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The Road to BIBFRAME: The Evolution of the Idea of Bibliographic Transition into a Post-MARC Future

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This article provides a representative overview of literature related to the idea of replacing MARC with a linked-data metadata structure, covering the period from 2002 through the 2012 release of the draft of the proposed bibliographic framework, BIBFRAME. Works proposing the replacement of MARC or exploring linked data in a library context are examined. In particular, key documents leading to the creation of the Library of Congress Bibliographic Framework Transition Initiative are examined, along with some of the critical responses they received, to better understand the chain of ideas shaping BIBFRAME.

KEYWORDS *BIBFRAME, MARC standards, bibliographic framework, transition*

INTRODUCTION

On November 21, 2012, the Library of Congress announced BIBFRAME, short for Bibliographic Framework, a new contender in the struggle to replace the venerable MARC with a more modern metadata encoding format.¹ BIBFRAME is a linked data entity-relationship model based on the Resource Description Framework (RDF), featuring four main classes of entities: *Creative Work* (often shortened to *Work*), *Instance*, *Authority*, and *Annotation*² (WIAA). As of this writing, BIBFRAME is not a finished product ready for implementation,

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but a draft open for comment and revision.³ In order to understand the future promised by BIBFRAME, it is useful to examine the past. This article traces the evolution of ideas over the last decade, from the spreading awareness of the necessity of replacing MARC to the developing consensus regarding what functions and form a viable MARC replacement would need, thus explicating the chain of concepts shaping BIBFRAME.

This is not a comprehensive literature review. Rather, this article begins with a representative overview of the seminal literature that has shaped the discussion around replacing MARC. While cataloging rules and bibliographic formats are often intertwined, especially in the minds of catalogers, the migration from the *Anglo-American Cataloguing Rules*, Second Edition (AACR2) to *Resource Description and Access* (RDA) is an issue independent of the prospective migration from MARC to a new format, and is not covered here. As a conceptual model, the Functional Requirements for Bibliographic Records (FRBR) is also independent of AACR2, RDA, and MARC. However, RDA has been built around FRBR, and an RDA-compliant bibliographic format would be expected to support the types of relationships defined in FRBR. Thus, this article considers the degree to which BIBFRAME is compatible with FRBR and RDA. Following the review of the relevant literature is a discussion on the implications of BIBFRAME for libraries in general.

MUST MARC DIE?

Although Roy Tennant assuredly was not the first to suggest replacing MARC with a newer metadata structure, his brief, provocatively titled 2002 article “MARC Must Die!”⁴ lit fire to the idea among catalogers at all levels. In point of fact, his attack was not strictly limited to MARC, as he admitted to “conflating several interrelated things. There are the MARC syntax, the MARC data elements, and the *Anglo-American Cataloguing Rules* (AACR). These pieces are so intertwined that teasing out which must be jettisoned and which can be kept will be at least as difficult as starting from scratch.”⁵ A month later, Tennant published a follow-up article, clarifying why he believed MARC was too limited to serve modern needs, particularly that it was inflexible and too bound up with treating the book as a physical object, resulting in a proliferation of many records for the same content.⁶ He offered Extensible Markup Language (XML) as a flexible and hierarchical alternative, and proposed several “exit strategies” for leaving MARC behind, with a preference for saving the data from existing MARC records through automated migration into a new standard.⁷

FRBR⁸ had already been out for five years when Tennant called for the death of MARC. FRBR is a conceptual model for describing relationships between bibliographic entities, defined as *Work*, *Expression*, *Manifestation*,

and *Item*⁹ (WEMI). Although FRBR did not explicitly advocate any particular metadata standard, it suggested that MARC could not adequately express the entity-relationship model.¹⁰

In 2004, *Library Hi Tech* published two special issues on MARC and metadata, showcasing many viewpoints and projects. Leif Andresen described the development of multiple parallel MARC formats, and then compared MARC 21, the current standard in the United States, with danMARC, the Danish standard,¹¹ providing a vivid reminder that MARC was never a monolithic standard, but a fragmented family of similar standards. This adds a potential layer of complexity to the logistics of migrating from MARC to BIBFRAME or any other new standard, because the same metadata translation tools may not work for all variations of MARC. Although USMARC (United States) and CAN/MARC (Canada) were harmonized and republished as MARC 21 in 1999 and the British Library adopted MARC 21 as a replacement for UK-MARC (United Kingdom) in 2004,¹² UNIMARC (UNiversal MARC) continues to be maintained and developed by the International Federation of Library Associations and Institutions (IFLA),¹³ and even MARC 21 has a multiplicity of subtle variations for different languages and countries.¹⁴ Potential solutions might include building multiple translation tools into BIBFRAME, translating MARC variants first into standard MARC 21 as a transitional step, or creating multiple variations on BIBFRAME, corresponding to each variation of MARC.

Also in the *Library Hi Tech* metadata special issues, Roy Tennant offered a list of requirements for a new bibliographic metadata infrastructure, including “versatility,” “extensibility,” “openness,” “transparency,” a “low threshold” for entry, a “high ceiling” for complexity, “cooperative management,” “modularity,” “hierarchy,” “granularity,” and “graceful” handling of failed searches.¹⁵ Tennant further recommended the Metadata Encoding and Transmission Standard (METS) as an XML-based “transfer schema” that could receive any metadata package.¹⁶ It is worth noting that BIBFRAME, based in RDF and encoded in XML, has the potential to meet all of the requirements on Tennant’s list.

In the same issue, Karen Coyle stated that the functions of a bibliographic record went beyond the “find,” “identify,” “select,” and “obtain” described by FRBR,¹⁷ and offered her own list of tasks that must be supported: “description,” “discovery,” “location,” “purchase,” “preservation,” and “promotion.”¹⁸ At first glance, Coyle’s list seems to lack any overlap with Tennant’s list of requirements. However, the infrastructure *qualities* listed by Tennant would support the user *functions* delineated by Coyle.

Coyle cautioned that simply moving the MARC record structure into an XML format would “not necessarily encourage any modification of the fundamental content of the MARC record.”¹⁹ Observing that our current MARC record structure has two levels (bibliographic records and holdings records), Coyle expressed doubts about FRBR’s four-level WEMI structure, noting that,

“In fact, we may have more or fewer levels, but the exact number of levels is not important.”²⁰ What is important is the object-oriented relational database model, where “qualities and data elements of higher levels are inherited by the linked levels below them.”²¹

Coyle was not the only one considering entity relationships beyond FRBR’s WEMI. The seeds of BIBFRAME’s WIAA entities can be seen as early as 2003, when Lorcan Dempsey defined *Annotation* as “a user-oriented application, where [sic] users or groups of users might be able to add sharable or local annotations to a resource,”²² which seems notably similar to BIBFRAME’s later usage of *Annotation*.²³ Dempsey explored issues of interoperability and converting or crosswalking metadata from one schema to another, describing the loss of granularity that can occur, for example, when converting records from MARC to Dublin Core.²⁴ Although he was not yet addressing a permanent migration from MARC to another schema, many of the same issues apply.

As libraries seriously explored the future of cataloging, they often came to the conclusion that non-MARC metadata was key. The University of California Libraries considered Dublin Core, Learning Object Metadata (LOM), and Visual Resources Association (VRA) Core as alternatives to MARC for certain cataloging projects,²⁵ but not necessarily as a wholesale replacement for MARC, which they viewed as continuing to have a role.²⁶ Indiana University likewise expected to pursue VRA Core, Metadata Object Description Schema (MODS), Encoded Archival Description (EAD), and Text Encoding Initiative (TEI) as metadata formats “in addition to MARC.”²⁷ It is worth noting that Dublin Core, VRA Core, LOM, EAD, TEI, and MODS are all XML-based metadata schemas.²⁸ Whatever the details for a MARC replacement, XML encoding was assumed and assured.

At first, RDF may not seem an inevitable characteristic of a MARC replacement. Recall Roy Tennant’s push for METS²⁹ and the efforts to convert MARC to Dublin Core,³⁰ neither of which is inherently bound to RDF. However, if it is desirable for the new framework to utilize linked data, as will be supported in the next two sections, then it makes sense to develop a MARC replacement in accordance with the widely used linked data standards of the World Wide Web Consortium (W3C). Indeed, there is some debate within the linked data community as to whether something can even be considered “linked data” without RDF.³¹ RDF is considered to be more “machine processable” than other metadata schemas.³² Further, a great many library metadata element sets have already been published as RDF vocabularies, including Dublin Core, MODS, EAD, TEI, VRA Core, International Standard Bibliographic Description (ISBD), various FRBR ontologies, RDA Group 1 elements, and the entirety of MARC 21 itself.³³ BIBFRAME has the potential to draw from any or all of these existing RDF vocabularies.

A decade after Tennant declared, “MARC must die!”³⁴ Diane Hillmann asked, “Is MARC dead?” and then answered, “The communication format is

very dead.... The semantics are not dead.”³⁵ Hillmann described a “loss-less” way to map all MARC data, not merely a selection, into RDF.³⁶ The implication was that it was past time to accept MARC’s demise and move on.

THE CALHOUN REPORT

In 2006, the Library of Congress commissioned a report by Karen Calhoun, entitled *The Changing Nature of the Catalog and Its Integration with Other Discovery Tools*.³⁷ Combining a literature review with structured interviews, the report examined the existing state of library catalogs, changing needs, and prospects for the future.³⁸ Although the term *linked data* was not coined by Tim Berners-Lee³⁹ until several months after the release of Calhoun’s report, Calhoun was clearly thinking in that direction when she referred to “linked pools of data”⁴⁰ and recommended that libraries “prepare for linkages in and out of the catalog and/or ILS [Integrated Library System].”⁴¹ She stressed the importance of interoperability and data sharing.⁴² Although Calhoun acknowledged the possibility that future needs might require changing “how MARC data is packaged” to an XML-based standard, “the consensus [among interviewees] was that MARC is not going anywhere.”⁴³

Also noteworthy was the Calhoun report’s recommendation to abandon *Library of Congress Subject Headings* (LCSH) in favor of keywords alone, which went so far as to suggest that the Library of Congress actually “dismantle LCSH.”⁴⁴

Thomas Mann, writing for the Library of Congress Professional Guild, penned a scathing response to the Calhoun report, taking issue especially with the application of a business model to research libraries, which he perceived as being anti-scholarship.⁴⁵ Mann had an irreconcilable philosophical disagreement with Calhoun, expressing his preference for academic libraries as a scholarly “niche,” which he justified on the grounds that the needs of serious scholars were more important to society than the lowest-common-denominator needs of casual information seekers.⁴⁶ Although it is tempting to dismiss Mann’s response because of his defensive tone, Mann’s detailed exposition on the value of LCSH, controlled vocabulary, and left-anchored subject browsing is worthy of attention.⁴⁷

Indeed, outside of libraries, most metadata creators independently discovered the value of controlled vocabulary, and most metadata standards include the recommendation or requirement to use controlled vocabulary for subject elements.⁴⁸ Whether or not some form of LCSH will continue to be the sole or primary source of controlled subject vocabulary for libraries remains to be seen, but BIBFRAME enshrines the concept of controlled vocabulary with its inclusion of *Authority* as one of the four main classes of the WIAA model.⁴⁹

ON THE RECORD

In 2008, the Library of Congress Working Group on the Future of Bibliographic Control published a report titled *On the Record*.⁵⁰ The Working Group's guiding principles were redefining "bibliographic control" to be broader than the traditional domain of cataloging, recognizing that the "bibliographic universe" included a much wider range of participants than libraries and publishers, and acknowledging that the Library of Congress was not able to fulfill all of the roles expected of it by the broader U.S. library community.⁵¹

The report covered a lot of ground, including the recommendation to develop a plan for the "realization of FRBR."⁵² The value of controlled vocabularies and authority control was emphasized,⁵³ an about face from Calhoun's recommendations regarding LCSH, and a foreshadowing of BIBFRAME's focus on authorities. Importance was given to "managing relationships—among works, names, concepts, and object descriptions—across communities"⁵⁴ a hint of the entity-relationship model to come.

However, MARC reform mostly seemed to fall under the aegis of the recommendation to "position our technology for the future."⁵⁵ The report firmly stated that MARC "is out of step with programming styles of today"⁵⁶ and called for "a format that will accommodate and distinguish expert-, automated-, and user-generated metadata, including annotations (reviews, comments) and usage data. Flexible design should allow for the selective (modular) use of metadata in different environments (e.g., use of controlled vocabularies appropriate to specific domains)."⁵⁷ As an action step, the Working Group recommended that the Library of Congress "work with the library and other interested communities to specify and implement a carrier for bibliographic information."⁵⁸ The implication was that it was time to stop talking about replacing MARC and actually get to work building its replacement. The Library of Congress heeded the recommendation with the creation of the Bibliographic Framework Transition Initiative,⁵⁹ which will be examined in greater detail below.

Thomas Mann returned with an inflammatory response to *On the Record*.⁶⁰ He seemed to have misunderstood some of the intent of the Working Group's report, getting caught on the idea of non-librarians contributing to LCSH within the library environment,⁶¹ which was not what the Working Group actually proposed. Rather, the Working Group suggested translating LCSH into a linked data format, making it available for use outside of libraries (while still being maintained by librarians); facilitating greater use of non-LCSH controlled vocabularies by libraries; and building connections between LCSH and other controlled vocabularies.⁶² However, Mann did offer a "concrete example" of the type of subject searching that might become impossible in a Web environment,⁶³ and it is valuable to consider whether

the type of functionality offered by a browsable list of cross-references with detailed subdivisions may be preserved in some fashion.

Meanwhile, Deanna Marcum provided the Library of Congress' official endorsement of the *On the Record* report.⁶⁴ Regarding the recommendation to develop a new metadata carrier, the Library of Congress supported the idea, but expressed the conviction "that Z39.2 and the MARC record structure (ISO 2709) will have an important role for the foreseeable future."⁶⁵ The report mentioned the Library of Congress's work on MARCXML and its efforts to map MARC to other metadata standards since 1991.⁶⁶

Regarding *On the Record*, Janet Swan Hill observed that, individually, "most recommendations were not controversial or particularly radical, at least in concept."⁶⁷ What was radical was how the combination of recommendations interwove to form a "new universe" that would "require substantial change in the way we view ourselves, our libraries, our collections, our finding tools, our work, and our obligations to each other."⁶⁸ Hill made the observation that librarian "uproar" over the Library of Congress' earlier decision, made without input from other libraries, to cease series authority control may have influenced the Library of Congress' approach to the Working Group on the Future of Bibliographic Control, which solicited and incorporated extensive input from librarians outside the Library of Congress.⁶⁹

By late 2009, the OTR Report Implementation Working Group at the Library of Congress had prepared a set of official strategies and a plan of action regarding the recommendations from *On the Record*.⁷⁰ This implementation report included little related to the development of a MARC replacement, except for the provision to offer grants "to support research projects to develop a more flexible, extensible metadata carrier."⁷¹

YEE'S CATALOGING CODE

In 2009, Martha Yee boldly—and independently—created her own RDF model of cataloging rules,⁷² following the FRBR model even more faithfully than RDA does.⁷³ She described her vision of the future of the Semantic Web as "a new RDF-based Web consisting of data encoded as classes, class properties, and class relationships (semantic linkages), allowing the Web to become a huge shared database."⁷⁴ Her model was "degressive," such that data expressed at higher levels of the hierarchy would not need to be input repetitively at lower levels.⁷⁵ In object-oriented programming, this principle is called inheritance.⁷⁶ She explained RDF triples in language familiar to catalogers, observing similarities in the FRBR and RDF models and correlating FRBR's concepts of *entity*, *attribute*, and *relationship* to RDF's *subject*, *object*, and *predicate*, respectively.⁷⁷

Yee operated on the assumption that researchers who need "structured and granular data" with high-precision retrieval are a minority whose

importance to the overall culture cannot be overlooked.⁷⁸ In that way, her model addressed the concerns of Mann's camp, while still moving library catalog data into a linked data framework. In creating her model, she wrestled with the inverse relationship between complexity and interoperability,⁷⁹ indexing and display issues,⁸⁰ and distinctions between different types of metadata.⁸¹ She posited a series of questions about RDF, along with the reasoning behind her decisions.⁸²

Karen Coyle, believing that Yee had misunderstood some RDF concepts,⁸³ wrote a detailed commentary on Yee's paper, responding to each of Yee's questions over the course of six blog posts (later compiled into a unified page on *futurelib* wiki).⁸⁴ Coyle observed that part of the issue was that Yee, like most librarians, thought in terms of bibliographic records; however, RDF is not a record format, but merely a mechanism for expressing relationships between pieces of data.⁸⁵ Eric Hellman, also commenting on Yee's work, suggested that one of the stumbling blocks for the library community is that library metadata has long been focused on human use, while Semantic Web technologies require that metadata be optimized for machine use.⁸⁶

Although Yee created her rules as a thought experiment, not intended for actual implementation,⁸⁷ the discussion generated in response to her work illustrated the struggles librarians were having—and are still having—in understanding the nature of linked data, the Semantic Web, and RDF. A reading of Yee's work and Coyle's response provides a good primer on RDF for librarians.

RDA

In 2010, OCLC published a report that sought to determine which MARC tags were essential for “good enough” cataloging, as determined by existing patterns of usage.⁸⁸ The problem, of course, was that the needs of different users of MARC metadata differ widely, and what is “good enough” for one agency may overlap only minimally with what is “good enough” for another; thus, the report determined that “for a wide range of MARC tags there is little consistency beyond a core set.”⁸⁹ In order to realize the vision presented by FRBR and RDA, a relational, linked data system would be required, for which MARC was unequivocally not up for the task, and OCLC recommended giving priority to building interoperability between MARC and other existing metadata schemas while planning to permanently crosswalk “legacy” MARC records into a yet-undetermined schema.⁹⁰ The bulk of the report comprises page after page of tables, detailing each MARC tag's frequency of occurrence in WorldCat,⁹¹ which MARC tags and subfields are used for machine matching by five major union catalogs or aggregators,⁹² and other detailed usage patterns. This hard data, in laying bare which MARC fields are heavily

used and how they are used, should be invaluable in building the desired crosswalk and deciding the priority of MARC fields for translation.

In 2011, the U.S. RDA Test Coordinating Committee released their report, firmly stating that RDA should not be implemented until “credible progress towards a replacement for MARC” was underway, with a timeline of 18 to 24 months offered for this task.⁹³ This served as an oblique acknowledgment that changing the cataloging rules without upgrading the catalog metadata-encoding framework would not effectively improve library systems.

Agreement on the need to retire MARC was not, and at the time of this writing is still not, universal. A 2011 report by Michele Seikel and Thomas Steele detailed the history of MARC and its various transformations.⁹⁴ This report, published just before the recommendations of the U.S. RDA Test Coordinating Committee, made no mention whatsoever of non-MARC alternative formats, demonstrating optimism that, having already changed so much, MARC could continue to evolve to suit modern needs. Given that even the Calhoun report⁹⁵ and the Library of Congress’ endorsement of the *On the Record* recommendations⁹⁶ both suggested that MARC could linger indefinitely, this belief is neither unrealistic nor regressive. And indeed, new MARC fields have been added to accommodate the requirements of RDA.⁹⁷

THE BIBLIOGRAPHIC FRAMEWORK TRANSITION INITIATIVE

Following the Working Group on the Future of Bibliographic Control, the Library of Congress created an initiative, headed by Deanna Marcum, to transform the library’s bibliographic framework.⁹⁸ Marcum announced that the library would experiment with linked data and with making entity relationships navigable for users, and they would explore non-MARC metadata, although they hedged a bit, saying they would “consider MARC 21, in which billions of records are presently encoded, as well as other initiatives.”⁹⁹ The initial announcement also mentioned that they would “explore the use of promising data models such as Functional Requirements for Bibliographic Records (FRBR) in navigating relationships.”¹⁰⁰ That little phrase “such as” hinted that the coming bibliographic framework might not be strictly based on FRBR.

By October 2011, the initiative, sometimes denoted as the Bibliographic Framework Transition Initiative,¹⁰¹ and sometimes as the Bibliographic Framework Initiative,¹⁰² announced their general plan. With a focus on linked data, and a commitment to maintaining compatibility with existing MARC records, they intended to replace MARC with a new bibliographic framework that would be “an environment rather than a ‘format’” and which would be “agnostic to cataloging rules.”¹⁰³ That is, it would not be tailored to fit AACR2 or RDA. This, perhaps, makes good sense, particularly in view of Roy Tennant’s complaint that AACR2 and MARC were so intertwined that

it would be impossible to separate them.¹⁰⁴ Keeping the new carrier framework separate from the new content rules seems like an attempt to avoid a repeat of that situation.

Eric Miller of Zepheira, the company with which the Library of Congress partnered to develop this new bibliographic framework (the same company that was involved with OCLC's kindred Schema.org linked data initiative),¹⁰⁵ discussed the difficulties in deconstructing MARC records, which are very rich in information, but very poor at expressing relationships between those pieces of information in patterns that can be easily identified by computers for conversion to linked data.¹⁰⁶ He also stressed the value of controlled vocabulary for linked data on the Web, explaining how at curated "control points," non-library metadata communities could link to, use, and "add value" to library data.¹⁰⁷ He described the Bibliographic Framework Initiative's approach as "very light FRBR-esque."¹⁰⁸

During early stages of development, the MARC replacement was referred to as MARCR, for MARC Resources, emphasizing the intent to "deconstruct" bibliographic records into smaller resources, such as author, publisher, and subject components.¹⁰⁹

BIBFRAME

On November 21, 2012, the Library of Congress released a primer for the BIBFRAME model.¹¹⁰ The RDF vocabulary for BIBFRAME, not available at the time the primer was released,¹¹¹ was published on the new BIBFRAME.org website in early 2013.¹¹² The website also offered sample collections of records, viewable in either MARC/XML or RDF/XML, provided by the Library of Congress, the British Library, Deutsche National Bibliothek (DNB), George Washington University Library, the National Library of Medicine, Princeton Library, and OCLC.¹¹³

Unsurprising, in light of the literature of the last decade, was that BIBFRAME was a flexible and extensible RDF-based entity-relationship model encoded in XML,¹¹⁴ with a "pipeline" for translating MARC 21 bibliographic data into the BIBFRAME "Linked Data environment" and an eye toward permanent migration from MARC.¹¹⁵ What was less expected was simplification of RDA and FRBR.¹¹⁶ People struggled to align the familiar FRBR Group 1 entities with BIBFRAME's WIAA model. On the *CatalogingRules* blog, the analysis was "Work = Works; Instances = Expressions + Manifestations; Authorities = Authorities; Annotations = Holdings + Other linked data stuff."¹¹⁷ In a discussion on the *Autocat* mailing list, Joel Hahn speculated that the BIBFRAME *Work* and *Instance* might correspond respectively to the classic AACR2 *uniform title* and *bibliographic records* of existing MARC metadata.¹¹⁸ Representing the Library of Congress, Sally McCallum clarified

that BIBFRAME's *Works* encompassed RDA/FRBR's *Work* and *Expression*,¹¹⁹ while BIBFRAME's *Instance* corresponded to RDA/FRBR's *Manifestation*.¹²⁰

BIBFRAME's *Authority* concept builds on the concept of controlled vocabularies already familiar to librarians, expanding beyond LCSH to introduce the possibility of using controlled vocabularies from other domains¹²¹ and controlling elements not historically covered by MARC authority records, such as publisher.¹²² The BIBFRAME *Authority* uses Uniform Resource Identifiers (URI),¹²³ obviating the need to match a text string against an authority record as is done with MARC authorities. Because the BIBFRAME *Authority* is actually a "lightweight Abstraction Layer," it can potentially link to a traditional library authority source, to a non-library authority source, or to no authority source at all, in which case the "lightweight Abstraction Layer" itself would serve as the domain for identifying the resource.¹²⁴

BIBFRAME's *Annotation* concept is less familiar, encompassing everything from holdings data (that is, FRBR's *Item* entities) to reviews and book cover images.¹²⁵ However, many libraries already employ third party add-ons to display book covers and reviews along with their catalog search results. Formalizing these types of relationships within the library's bibliographic framework seems like a logical extension. The BIBFRAME *Annotation* has the potential to make third party annotations—including those from library users—easier to include.¹²⁶

Since the release of the BIBFRAME model primer, until the time of this writing, there have been frequent updates to the BIBFRAME vocabulary¹²⁷ and the MARC transformation code.¹²⁸ Members of the BIBFRAME team have also been releasing a series of discussion papers, with the first three on *Annotation*, *Authority*, and *Resource Types*, respectively.¹²⁹ These discussion papers are working drafts, not official documents,¹³⁰ and so the information presented in them should be expected to evolve. Those interested in actively participating in the development of BIBFRAME may join the Bibliographic Framework Initiative discussion list or download and try out the MARC-2-BIBFRAME transformation code.¹³¹

Now that BIBFRAME has been presented as a potential MARC successor, what happens next?

MARC UNDER A MAGNIFYING GLASS

Richard Wallis, chair of the W3C Schema Bib Extend Community Group, suggested that OCLC might be able to prepare for the widespread flip from MARC to BIBFRAME by "analyzing all [of the] MARC records it can get its hands on and listing in priority which elements of the records are used most."¹³²

Indeed, by March 2013, Roy Tennant, now with OCLC Research, announced to the BIBFRAME discussion list that he had released a large dataset

on MARC usage in WorldCat, which would be updated quarterly.¹³³ This appears to be a substantial expansion beyond OCLC's 2010 report on MARC tag usage.¹³⁴ Data on each and every MARC tag is viewable in table or chart form, and is available for download, and reports on specific subfields are available upon request.¹³⁵ This tool should be eminently useful in prioritizing which MARC fields will be transferred to the new format, if it proves impossible to migrate every field.

PUTTING THEORY INTO PRACTICE

Lest anyone think BIBFRAME is just another conceptual framework with no genuine prospects for implementation, it is worth noting that some libraries are already putting BIBFRAME into practice. The Tutt Library at Colorado College and the Penrose Library at the University of Denver have partnered in "prototyping a peer-to-peer BIBFRAME Datastore" in order "to test the usability of a shared BIBFRAME Redis-based union catalog with two institutions to prepare for scaling up to a consortium-level service."¹³⁶ (Redis is a key-value store,¹³⁷ which allows developers to store data without a schema.¹³⁸) If this prospective BIBFRAME union catalog is successful and scalable, it could provide a model for more widespread BIBFRAME implementation.

DISCUSSION

Does BIBFRAME stand a realistic chance of dislodging MARC? BIBFRAME is still in its infancy, and while it seems promising, its potential is far from fully realized.

Perhaps the reason MARC has endured so long is precisely because it is so entangled with the cataloging rules. Roy Tennant suggested that the conflation of MARC and AACR2 was part of the problem,¹³⁹ and the decade since then seems to prove that this is indeed one of the reasons MARC is so hard to replace. The marriage of cataloging rules and encoding format results in the reinforcement of both. The development of RDA as completely separate from any companion encoding format has led to RDA implementation in a MARC environment. Logically, this promotes the impression that MARC still works well enough to carry out the functions required by the new rules. In not aligning closely with FRBR and RDA, BIBFRAME may be hobbled before it even leaves the starting gate.

Another barrier to BIBFRAME implementation is the lack of BIBFRAME-compatible library system software. Paradoxically, most libraries will not be able to implement BIBFRAME because their systems do not support it, and software vendors have little incentive to develop BIBFRAME integrated

library systems without reasonable certainty of library implementation of BIBFRAME. Thus, it seems likely that libraries will continue using MARC for years to come because that is what works with available library systems.

Lastly, while the developments of the last decade certainly point to an RDF-based linked-data metadata structure encoded in XML as the obvious choice to replace MARC encoding, RDF/XML—and hence, BIBFRAME—may not provide the long-sought universal interoperability with other metadata standards.¹⁴⁰ The famous “Linking Open Data Cloud Diagram” shows a cluster of more datasets than can be comfortably counted by eye.¹⁴¹ Jenn Riley’s well-circulated visualization of metadata standards depicts a dizzying array of 105 unique standards,¹⁴² some of which are so radically different from one another in form and function that it is difficult to imagine how they could ever be linked to one another in any kind of systematic way. Even among linked data gurus, there is some disagreement about what exactly linked data is.¹⁴³ In short, there is the possibility that, despite strong intentions to the contrary, BIBFRAME might only move library bibliographic data from the MARC silo into a different silo.

Despite these challenges, there remains a widespread perception that continued adherence to MARC is causing libraries to fall behind the technological curve and to miss out on collaborative opportunities with other metadata communities. If there is a more suitable MARC-replacement than RDF-based XML, it has likely not been invented yet. The flexibility and versatility of RDF/XML present expanded opportunities for exploring different ways of combining library bibliographic metadata with non-library metadata and building new tools to connect library users with library resources.

Thus, BIBFRAME represents movement in a progressive direction, and pursuing BIBFRAME holds more promise than stagnating with MARC. If a sufficiently diverse body of libraries with different bibliographic needs work together on the continued development of BIBFRAME, it may become sufficiently complete, versatile, and robust to take on the mantle that MARC has held for nearly half a century.

CONCLUSION

In light of the developments of the last decade, the direction BIBFRAME has taken seems almost inevitable. It uses the expected tools—RDF and XML—to attempt to move beyond the well-documented limitations of the MARC encoding format. Despite different vocabulary, the principles behind the WIAA model are not so radically different from FRBR’s WEMI model that they cannot be brought into harmony. Harmonization with FRBR would open the way to harmonization with RDA. The yoking together of rules and format, like draft horses, could strengthen BIBFRAME as much as it strengthened MARC. The downside would be that future format migrations

could face the same difficulties as the current efforts to escape MARC. The wisdom of BIBFRAME's separation from RDA and FRBR will only become apparent with time and experience.

Whether BIBFRAME will actually be the long-awaited MARC replacement, or just another step along the road, remains to be seen. Because of the Library of Congress' influence over the majority of U.S. libraries, it is probable that widespread adoption of BIBFRAME will be dependent on whether the Library of Congress decides this initiative is a success and opts for full implementation. Given that BIBFRAME is a work in progress, it also seems likely that the details of the model will evolve, and BIBFRAME next year may resemble BIBFRAME this year as little as MARC II resembled the original MARC.¹⁴⁴ Because of Zepheira's involvement both with OCLC's Schema.org initiative and the Library of Congress' BIBFRAME initiative, it is not unreasonable to anticipate some convergence of these two paths toward library linked data.¹⁴⁵ But at last, it seems, library bibliographic data may finally be setting sail toward a post-MARC linked data future.

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