECORDS: THE HISTORY OF BIBLIOGRAPHIC RECORDS AND THEIR INFLUENCE IN CONCEPTUALIZING BIBLIOGRAPHIC DATA. CATALOGING & CLASSIFICATION QUARTERLY, 53(3/4), 286-302. DOI:10.1080/01639374.2014.960988 COYLE, K. (2013, JULY 23). LINKED DATA FIRST STEPS & CATCH-21 [BLOG POST]. RETRIEVED FROM: <u>HTTP://KCOYLE.BLOGSPOT.CA/2013/07/LINKED-DATA-FIRST-STEPS-CATCH-21.HTML</u> GONZALES, B.M. (2014). LINKING LIBRARIES TO THE WEB: LINKED DATA AND THE FUTURE OF THE BIBLIOGRAPHIC RECORD. INFORMATION TECHNOLOGY & LIBRARIES, 33(4), 10-22 13P. RETRIEVED FROM: http:// //ejournals.bc.edu/ojs/index.php/ital/article/download/5631/pdf

SEEMAN, D., & GODDARD, L. (MAY 19, 2015). PREPARING THE WAY: CREATING FUTURE COMPATIBLE CATALOGING DATA IN A TRANSITIONAL ENVIRONMENT. CATALOGING & CLASSIFICATION QUARTERLY, 53, 331-340. SCHMACHTENBERG, M., BIZER, C., JENTZSCH, A. & CYGANIAK, R. (2014). LINKING OPEN DATA CLOUD DIAGRAM. RETRIEVED FROM: http://lod-cloud.net/ STAHMER, C. (2015). LINKED DATA IN THE LIBRARY WORKFLOW ECOSYSTEM. <u>https://www.youtube.com/watch?v=6MEyLLQshJY</u> SZETO, K. (2013). POSITIONING LIBRARY DATA FOR THE SEMANTIC WEB: RECENT DEVELOPMENTS IN RESOURCE DESCRIPTION. JOURNAL OF WEB LIBRARIANSHIP, 7(3), 305-321. DOI:10.1080/19322909.2013.802584

## Step 3: AAP, Identifiers, and Relationships

With the development of the OCLS Cataloguing Workflow, in addition to emphasizing RDA's underlying FRBR model, it became clear that in order to prepare for upcoming metadata needs, RDA's usage of authorized access points, identifiers and relationships (AIR) would need to be stressed.

The Resource Description Framework (RDF) used by linked data, organizes data into a series of triples, in the form:



"Catalogers must create data in MARC that will allow it to be batch processed into RDF automatically with the least amount of difficulty. Here again they can look to the fundamentals of data quality and require that the data produced during batch processing will be discrete, consistent, and semantically unambiguous." (Seeman & Goddard, 2015, p. 335)

### 024 7# \$ahttp://experiment.worldcat.org/entity/work/data/1840249565\$2uri

### 050 #4 \$aZ666.73.L56\$b.H66 2014

### 100 1# \$aHooland, Seth van,\$eauthor.\$0http://id.loc.gov/authorities/names/no2014097600

### 245 10 \$aLinked data for libraries, archives and museums :\$bhow to clean, link and publish your

### metadata

While we are still working within MARC, in this example the following elements can be drawn out:

		_
/ork	"Linked data for libraries"	
/ork lentifier	http://experiment.worldcat.org/entity/work/data/1840249565	
elationship esignator	"author"	This is starting to look like a triple!
rom linked ata set - as identifier	http://id.loc.gov/vocabulary/relators/aut	
erson	Hooland, Seth van	
lentifier for erson	http://id.loc.gov/authorities/names/no2014097600	

## REFERENCES

ALEMU, G., STEVENS, B., ROSS,, P., & CHANDLER. (2012). LINKED DATA FOR LIBRARIES: BENEFITS OF A CONCEPTUAL SHIFT FROM LIBRARY-SPECIFIC RECORD STRUCTURES TO RDF-BASED DATA MODELS. NEW LIBRARY WORLD, 113 (11/12), 549. doi:10.1108/03074801211282920

AMERICAN LIBRARY ASSOCIATION. (2010). RDA TOOLKIT. CHICAGO, ILL: AMERICAN LIBRARY ASSOCIATION. RETRIEVED FROM HTTP://ACCESS.RDATOOLKIT.ORG/

HILARIO, A. B. R., FERNANDEZ, T.R. AND CAMPO, D.M. (2014). FROM BIBLIOGRAPHIC RECORDS TO DATA: CHANGES IN THE LIBRARY ENVIRONMENT WITH THE APPLICATION OF LINKED OPEN DATA TECHNOLOGIES INFORMATION RESOURCES MANAGEMENT JOURNAL, 27.3 (JULY-SEPTEMBER 2014).

JING, J., TRIPP, E., BIGELOW, I., BOILEAU, S., & EMON, D. (2015, SEPTEMBER). THE IMPACT OF LINKED DATA IN DIGITAL CURATION AND APPLICATION TO THE CATALOGUER'S WORKFLOW. PRESENTATION AT THE ACCESSYYZ CONFERENCE, TORONTO, CANADA.

MCCALLUM, S. (2015). BIBFRAME UPDATE. Library of Congress. <u>https://www.youtube.com/watch?v=0-B0sUhGnKo</u>

MILLER, E. (2014, DECEMBER). MOVING FROM MARC: HOW BIBFRAME MOVES THE LINKED DATA IN LIBRARIES CONVERSATION TO LARGE-SCALE ACTION. PRESENTATION AT THE SEMANTIC WEB IN LIBRARIES CONFERENCE, BONN, GERMANY. SLIDES RETRIEVED FROM HTTP://SWIB.ORG/SWIB14/SLIDES/MILLER\_SWIB14\_57.PDF

SEARLS, D. (2009). SILOS. FLICKR. RETRIEVED FROM: https://www.flickr.com/photos/docsearls/5500714140/