



Linked and open data: RDA and bibliographic control

Alan Danskin

What is RDA?

Resource Description & Access (RDA) is a new content standard for describing resources and enabling access to them. This is often misunderstood, so I want to begin by clarifying what we mean by a content standard. Let's begin by thinking about an information resource; it could be any kind of resource, a book, a newspaper, a film, a song, a disk. How do we describe it? This is not as simple as it sounds. Cultural Heritage and information resources are complex and multifaceted. How do you describe a CD? Should you describe the disk, should you describe the content of the disk? How much of the content of the disk? What about the people associated with it? Are they a group or individuals? Where should we take the information from? What information is going to be useful? These are all valid questions, but are they all equally important? How do we know what is important? These are just some of the questions that RDA helps to answer. RDA will give you guidance on how to interpret the information on the resource. RDA will tell you what sources of information you should use. It will tell you how to record the title and how to gauge the significance of people or other enti-



ties associated with the resource. RDA is the latest manifestation of a cataloguing tradition that was developed in the 19th century. From a cataloguer's perspective, RDA has to do the same things that the Anglo-American Cataloguing Rules, 2nd edition (AACR2) have done for the last forty years, but the rapidly changing technological environment in which RDA has developed creates additional demands.

RDA is different from its predecessors, including Anglo-American Cataloguing Rules, which originated in an era when print was the dominant means of communication. RDA is one of the first general cataloguing codes to be created since digital began to supplant print as the dominant technology for communication. The negative reactions that greeted the drafts of RDA and which continue to be repeated can be attributed in part to the fact that RDA instructions and guidelines look very similar to AACR2. Many prospective users are disappointed because they feel that such a big technological change demands an equally big response in the instructions; and for some it calls into question the need for RDA at all. If there is relatively little change in RDA, what is the justification for adopting a new standard?

Justification and criticism

The original justification for RDA came from the conference on the future of AACR2, held in Toronto in 1997. The conference identified structural issues with AACR2 which were too deeply rooted to be corrected through the normal revision process. These included the confusion of content with carrier; arrangement by class of materials and the cultural bias of many instructions. Initial attempts to address these problems through a new edition of Anglo-American Cataloguing Rules (AACR) did not go far enough and RDA devel-

oped from the realisation that a new standard was need to address these issues.

Responses to the initial drafts of RDA were mixed. There were many who felt that AACR2 wasn't broken and didn't need to be fixed, but there were also many respondents who argued that RDA did not go far enough. Frequent criticisms were:

- RDA should be an open standard;
- RDA should be less like a cataloguing code and more like a data dictionary;
- RDA should be more explicitly structured around Functional Requirements for Bibliographic Records (FRBR).

Joint Steering Committee (JSC) took these concerns seriously and has addressed them. These issues have a bearing on RDA's compatibility with linked data.

Open standard

RDA is an open standard in the sense the any interested party can contribute to its development. Editorial control over the standard resides with the Joint Steering Committee for Development of RDA. JSC is made up of representatives of those communities already committed to RDA: the Australian Committee on Cataloguing (ACOC); the American Library Association (ALA); British Library (BL); Canadian Cataloguing Committee (CCC), Chartered Institute of Library and Information Professionals (CILIP) and Library of Congress (LC). In January 2012, the Deutsche Nationalbibliothek (DNB) became the most recent member. But you don't have to be a member of JSC or one of its constituencies to contribute to RDA development. Any organization or individual can suggest changes directly to the Chair

of JSC. In Europe, EURIG (European RDA Interest Group) offers an informal forum for discussion and collaboration.

RDA is open but not free. RDA development is paid for by charging for access to the standard. This is a common model for standards and it is fair in the sense that development is paid for by users. RDA has to be sustainable in the long term and no change to the business model can be considered until the investment has been recouped. It is recognised that not every user of RDA requires access to the instructions; therefore some content is being made freely available as Linked Open Data. The Committee of Principals agreed that the RDA element set and the RDA vocabularies should be placed in the public domain to enable their re-use. The element set and the RDA vocabularies are being published in the Open Metadata Registry (OMR).¹

Element set and metadata

RDA was developed to be independent of any specific schema or format.² RDA conforms to broad principles of good metadata³ practice. RDA is based on IFLA's FR family of models, which define the entities or objects of interest specified in RDA. The RDA element set corresponds to the attributes and relationships defined for those entities.

RDA gives definitions for each element and specifies how the content (or value representations) of the element should be recorded.

¹Open Metadata Registry <http://metadataregistry.org/>, RDA namespace <http://rdvocab.info/>.

²JSC. Statement of objectives and principles for RDA. 1 July 2009. 5JSC/RDA/Objectives and Principles/Rev/3 <http://www.RDA-jsc.org/docs/5rda-objectivesrev3.pdf>.

³JSC Encoding RDA data. 31 May 2007 5JSC/Editor/3, <http://www.RDA-jsc.org/docs/5editor3.pdf>.

RDA also incorporates some features of an application profile by specifying whether an element is considered to be core or non-core. An element is considered to be core if it is required to support a basic user task. Some elements are considered to be core only in particular circumstances or for particular types of resource.

RDA also specifies controlled lists of values or vocabularies, which are mostly open allowing new terms to be added to meet changing needs. A few vocabularies, such as the RDA/ONIX Framework for Resource Categorization (ROF), are closed. ROF was developed in conjunction with Editeur to provide a flexible, extensive set of attributes and values to describe both the intellectual content of a resource and the characteristics of its carrier (Dunsire, "Distinguishing Content from carrier: the RDA/ONIX Framework for Resource Categorization").⁴

FRBR and Functional Requirements for Authority Data (FRAD)

RDA is an implementation of two models: Functional Requirements for Bibliographic Records and the Functional Requirements for Authority Data (IFLA Study Group on the Functional Requirements for Bibliographic Records, *Functional Requirements for Bibliographic Records: Final Report*). RDA does not specifically implement the Functional Requirements for Subject Authority Data (IFLA Working Group on Functional Requirements and Numbering of Authority Records (FRANAR), *Functional Requirements for Authority Data: A Conceptual Model*), which was developed too late for inclusion. In response to criticisms (based on early drafts) that RDA was not suf-

⁴RDA/ONIX Framework for Resource Categorization, version 1.0 (Released 1 August 2006). 5JSC/Chair/10, <http://www.RDA-jsc.org/working2.html#chair-10>.

ficiently “FRBRised”, JSC comprehensively revised the structure to relate the sequence to the FRBR and FRAD models.⁵

Few current cataloguing systems or schema use the FRBR or FRAD models. Three possible implementation scenarios were identified for migration to RDA:⁶

- scenario 1: fully relational or object oriented database structure;
- scenario 2: Integrated Library System (ILS) structure, with separate bibliographic, authority and holdings records;
- scenario 3: flat file structure in which the bibliographic record is the vehicle for all the metadata.

To support migration from scenarios 2 and 3, RDA includes features which are rightly regarded as out of place in a modern metadata standard. For example, RDA provides detailed instructions on how to build authorized access points by stringing metadata attributes together into a unique key. For example, the authorised access point for the work *Bleak House* would be:

Dickens, Charles, 1812-1870. Bleak House

The authorised access point for a French translation would be:

Dickens, Charles, 1812-1870. Bleak House. French

This is the kind of data currently required by some systems. In a relational database system the string would be replaced by an identifier representing an authority record for the work; in a linked data context the different components and the relationships between them would be represented by URIs.

⁵JSC RDA Scope and Structure. 1 July 2009. 5JSC/RDA/Scope/Rev/4, <http://www.RDA-jsc.org/docs/5rda-scoperev4.pdf>.

⁶JSC RDA, FRBR/FRAD Implementation scenarios. 23 January 2008. 5JSC/Editor/4, <http://www.rda-jsc.org/docs/5editor4.pdf>.

RDA as linked data

RDA was originally conceived of at a less granular level than Resource Description Framework (RDF) properties, but that is not a barrier to its use in a linked data context. Meaningful linking between resources is inherent in RDA.

RDA Appendix J defines relationship designators to enable consistent and explicit linking between bibliographic resources. Drawing upon Tillett's taxonomy of bibliographic relationships, RDA makes it possible to express derivative, descriptive, whole-part, accompanying, equivalent or sequential relationships (Tillett); refinement of terms enables nuances of the relationship to be expressed. For example, *The bored of the rings* is a derivative work, which is an imitation of, or more explicitly, a parody of, *The lord of the rings*. Approximately 200 bibliographic relationships are specified in RDA. RDA Appendix I defines relationship designators to connect resources to persons, families, or corporate bodies. For example Charles Dickens is the author of the work *Bleak house*; Andrew Davies is the screenwriter of the 2005 work *Bleak House*.

The relationship designators specified in appendices I and J have been registered on the Open Metadata Registry. Seventy five RDA vocabularies have also been registered in the OMR. The vocabularies constitute a rich source of metadata, with applications beyond libraries. The vocabularies range from Applied material to Video Format and encompass terms as diverse as spoken word: (Content type), quarterly (Frequency); female (Gender); serial (Mode of issuance). A total of 810 terms have been registered in vocabularies. RDA vocabularies have great potential for reuse. The relationship designators are particularly valuable for explaining why x is related to y, but it is important to be aware that they are not yet stable. The majority of RDA terms in OMR currently have the status "New Proposed". JSC, with the assistance of Metadata Management Asso-

ciates, is in the process of changing the status to “published”.

At present, only a relatively small number of vocabularies have been published because JSC is confirming definitions for all of the terms. This process has inevitably raised some issues regarding duplication of terms between vocabularies and the forms of terms. JSC intends to resolve these issues before publishing the terms. Publication of the terms in the OMR signals to the community that the URIs for the concept represented by the term can be reused with confidence. The RDA elements are also registered on OMR with the status of “New-Proposed”. JSC is reviewing the RDA element set based on feedback from testing and extensive discussions with Metadata Management Associates (MMA). JSC has to be confident that the element set is stable before the elements are published. Several difficult issues have had to be resolved in order to attain the required level of confidence.

Constrained or unconstrained elements

An aspect of the linked data vision is that metadata can break down barriers, including those silos erected within the cultural heritage sector to meet the specific needs of museums, archives and libraries. Placing constraints on linked metadata elements is a barrier to reuse. For example, RDA Publisher’s Name is an RDF property with domain manifestation. This is consistent with the FRBR model but it makes the element unattractive to users or communities who do not perceive a need to distinguish between Work, Expression Manifestation and Item. It has taken some time for JSC to understand these perspectives and from JSC’s perspective an element set without FRBR cannot be RDA. It was therefore agreed that an unconstrained (or unbound) element set should be created in addition to the constrained elements. As illustrated below, the constrained RDA

elements have been modeled as sub-properties of the unconstrained elements. In this example the constrained element is currently distinguished by a parenthetical qualifier in the label. Publisher's name (Manifestation) has domain Manifestation, as is reflected in the URI. The unconstrained element Publisher's Name is the "parent" of the constrained element, "Publisher's name (Manifestation), but its own domain is unbounded. The registration of constrained and unconstrained elements in the same namespace is likely to be confusing to prospective users and will also complicate dissemination of information about the element sets. Different options for resolving these problems are being discussed by the stakeholders and need to be resolved before the elements can be published.

The RDA namespace also includes FRBR entities for RDA element set. This element set was registered because FRBR and FRAD entities were required by RDA but had not been registered by IFLA.

Interoperability and mapping

In addition to FRBR and RDA, the International Standard Bibliographic Description element set was published on the OMR in 2011; basic MARC 21 elements have also been published and the Dublin Core Element set has been available since 2008. The increasing availability of element sets and vocabularies in RDF creates new possibilities for interoperability and mapping. At the JSC meeting in Glasgow, in 2011, Gordon Dunsire reported on work to map between the RDA and International Standard Bibliographic Description (ISBD) element sets and vocabularies (Dunsire, "Mapping ISBD and RDA element sets: briefing/discussion paper"; "Mapping ISBD Area 0 vocabularies to RDA carrier and content"). Two different approaches were followed.

The ISBD Area 0 vocabularies and the RDA vocabularies for content

type, media type and carrier type were mapped in a hub and spoke model to the RDA/ONIX Framework for Resource Categorization.

The ISBD and RDA element sets were mapped using the element definitions and scope notes and the more explicit semantics in property and class declarations. The exercise implied that RDA and ISBD elements are sub-properties of other properties, which have neither ISBD nor RDA as domains or ranges. To put it another way, unconstrained or unbounded elements could support mapping between the constrained ISBD and RDA element sets.

At the DCMI UK Regional Meeting hosted by the British Library in April, 2012 Dunsire explored these ideas further, using MARC 21 and Dublin Core. A significant implication of this work is that it is possible to build mappings between element sets which have different levels of specificity. Therefore it is possible to link MARC 21 "Target audience"; Dublin Core Terms "audience"; FRBR "has intended audience"; and RDA "intended audience" by means of an unconstrained property "intended audience", which can itself be link to ISBD "has note on use or audience" through a further unconstrained property, "has note on use or audience. Rich RDA metadata linked as sub-properties of less granular elements can be dumbed-up into simple Dublin Core for applications that don't want RDA ("Turtle Dreaming").

Similar approaches could be followed for other metadata schema with wider application than libraries. There is much common ground between RDA and Friend of a Friend (FOAF); both define properties of the person. The registration of RDA properties in RDF will enable a more rigorous comparison of their semantics and how and whether they relate will become clearer. For example, RDA does not refine the components of a personal name, but FOAF does have properties for given name and family name.

Internationalization

One of the objectives of RDA was to internationalize the instructions. Much work has been done to remove AACR2's cultural bias and RDA is already being translated into several languages, including German, French and Spanish. In the OMR URIs representing elements or controlled terms can have labels and definitions specific to each language community. This holds out exciting possibilities in future for metadata which can be presented in the language appropriate to a specific audience or even to a specific user.

Bibliographic framework

Realising the benefits of RDA has always been dependent on the development of schemata and systems to unlock its potential. Linked data concepts, developing more or less concurrently with RDA, offer exciting possibilities to make library metadata open and actionable. But linked data also has to demonstrate its ability to meet the demanding requirements of resource discovery and data management. Nor is RDA only about the metadata we create tomorrow, unlocking legacy metadata, which represent humanity's literary and intellectual heritage is at least important.

Library of Congress announced the Bibliographic Framework Transition Initiative in early 2011. The initiative is intended to map a path from the current bibliographic framework, built upon the exchange of MARC records, towards a new framework in which library metadata can be shared and reused without being transported and replicated. In October, we learned that the framework would be looking towards solutions based on RDF and linked data. In May, LC announced the appointment of Zepheira to lead a modelling

initiative to translate MARC 21 into a linked data model.⁷

At last, the pieces are coming together which will enable the links to be forged.

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⁷Bibliographic Framework Transition Initiative
<http://www.loc.gov/marc/transition/>.

ALAN DANSKIN, British Library.
alan.danskin@bl.uk

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ABSTRACT: Resource Description & Access (RDA) is a new cataloguing standard which will replace the Anglo-American Cataloguing Rules, 2nd edition, which has been widely used in libraries since 1981. RDA, like AACR2, is a content standard providing guidance and instruction on how to identify and record attributes or properties of resources which are significant for discovery. RDA is also an implementation of the FRBR and FRAD models. The RDA element set and vocabularies are being published on the Open Metadata Registry as linked open data. RDA provides a rich vocabulary for the description of resources and for expressing relationships between them. This paper describes what RDA offers and considers the challenges and potential of linked open data in the broader framework of bibliographic control.

KEYWORDS: Library linked data; RDA; Bibliographic control

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