Chapter 5

FOLIO

A New Open Source Initiative

Stakeholders and Community

The FOLIO project aims to foster a broad community of participants and stakeholders. As an open source project, FOLIO contrasts with the processes involved in the creation of other strategic library products, though there are common aspects as well.

The Role of EBSCO Information Services

EBSCO Information Services plays a prominent role in the FOLIO initiative. The company launched the project and has provided funding, strategic leadership, and promotion. The strategy to conduct the project as an open source initiative also places a bit of distance between EBSCO and FOLIO. Although the company will contribute considerable resources, it will not own the software and will exert influence but not control.

EBSCO has made significant financial contributions to fund FOLIO. The specific amounts have not been disclosed, but it has been characterized as significantly more than the cumulative funding for Kuali OLE and one of the largest contributions of this kind in the library arena. EBSCO engaged Index Data to begin developing the initial technical platform. The company has contributed its technical expertise to the design of the technical architecture. EBSCO has also been in the forefront of promoting FOLIO. Key company executives have been involved in presenting information on FOLIO to library audiences all around the globe, and its sales force has also played a role in its promotion.

Although EBSCO does not own FOLIO, the project represents an important facet of the company's business and technology strategy. EBSCO Information Services ranks as one of the largest companies in the library industry and provides a diverse set of products and services. The company's traditional focus has been on the creation of content products, especially those based on subject indexing and abstracts. Its EBSCOhost platform provides access to a broad array of content resources. EBSCO has also created a variety of tools for managing electronic resources. EBSCO Discovery Service has become the leading index-based discovery service, competing with products such as ProQuest's Summon service, Ex Libris Primo, and OCLC WorldCat Discovery Service.

FOLIO has been designed as a modular environment that is consistent with addressing resource management and discovery as distinct functional areas. This approach contrasts with Alma, which has been tightly bundled with Ex Libris's own discovery services, and OCLC's WorldShare Management Services, tied closely to WorldCat Discovery Service. Fostering a technical environment that positions resource management systems as separate from discovery can be seen as a means to address the bundling strategies of its competitors. FOLIO provides a new choice in the realm of resource management systems in a field of uncomfortably narrow options for academic and research libraries. It also reinforces the concept of selecting and implementing discovery services as a distinct component of a library's overall technical infrastructure.

The launch of FOLIO can be interpreted as a parallel move to the acquisition of Ex Libris by ProQuest. EBSCO and ProQuest both operate at the top tier of companies in the library industry with diverse portfolios of products, spanning content, technology, and services. ProQuest catapulted its position in

technology through purchasing Ex Libris, which had established dominance with its Alma library services platform and a vast arsenal of other products. EBSCO likewise has steadily diversified its business activities, with more emphasis on software-as-a-service offerings. But rather than making a business acquisition to become more involved with the resource management technologies used by libraries as its rival ProQuest, EBSCO has taken the novel approach of launching and supporting an ambitious project to create a new alternative in the market as an open source software product.

EBSCO will also become involved with FOLIO commercially as a hosting and services provider. The business ecosystem of open source centers on services rather than licenses. EBSCO has indicated it will offer services for FOLIO along with other organizations that may also offer services. SirsiDynix, for example, has made statements that it plans to offer hosting and other services for FOLIO.[1]

The Open Library Environment

The Open Library Environment, the organization that spearheaded the Kuali OLE project, has engaged with the FOLIO project. The libraries affiliated with OLE currently include

- Cornell University, which joined the FOLIO project in summer 2015;
- Lehigh University, which implemented the Kuali OLE software and intends to migrate to FOLIO;
- hbz (Hochschulbibliothekszentrums des Landes Nordrhein-Westfalen);
- GBV (Common Library Network);
- Texas A&M University Libraries;
- North Carolina State University; and
- Library of School of Oriental and African Studies, affiliated with the University of London.

Some libraries that were affiliated with the Kuali OLE project have not formally engaged with FOLIO, including

- University of Pennsylvania (has selected Ex Libris Alma);
- Indiana University (no specific strategy announced);
- University of Maryland and Affiliated Institutions (no specific strategy announced); and
- University of Florida, which was involved with Kuali OLE during its earlier phase. All of the publicly funded universities and colleges are in the process of implementing Sierra from Innovative.

The Open Library Foundation

A nonprofit organization was established in 2015 to support the governance for FOLIO and related projects. The entities currently affiliated with this foundation include FOLIO, the Global Open Knowledgebase, and the Open Library Environment. The Open Library Foundation will serve as the legal entity to hold the intellectual property related to FOLIO.

Index Data

Index Data has been engaged as the primary development organization for FOLIO. Founded in 1994, the company, with offices in the United States and Copenhagen, Denmark, has extensive experience creating open source software components for library applications. It developed the YAZ toolkit, which has been widely implemented in many library applications to support the Z39.50 and SRU search protocols, and the Zebra search engine.

Sebastian Hammer, cofounder, chief strategist, and president of Index Data, has been one of the prominent spokespeople for FOLIO, especially on the benefits of its technical architecture and functional design. Peter Murray recently joined the company as its open source community advocate and has been active in outreach and education activities to strengthen the FOLIO development community. Lynn Bailey serves as Index Data's chief executive officer and chief financial officer. Company cofounder Adam Dickmeiss serves as the chief technical architect for Index Data.

Functional Vision

FOLIO posits a somewhat different vision of a technology support environment from the existing library services platforms such as Ex Libris Alma and OCLC WorldShare Management Services. Rather than a comprehensive business application addressing a broad range of library tasks within a single interface, FOLIO takes a more modular approach. FOLIO will serve as a lightweight platform to support apps, each addressing a discrete function. A suite of apps will comprise an implementation of FOLIO to support the library in a flexible and customized way. The concept can be compared to that of a smartphone, where FOLIO represents the basic operating system that can support a wide variety of apps.

The FOLIO environment will include a set of low-level services to manage common data elements and to provide other technical services for each app. A set of interface tools and guidelines will ensure that each of the apps created for FOLIO will present a similar look and feel.

The app-oriented approach for FOLIO means that any organization might create its own app for each functional area. The initial version of FOLIO is slated to include apps for the core functional modules, such as circulation, cataloging, acquisitions, and electronic resource management. This approach also leaves the possibility that there might be competing apps for a given area and that a library would have a choice of which one best meets its needs. Apps can also be developed for tasks beyond those currently conceived in existing systems. This best-of-breed approach, if it can be fulfilled, would be a unique capability.

The FOLIO community anticipates the eventual availability of a variety of apps, ranging from those that may perform minor utility tasks to others offering full suites of functionality, similar to ILS modules. These apps would be made available through an app store, not unlike those associated with smartphones. Before being made generally available, some type of certification process would validate an app's compatibility with the FOLIO ecosystem, so that it can reliably maintain the integrity of data and operate with proper levels of security.

Although designed as a multitenant platform able to support many different institutions, it is anticipated that there will be many different instances of FOLIO. Different support providers, for example, may each want to implement instances of FOLIO with their own selection of apps or other value-added services. Some libraries or consortia might want to have their own entirely separate customized instances. This approach contrasts with that of other multitenant products, such as Ex Libris Alma and the OCLC WorldShare Platform, which are based on a global platform with the same codebase and functionality deployed for all organizations using the product.

Technical Vision

FOLIO has been conceived as a lightweight multitenant platform, following a microservices architecture. Several layers constitute the overall design:

- A **System Layer** forms the foundation of FOLIO, playing a variety of roles providing services for functional apps and for the management of the platform. Some of the components of the system layer include
  - relational databases
  - document store
  - indexing technology
  - management and configuration for each tenant
- **Okapi** multitenant gateway, a messaging bus for the exchange of data among apps and the lower-level framework.
- **Application Layer**, the array of apps that will be deployed within each instance of FOLIO.
- **Stripes**, a user interface toolkit based on the React JavaScript framework. This toolkit will provide developers with the means to create a user interface with an appearance and presentational style similar to other apps. It will facilitate more rapid interface construction, saving developers from the need to code commonly used elements.

The technical design of FOLIO is based on microservices, which have gained increasing adoption as the preferred architecture for the creation of complex and highly scalable applications. Microservices are constructed as small elements of functionality that operate independently. Each microservice addresses a finite function, manages its own data store, and is deployed on an independent technology stack. A higher-level interface can be presented that spans many microservices and communicates with them via REST APIs with responses delivered in JSON. This architecture contrasts with the previously prevalent application deployment method, which created a single monolithic executable holding all its functionality. The monolithic development style requires the entire application to be retested and recompiled with every programming change. The microservices approach decomposes the application into many separate services, each of which can be developed independently of the others. Each service is developed by its own small team, using the programming languages, tools, and technical components appropriate to its functionality and its anticipated transaction load. The internal construction of each service is not exposed to the broader application. Many of the largest-scale business environments on the Web implement the microservices architecture, often by reworking their monolithic applications. eBay and Uber, for example, have undergone such architectural transformations.

FOLIO will be made available under the Apache v2 license. This license, while preserving open source requirements regarding use, modification, and redistribution, offers considerable flexibility for commercial use. Proprietary products can make use of open source components with Apache v2 licenses.

Time Line and Current Status

At this time, the FOLIO software has not yet been completed and thus has not been implemented in any library.

The initial codebase for the low-level FOLIO framework was released in September 2016.[2] The on-time completion of this initial benchmark enabled other developers to begin working with the FOLIO framework to become familiar with the system architecture and to begin the development of other tools

and apps needed to eventually assemble functional implementations.

Building on the core framework, intensive development is planned for 2017, distributed among multiple programming teams. Work toward initial versions of apps related to resource management, record loading, and circulation will commence, followed by acquisitions, authentication, and integration with discovery services. A beta installation of a functional system is expected by the end of 2017 for testing. The project anticipates its first library to place FOLIO into production in 2018.

This three-year development cycle from the initial design and programming in August 2015 through 2018 seems ambitious for a complex enterprise business application for academic and research libraries. But this time frame is not inconsistent with Ex Libris Alma, with a three-year interval between its initial work in June 2009 and the first library to place it into production in June 2012.

Forecast

FOLIO faces immense challenges not only in completing an ambitious development schedule, but also in recruiting libraries to adopt it once it is ready. The demise of the Kuali OLE, which ultimately failed to deliver a viable product after seven and a half years of development, may have eroded confidence in the viability of creating a large-scale library services platform for academic and research libraries in a community-based open source development initiative. ProQuest's inability to complete its Intota library services platform as a proprietary commercial product also reinforces the enormously high level of difficulty.

Despite these obstacles, there are factors that point toward a higher likelihood of a successful outcome for FOLIO:

- Financial resources. Although the exact amounts cannot be documented, funding available for FOLIO, mostly through contributions from EBSCO, greatly exceeds the funding awarded to the Kuali OLE project from the Andrew W. Mellon Foundation.
- Technical leadership. FOLIO technical design has been informed by both the technologists behind EBSCO's globally scaled content and discovery platforms and those at Index Data, a highly regarded library-oriented software development firm. EBSCO has recruited leading technologists and executives with significant experience in the development of major library resource management and discovery platforms.
- Transparent software development environment. Technical documentation, existing software code, and other related resources have been made available in the project's repositories, and the efforts of developers are well coordinated and openly accessible.
- Outreach and publicity activities for FOLIO have been massive, primarily by EBSCO personnel, but also with support from the Open Library Environment.
- Despite the faltering of previous projects, at least some segment of academic libraries embraces the values behind open source software.
- FOLIO offers a fresh vision of technology and functionality. A product that embodies a more recent adaption to current library workflows may be able to establish a foothold in the competition with existing commercial offerings.
- EBSCO has a positive reputation in the perspective of many libraries, and they may be receptive to a new technology platform backed by that company.

These factors support some degree of optimism for the prospects of FOLIO, which remains in the development phase with no libraries using it. Successful completion of key benchmarks will be essential to the success of the project. Delays in the availability of a functionally complete version of FOLIO or initial production implementations could impede the momentum of the project. But barring such difficulties, it seems likely that FOLIO will become part of the ongoing landscape of alternatives for academic libraries.

Notes

1. FOLIO, "Introducing FOLIO—A New Collaboration Bringing Libraries, Service Providers and Developers Together to Speed Innovation and Redefine the Future of Library Automation," news release, June 24, 2016, https://librarytechnology.org/news/pr.pl?id=21713.
2. FOLIO, "The Repos Are Here—FOLIO Source Code Repositories Released," news release, September 27, 2016, https://librarytechnology.org/document/21910.

Chapter Resources

Folio website
https://www.folio.org/

Open Library Environment
https://www.openlibraryenvironment.org/

Open Library Foundation
http://www.openlibraryfoundation.org/

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