Knowledge Bases and Library Services Platforms

One of the most exciting new uses of the knowledge base is its central place in the current generation of library services platforms (LSPs). These systems aim to integrate functionality traditionally distributed across siloes, specifically the discovery knowledge base, the integrated library system (ILS), and the electronic resources management system (ERMS). Oliver Pesch, chief product strategist at EBSCO, sums up the way that bringing these environments together around a central knowledge base benefits libraries:

> For things to function properly—acquisitions and circulation and discovery and linking and usage and all of those pieces—you need to be consistent in how you talk about the resources that are in your collection. And the best way of doing that is to have some fairly rich central knowledge base in the middle that, if nothing else, is acting as an identity broker. You can take and enhance that thing that you decided to purchase. You're not copying that thing each time in a new system, but supplementing it. We see the knowledge base as pretty important in that world.[1]

By using the knowledge base to create consistent, reusable representations for electronic resources holdings, these new systems promise to offer libraries new levels of efficiency, interoperability, and automation. And while there is still work to be done before any one vendor fully realizes the LSP vision, several of the larger players have already made significant progress. These systems offer a taste of the impact that a knowledge base–centered system will have on the library management space.

EBSCO's EBSCONet, Usage Consolidation, and ERM Essentials

While EBSCO doesn't offer a single, unified LSP, its suite of tools demonstrates an understanding of how to use a central knowledge base to achieve consistency and interoperability across related products. EBSCO's global knowledge base supports its discovery products, including EBSCO Discovery Service and the LinkSource OpenURL resolver. As a subscription agent and content provider, the company has begun to also explore the use of the knowledge base in other contexts, including an ERMS, a usage statistics manager, and its flagship EBSCONet subscription management service.

Pesch describes how EBSCO creates a mapping between its subscription management service and its knowledge base. On the subscription side, customers place orders that are tracked along with information about payment and coverage entitlements. This information can then be ported to the customer's implementation of the knowledge base, where EBSCO knows which holdings to activate based on subscription data. The value the subscription agent can bring to this exchange is the knowledge of the purchase details—whether a resource is owned or leased, bundled with other titles, and billed at the title or collection level.

That knowledge can then be used to manage additional types of data, for example, usage statistics. EBSCO's Usage Consolidation product allows libraries to import their COUNTER-compliant statistics and associates them with the appropriate holding in the

knowledge base. Associating the usage data with the holding rather than the title is essential for creating sophisticated metrics. Large libraries often purchase access to the same title through multiple sources, including traditional subscriptions, back files, and aggregated databases. Each of these purchases will accrue its own usage statistics that need to be correctly matched with payment information to calculate the popular metrics like cost per use. Usage Consolidation aids in this process by pulling together usage statistics with cost information from EBSCONet. The knowledge base holding acts as a connector between these two components, allowing the correct match to be made (see Figure 3.1).

The connection between subscription and knowledge base data has also allowed EBSCO to automate processes related to license management. On the subscription side, EBSCO receives license details from the vendors it works with. This data can be pushed into EBSCO's ERMS, ERM Essentials, where supply terms are automatically populated for an institution's collection. Pesch estimates EBSCO has been able to populate more than one million license data elements for its customers.

Dana Taylor is the head of collection management at Louisiana State University, where she uses EBSCO's subscription services as well as ERM Essentials and Usage Consolidation. Taylor said that the major benefit of the integrated products is that work can be done in a single place and then be pushed out across the EBSCO ecosystem. For LSU, orders are placed using EBSCO's subscription management tools. EBSCO can then automatically activate the purchased titles in the knowledge base, making the new resources available through LinkSource and EDS and prompting delivery of a MARC record to LSU's Sirsi ILS.

"The fact that we have that single knowledge base is extremely helpful to us," Taylor said. "Not only do the resources that we purchase from EBSCO populate our knowledge base and link resolver, but it allows us to check off resources that we've published from another publisher or vendor. It creates a seamless way to manage our entire collection."[2]

While EBSCO has made significant progress in bringing together discovery and electronic resources management components in its environments, the company currently lacks the ILS component that would bring in functions like acquisitions, cataloging, and circulation. As of early 2016, EBSCO has begun to publicly share its intentions to fund the development of an open-source library services platform in collaboration with the Danish software development firm Index Data and the Open Library Environment (OLE), an existing open-source LSP project. The new product,
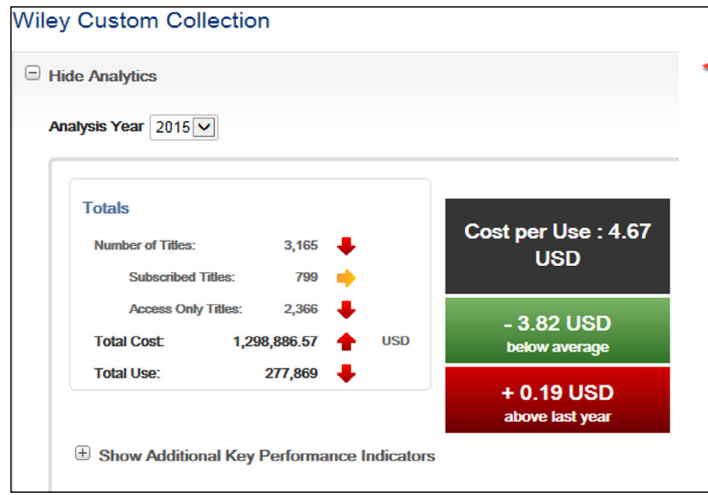

Figure 3.1
EBSCO's Usage Consolidation brings together cost and usage metadata by linking them through a central knowledge base record.

called FOLIO, is expected to be engineered to promote community engagement by using a modular approach and will be built around a central knowledge base.[3]

OCLC's WorldShare Management Services

OCLC's WorldShare Management Services (WMS) provides another solid demonstration of the ways that a knowledge base can unify a suite of services that covers the entire resource management life cycle. WMS includes core acquisitions, cataloging, and circulation functionality, in addition to integration with WorldCat Discovery and OCLC's resource-sharing tools. The WorldCat Knowledge Base underpins all of these services.

Jonathan Blackburn, OCLC's product analyst for WMS Acquisitions, describes how the knowledge base supports acquisitions work in WMS. To begin the ordering process, users can search the knowledge base through a widget embedded directly into the acquisitions module. This search brings up familiar knowledge base results: packages that can be expanded to show individual titles. "Add to Order" buttons embedded throughout the search results allow users to add whole packages or individual titles directly to a purchase order (see Figure 3.2). The beauty of this setup is that the purchase order itself now contains a link to the knowledge base record for the package or title that has been purchased.

"The assumption we came to this with," Blackburn said, "is that the items in the knowledge base, whether they're titles or collections, should function just the same as anything you're purchasing. It's a line item that's associated with this specific order. What's

Collection	Provider	Created	In My Holdings	Action
☐ ? **EBSCO MasterFILE Complete** ✏ Customizable	EBSCOhost	7/23/2012, 4:59:56 PM	✔ **Held** by my library (1 / 7,307) Titles Deselect Collection	Add to Order

Results 1 - 1 of 1 ↻ |< < [1] > >|

Figure 3.2
OCLC's WorldShare Acquisitions module allows users to search for knowledge base collections and add them as line items on a purchase order.

nice, though, is that the knowledge base contains so much richer information in a lot of cases than World-Cat does, because it's got the platform and provider, the specific collection the title is a part of—all of that is being tracked."[4]

WMS also supports a number of other management features that rely on the integrated knowledge base. Steve McCann, the product manager for World-Share License Manager, described how the license tool functions as a rights and responsibilities engine that associates permitted uses of a resource with the corresponding knowledge base collection. ILLiad and other ILL products can query the knowledge base, get a list of the libraries that hold the resource being requested, and ask License Manager whether or not those holdings can be shared.[5]

Karl Stutzman, assistant director for digital libraries services at Anabaptist Mennonite Biblical Seminary, uses the WMS suite at his small library of two-and-a-half full-time staff. Stutzman singled out the support that WMS can provide for management of demand-driven acquisitions (DDA) as another advantage of a knowledge base powered system. DDA programs allow libraries to provide their users with records for a pool of e-books that they have not yet purchased. Users trigger purchases of these books when they view a certain number of pages or meet other criteria. The way WMS works, the DDA vendor can tell OCLC what specific titles a library has active in its DDA profile and send those to the knowledge base, where they are automatically activated for discovery. From Stutzman's end, the process requires no manual intervention.

"We're in a very small library," Stutzman said. "Our ability to do something like a DDA program was nonexistent before we got this software. It really opened up the possibility, because we wouldn't have had the time and expertise to do complex record loading. So that kind of integration is really important for us."[6]

ProQuest's Intota and Alma

ProQuest announced the development of a library services platform in 2011 and released the first version of Intota in 2013.[7] On paper, Intota has embraced the LSP vision, promising functionality to support acquisitions, cataloging, discovery, fulfillment, and assessment with a focus on streamlined workflows and interoperability. The knowledge base was to have been the foundation of all of these services. The full version of Intota was never completed, though some of the discovery and assessment functionality released under the Intota name has capitalized on the integrated knowledge base. The ProQuest knowledge base can receive automated holdings updates for DDA titles and other collection types, helping libraries to track complex and changeable materials. The central role of the knowledge base throughout the system also provides users with a single point of management and eliminates the need to manually create e-resources metadata.[8]

ProQuest has embraced the Alma LSP in the months following its official acquisition of Ex Libris in early 2016. In a January product strategy webinar, senior staff from the two companies announced that ProQuest would cease further development of Intota, instead diverting the vision for the product into continued development of Alma, which will become the flagship LSP for ProQuest. The webinar also revealed that an enhanced ProQuest knowledge base originally intended for Intota would be rolled into Alma by the start of 2017, presumably replacing the original SFX knowledge base.[9]

While I was not able to speak with a representative from Ex Libris for this report, published accounts of Alma implementations reveal some of the ways that the product has used an integrated knowledge base to its advantage. Chief among them is Alma's Community Zone, a hybrid of its knowledge base and a shared pool of MARC records.[10] Barbara Anderson, the head of metadata and discovery at Virginia Commonwealth University Libraries, described her institution's use of the Community Zone in a presentation for the Ex Libris users group. In the past, librarians at VCU had to manage their collections in each environment separately, activating resources in SFX and loading MARC records into Aleph from multiple vendors. Using the Community Zone, they can activate a title or collection in the knowledge base, and the resource will automatically become available through Primo—no need to source, store, and manage local MARC records.[11]

Melissa Parent and Lesa Maclean, librarians at the Royal Melbourne Institute of Technology (RMIT), addressed the impact of Alma's integrated knowledge base from the acquisitions perspective. They described Alma as inventory-centric, meaning that acquisitions records are associated with knowledge base inventory information like packages and holdings, rather than bibliographic records like in a traditional ILS.

Automated workflows can be set up that allow order records to be imported using customized profiles and linked to local inventory records. And while the initial setup for these profiles proved complicated, Parent and Maclean found that they were eventually able to automate the ordering process for most of their routine purchases. The use of inventory records as the center of the data model also brought clarity to e-resources management work by explicitly mapping relationships around a central knowledge base object.[12]

Other Services

Currently EBSCO, OCLC, and ProQuest/Ex Libris are the major vendors offering products that offer a significant realization of a knowledge base integrated across a suite of services. A few other organizations have also begun to take steps in this direction, though they are not as far along.

In late 2015, Innovative Interfaces, Inc., announced that it was developing the Innovative Central Knowledge Base, which would integrate with its Sierra LSP and other services. Innovative's effort is unique among the larger vendors in that it will be acquiring EBSCO's knowledge base data to use as a foundation for the e-content portions of its knowledge base, while also leaving the door open to collaborate with other suppliers like ProQuest and Knowledge Base Plus. Innovative's arrangement will also allow mutual customers with EBSCO and other partners to seamlessly share their local holdings data between the two services.

Innovative's Central Knowledge Base will be released as a beta in the first quarter of 2016. The first version of the service will support holdings management as part of Sierra. The next release version, scheduled for the second quarter of 2016, will include integrated MARC records from Innovative's SkyRiver database, eliminating the need for users to import local versions of these records. Also scheduled for this release is a unique service that will perform automated access checking of library holdings, verifying URLs, local entitlements, and proxy configurations.[13]

Another open-source product, TIND, is also hoping to leverage the network effect encouraged by the community knowledge base movement. TIND spun off from Invenio, a digital asset management system originally developed to manage research documents at CERN and now overseen by an international collective. The TIND library system currently supports cataloging, circulation, and an online catalog. TIND has begun development of a combined tool to support acquisitions and e-resources management. It will be a stand-alone system that can be used with the existing TIND platform or another ILS. The system will also integrate with the GOKb open knowledge base. TIND will benefit from the work and user base that has already begun to develop around GOKb, and its reuse of the data should also help to bring new users and contributors to that community. TIND has been working with the library community to develop its data model and services and is planning to release a beta version of its new product in late 2016.[14]

Conclusion

The central role of the knowledge base in the new generation of library services platforms has already led to greater efficiency in the management of electronic resources. By serving as an identity broker, the knowledge base allows users to bring together data in intuitive and useful ways: managing purchasing alongside public activation workflows, matching up usage statistics with payments to create cost-per-use metrics, and communicating permitted uses from license records to resource-sharing systems to facilitate unmediated lending. While it's hard to quantify the exact labor savings for libraries, the examples provided by smaller libraries show that LSPs are making complex programs like DDA viable when they would not have been possible using traditional systems.

Undoubtedly, more features will become available as these tools continue to evolve. Areas of potential innovation include workflow management tools that guide users through the resource life cycle and automate tasks when possible; round-trip communication, allowing users to make changes anywhere in the system and push them out to the knowledge base; and increased reliance on knowledge base–like environments for other types of data, such as MARC records, article-level metadata, and instructional materials. With the promise of the integrated knowledge base beginning to crystalize, creative organizations have the opportunity to drive a real evolution in library systems technology.

Notes

1. Oliver Pesch (chief strategist at EBSCO) in discussion with the author, November 2015.
2. Dana Taylor (head of collection management at Louisiana State University) in discussion with the author, December 2015.
3. Sebastian Hammer, "Constructive Disintegration—Re-imagining the Library Platform as Microservices," (presentation, Code4Lib 2016 conference, Philadelphia, PA, March 9, 2016).
4. Jonathan Blackburn (product analyst for WorldShare Management Services Acquisitions at OCLC) in discussion with the author, November 2015.
5. Steve McCann (product manager for WorldShare License Manager at OCLC) in discussion with the author, November 2015.
6. Karl Stutzman (assistant director for digital library services at Anabaptist Mennonite Biblical Seminary)

in discussion with the author, December 2015.

7. Marshall Breeding, "Library Services Platforms: A Maturing Genre of Products," *Library Technology Reports* 51, no. 4 (May/June 2015): 26–36, https://journals.ala.org/ltr/issue/view/509.

8. ProQuest, *Intota and Our Knowledgebase: Global Metadata from a Central Source,* datasheet, accessed April 29, 2016, http://media2.proquest.com/documents/+D3935+-+Intota+Knowledgebase+Datasheet.pdf.

9. "Ex Libris and ProQuest Product Strategy and Roadmap," webinar, ProQuest, January 13, 2016.

10. Kristen Wilson, "Introducing the Next Generation of Library Management Systems," *Serials Review* 38, no. 2 (2012): 110–23, http://dx.doi.org/10.1080/00987913.2012.10765438.

11. Barbara Anderson, "The Parallel Universe of Electronic Resources Discovery, or How I Learned to Stop Worrying and Love the Community Zone" (presentation, Ex Libris Users of North America Annual Meeting, Minneapolis, MN, May 5–8, 2015), http://scholarscompass.vcu.edu/libraries_present/34.

12. Melissa Parent and Lesa Maclean, "Go with the Flow: Discovering New Workflows in Alma" (presentation, VALA conference, Melbourne, Australia, February 3–6, 2014), VALA2014 Proceedings website, www.vala.org.au/vala2014-proceedings/vala2014-session-14-parent.

13. Tim Auger (director of resource sharing and e-content at Innovative Interfaces, Inc.) in discussion with the author, March 2016.

14. Kristen Wilson, "Building the Global Open Knowledgebase (GOKb)," *Serials Review* 39, no. 4 (2013): 261–65, http://dx.doi.org/10.1080/00987913.2013.10766408.