Smarter Libraries through Technology: Transition in Open Source Resource Management for Academic Libraries

By Marshall Breeding

In this issue of *Smart Libraries Newsletter*, we cover a major transition in open source library software. EBSCO Information Services has launched an initiative to develop a new open source library services platform for academic libraries. With the backing of EBSCO, one of the largest companies oriented to libraries, this project has the potential to gain traction quickly. The Kuali OLE project, which has seen extensive coverage in this publication, facing a variety of complications, has opted to shift its efforts from the software, which it has been developing in the course of its project, to lending its resources to the EBSCO-sponsored initiative.

Those anticipating an open source library services platform may be disappointed to see the Kuali OLE software, which has been under development since 2008, ultimately not go forward. It is also important, however, to recognize the important contributions made by the project. It has advanced the state of the art in workflows for efficient management of electronic and print resources in academic libraries. Also, it has built a strong community of libraries engaged in open source software. This work will be vital to the success of the new initiative and will accelerate its progress.

The transition underway promises continuity, launching a new development initiative while winding down another. The individuals and institutions involved in Kuali OLE have pivoted to engage with the new project. Rather than starting from scratch, the project has assets, such as the existing community and vision of Kuali OLE, that otherwise would take significant time to develop.

In the context of the competitive dynamics of the academic library technology industry, ProQuest—with Ex Libris as part of its arsenal—and EBSCO Information Services hold opposing visions for resource management and discovery. Ex Libris has emphasized a unified approach. Its Primo brings together search across all aspects of library collections. Alma manages electronic, digital, and print materials. In combination, they offer synergy. EBSCO in contrast favors a more modular approach, where libraries choose patron-facing discovery services independently of the software managing collections. Each favors differing approaches to openness. Ex Libris has created a global, multi-tenant platform based on proprietary software, providing APIs for extensibility and interoperability. EBSCO has championed open source software for the platform itself, enabling libraries to become involved directly in its development. Given the vast resources of these two organizations, we can expect vigorous competition as each works to instantiate its vision in the marketplace.

This new initiative is in its early phase with many of the details still being worked out. It has not even settled on a name. Yet work is already underway. This feature article in this issue provides details and context as is currently available. Readers can expect further coverage as the project takes shape and moves forward.

EBSCO Supports New Open Source Project in Partnership with Kuali OLE

A new initiative hans launched to create an open source library services platform for academic libraries. EBSCO Information Services conceived the project and will provide substantial funding. A community of developers comprising commercial and library organizations will create the software. Kuali OLE, previously working to create its own open source library resource management system, will make a transition to participate in this new initiative rather than complete its own software. Many details of the new project, including the nature of Kuali OLE's involvement, are not yet finalized. The resources currently lining up behind this initiative provide the potential for the rapid development generally consistent with the plans for Kuali OLE. Participants characterize this new project as not as a setback, but as an acceleration of the availability of an open source library services platform for academic libraries.

A name for the software created through this initiative has not yet been determined.

Key Project Principles

This initiative intends to create a new library services platform with similar scope of functionality relative to the current proprietary services though with significant conceptual differences. It carries forward or much of the vision of Kuali OLE. Some of the key characteristics include a technical architecture able to support a flexible approach where modules or apps related to any given area of functionality can be inserted or replaced, rather than being created as a tightly-knit, all-inclusive platform. The software will be supported by a layer of technical infrastructure to provide core services, exposing APIs to support functional modules which can be created by any organization or individual in any programming language desired.

All code will be released as open source software with a license friendly to commercial services. Although the core infrastructure initially will be created by a commercial developer, modules and apps can be contributed by any organization or individual. The project will initially center on the requirements of academic libraries. The modular design for resource management is specifically intended to support any open source or proprietary discovery service.

EBSCO Involvement

EBSCO does not intend to develop this software as a product that it will own and control, but rather to attract a community of libraries and development organizations to design and develop a new open source library services platform. A number of high-level EBSCO personnel have been involved in this initiative, including Christopher Spalding, Vice President, Open Source Platforms and Communities; Neil Block, Vice President for Open Source Innovation; and Tamir Borensztajn Vice President of SaaS Strategy.

EBSCO has pledged a substantial financial donation, made available as a philanthropic grant, in support of this initiative. The Stephens family and EBSCO Industries, the parent organization of EBSCO Information Services, regularly make gifts to libraries, universities, cultural centers, and other charitable interests. Without stating a specific amount, EBSCO states that it will contribute more than any previous library vendor has to an open source project, comparable or greater than what other organizations have invested in creating proprietary library services platforms. The value of the contribution also goes well beyond the total amount of grant funding received by the Kuali OLE and GOKb projects.

EBSCO's involvement goes beyond a financial contribution. The company intends to lend its expertise in software architecture, user experience, and other areas. It will contribute to development along with other commercial firms and libraries, participate in governance, and assist with project management and other activities to ensure that it tracks along an aggressive schedule. Once the software is ready for deployment, EBSCO plans to provide hosting and support services.

Although it has provided the initial leadership and funding for this new initiative, and will play a role in its governance, EBSCO does not expect to exert direct control. The new product will be made available as open source software. Its development agenda will be set through a participatory process. EBSCO has less of an interest in the detailed functionality of the product beyond basic expectations of an open and modular system. EBSCO articulates a vision of resource management where libraries have a choice regarding which discovery service they use, rather than the currently prevailing practice

where library services platforms come tightly bundled with discovery services from the same provider.

EBSCO has engaged in a strategy of strengthening the overall ILS industry through partnerships and support of open source software, rather than acquiring an ILS company, as did its rival ProQuest, or by developing its own proprietary library services platform. EBSCO began exploring the possibility of launching an open source project in early-2015, with formal approval coming in Fall 2015, after which work commenced immediately. As part of the diligence process, EBSCO has consulted with a variety of libraries and engaged a third-party organization to conduct surveys gauging the level of support of open source software in libraries and interest in adopting an open source ILS.

By supporting the project through a major grant, EBSCO is able provide acceleration of the development of an open source library services platform without encroaching on the relationships it has established with the community of global ILS providers. This approach puts EBSCO's involvement at arm's length rather than establish itself as a direct competitor in this space. The open source software created through this initiative would be available through an Apache 2 license, which does not preclude commercial use. Any of the companies in the ILS community would be free to use the software to strengthen its own products. Those with traditional ILS products, for example, may be interested the new functionality that will be developed for managing electronic resources, including access to a comprehensive knowledge base.

Consistent with EBSCO Information Services Strategy of ILS Support

EBSCO executives have stated repeatedly that the company does not intend to enter the ILS arena directly. Its ability to compete in the discovery services arena depends on not being locked out through the tight bundling of integrated library systems or library services platforms with their own discovery service or no technical capability for integration.

EBSCO has partnered with dozens of commercial ILS vendors to facilitate the technical integration of their products with EBSCO Discovery Service (EDS). This integration can take the form of either using EDS as the primary patron interface for the ILS or using the EDS API to give article-level search results through the ILS. EBSCO has worked with some of the global companies, such as SirsiDynix and Innovative Interfaces, as well as dozens of smaller ILS providers worwide.

Support of open source software is one of EBSCO's approaches for strengthening the ILS sector to promote competition in discovery services. In February 2015, EBSCO funded development activities for Koha, not only to strengthen its ability to integrate with EDS, but also to enhance other areas of functionality. EBSCO joined the Kuali Foundation in June 2013 as a Kuali Commercial Affiliate and as a member of the Board of Directors for Kuali OLE. This new project massively accelerates EBSCO's commitment to open source software to influence the ILS arena in ways that preserves the ability for libraries to make independent choices of discovery services.

Expectation for Multi-tenant Software-as-a-Service

Deployment of library applications through software-as-as-service (SaaS) has become a fundamental expectation in the current environment. Few libraries are interested in maintaining local servers with their need for costly physical infrastructure and personnel with expertise in systems administration and security. As the business software has increasingly shifted to SaaS, libraries likewise have gained confidence in this approach.

Organizations developing and supporting library applications increasingly prefer architectures that favor SaaS deployment. Developing multi-tenant web-native platforms may be a bit more complex than the previous approach of single-tenant, server-oriented applications, but it offers great benefits. Once the platform has launched, adding new institutional users is much easier than the previous model of installing an independent version of the application on physical or virtual servers. Multi-tenancy enables adding new clients with only incremental increases in hardware capacity. New features and bug fixes can be deployed once for all users of the product. With a well-designed, multi-tenant platform, hosting services can manage large numbers of customers more efficiently than separate instances of a single-tenant application.

This new initiative will be based on multi-tenant software, which will be available for multiple implementations. Existing multi-tenant library services platforms, including Ex Libris Alma and OCLC WorldShare Management Services, have been deployed through a single global implementation. As an open source alternative, the software created by this new initiative will be available for implementation by any organization. Multiple vendors may opt to create their own implementations for libraries that opt for paid hosting and support services. EBSCO plans to offer such services. Libraries or consortia could also deploy their own instances of the software.

Why a New Project?

As part of its analysis of the ILS industry, EBSCO concluded that none of the existing open source ILS products could serve as the foundation of this new initiative. Each of the existing open source ILS products was assessed, including Koha, Evergreen, and Kuali OLE. While these applications have become well established as open source alternatives in the ILS arena, they do not provide the comprehensive scope of functionality spanning electronic as well as print resources, nor do they have

a multi-tenant architectural foundation. While Koha ranks as one of the most widely adopted integrated systems globally, it lacks both comprehensive electronic resource management capabilities, essential for large academic libraries, and the underlying architecture for deployment as a multi-tenant platform. Evergreen was designed for consortia of public libraries and not for the target sector of academic libraries.

Kuali OLE, oriented to large academic and research libraries, was given detailed consideration. After a thorough technical review of Kuali OLE software, EBSCO opted not to target its efforts on that codebase, but rather to invite the Kuali OLE partners to engage with its initiative. The reliance of the existing Kuali OLE application on the now-orphaned Kuali Rice infrastructure, with its inability to be deployed through modern SaaS technologies, made it unsuitable as the basis for the new initiative. Kuali OLE, despite its eight-year planning development process, saw slow growth in the numbers of libraries beyond the initial development partners, nor has it yet completed development of electronic resource management functionality.

Having regularly made strategic acquisitions, EBSCO could have purchased a company with a resource management product. Contrary to speculation, such an acquisition was not consistent with EBSCO's business strategies. Nor do the available products meet the technical expectations. Few of the proprietary products provide a suitable starting point for a new multi-tenant library services platform for academic libraries. They lack the technical infrastructure and architecture envisioned for this multi-tenant modular library services platform. Ex Libris Alma and OCLC WorldShare Management Services are both based on multi-tenant architectures, but do not necessarily employ the pluggable modular design anticipated for this project, nor have they been developed as open source software.

Given these findings, EBSCO opted to facilitate the creation of an entirely new open source library services platform, backed with adequate resources to make a more immediate impact than previous projects have been able to accomplish.

Competitive Context

This move answers the deep consolidation of the companies and the narrowing of options in this space. While EBSCO does not want to enter the integrated library systems or library services platform arenas directly, it aims to impact the overall industry in a way that preserves competition in the discovery services sector. This project inserts a new alternative more consistent with its interests in resource management systems open to multiple discovery options.

This project must be seen in the context of the recent acquisition of Ex Libris by ProQuest. Not only is ProQuest a key competitor in the content arena, but Ex Libris follows a strategy of bundling Alma and Primo in a way that threatens EBSCO's position in the discovery services arena. Ex Libris has seen considerable success with Alma, which has become established as the dominant choice as academic libraries move away from traditional, print-oriented ILS products. Alma has been especially popular with large academic libraries, multi-campus systems, and consortia seeking greater collaboration through shared technology infrastructure. OCLC has provided some competition in this sector with its WorldShare Management Services, though its appeal has so far not been as strong with the large-scale projects. Kuali OLE offered some potential competition as well, though its impact in the overall sector proved to be minimal, due to its sluggish development timeframe.

Functional Expectations

Planning functionality is still in the early stages. The new system will take advantage of the workflow designs and specifications created by the Kuali OLE project. General expectations include the ability to manage library content in all media, to support MARC and other metadata standards currently used in operational systems, as well as linked data.

Time Frame for Delivery

In order to make an impact in the existing dynamics in the way that academic libraries approach resource management, any new initiative must be ambitious in scheduling. Libraries that had their sights set on Kuali OLE, an open source alternative under development from 2008 to 2016, will need to have strong reassurance. Realizing the urgency of the situation, the project aims to deliver the initial version of the software in early 2018. This anticipated delivery date is generally consistent with the latest estimate of when the Kuali OLE software would have been ready for full implementation among its partner libraries.

Role of Index Data

Index Data, a software development firm based in Copenhagen, will participate in the development of the software. This company has been involved in the development of open source library software since 1994, when it was co-founded by Sebastian Hammer. It specializes in the development of infrastructure components used by higher level applications. It created, for example, the YAZ toolkit for Z39.50 services, used within many integrated library systems.

The company will especially be involved in defining the architecture and creating the mid-level infrastructure for the platform, designed specifically to support functional modules as plug-ins. Index Data began work on the development of the infrastructure for this new initiative in late 2015.

Table 1. Grants awarded to Kuali OLE and related projects by the Andrew W. Mellon Foundation

Date Announced	Recipient	Scope	Amount
Feb 2016	Duke University	Build Phase, Increase technical capacity of core partners	$1,165,000
Dec 2013	Indiana University	Kuali OLE Build	$882,000
Dec 2012	Indiana University	Kuali OLE Build	$750,000
Mar 2012	North Carolina State University	Global Open Knowledge Base	$499,000
Dec 2009	Indiana University	Kuali OLE Build	$2,380,000
Jun 2008	Duke University	Planning phase	$475,000
Total			$6,151,000

While Index Data will perform some of the development work for the initial technical infrastructure, the project generally embraces a more distributed model of development. In contrast to earlier phases of Kuali OLE, where almost all software engineering was performed by its contractor HTC Global, this project will enable libraries to tap existing technical expertise or expand their own development capacity.

Governance

A new independent non-profit foundation is being established for the governance of the initiative. Any open source project requires some type of arrangement for the assignment of copyrights, decision-making processes, and for managing financial and other assets.

A new non-profit corporation called the Open Library Foundation has been established to house the governance of this new project. Details regarding how the foundation will be organized are still under consideration.

Transition for Kuali OLE

Underway since 2007 with funding from the Andrew W. Mellon Foundation and contributions by partner institutions, the Kuali OLE project was to design and build an open source resource management platform for research and academic libraries. After seven years of effort, the software was making progress, but still remained short of its original vision as a modern open source platform to provide comprehensive management of electronic and print resources. Kuali OLE has now entered a transition period. The forward development of its own software will halt, and it will engage with the new EBSCO-sponsored project to support the development of a new open source library services platform.

Kuali OLE Organization and Timeline

The Kuali OLE project operated through multiple years of funding from the Mellon Foundation. To date, Kuali OLE and the related Global Open Knowledge Base have received more than $6 million from the foundation, supplemented by financial and in-kind resources contributed by its participants.

The current partners involved in Kuali OLE include:

- Lehigh University: involved with Kuali OLE since the initial planning grant, migrated in August 2014.
- University of Chicago: involved with Kuali OLE since the initial planning grant, migrated in August 2014.
- Indiana University: involved with Kuali OLE since the initial planning grant; lead institution for build project from 2009–2015.
- University of Maryland: involved with Kuali OLE since the initial planning grant.
- University of Pennsylvania: involved with Kuali OLE since the initial planning grant.
- Villanova University: joined Kuali OLE in June 2012.
- Duke University: lead institution for initial planning grant and latest build phase.
- North Carolina State University: lead institution for GOKb.
- University of London Library Systems Association (Bloomsbury).
- North Rhine-Westphalian Library Service Center (hbz): joined Kuali OLE in November 2015.
- Common Library Network (GBV): joined Kuali OLE in November 2015.
- Cornell University: joined Kuali OLE in January 2016.
- Texas A&M University: joined Kuali OLE in January 2016.

The timing of the four most recent Kuali OLE partners was at least partially sparked by their knowledge of this new initiative. This new platform was attractive to these new organizations, hbz and GBV, which are two of the largest library consortia in Europe and represent a large percentage of the academic libraries in Germany and ARL members Cornell University and the Texas A&M University system.

HTC Global has served as the primary development firm for the project since the first build phase in 2009. The company has offices in Troy, MI and makes use of offshore

developers in India in addition to its US personnel. EBSCO Information Services joined Kuali OLE in 2013 as a commercial affiliate and board member.

Following the initial planning grant, the Open Library Environment chose to join the Kuali Foundation as its governance organization. The Kuali Foundation was closely associated with the Mellon Foundation and offered the organizational and legal facilities need for an open source project, which would be costly to establish independently. Though not a requirement for association with the Kuali Foundation, the Open Library Environment, afterward known as Kuali OLE, opted to use some of the technical components that had been created for other projects. These included the Kuali Rice enterprise services layer, which provides much of the underlying technical infrastructure and services needed for complex business applications. At the time of adoption, Kuali Rice was in active development toward a major upgrade (Version 2.0) that included many architectural improvements. The Kuali OLE project also took advantage of the Kuali Financial System to provide some of the business functionality needed to support acquisitions and funds management.

Kuali OLE Opts Not to Engage with KualiCo

The Kuali OLE project was making steady progress on the development of its software, meeting most of the milestones as outlined in its grant proposals. The ongoing viability of the software came into question in late 2014, when the Kuali Foundation began a transition to a business model. A newly established for-profit company, called KualiCo, would lead development for the major Kuali Foundation projects. The overall set of Kuali software projects faced the need for accelerated development and a modern architecture better suited for deployment through hosted services.

Preferred technology architectures do not remain static. Kuali Rice was conceived at a time when large business systems were expected to reside on institutional servers. More recently, shifting expectations are for applications to be designed for delivery as a hosted service. Systems developed in the current era would be designed for deployment through highly distributed multi-tenant platforms. The inability of Kuali Rice to easily support applications delivered as a service on a multi-tenant platform made it less tenable as the basis for the Kuali projects.

The pace of development for the major projects such as Kuali Financial and Kuali Student was also below expectation. Less organic interoperability among the Kuali products left institutions unable to gain necessary efficiencies. To accelerate the advancement of the software products and to address

the obsolesce of Kuali Rice, the Kuali community took drastic measures. The commercial company KualiCo, led by Joel Dehlin, would take over the development of the software, previously distributed among partner institutions, and would develop a new architecture and middleware for delivery of applications as a hosted service on a multi-tenant platform.

These changes in the broader community essentially meant that Kuali Rice would not see forward development. Given that it was used for the major business systems in many institutions, it would be essential to be supported with any fixes or patches needed to address problems. Kuali Co would build a new enterprise service bus, which would be primarily targeted to its own projects.

The transition from a distributed community source model to more of a commercial model centered on KualiCo initially brought in Kuali Student, Kuali Financial, and Kuali Coeus. Kuali OLE, as a much smaller project, was not a short-term priority for KualiCo. Engagement with KualiCo was voluntary for each project.

Kuali OLE Sets New Strategy

Kuali OLE, a project on a much smaller scale, opted to remain independent and remained reliant on its own funding and organizational structures. Following the KualiCo shift to the more commercialized model, Kuali OLE continued to operate as before, with its own board, funding, and development agenda. It could not escape the same challenges related to its now outdated underlying infrastructure.

The circumstance related to KualiCo and Kuali Rice left Kuali OLE in a difficult situation. While progress had been made, the software did not yet realize the intended vision. Its underlying components were out of date. The Kuali OLE software made use of Kuali Rice both for lower-level services and for higher-level interface design. Refactoring the software around a different enterprise service layer would take time and additional resources.

Furthermore, the development of the software was considerably behind that of the commercial products targeting libraries in higher education, especially Ex Libris Alma and OCLC WorldShare Management Services. The reliance on Kuali Rice, with its outdated architecture, left Kuali OLE bound to a model of local institutional deployment no longer in favor.

Kuali OLE (versions 1.5 to 1.65) had been implemented in three partner libraries. Lehigh University migrated in August 4, 2014 from SirsiDynix Symphony, the University of Chicago migrated on August 20, 2014 from a SirsiDynix Horizon ILS, and the School of Advanced Oriental Studies, part of the

University of London, migrated most recently in April 2015 from Millennium. These institutions have implemented Kuali OLE, focusing on the print management capabilities available in that version. The capabilities for electronic resource management and integration with the Global Open Knowledgebase were anticipated for Kuali OLE versions 2 and 3.

In this context, that the Kuali OLE project was presented with an opportunity to collaborate with the EBSCO-sponsored initiative to create a new open source library services platform. The new project would gain substantial benefits from the Kuali OLE team, through the expertise that it has gained in the course of its work, but also in the community of libraries committed to open source software.

The Kuali OLE Board of Directors unanimously approved the proposal to collaborate with the new EBSCO-backed initiative in their February 29, 2016 meeting. According to Winkler, this proposal offered opportunities not possible through an engagement with KualiCo, which would have involved a more closed process still reliant on external development. The EBSCO initiative was consistent with Kuali OLE interest in developing its own internal capacity for development and in contributing its experience and functional expertise into the development process.

As a result of these events, the Kuali OLE software will not be completed as planned. The current codebase developed by the Kuali OLE project will see incremental development to support the three libraries where it's in production, but will not be completed as a comprehensive resource management system. HTC has been charged with delivering scaled-back versions of the product (Version 2.0 and 3.0), focusing on functionality needed for more complete support of print resource management, such as reporting. These versions will not include the previously planned incorporation of electronic resource management and integration with the Global Open Knowledgebase (GoKB). The goal of the remaining Kuali OLE development will be a stable environment to support ILS functionality until the new open source system is ready for migration.

The Kuali OLE organization will continue as it shifts to the new development project, contributing its financial resources and the expertise of its participants. The teams of subject matter experts will work closely with Index Data and others involved in the development of the new software, contributing the body of knowledge they have developed in the workflows surrounding library processes. Consistent with its strategy to shift away from reliance on external providers and build its own capacity, Kuali OLE is recruiting developers for newly-established positions.

Another key role for Kuali OLE centers on engaging the library community. Some of these activities, many of which are already underway, include establishing forums in which individuals from throughout the library community can participate in the development and promotion of this and other open source software projects. The organization will offer webinars, convene interest groups, and other programs to stimulate engagement from a diverse group of individuals. This anticipated community will include not only technologists, but also those with expertise in areas such as project planning, functional areas of library operations, and user interfaces, extending to vendors and service providers as well.

Following the transition, the Kuali OLE Board of Directors will continue with Michael Winkler serving as the project's Managing Director. Some changes in the structure of the operational groups, such as the functional councils, were already underway to better align with agile software methodologies. The previous structures were set up for the waterfall development, which focused on releasing software in large bundles.

Although the software which Kuali OLE planned to create will not see completion, these events may serve to reinvigorate the broader open source movement. The new initiative brings substantial resources into play far beyond what has been available to previous projects. These resources will be directed not only on technical development, but also on building a community committed to employing open source software to better support library strategies and values as compared to proprietary products.

This change comes at a crucial time in the product cycle of library services platforms for academic libraries. Proprietary library services platforms have taken hold and have momentum. As of the end of 2015, 626 libraries have selected Ex Libris Alma, and 386 have selected OCLC WorldShare Management Services. This represents a small but growing percentage of the global academic library community. This new open source initiative, aggressively pursuing an alternative, holds the potential for disrupt existing trends. The overwhelming majority of academic libraries has yet to commit to a new library services platform and can be considered still in play. This project has an opportunity to gain momentum, leveraging libraries' almost inherent values of open source software and inclusive processes. The launch of this new project opens a new chapter in the library technology industry potentially wielding an even greater impact than the latest rounds of mergers and acquisitions.

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May 2016
Smarter Libraries through Technology

Smart Libraries Newsletter

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