Smart Libraries Newsletter

News and Analysis in Library Technology Developments

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Smarter Libraries through Technology

Integration and Interoperability Versus Unification

By Marshall Breeding

An important set of contracting trends can currently be seen in play in the library technology arena. The issue centers on whether the scope of technology systems should continue to expand to encompass an ever-broader universe of functionality and services, or should products ideally focus on a more finite scope with an emphasis on interoperability so that libraries can assemble customized environment?

The products and technology of Ex Libris follows strategy of expanding unification. Beginning in about 2009, the company began articulating a product strategy based on "unified resource management" and "unified resource discovery and delivery." The strategy centers on the premise that library work can become more efficient when the same platform is able to manage all formats of content compared to scenarios where staff work with different specialized systems. Likewise, library users expect all the resources available from the library to be searchable and accessible through a single interface without having to deal with separate systems for print materials, electronic resources, or other types of content.

The initial fruit of this strategy was seen in the creation of the Primo discovery interface and later supplemented by the Primo Central index. The concept of unified resource discovery was not unique to Ex Libris with ProQuest launching its Summon service even before Primo Central. OCLC developed WorldCat Local and EBSCO launched EBSCO Discovery Service at about the same time. Index-based discovery has become the prevalent genre of library-provided search.

This strategy of unified resource management was formed in the context of an era where integrated library systems (ILSs) were well established but did not work well with electronic resources. Specialized electronic resource management (ERM) systems were emerging but were not gaining wide acceptance. Ex Libris posited that creating a new platform consolidating all formats would create efficiencies that could not be attained through strengthening the interoperability between specialized systems. Initially the company stressed Alma for managing print resources and electronic resources though recently it has also emphasized its capabilities for managing digital collections.

Alma was launched as a unified platform for managing electronic and print resources in about 2011 and has since been widely adopted by academic and research libraries globally. OCLC's WorldShare Management Services embodied many similar concepts, though some of its capabilities for electronic resources were packaged separately as WorldShare License Manager.

As Alma gained a growing customer base globally, the company began to build other products on its foundation. These products so far have included Leganto course reading list application and Esploro, a new set of services in support of academic research activities. Ex Libris has also developed Primo VE, a new version of its discovery solution managed via Alma rather than through its own dedicated back office console. This issue of *Smart Libraries Newsletter* features yet another product genre to be built on the Alma platform, Rialto, a new selection and ordering service.

This strategy of unification of functionality and services through Alma has resonated with many libraries, as seen through its growing dominance in selections by academic libraries moving to new systems.

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The model of unified platforms of ever-expanding reach also has detractors. Many libraries prefer interoperable components of finite scope. Many vendors of ILS products continue to strengthen interoperability with specialized ERM systems. SirsiDynix, for example, has developed its BLUEcloud Campus suite that relies on the library's Symphony or Horizon ILS for print resource management in conjunction with the open source CORAL ERM and article-level discovery taking place through EBSCO Discovery Service.

The Virginia Tech University Libraries have recently opted to implement an integrated set of systems rather than a unified platform. As described in the March 2018 issue of *Smart Libraries Newsletter*, this university has partnered with ByWater Solutions to implement an environment of open source products, including the Koha ILS and the CORAL ERM. It is yet to be seen whether this integrated approach will be a sustained trend relative to the now established model of unified resource management among large academic libraries.

The FOLIO initiative also embraces a more modular approach to library resource management and discovery. The FOLIO platform can be seen as a layer of infrastructure able to support a wide range of modules or applications addressing many different areas of functionality. Each library, however, can opt to implement the modules most suitable for its requirements as they become available. The FOLIO community is not only developing a set of applications that replace the functionality of ILSs, but they also are building tools and modules to address other aspects of library operations or services. The FOLIO platform and modules are reportedly at the cusp of entering the implementation stage. Expect to see more coverage of these activities in future issues of *Smart Libraries Newsletter*.

The presence of multiple models relative to unification or interoperability represents a healthy competition for the library technology industry. Many libraries may appreciate a mature and unified platform able to support their work without a great deal of technical intervention. Others may be concerned by becoming overly dependent on a single vendor and relish the opportunity to assemble their own preferred set of components. We can also anticipate that the developers of unified platforms will continue to explore new areas of service able to leverage their existing technical infrastructure. But even the most ambitious platforms are unlikely to solve all the needs of the library and will therefore need to interact with many other systems through APIs and other interoperability mechanisms.

ProQuest Introduces Rialto

The January 2015 acquisition of Ex Libris by ProQuest joined the leading technology provider for academic and research libraries with a larger-scale company offering a wide range of content and workflow products. Since its acquisition, Ex Libris has continued to develop, support, and market its products through its own brand and business identity. In a move that highlights the synergies between ProQuest and Ex Libris, the company has launched a new product branded as Rialto to deliver the capabilities of ProQuest OASIS through the Alma platform.

OASIS: Online Platform for Selection and Acquisition

OASIS (Online Acquisitions and Selection Information System) is an online service used by library personnel for the selection and acquisition of library materials. This longstanding service can be seen as a base level of capabilities that provides some context for Rialto as a new service within Alma addressing a similar scope of activity. OASIS provides access to a consolidated marketplace of materials spanning many publishers including those from Ingram, ProQuest's own Ebook Central, EBSCO Ebooks, Wiley, Taylor & Francis, and others. Materials available include over 2.5 million e-books and 25 million print titles.

OASIS was originally developed in about 2004 by Coutts Information Services, a major book supplier for libraries based in Ringwood in the United Kingdom. John Coutts Library Services was originally founded in Canada in 1969. Coutts had a complex history as the company grew through mergers and acquisitions, including the book division of Martinus Nijhoff in 2002. Coutts Information Services launched OASIS in about 2004 as a new web-based portal providing consolidated access to all its services, including access to its bibsource database of published materials. OASIS supported firm orders, approvals, the ability to set profiles of criteria for approvals, and management reports. Coutts offered ILS integration options including downloadable MARC records and EDI support. The platform supports multiple procurement options including firm orders, approval plans, standing orders, demand-driven acquisitions, and orders transmitted via EDI.

OASIS has gone through several business transitions following its initial development by Coutts. Ingram Industries acquired Coutts Information Services in December 2006. This acquisition also involved the MyiLibrary e-book hosting platform developed by Coutts. Ingram continued to develop the service and expand the content available throughout the course of the next decade. ProQuest gained responsibility for OASIS through its 2015 acquisition of Coutts from Ingram Content Group. OASIS continues as an important service within ProQuest's product portfolio.

EBSCO Information Services offers the GOBI online acquisitions tool as a service that competes directly with OASIS. EBSCO acquired YBP Library Services, including the GOBI service, from Baker & Taylor in February 2015. GOBI includes content from many different publisher partners, including ProQuest. EBSCO partnered with Ingram Content Group to make its catalog of e-books available through OASIS in 2013. Despite the intense competition between ProQuest and EBSCO on other fronts, EBSCO continues to make its e-books available through OASIS. These two selection and acquisitions services reflect an important dynamic were arrangements to supply content from the broad field of publishers remains strategically important even in the context of competing workflow or discovery products.

ProQuest has consolidated its multiple e-book platforms into Ebook Central, including ebrary (acquired in 2011), EBL (2013), and the MyiLibrary platform acquired from Ingram.

OASIS Alma API

ProQuest and Ex Libris have already worked to create integration between Alma and OASIS. Alma Real-Time Acquisition, launched in June 2016, provides a streamlined interface between the OASIS service and Alma. This integration automates the creation of bibliographic and order records in Alma for materials ordered via OASIS. Data transferred includes the MARC bibliographic record, the designated fund code, price, and designated library. The OASIS Alma API avoids duplicative entry of data but continues to rely on selectors and acquisitions personnel working across two separate systems, Alma and OASIS.

Rialto: Reconceptualizing Selection and Acquisitions

One of the first examples of the strategic synergies possible between ProQuest and Ex Libris is Rialto. Although part of the ProQuest organization, Ex Libris has generally continued its own independent product strategies. Ex Libris has also taken on some products formerly within the ProQuest portfolio, including RefWorks, Summon, 360 Link, 360 Resource Manager, Intota, Ulrichsweb, and Pivot. Rialto will be a new product jointly developed by ProQuest and Ex Libris personnel and in consultation and collaboration with an international group of library partners.

ProQuest's research into this product opportunity included a discovery phase where the company met with personnel from dozens of institutions across many global regions, including North America, Europe, and Asia Pacific. This wide consultation is especially important for Rialto since business rules, workflow patterns, and suppliers differ considerably by country and region. The product aims to address some of the pain points that acquisitions personnel encounter in their work.

The investigation showed that libraries in different regions experienced similar pain points. Libraries acquire content from many different suppliers, often involving different processes for invoices, payments, and other business details. Preliminary findings also suggest that some difficulties in selection and acquisition are common across geographic regions.

The design of Rialto aims to better align items acquired for library collections with actual use. According to Oren Beit-Arie, Rialto aims to help libraries "buy what they need, use what they buy and to do it with less manual work. These efficiencies will then free time for more strategic activities." In the initial conversations with library partners, many noted a disconnect between selection and acquisitions, resulting in considerable manual or redundant work. This new product aims to unify selection, ordering, and acquisitions, even beyond the API integration that is currently available through the OASIS Alma API.

The basic idea of Rialto involves providing a selection and acquisition service of similar scope to OASIS but contained entirely within Alma. For libraries using Alma, it will not be necessary to interact with a separate system for selection and ordering. Rather, this capability will be available directly within Alma as an additional set of tabs within the familiar Alma dashboards. The marketplace of available content will likewise be available through the Alma platform. Even though the OASIS Alma API streamlines the data exchange between OASIS and Alma, library staff members still have to login to and work in two separate systems with different interfaces. Many of the existing workflows were conceived during the time when print materials dominated library collections. Now that collections have become more oriented to electronic resources, it is important to incorporate better workflows for their procurement patterns.

ProQuest positions Rialto as a bridge between the aspects of acquisition accomplished from within products like Alma and the selection and purchasing tasks carried out in services such as OASIS. The product name was inspired by the Rialto Bridge in Venice, which spans the Grand Canal, connecting important markets with other districts of the city.

The design of Rialto will take a new look at relevant functionality relative to the broader context of library collection. According to ProQuest's preliminary findings, selection is not only not well integrated with acquisitions and cataloging, but it could also benefit from better integration with resource sharing, reading lists, and other operational areas. Procurement decisions need to be driven more by data and analytics with less reliance on guess work. Rialto will include an advanced analytics component to assist selectors purchase or license the materials optimal to immediate use and desired collection strengths. These data points and predictive artificial intelligence will enable Rialto to present recommendations to selectors not unlike is common in other e-commerce environments. Building the product within Alma also provides the opportunity to bring other elements into the algorithms such as circulation statistics, acquisitions data, and other operational data.

ProQuest and Ex Libris concept of Rialto goes beyond just deploying the functionality of the current OASIS service in Alma. Rather, the company aims to take a fresh look at the selection, ordering, and acquisition processes in light of current issues and pain points librarians experience. OASIS was initially developed primarily around print materials. Although much of the content acquired through the platform today includes other media, the basic workflows and design of the platform revolves around acquisitions methods oriented to print materials. Rialto aims to not only bring this area of functionality into a more modern technology platform but will also modernize its workflows relative to current and future content formats, procurement methods, and business models. Rialto will support all types of content, print and e-books, audio, and video. The environment is designed to be flexible to support other types of content as they become available.

Rialto, like OASIS, will include a marketplace of resources available for purchase provided within Alma. The content available will include materials from ProQuest as well as from many other publishers and aggregators.

The conceptual design of Rialto is underway. ProQuest and Ex Libris have concluded an initial set of kick-off meetings with development partners in the United States and the United Kingdom. The company will recruit additional library partners. The development strategy will also include a publisher development program to ensure that Rialto will include the most comprehensive marketplace of content resources possible. The product roadmap currently anticipates a release for development partners in December 2016, an early adopter program in mid-2020, and general release by late 2020. The business model of Rialto will parallel that of OASIS where ProQuest assesses a commission on sales and does not charge a platform fee.

Rialto will not replace OASIS but will provide a new service for libraries using Alma. ProQuest will continue to develop and support OASIS, which is used by libraries using many different ILS products. The company isn't making changes for libraries using other automation products but aims to create a better experience for those using its flagship technology platform. It is reasonable to expect that at least some of the advancements developed for Rialto will also be retrofitted into OASIS.

The development of Rialto can also be seen as a move that might strengthen ProQuest's position relative to other online acquisitions environments. As noted, the GOBI service from EBSCO Information Service is the major competitor to OASIS. The appeal of performing selection and ordering as a unified service within Alma may attract both OASIS and GOBI customers. Today, around 1,300 institutions have selected Alma. As Alma becomes ever more dominant among academic and research libraries, it has reached a critical mass to sustain a previously separate product genre.

Smart Libraries Q&A

Each issue, Marshall Breeding responds to questions submitted by readers. Have a question that you want answered? Email it to Samantha Imburgia, Associate Editor for ALA TechSource, at simburgia@ala.org.

Are any ILS companies investing in BIBFRAME based systems?

The introduction of BIBFRAME as a possible or eventual replacement for the MARC21 standard for the description of

content resources has sparked considerable discussion and development activities in the library sphere. This new standard offers new possibilities for improving the interoperability of library collections with the broader information ecosystem. Linked data, semantic web technologies, and graph databases have become widespread in many other information-oriented domains. Ongoing reliance on MARC can be seen as a barrier that impedes access to library resources in the current environment increasingly dominated by these technologies. Yet the adoption of BIBFRAME means a major overhaul of the foundation of the bibliographic ecosystem that currently provides ubiquitous interoperability among library systems, content suppliers, and end-user applications. The degree to which developers of ILSs, library services platforms, discovery systems, and bibliographic utilities support BIBFRAME will have a major impact on the timeline in which BIBFRAME can supplement or replace MARC in the library information ecosystem.[1]

The MARC family of standards has been the core of the bibliographic ecosystem for library systems for more than four decades. The standard traces its origin to the work of Henriette Avram for the Library of Congress in the 1960's. MARC21 was created in about 1999 and finds widespread use today. This record structure, though a well-established library standard, is not used by other types of organizations, leaving libraries a bit isolated relative to the broader information universe. Within the library sector, the MARC standards have been implemented ubiquitously, with many billions of records circulating among resource management systems, discovery services, and bibliographic utilities. MARC has been an effective solution to interoperability among systems, cooperative cataloging, and resource sharing for libraries.

In an effort to propel libraries out of this isolated bibliographic infrastructure and into the realm of semantic web technologies, the Library of Congress and other stakeholders developed BIBFRAME as a successor to MARC. BIBFRAME is constructed using linked data as the carrier for bibliographic data rather than MARC21. Much of the work of developing BIBFRAME was performed by Zepheira, a company that was engaged by the Library of Congress to create a replacement for MARC based on linked data principles. Specifically, the elements of a bibliographic record are broken into RDF (Resource Description Framework) triples (subject, predicate, object). See Bibframe.org for tools created by the Library of Congress, such as the BIBFRAME Editor and the BIBFRAME Profile Editor.

Many efforts are underway to further operationalize linked data and BIBFRAME. The Andrew W. Mellon Foundation, for example, recently awarded Stanford Libraries, in partnership with Cornell University, Harvard University, and the University of Iowa a $4 million grant to pursue the implementation of linked data in the library metadata ecosystem. These university libraries will partner with the Program for Cooperative Cataloging and the Library of Congress to expand involvement with linked data in the library cataloging community.[2]

The emergence of BIBFRAME has naturally caught the attention of the organizations involved in the development of ILSs, library services platforms, and other library-oriented applications. In response to this change contemplated for the core library metadata standard, each organization must plan how it will eventually adapt its products. All the major companies offering library systems have been involved to some extent in the discussions surrounding BIBFRAME. Each has developed a strategy based on their projections of the timeline in which BIBFRAME might become operationalized or how they might leverage it to add new capabilities to their products.

OCLC

As a provider of cataloging services and developer of a variety of resource management systems and discovery services, OCLC has a strong interest in future developments in metadata standards. OCLC has been an active participant in the development and implementation of BIBFRAME and other linked data initiatives.

OCLC has incorporated a variety of linked data concepts into its products. The organization has worked extensively, for example, with schema.org. WorldCat records include linked data expressed through schema.org syntax and vocabularies. This technique amplifies the discoverability of WorldCat records through search engines since schema.org is one of the main approaches to represent descriptive content as structured data. OCLC has published key resources such as the Virtual

1. For in-depth information related to BIBFRAME concepts and tools, see "Bibliographic Framework Initiative," Library of Congress, accessed November 18, 2018, http://www.loc.gov/bibframe/.

2. For more information, see Gabrielle Karampelas, "Stanford Libraries Awarded Grant to Implement Linked Data Metadata Environment," Stanford News, July 3, 2018, https://news.stanford.edu/thedish/2018/07/03/stanford-libraries-awarded-grant-to-implement-linked-data-metadata-environment/.

International Authorities File (VIAF), the Dewey Decimal Classification scheme, and the Faceted Application of Subject Terminology (FAST) as linked data.

Resources describing OCLC's approach to BIBFRAME and other linked data technologies include

- Data Strategy
  https://www.oclc.org/en/worldcat/data-strategy.html
- Data Sets and Services
  https://www.oclc.org/developer/develop/data-sets.en.html
- Linked data in libraries: From disillusionment to productivity (by Andrew Pace)
  http://www.oclc.org/blog/main/linked-data-in-libraries-from-disillusionment-to-productivity/
- Experimental conversion of OCLC data to BIBFRAME 2.0
  https://www.loc.gov/bibframe/news/pdf/oclc-converter-alaal2018.pdf

Ex Libris

Ex Libris, the dominant provider of technology products to research and academic libraries, has a longstanding track record of building its products around established standards. The company has articulated a strategy of gradual adoption of BIBFRAME. Some of its early development will include creating APIs in Alma to deliver bibliographic works in BIBFRAME, including at the work and instance level. Any set of records in Alma can be published to external system as BIBFRAME. Currently, within the Alma interface, it is possible to select and view any given record in both MARC and BIBFRAME formats.

The first implementation of BIBFRAME in Alma was created in partnership with Harvard University in 2017.[3]

Resources related to the support of BIBFRAME in Ex Libris products include

- Developer Network: BIBFRAME
  https://developers.exlibrisgroup.com/alma/integrations/linked_data/bibframe
- Ex Libris Alma—Linked Data and Bibframe (video)
  https://www.youtube.com/watch?v=Ycorf2SUaNE

SirsiDynix

SirsiDynix has incorporated linked data into its product strategy more on the discovery front than within its resource management products. In partnership with Zepheira, SirsiDynix offers BLUEcloud Visibility, an implementation of the Library Link service. SirsiDynix is able to publish records from a Horizon or Symphony ILS into the Library.Link network on behalf of the library to amplify discoverability of its resources through general web searches performed via Google or other major search engines.

Related resources:

- BLUEcloud Visibility
  http://www.sirsidynix.com/products/bluecloud-visibility
- SirsiDynix Linked Data FAQ
  http://www.sirsidynix.com/blog/2016/05/26/linked-data-faq

EBSCO Information Services

EBSCO has been involved in linked data technologies on multiple fronts. The open source FOLIO project, in which the company has been involved, has been designed to support BIBFRAME in addition to other metadata formats through its CODEX data model.[4]

EBSCO also participates in the Zepheira Library.Link service through its NoveList service.

Resources:

- BIBFRAME
  https://www.ebscohost.com/novelist-the-latest/by_tag/tag/Bibframe
- NoveList Amplifies the Power of Linked Data with the Release of NoveList Select for Linked Data
  https://librarytechnology.org/pr/21920
- Linked data: What is it, and why should you care?
  https://www.ebscohost.com/novelist-the-latest/blog-article/linked-data-what-is-it-and-why-should-you-care

Innovative Interfaces, Inc.

Innovative has embraced BIBFRAME as one of the core data models in the next generation product strategy. The company

3. "Ex Libris Increases Library Connectivity with Implementation of BIBFRAME Roadmap," Ex Libris, press release, May 8, 2017, https://librarytechnology.org/document/22573.

4. Vince Bareau, "The Codex Metadata Model," FOLIO Wiki, last modified by Hongwei Ji November 20, 2017, https://wiki.folio.org/pages/viewpage.action?pageId=1415393.

has begun to describe its next generation discovery and resource management platform, based on technology it calls the "Context Engine." One of the initial applications built on this platform will be a new context-based discovery solution, with search results that take into consideration information about the user and other relationships to deliver tailored results. The context engine is based on platform natively based on linked data, using BIBFRAME as the central reference model. Bibliographic records within the platform may be imported as formats such as MARC or ONIX but will then be transformed into linked data statements that can interact with agent objects and other concept objects to enable new opportunities for discovery not possible through a flat record structure. Innovative describes its next gen discovery service as following the BIBFRAME metadata model, including Works, Instances, and Items as well as Agents and Concepts. Innovative has not yet publicly announced the date in which it anticipates completion or implementation of its next generation platform and context engine.

The company has also partnered with Zepheira to offer a linked data discoverability service through the Library.Link network. Innovative offers this subscription-based service for all of its ILS products, including Sierra, Millennium, Polaris, and Virtua.[5]

A review of the public information available on the other ILSs does not reveal much support for BIBFRAME. Scouring the websites and literature of products including proprietary systems, such as Library.Solution and Carl.X from The Library Corporation, Follett Destiny, Biblionix Apollo, Auto-Graphics VERSO, Book Systems Atriuum, as well as open source projects Koha and Evergreen revealed no publicly announced strategies to adopt BIBFRAME as their bibliographic model. This lack of public information does not mean that these companies are not actively preparing for some level of adoption of BIBFRAME in the future should it become more of an operational reality.

It is not surprising to find less support in ILSs for BIBFRAME than in the newer genre of library services platforms. The traditional ILS has evolved around the MARC bibliographic, authority, and holding formats, making it difficult to provide support for BIBFRAME in the short term. More importantly, MARC continues to permeate the bibliographic ecosystem in which these systems operate. Until BIBFRAME becomes established as a reliable source for bibliographic description, the value of re-engineering existing systems to support a new bibliographic data model will be limited. Library services platforms, which were developed during the era where the concept of the bibliographic transformation was already well underway, were created with flexible metadata models allowing for support of a wide range of formats rather being hardwired for MARC.

BIBFRAME and other linked data initiatives within the library community represents an important development with the potential of better exposure and interoperability of library collections and services in the broader realm of web-based information. Some of the large academic and research libraries may pave the way toward operationalized linked data. Any wholesale transition from MARC to BIBFRAME seems distant. In the interim, ILSs will continue to operate well using MARC record interchange for collection management. Amplified discovery today is available through exporting MARC records and publishing them as linked data through services, such as Zepheira Library.Link Network. Library services platforms and other more recently developed resource management and discovery services include data models more amenable to linked data but are today operating primarily in a MARC-based bibliographic ecosystem. BIBFRAME and linked data continues to see many experimental and a few operational implementations.

For the time being, support for linked data cannot be seen as a major differentiator among the major ILS products, but is more of a potential component for new development efforts. Organizations with more developed strategies for BIBFRAME and linked data include OCLC and Ex Libris. Innovative has opted for BIBFRAME to serve as the foundation of its new next-generation development efforts. Libraries with a strong interest in incorporating linked data into their own information environments can lobby their vendor accordingly.

5. For more information, see "Linked Data," Innovative Interfaces, Inc., accessed November 18, 2018, https://www.iii.com/products/metadata-management/#linked-data.

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