Background

Open source ILS trends. Across the last decade, adoption of open source integrative library systems (ILS) in libraries steadily increased and has become an integral part of the library landscape, with nearly 12% of public libraries in the United States currently using an open source system (Breeding, 2011; 2015). Growth in open source adoption among institutions of higher education has been less robust, though nearly 29% of academic library sales contracts in 2010 were to open source vendors (Breeding, 2011). Indicative of continued growth among open source systems in academic libraries is the recent implementation of Kuali OLE (an open source library system) by the University of Chicago and Lehigh University, with promises from Cornell University, Duke University, the University of Pennsylvania, Indiana University, the University of Maryland, North Carolina State University, and Villanova University to implement Kuali OLE across the next few years ("Cornell," 2016; "Kuali Adopters," 2013). Nevertheless, the majority of libraries that currently have implemented an open source system, choose either Evergreen or Koha (Breeding, 2015).

Attitudes toward open source ILS systems. Despite a growth in openness toward the adoption of open source ILS systems, most libraries (especially academic) do not use open source ILS systems, and attitudes among librarians are mixed regarding open source systems. Singh (2013a) surveyed 73 librarians from institutions using proprietary ILS systems (64% of respondents were from academic institutions). The author found that 60% had considered adopting an open source ILS and 22% believed an open source ILS would result in cost savings, additional flexibility, or additional customization options. However, 40% of respondents felt their library lacked the training, support, or technical expertise to facilitate a smooth migration,

with 70% anticipating great difficulty in a migration to an open source ILS, and 18% worried about open source ILS systems lacking the necessary functionalities or features needed to run smoothly. Brooke (2013) examined public libraries that had transitioned to an open source ILS and found the beliefs that open source ILS systems offer financial savings and flexibility substantiated by experience, finding the primary advantages to be financial, and diversity among support companies. Riewe (2008) surveyed 361 libraries (public, academic, school, and special) using Koha, Evergreen, and various proprietary ILS systems, with open source libraries most satisfied with the affordability, customizability, interoperability, portability, and functionality of their system.

Koha migration experiences. Bissels (2008) describes the selection process and criteria that led to the implementation of Koha 3.0 at the Complementary and Alternative Medicine Library and Information Service (CAMLIS), Royal London Homoeopathic Hospital, the first implementations of Koha in the UK. CAMLIS used a vendor for the migration and ongoing support, with the selection and implementation process taking less than a year. The author found that vendor training was largely unnecessary due to Koha's "self-explanatory" (p. 309) design and ease of use. Ahammad (2014) also describes a relatively quick implementation of Koha (three months) at the Independent University, Bangladesh, with the comprehensive module functions of Koha a staff time saver. Dennison (2011) reports a relatively quick migration (two months) at the Paine College Collins-Callaway Library. The vendor supported migration to a hosted Koha solution was scheduled for after summer school ended with no budget or staff additions, and onsite training provided by the vendor. The transfer of patron information proved problematic as not all relevant information was able to be extracted from

the legacy system. The author found that the hosted Koha system distributed the work of maintaining an ILS, saved money to use for new resources, and improved the online catalog.

Walls (2011), and Morton-Owens, Hanson, and Walls (2011) provide the background and circumstances surrounding the New York University Health Sciences Libraries' (NYUHSL) migration from a proprietary ILS to an open source ILS (Koha). Koha was chosen over Evergreen because of its robust community of users, advanced module functionality (especially the acquisitions module), and the library IT staff's familiarity with Koha's database system. Additionally, Koha proved easier to integrate with other services and allowed the library's IT staff to provide service, support, and upgrades to the system without having to deal with external network connectivity issues. NYUHSL migrated to Koha in three months and scheduled the process to coincide with the end of the fiscal year to avoid complications with acquisitions data. The migration was also used to sync circulation rules between libraries and weed out inactive patrons. On-sight training was purchased from ByWater Solutions, with Morton-Owens, Hanson, and Walls (2011) noting that both open-source software and user training must often be customized to fit the needs of each local implementation.

Kohn and McCloy (2010) reported on the phased migration to Koha at the Landman Library at Arcadia University, finding that local customization and development was needed to make Koha fully usable. Additionally, the authors found that using a single point-of-contact between IT and library personnel proved a more effective strategy for limiting misunderstandings and miscommunication. Espiau-Bechetoille, Bernon, Bruley, and Mousin (2011) also describe the need for robust local customization of Koha. The authors provide a chronological examination of how three French university libraries decided to migrate to Koha

from a proprietary ILS, then tested the software, wrote common specifications, and determined which developments could be carried out in-house and which would be outsourced. The authors note that institutions switching to Koha could benefit from shared testing and development costs and also point out that Koha documentation, in French, is scattered and not current. Enunjobi and Awoyemi (2012) also emphasize the importance of ensuring adequate planning and technical support prior to beginning a migration in their report of the automation of Adeyemi College of Education Library with Koha.

Not only customization, but testing and development are part of an open source migration. Genoese and Keith (2011), of the New York Academy of Medicine Library (NYAM), migrated to Koha (working with the WALDO consortium), with support from LibLime. The authors found that open-source migrations require a significant amount of staff time dedicated to testing and development. Further, the authors caution that contracts with support vendors should be scrupulously studied and timeliness explicitly stated. Helling (2010) also offers caution when dealing with open source support vendors in discussing the migration from one open source provider to another (LibLime Koha to Evergreen). Citing problems with how LibLime Koha handled circulation issues for patrons of branch libraries, and issues with structural and vendor technical support, the author concludes that the current environment for academic and larger public libraries favors Evergreen. Rapp (2009) agrees that Koha is not a good fit for some libraries, finding that Koha was not functional in the author's local library environment, with the organization later switching to Evergreen. The author also discovered that other libraries found implementing an open source ILS to often be more work and/or financial commitment than initially expected.

Selecting a New ILS System

In 2010, the campus libraries of God's Bible College (GBC) began to look for a new solution to their current ILS. GBC is a private, special-focus college in Cincinnati, Ohio that provides Biblical, theological, and professional training for undergraduate and graduate students. The main campus library and two branch locations serve an undergraduate and graduate population of traditional and online students, while providing additional support for an affiliated institution, for a total user population of approximately 600 students and faculty. The library had used Follett's Destiny since 2007. The library receives information and learning technology support from campus IT and does not employ in-house technology support staff. The proprietary ILS was hosted locally (in a campus-based server) with updates and support provided through an annual contract. In late 2010, the library identified the need for a new, and more robust, ILS to manage the variety of print and digital resources held in campus collections.

Selection criteria. The criteria on which a new ILS should be chosen are of immense importance and will vary across libraries and organizations. As many stakeholders as possible should be consulted in this crucial step of a migration. Institutions planning a migration to an open source ILS would benefit from the detailed ILS selection criteria and decision matrixes provided by Bissels (2008), Müller (2011), Pruett and Choi (2013), Singh and Sanaman (2012), and Yang and Hofmann (2010). The GBC library determined that the new ILS system should be marked by

- affordability;
- a web-based server;
- a robust and highly customizable interface;

- increased system functionality; and
- a large degree of local control.

Interface customization. The legacy system used by the library offered OPAC users limited search options and employed a search interface that was primarily suited toward a K-12 user demographic, with images, labels and search options targeted toward younger readers, not a population of undergraduate students and faculty researchers.

Increased system functionality. The legacy ILS limited what library staff could accomplish in reporting, cataloging, user notification, item display, and circulation. In 2011 the library decided not to renew their annual support and maintenance contract with Follett. The new ILS would need robust (and improved) circulation, cataloging, and serials functions while offering a customizable and clean search OPAC interface.

Evergreen vs. Koha. Initially the library had intended to solicit proposals from proprietary ILS vendors, but early conversations with vendors found the proposed costs of migration, adoption, and hosting with another proprietary solution to exceed budgetary constraints. Once new proprietary options had been eliminated, the library identified Evergreen and Koha as potential choices for the new ILS. The decision to move toward an open source solution, saw a need to update the ILS selection criteria. As the library was now certain that the adoption of an open source ILS would also mean a locally managed migration (and locally hosted solution), the criteria came to include not only the ILS, but other factors relating to the system's ecology. The ILS would also be marked by

- a robust user community;
- widely and freely available documentation and training; and
- a database and technological structure that was friendly to the current strengths of campus IT.

Campus IT was more familiar with Koha's database server (MySQL), than with Evergreen's database server (PostgreSQL). The library was able to find a robust and plentiful source of training, literature, and documentation relating to Koha, with the current literature expressing a preference for Koha in smaller (and less complex) library systems. Evergreen offered many of the desired functionalities the library was seeking but, in the end, Koha was seen as a better fit and the library invested several weeks in exploring and testing the functionalities of Koha in a demonstration context. While many factors went into the decision, Koha's clean and highly customizable OPAC, and Staff interface were key (Figure 1, 2).

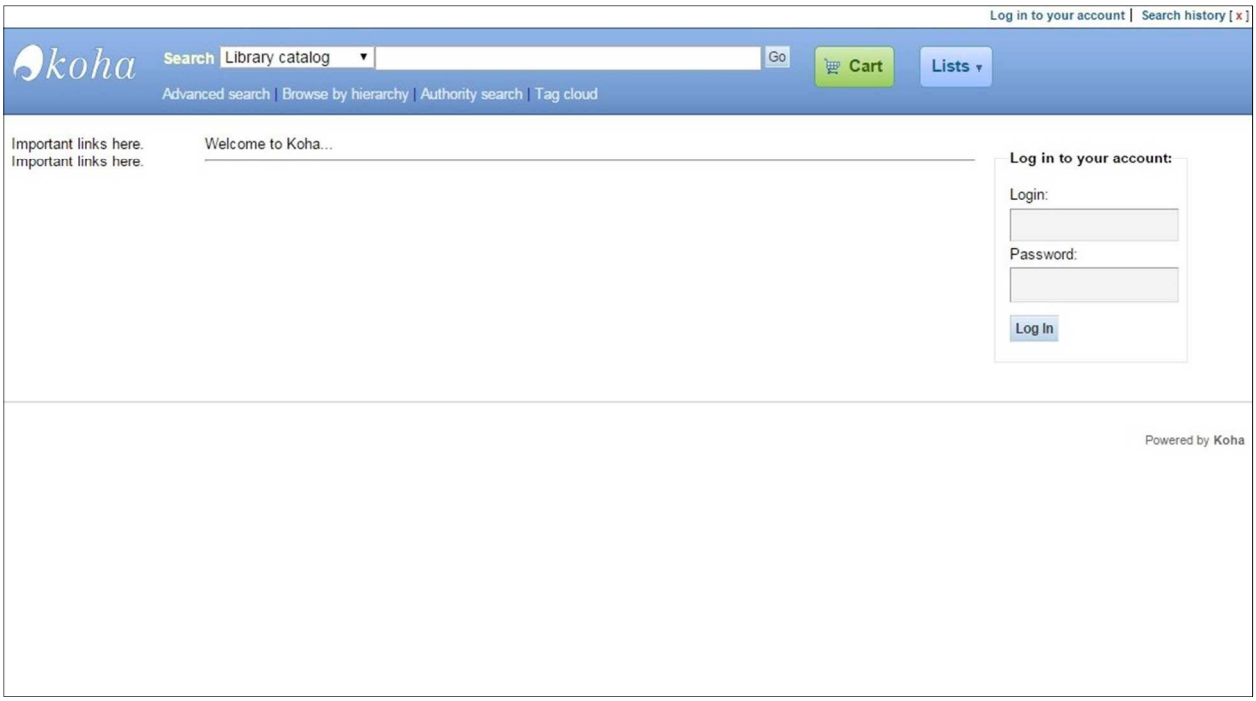

Figure 1. Original Koha 3.x theme.

Figure 2. Koha 3.x staff interface.

Migration and Implementation of Koha: 12 Months

Transitional year. Once Koha was the clear choice, the library secured the necessary institutional and budgetary approvals to begin the migration process in the fall of 2011. The library then formalized an agreement with campus IT as to how responsibilities would be divided. Key personnel, one from each department, were identified to facilitate and co-manage the transition. This began a series of formal, and informal, meetings with campus IT that would remain on-going through both the migration and following period of local hosting and support. During this early state, a year-long schedule for the migration was established and a task-management system was implemented to enable both IT and the library to manage, schedule, track and update each stage of the migration. The go-live date was scheduled for the early fall of 2012.

Resources and tools. The campus IT database specialist began to gain further knowledge about Koha, and its system requirements, through electronic mailing lists, chat-boards, weblogs, tutorials, support documentation, and other contacts. Meanwhile, the library contact began the familiarization process through reading the online Koha handbook and reaching out to other Koha institutions of similar size to gain insight. Additionally, all library staff continued to explore the Koha demo to gain understanding about system functionalities. Campus IT then set up two implementations of Koha. One would serve as the "test" version, the other would serve as the version seen and utilized by library patrons and staff. This set-up allowed all new Koha releases and updates to be tested before final implementation, ensuring staff and users experienced a minimum of disruption. The library and campus IT also agreed to use a web based, collaboration and project management software product called Asana. Once accounts were set up in Asana and the project was begun, the entire project was laid out in steps, with each step assigned to either campus IT or someone from the library. This allowed stakeholders to continually track progress, as well as assess and re-assign tasks as needed. The library relied on the Koha implementation checklist found in the Koha manual (available online) to structure the implementation and provide a framework for laying out the tasks in Asana. It is imperative that all steps of the implementation checklist be followed to ensure a smooth migration and implementation of Koha.

Data migration. Once Koha was installed, the library began to follow the Koha implementation checklist in the Koha manual. Configurations for branch libraries, item types, patron categories and attributes, authorized values, collection codes, shelving locations as well as other administrative and circulation rules and preferences were all planned and entered into

the new ILS. This process allowed the library to thoroughly evaluate its current rules, configurations, and systems and make needed updates and adjustments when planning the new rules and preferences in Koha. Once patron, circulation, cataloging, authorities, and searching configurations had been set, the data migration process could begin. Serials, acquisitions, OPAC, and enhanced content configurations were left until closer to the go-live date.

Data mapping. Approximately four months prior to the go-live date, the library finalized the MARC to Koha mapping. In Destiny, as with other proprietary systems, the 852 field contains holdings data. Prior to the 3.4 release, Koha serialized and stored holdings data in a repeatable 952 field. While Koha no longer stores holdings data in the 952 field, for the import or migration of MARC 21 records the holdings (or item) data must be in the 952 field. Additionally, Koha uses the 942 field for added entry elements such as classification source and item type. In order to prepare the MARC records for migration, the library used the MarcEdit program to make the appropriate adjustments to single records that had been exported from Destiny. The library experimented with one record of each item type (book, AV, etc.) and worked with the record to make the necessary modifications so that it could be imported into Koha and would display properly. Once a single record could be exported from the legacy ILS, modified properly with MarcEdit, and seamlessly uploaded into Koha, the library was ready to migrate. A date was set for the final data export from Destiny.

MARC data was extracted from Destiny, modified in MarcEdit and batch uploaded into Koha. Koha allows for comments to be made about batch imports and the library discovered that carefully, and systematically, labeling batch imports was important. While the import file

name can, and should, also be labeled, making use of the comment function in the Koha batch upload tool is a crucial step in tracking the migration process (Figure 3).

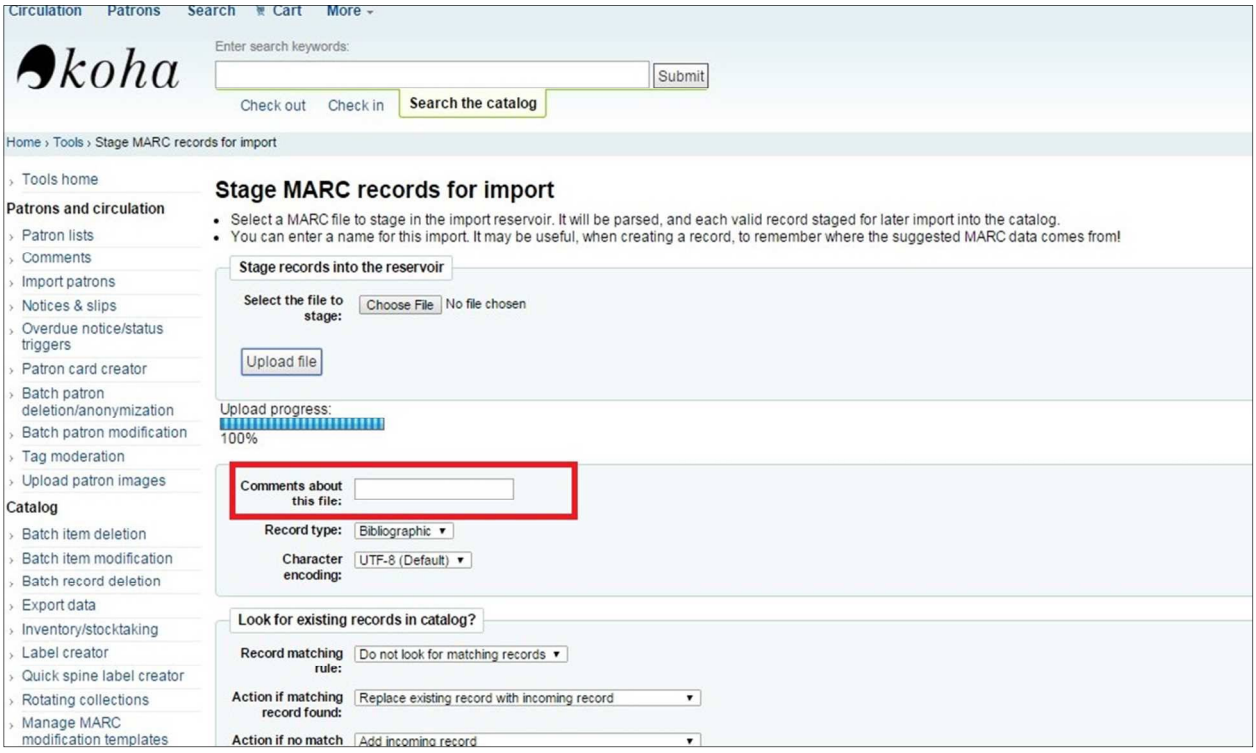

Figure 3. Koha MARC import reservoir, with comment field highlighted.

The Koha MARC import comment function is especially important in the handling of e-book and other e-resource collections, as the contents of these packages is subject to change over time. The library found that batch uploading MARC records in groups of less than 10,000 records worked best for the migration process. In between each batch upload, spot testing was done to help insure that the MARC records had been properly migrated to Koha.

Circulation records. Koha allows for the batch upload of circulation data through the Offline Circulation module, but the library was unable to extract circulation data from the Destiny in a manner that would easily allow for modification and batch upload to Koha. The library decided to not import circulation data from Destiny, but to simply maintain historical data and move forward with Koha's circulation data. The library also decide to start with a clean slate regarding patron fines, something that

was welcomed by patrons and freed up valuable work time for library staff. As the library and IT had decided to keep Destiny running as a back-up solution to a failed migration, there was little concern about accessing this data.

Final month. Once the MARC records had been completely migrated, patron information was batch uploaded through the CSV template provided in the Koha tools module. The CSV file provides clear instructions as to where data values should be placed, allowing the library to quickly batch import all necessary patron data. As the institution was transitioning toward a new student ID system, the migration was an opportunity to easily facilitate this change in the library's ILS. With less than 30 days remaining before the "go live" date the final OPAC customizations were completed and intense training and system familiarization began. The library staff had become very familiar with the system over the previous 12 months and hence the system training had been an on-going process that would continue past the go-live date. The Koha community maintains an up-to-date manual, several blogs, as well as countless AV tutorials, all available online. These resources were invaluable to library personnel as they trained on the new system.

Going live. Campus IT and the library worked together to ensure that every notification function was working properly and that all cron jobs were running. In the few remaining days before campus users were introduced to the system, the library crafted an AV tutorial that was distributed alongside the announcement of the new system. The launch of Koha in late August of 2012 was successful (with no service interruptions) and students and faculty alike provided verbal and written feedback in welcoming the new (and clean) interface. The new systems was announced through social media, website updates, and campus email.

The library and campus IT mutually agreed to continue running the legacy ILS for 24 months post- migration, to enable a rapid response to any serious failure in the Koha system. While the library

staff did, on occasion, harvest historical data about item circulation or patron usage from the old system, there was never any need to return to Destiny.

Outsourcing Support and Hosting

In the summer of 2015, the library was notified that campus IT would be experiencing additional personnel transition and would no longer be able to provide dedicated Koha support. For Koha, ByWater Solutions and Equinox Software are the two primary vendors in the United States, but the Koha community maintains a comprehensive, global directory of support companies that is freely available online. Having soliciting a quote for hosting and support from a number of Koha service providers, the library signed a contract in the fall of 2015 with ByWater Solutions. Within 7 days of signing the contract a virtual meeting with ByWater support staff, library personnel, and campus IT was convened and a second “go live” date of December 7 was agreed upon. ByWater Solutions is now responsible for hosting, updating and maintaining the Koha ILS. As the library was already running an up-to-date version of Koha, the migration was relatively simple with campus users experiencing little down time while the migration took place. The response time to help tickets has been reduced under vendor support and the library has been satisfied with ByWater Solutions’ customer and service support.

Lessons Learning

Singh (2013b) surveyed 20 librarians about their experiences in moving to an open source ILS and institutions looking to migrate would greatly benefit from the collective advice

offered in this article. However, each library will experience challenges and lessons peculiar to the migration and ILS. The following lessons and suggestions, while not unique to GBC, are derived from the peculiar experience of this migration and support process.

- Do formal (and informal) pre/post assessment of the library user and staff population to gather a wide range of feedback about the legacy and target ILS.
    - The GBC libraries only conducted *informal* assessment and could have greatly benefitted from formalized pre and post measures of user satisfaction with the ILS.
- Understand the relevant IT and technical skills required of the migration team prior to migrating, especially for a migration without vendor support.
    - Understanding the limits of the MySQL, CSS, HTML, Linux, Apache, and Perl knowledge of the migration team is critical in determining if a migration can be conducted without extensive vendor support.
- Ensure that both library (and other campus stakeholders) clearly understand both who is responsible for various phases of the migration and who is to be the point of contact.
    - Clearly determining a campus IT and campus libraries point of contact, and using a task management system to channel collaboration, allowed for minimal oversight and confusion as the minute details of a migration were fulfilled. Additionally, such steps helped to strengthen team harmony, and prevent inter-departmental misunderstandings.
- Understand that a migration will take a great deal staff time.

    - While the relevant literature indicates that a successful migration can be undertaken in a few months (or weeks), the respective library and IT staffs of GBC were small and a 12 month migration was scheduled to ensure adequate time could be devoted to the relevant migration tasks, without affecting day-to-day productivity. If a library cannot spare the necessary staff resources, a vendor should be considered to facilitate the migration.
- Waive fines and fees surrounding the migration.
    - This is a simple, but easy way to help ensure that any circulation errors on the part of the migration (or new ILS) will not alienate or unduly upset library users.
- Acquire on-going access to a demo version of the ILS as soon as possible for both selection and training purposes.
- Continue, if at all possible, to run the legacy ILS post-migration.
    - Continuing to have access to the legacy ILS will both provide a realistic alternative to a failed migration attempt, while ensuring that staff have access to any information that was not able to be migrated.
- Use the migration as an opportunity to clean up both bibliographic and patron data.
- Host regular, face-to-face meetings with all parties involved in the migration to ensure timely progress and communication.
    - Do not assume that using a robust task management system will obviate the need for regular meetings. These meetings will offer the migration team an opportunity to compare notes and will help bring to the surface problems that may otherwise go undetected.

- Try to schedule the final data migration during a vacation or holiday to give both staff and library users a chance to acclimate to the new system.
    - The GBC migration was scheduled during the late summer to ensure that all stakeholders had at least two weeks to finalize testing and acclimation before the increased traffic of a new semester.
- Ensure that you provide adequate marketing and instruction for library users.
    - The GBC libraries provided multiple announcements about the new ILS (a robust AV tutorial) through social media and other campus communication tools.
- Periodically, post migration, assess the cost effectiveness of local hosting and support.
    - While a locally supported migration may effect significant cost savings, it may not be as efficient to provide on-going hosting and support. One of the many benefits of open source systems, is the ability to move between vendors.

Conclusion

Since the GBC migration to Koha in 2012, a number of major improvements have increased institutional commitment to Koha. The Koha community has added, or perfected: course reserves, OPAC mobile responsiveness, and OCLC Connexion direct import functionality. Additionally, in early 2015, EBSCO Information Services announced that EBSCO would assist Koha libraries in upgrading Koha's core full-text search engine technology to ElasticSearch, developing a browse function, and ensuring OPAC functionality with EBSCO Discover Service (EDS).

The GBC libraries have greatly benefited by adopting a flexible and robust ILS that is supported by an active user, and developer, community. Migrating to an open source ILS can seem a daunting challenge for a library, especially one of modest size. Such a task, however, is not only possible, but may well be an affordable means to upgrade and improve the institution's ILS. Additionally, choosing a vendor for the hosting and support may well offer additional benefits in resource and personnel conservation. With planning, patience, and teamwork even the smallest of libraries can make a difference in the experience of their users, their staff, and open source libraries around the world.

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