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Open Source Integrated Library Systems in Public Libraries

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Abstract

One of the most fundamental decisions a library makes is choosing an integrated library system, or ILS. A public library can remove unwanted outside influence and save money by switching their ILS to free and open source software, or FOSS. This article is an examination of the progress made by FOSS ILSs to become not only contenders against proprietary systems, but also an appropriate choice for financial, functional, and philosophical reasons. Included is a timeline of published evaluations, the milestone of 14% adoption, a summary of the current landscape, and example implementation cases. A functional analysis shows why a public library can now safely make the switch. A philosophical analysis shows why they should do so. Finally, a proposal is made to "Buy Back America's Libraries," and return ownership of the keystone of our public information infrastructure to the people.

Keywords

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Increasingly, the face of the public library is no longer a bespectacled librarian behind an orderly desk. For many patrons the entryway to the library is now a computer screen. The era of electronic access is a Pandora's Box filled with promise, educational riches, and challenges. To bring that access to reality, information professionals make countless decisions from the mundane to the critical that shape what a patron sees when searching for information. One of the most fundamental decisions is the choice of an integrated library system, or ILS. The ILS usually provides the online public access catalog (OPAC) and can provide much of a library's administrative functionality. These tools affect how the information is delivered, not only in presentation but also in content. The selection of an ILS has far-reaching effects on the activities of patrons, librarians, and administrators.

The authority and reputation of a library is subject to relationships made with outside interests in order to provide resources to patrons. A library's acquisitions department is subject to commercial interests from major publishers and commercial databases (Campbell et al., 2007; Progressive Librarians Guild, 2009; The Editors of The Lancet, 2007). Budgetary constraints from funding sources put a constant limitation on a library's ability to help its community. Relationships with local government are strained by budget, censorship, and privacy concerns (Cowan, 2005).

Many of a library's outside relationships have few alternatives. For example, unless the publishing industry can transform into a self-publishing model, it will remain in the commercial sector. The scholarly journal database companies might be disintermediated by the nascent open access movement but that remains to be seen. Funding from local governments for public libraries is unlikely to improve soon as the trend in recent years has been significant cutbacks (American Library Association, 2011a):

- A majority (59.8%) of public libraries reported flat or decreased operating budgets in FY2011, up from 56.4% in FY2010 and 40% in FY2009.
- Almost two-thirds (65%) of libraries anticipate flat or decreased operating budgets in FY2012.
- Staff salary/benefits expenditures that had plummeted 43.2% in FY2010 only dropped 8.6% in FY2011. (American Library Association, 2011b, p. 13).

Libraries have very few options to save money on publishers and database providers. There is not much more that can be cut from salaries, and funding sources are not going to increase any time soon. But there is one solution that has only recently become viable. A public library can switch its ILS to free and open source software, or FOSS.

This report will draw together many sources to show that FOSS ILSs have become mainstream, reaching a 14% market share as of 2012 and achieving equivalent functionality to proprietary systems. The report argues that FOSS ILSs not only beat proprietary systems on the basis of cost, but remove unwanted outside influence, and are an appropriate choice for philosophical reasons. Included is: a timeline of published evaluations, the significant milestones, a summary of the current landscape, financial analyses, and example implementations. Case studies are presented showing public libraries that have safely made the switch to FOSS ILSs and are satisfied with the functionality. Beyond the immediate financial and practical arguments, a philosophical

analysis shows a fundamental alignment between libraries and the open source community. This alignment includes many commonalities and a clear mandate from library leadership.

Finally, all of these findings are assembled to propose an effort to "Buy Back America's Libraries," returning ownership of the keystone of our public information infrastructure to the people.

Background

The type of system referred to herein as an "Integrated Library System" has been known in various times and locales as a library automation system, library management system (LMS), or online circulation system (Hadro, 2009; Rubin, 2010). An ILS can provide most of a library's operational functions, including acquisitions, cataloguing, circulation, and the OPAC (Rubin, 2010; Taylor & Joudrey, 2009). Almost all public libraries in the U.S. use an ILS (Breeding, 2011c). An ILS can be either proprietary or open source.

One of the challenges associated with free and open source software (FOSS) is explaining it succinctly. In short, the underlying code is not protected by technological methods, and the final software package is released free of charge. "The defining characteristic of open source software is that the license encourages people to modify and improve the software and make the resulting improvements available to others for further enhancement" (Rubin, 2010, p. 340). Rather than development being funded by sales, it is funded directly by users who wish to have certain priorities met. A market-driven network of companies and independent contractors provides support. In contrast, proprietary software is usually owned, sold and supported by the same for-profit company. [For a more detailed introduction to open source from a librarian's perspective, consult articles by Colford and by Poulter (Colford, 2009; Poulter, 2010).] According to evaluations from a wide range of studies and opinions, the viability of FOSS ILSs has steadily increased since the first system was released in 2000. A timeline of evaluations follows, showing a progression of opinion from skeptical, to hopeful, to impressed. A similar increase in adoption rates will be shown as well.

In 2002, an overview of the first FOSS ILSs found that they were not yet as functional as commercial systems, but might work for certain small libraries:

> In their current state, the open source automation systems offer only promise and potential and are not yet a viable option for a run-of-the-mill library. Even for small libraries that might be satisfied with the capabilities of the open source systems, the technical implementation and difficulty in securing ongoing support remain a challenge.
>
> Yet… open source systems could soon surpass (or may have already) the features of some of the commercial systems that target small libraries. (Breeding, 2002, p. 43)

Wayne (2007) compared open source ILSs side by side with proprietary systems, and reports that the ILS market felt consolidation turbulence and saw increased interest in FOSS. Also in 2007, the American Library Association promoted the use and support of open source library applications, saying, "Because open source software is becoming increasingly robust, libraries no longer need to rely solely on expensive proprietary

software" (American Library Association, 2007, p. 14). However, this recommendation did not specifically mention ILSs.

By 2008, the viability of FOSS ILSs had increased beyond small libraries. "Open source library management systems have improved steadily in the last five years. They now present a credible option for small to medium libraries and library networks" (Balnaves, 2008, p. 1). Moreover, "the functionality and installed base of open source LMSs have evolved considerably" (Balnaves, 2008, p. 7) and includes a diverse selection of systems. According to earlier research by Moffitt (as cited in Hadro, 2009) fewer than 2% of U.S. public libraries were using open source systems, most of which were small libraries. In their discussion of the history of ILSs, Taylor and Joudrey (2009) mentioned the growing popularity of open source ILSs, noting that "the number of open-source systems is still rather small, but it is predicted that OSS ILSs may gain greater market share in the near future" (p. 166).

In early 2010, library technology researcher Marshall Breeding noted, "library automation based on open source software has become a major trend" (Breeding, 2010). Breeding is also the author of an annual Automation Marketplace survey of over 2,100 libraries about the ILSs in use and satisfaction with them. The 2011 survey, conducted in 2010, found "just over 10% of survey respondents currently operate open source ILS products, with generally moderate to high satisfaction scores" (Breeding & Yelton, 2011, Chapter 2, p. 10). If Moffitt (as cited in Hadro, 2009) and Breeding were using the same scale, this increase would be increase, from under 2% to over 10% in just a few years.

By 2011, functionality of FOSS ILSs had improved as well. In that year another researcher reported, "Increasingly, the quality of FOSS products is easily comparable to that of proprietary ILS products developed by commercial software vendors" (Müller, 2011, p. 57). The 2012 annual Automation Marketplace survey (from 2011 data) showed an increase in libraries switching to FOSS ILSs, an increase in the software as a service (SaaS) model, and reported that "Evergreen and Koha ILS products have become mainstream. Both offer features comparable to proprietary products" (Breeding, 2012).

In 2013, the same Automation Marketplace annual survey (published in April 2013 and presumably conducted in 2012), reported that:

> Open source ILS products, including Evergreen and Koha, continue to represent a significant portion of industry activity. Of the 794 contracts reported in the public and academic arena, 113, or 14 percent, were for support services for these open source systems. A growing number of projects involve regional or statewide projects based on an open source ILS. These include NCcardinal in North Carolina, the SPARK catalog in Pennsylvania, three regional libraries in Massachusetts, and SCLENDS in South Carolina. (Breeding, 2013)

This survey result indicates another significant increase: from 10% in 2010 to 14% in 2012. For perspective, consider that in the United States alone there are well over 9,000 public libraries (many with multiple branches), most of which use an ILS (American Library Association, 2011c; Breeding, 2011c). FOSS ILSs have now surged to a 14% market share, and have gained comparable features to proprietary systems. FOSS ILS users are no longer a fringe element.

Next we will look at some of the particular systems available, and see how some libraries have made decisions.

The Landscape of FOSS ILSs

The first open source library automation software system, Koha, was developed in 1999 and released in 2000. Koha began in New Zealand when a library needed to replace its older proprietary automation system with one that could properly handle the year 2000 (Koha Library Software Community, 2011). Until this time library systems were proprietary, but the Koha developers decided upon an open source model. Koha has been in active development since then, and has grown to be one of the leading FOSS ILSs.

Evergreen started in Georgia in 2006 and has quickly grown to become one of the leading contenders in this market (Evergreen Project, 2011b). Evergreen has experienced a recent burst of development, which will be detailed shortly.

OPALS is one of the leading ILSs in school libraries, besting proprietary systems in user satisfaction (Breeding & Yelton, 2011). Other FOSS ILSs include PMB, Gnuteca, NewGenLib, OpenBiblio, Emilda and PHPMyLibrary. These have achieved varying degrees of adoption, functionality, and community strength. Some are most appropriate for specific types of libraries (academic, international, etc.). Depending on a library's environment and particular needs, these other systems may be a step behind the leaders, Evergreen and Koha. Kuali OLE is in early development as of December 2011. It is an extensible LMS for academic and research libraries that will be an "enterprise-ready, community source software package to manage and provide access not only to items in their collections but also to licensed and local digital content" (Kuali Foundation, 2011, para. 1).

Examples Illustrating FOSS ILS Advantages

Financial Advantages

Cost savings is usually the first topic raised regarding FOSS. This reaction is understandable as cost is quantifiable, while discussions of features are more complicated and technical. Decision-makers want to know the bottom line: Can FOSS ILSs save money? There are three main components of ILS pricing. Proprietary and open source systems both have initial transition costs, including migration of data, configuration and training of staff. Both types of ILSs have ongoing costs associated with hosting, whether onsite or remotely provided. The third component is ongoing post-transition maintenance and upgrade costs, which are very different for these two models.

Proprietary ongoing costs can be difficult to quantify because proprietary ILSs have variable pricing, scalable systems, unpublished prices, and vendors that require non-disclosure agreements. These factors make it very difficult to compare prices (Breeding, 2009). Proprietary system pricing can be predictable month-to-month when contracts are yearly. But even these costs are unpredictable year-to-year because prices can and do increase each year. Furthermore, there is little control over when features are added and issues are fixed. Open source ILSs have their own budgeting vagueness, but the difference is control and choice.

FOSS ILS costs after migration and installation are dependent upon improvements that a library wishes to implement. If a library would like to add a new feature, it would get a quote from a developer (often a support company with whom it has a previous relationship). If an unexpected budget cut hits the library, it can simply wait to do that work. Another approach to less urgent needs is to hope that someone else using

the same FOSS ILS adds the feature, which would then be included in the next release at no cost. Of course, some bug fixes are urgent and not optional. But most of the time, this flexibility is very valuable. A library has control over what it spends dependent on the urgency, and is not "locked in" to a fixed cost.

For an example of ongoing proprietary pricing, the San Francisco Public Library (SFPL) spent $253,984 on ILS software in FY 2010-2011 (City and County of San Francisco Office of the Controller, 2011). A similar amount is paid every year. This is not a software purchase, and does not include training and maintenance, as detailed in Figure 1, which shows 2009-2012.

City and County of San Francisco
Vendor Payment Summaries Website
Search Results by Vendor, Department, Type of Goods and Services

Vendor Names	Non Profit	Departments	Types of Goods and Services	Payments				
				FY 2009-10	FY 2010-11	FY 2011-12	In Process	Remaining Balance
INNOVATIVE INTERFACES I								
		PUBLIC LIBRARY						
			TRAINING	$1,050	$200	$0	$0	$0
			OTHER CURRENT EXPENS	$232,567	$253,984	$226,249		$0	$0
			MAINTENANCE SVCS-EQU	$285	$285	$0	$0	$285
				$233,902	$254,469	$226,249	$0	$285

Figure 1: City and County of San Francisco summary of vendor payments to Innovative Interfaces for 2009-2012 (data as of 1/28/12).

That amount of money spent each year could pay for a full-time team of programmers to augment an open source ILS lacking any features needed by the library system. This approach was taken by King County Library System (KCLS) in Washington, one of the largest library systems in the nation. These two systems are comparable: while SFPL serves a smaller population and has fewer branches than KCLS, it holds a larger collection (Breeding, 2011c). In 2009, the Institute of Museum and Library Services (IMLS) granted about a million dollars to a project called "Empowered by Open Source" to spur the development of open source ILSs in large library systems. KCLS, the lead library of the twelve-library system project, chose to use and improve Evergreen, one of the leading open source ILSs. The grant and resulting Evergreen work was intended to have a multiplying effect for all libraries because open source improvements are given back to the community (Hadro, 2009; Rapp, 2011).

KCLS launched its new Evergreen system in September 2010, and in the following 14 months of in-the-field use it encountered and fixed significant limitations of the software. For example, the KCLS team contributed

- a rewritten, faster online public access catalog (OPAC),
- an ecommerce fine payment system,
- acquisitions improvements,
- MARC record importing improvements,
- self-checkout speed and interface improvements,
- a new telephone notification system,
- Electronic Data Interchange (EDI) accounts for ordering materials,
- a mobile-device accessible catalog, and
- established an administrative, development and governance structure (Moffitt, personal communication, December 1, 2011).

The subsequent versions of Evergreen, built with code contributions from KCLS and others, contain hundreds of significant improvements including

- paper and electronic serials prediction and check-in,
- authority record management,
- complete MARC record import/export with batch processing,
- OCLC Connexion support,
- federated Z39.50 bibliographic search,
- a customizable Template Toolkit OPAC (TPAC), and a Kids OPAC (KPAC) for children/teens, and
- many administrative and patron interface improvements (Evergreen Project, 2011a, 2011b, 2013).

This development period was a significant milestone. By taking the lead and bearing the brunt of the challenges, KCLS has pushed Evergreen to the next level. The patrons of KCLS sacrificed some features at first, and there were complaints (Breeding, 2011a; Rapp, 2011). But in the following months bugs were identified and fixed, and new features were commissioned and built into Evergreen. KCLS believes that because of this trial-by-fire, future libraries will not experience such disruption, and Evergreen has been proven as viable for a large library system (J. Moffitt, personal communication, December 1, 2011).

KCLS switched to Evergreen from the proprietary system Millennium. KCLS Information Technology Services Director, Jed Moffitt, reports that the conversion and installation of the new ILS cost the library "about the same price as it would cost to repurchase Millennium [for one year]… Support costs for Evergreen are about 70% of its former Millennium support charges… and combined with other expenses (including elevating a staff member who became an Evergreen expert), the tab for the new system is about the same as the old one." (Rapp, 2011) However, because KCLS was building major updates to Evergreen, this cost level is likely a ceiling. Few libraries would need to do that amount of development now that Evergreen has been advanced so far.

Nine libraries are taking part in the IMLS "Empowered by Open Source" grant with varying levels and types of input. Some have made the transition, some have chosen

to wait for Evergreen to mature before switching, and one has decided not to switch (J. Moffitt, personal communication, December 1, 2011).

An example of a smaller library that switched to a FOSS ILS to save money is the Crowell Public Library in San Marino, CA. This library serves a population of 13,000, has 38,000 patrons (many from adjoining areas), and has an 80,000 record database. In August 2010, the library was paying $60,000 per year for SirsiDynix Horizon and it switched to a software as a service (SaaS) hosted version of LibLime Koha for $7,000 per year (McDermott, 2012). The decision was made primarily on price, forced by city management. Yet the library reported a quick, easy migration and satisfaction with Koha despite a few quirks. The library's Reference Librarian/Systems Manager describes many details of the transition, reporting, "in spite of its oddities, I believe LibLime's Koha operating as SaaS was the best choice for our new library ILS" (McDermott, 2012, p. 11). Further, he stated, "I urge public libraries under budgetary stress to consider a migration to an open-source-based ILS" (McDermott, 2012, p.44).

The examples of KCLS and the Crowell Public Library show that switching to a FOSS ILS has definite financial advantages. As stated earlier, there are approximately 9,000 public libraries in the United States. Consider for a moment what could be achieved if the savings achieved by these particular libraries were achieved on a wider scale. But more importantly, note that these savings could then be pooled towards developing common solutions that would benefit all libraries, from SFPL to a rural one-room library. This is a fundamental tenet of FOSS: By aggregating the money previously spent on proprietary software, an economy of scale creates rapid progress. In the conclusion of this report, a proposal is offered to utilize this powerful effect to benefit all libraries.

But clearly price is not the only factor. Next, it will be shown that flexibility and freedom from vendor lock-in are also significant advantages offered by FOSS ILSs.

The Advantage of Choice and Diversity

In a 2010 survey, Breeding and Yelton note a trend regarding an expansion of the number of FOSS ILS support companies in the marketplace. For example, the number of companies that support the Koha FOSS ILS went from one in 2007 and 2008, to four in 2009, and jumped to nine in 2010 (Breeding & Yelton, 2011, Chapter 4, p. 32). This trend is evidence of a more diverse and hearty ecosystem, which is one of the pillars of a successful FOSS project (Stürmer, 2005). Companies providing support to FOSS ILSs include LibLime, Bywater Solutions, and Equinox.

An advantage born of a diverse vendor landscape is a library's ability to choose a support vendor independently. The Complementary and Alternative Medicine Library and Information Service (CAMLIS) in London switched to the Koha FOSS ILS in 2007, and reported their experience in 2010. It had success "using two specialist software companies simultaneously which otherwise compete for business – a situation hardly imaginable in the world of proprietary LMS companies" (Bissels & Chandler, 2010, p. 289). This plurality fosters a competitive environment for support work that can only increase service quality. Rather than competing for the initial sale and then begrudgingly providing support as a cost of doing business, FOSS support vendors compete based on the quality of their actual support work. CAMLIS also found that "with full access to the code, free choice of vendors, and even the option to use more than one at a time, Koha

and other open-source LMS packages are much more future-proof than any proprietary competition" (Bissels & Chandler, 2010, p. 290).

Freedom from vendor lock-in is another strong incentive. For example, MassCat, a cataloguing service running Koha since 2008, was able to nimbly change support vendors in 2011 (from LibLime to ByWater Solutions), without changing software. This support vendor change was invisible to the patrons (Rapp, 2011).

A unique story comes from the Bloomfield-Eastern Greene County Public Library in Indiana. This library has used two FOSS ILSs. It first tried Koha in September 2008, but ran into problems with its consortium and with Koha. In September 2009 it switched consortia to join the Indiana State Library's consortium, which was using Evergreen. It found Evergreen to be more reliable, but acknowledged that this difference might have been due to the consortia and the support vendor, not the ILS itself (Helling, 2010).

La Conner Public Library in Washington switched to Evergreen from a proprietary ILS (InfoCentre) in March 2011, teaming up with the Burlington Public Library and Upper Skagit Library District. These smaller libraries found the changeover to be smooth and the new features an improvement over their old systems. They pooled resources and hired Equinox for support, finding the overall costs to be "less than an equivalent proprietary ILS installation" (Rapp, 2011, p. 36).

Sage Library System of Eastern Oregon reported its reasons for switching to Evergreen in 2010, saying it allows them "to take advantage of new features at no additional cost unless we choose to fund development" (Longwell, 2010, p. 17). Moreover,

> access to and control over our data… opens the door to interface possibilities with other software, interoperability which can create greater efficiency for patrons and staff. Ultimately, by using open source software for our ILS, we have the freedom to choose how our money is spent, whether on strengthening in-house support or contracting out for support services. (Longwell, 2010, p. 17)

These stories indicate that flexibility and support options are important to a diverse set of libraries. Again, FOSS ILSs meet the needs of libraries in a way that proprietary vendors do not. Next, it will be shown that that the governance of the organization behind a software solution, whether proprietary or open source, is an important factor to consider.

Analysis

Open Source Trends

The cases described above tend to show a pattern that the more recent the conversion to a FOSS ILS, the smoother the transition. Does this trend indicate that these systems are now more mature? How can the maturity of an open source project be measured?

As a general trend, FOSS ILSs may be following the same path in the library and information science (LIS) sector as has occurred in other sectors. Spinellis and Giannikas (2012) found that in the business world, the main advantage of open source software was lower cost, and it was most likely to be adopted in "stable slow-growth environments with a large number of software installations" (p. 14). This description fits libraries well, and ILSs are a long-term decision. They also found that FOSS is more likely to be

adopted at the individual application level before being adopted at the platform level (ie. ILS). Consistent with this finding, FOSS is very present at the application level in libraries, including

- web browsers (e.g., Firefox, Chromium, Camino);
- digital preservation tools (e.g., ACE, EMET, INFORM, JHOVE2, Transfer Tools);
- archives management (e.g., ArchivesSpace, Archivists Toolkit, Archon);
- general purpose software (e.g., OpenOffice, LibreOffice);
- reference management (e.g., Zotero, many more);
- operating systems (e.g., Linux, Unix); and
- audio metadata editing (e.g., BWF MetaEdit).

Libraries also use open source software for purposes larger than applications which are comparable to the complexity of an ILS, following the predicted trend of prevalence at larger levels. Examples include

- discovery interfaces/next-generation catalogs (e.g., VuFind, Blacklight, eXtensible Catalog);
- digital archives/repository management (e.g., EPrints, DSpace, Fedora, Exhibit, Recollection);
- research discovery through semantic data (e.g., Vivo);
- scientific data (e.g., iRODS);
- non-integrated OPACS (e.g., SOPAC, CollectiveAccess);
- digital media interfaces (e.g., Variations);
- content management systems (e.g., Drupal, WordPress, Joomla);
- programming languages (e.g., PHP, Perl, C/C++, Java, JavaScript, Ruby);
- web servers (e.g., Apache); and
- databases (e.g., MySQL)
  (Association For Recorded Sound Collections, 2010; Dougherty, 2009; Fedora Commons, n.d.; LeFurgy, 2011; Parry, 2009; Smith, 2011; Trainor, 2009).

Consolidation and Controversy

A recent wave of mergers of the largest proprietary ILS companies has had a major effect on the ILS market and the library sector. "In 1990, there were approximately 40 companies providing library automation solutions; in 2008, because of a large number of mergers and buyouts, only about half are still in business" (Taylor & Joudrey, 2009, p. 166). From 2005 to 2008, a flurry of mergers concerned information professionals. Sirsi and Dynix merged in June 2005 (Dougherty, 2009). In 2006 and 2007, "Extensity became Infor Library and Information Solutions. Sagebrush was purchased by Follett Software Co. CASPR Library Systems has become Library World. Products [were] shifting too. Horizon and Unicorn merged into Rhome, which became Symphony" (Wayne, 2007, p. 23). OCLC took over eight other organizations. In Europe, Axiell Library Group acquired five companies (Breeding, 2011b). This wave of industry consolidation caused a significant loss of market competition, and limited vendor choices for libraries.

Another negative trend that compounded this consolidation effect was a round of buyouts by outside investment companies. The largest ILS vendors were bought up when equity firms saw the decreased lack of competition as an opportunity for profit. Francisco Partners, a private equity firm, bought Ex Libris and Endeavor in rapid succession (Breeding, 2011c), and "Vista Equity Partners acquired SirsiDynix in Jan 2007" (Dougherty, 2009, p. 483). Golden Gate Capital also invested in Infor. In 2008, Leeds Equity bought Ex Libris from Francisco Partners (Breeding, 2011b). Libraries were left wondering if the motives of the new owners would affect the product negatively. In for-profit sectors, private equity investment has been shown to successfully influence companies to prioritize short-term profitability towards the end-goal of selling off the company a few years later (Vester, 2011). "Private equity firms generally raise money to acquire, fix and sell companies, at a profit, on a timetable of five years or less" (Monks, 2012, p. 28).

This atmosphere of uncertainty due to mergers and outside ownership of proprietary systems drove some decision-makers to consider FOSS ILSs instead of changing or renewing ILS contracts. The uncertainty was not simply a vague undercurrent; libraries specifically mentioned the influence of these factors. For example, CAMLIS made the decision in 2007 to adopt Koha partly for cost savings, but also due to "a firm belief in the open-source concept and severe concerns about the suppliers of proprietary LMS packages, many of which had ended up in the portfolios of private equity firms at the time" (Bissels & Chandler, 2010, p. 284).

Open source software can be subject to undue influence from commercial interests as well. In a different chain of events that attracted attention, FOSS ILS Koha was caught up in controversy. In 2005, the leading Koha support company, LibLime, bought the copyright to the Koha code and took over the project. For four years, the project continued as before, with developers contributing to the open code. In 2009, LibLime announced "the launch of a proprietary version of Koha called Enterprise Koha. Buyers of this software would be the first to receive developed features and upgrades" (Helling, 2010, p. 703). LibLime Enterprise Koha (LLEK) was a new breed, running in the cloud and offering new features. LibLime promised to publish improvements publically on a delayed basis, but did not.

This move broke the two biggest rules of open source: giving code improvements back to the community for all to use, and not selling the software. (Selling support is essential but selling the software itself goes against the tenets of the FOSS model.) The non-LibLime users of Koha, including the original creators, were quite unhappy with this event, and struck out on their own to continue the project as true open source. When a software project experiences a division that creates two independent projects, it is called a "fork" (Willis, 2010). Following this fork, LibLime was acquired by Progressive Technology Federal Systems (PTFS) in 2010, consolidating two of the biggest Koha support companies. This acquisition concerned libraries for the same reasons as the consolidation of proprietary companies a few years earlier (Breeding, 2010). PTFS tried unsuccessfully to bring the two branches of the project back together, but the still-open branch community did not agree to the terms. A divisive battle ensued, complete with trademark lawsuits, name-calling, and significant damage to the reputation of Koha

(Willis, 2010). This fork and acquisition had a chilling effect on some libraries that were considering Koha.

Critical Mass, Tipping Point, or Isolated Surge?

Are the install base and developer community of the leading FOSS ILSs approaching a "critical mass" of adoption, after which a growing percentage of libraries will switch? Is the tipping point near? The market share statistics described earlier, showing that 14% of reported ILSs are FOSS, are based on an annual sample of about 2,100 libraries reporting to a survey about ILSs (Breeding & Yelton, 2011, Chapter 2, p. 10). While the survey was broad, the sample of libraries may not be large enough to be representative of the library population as a whole. Therefore, the exact percentage of libraries using a FOSS ILS out of *all* libraries could be lower. Still, the upward trend is clear.

Examples from open source projects in other markets can offer context. Successful open source systems tend to evolve slowly until they gain enough market share to be a safe choice, then they accelerate. Until a critical mass occurs, "the number of adopters grows very slow and product success is not necessarily ensured. But once the critical mass is reached, many customers have already adopted the product and it is time for other customers to follow suit," following a flattened-S (diffusion sigmoidal) curve (Midha & Palvia, 2011, p. 24). At this point the project is more sustainable in the long term.

One sign that an open source system has reached a critical mass is when development speeds up. The recent surge in development of Evergreen may seem like a sign that critical mass has been reached, but it is worth noting that this surge may be due to the large IMLS "Empowered by Open Source" grant. If so, it might not be a natural leap forward but may instead be a jumpstart from external influence. As for the noted increase in the number of Koha support companies, that may be an aftershock from the Koha forking controversy. A more valuable metric worthy of study would be the number of individuals working for open source support companies. Regardless of the reasons behind these trends, they show an active marketplace.

A factor that might be holding back open source adoption despite interest is reluctance to take a risk. There are signs of a pent up demand as libraries wait for others to test the waters:

> While the vast majority of libraries right now are invested in proprietary solutions, they are not necessarily committed. Technological, philosophical, or financial interests sometimes favor open source adoption. If a full-featured system with turnkey or cloud simplicity emerged, it could induce a tipping point in the market. (Breeding & Yelton, 2011 Chapter 2, p. 10)

Library systems may be more likely to jump on the FOSS bandwagon once they see what has been achieved at the huge KCLS. A switching trigger could occur when previously interested holdouts see that certain features have been implemented. Each time a new version is released, more adopters-in-wait may switch when they see that it contains certain sought-after features.

As choosing any platform is a long-term commitment, it is also worth considering what future trends will bring. Many proprietary vendors are beginning to offer hosted solutions and cloud delivery, which is a more turnkey solution allowing a

library to skip the cost of hardware (Breeding, 2011a; Cibbarelli, 2010). On the open source side, libraries are joining consortia to pool resources into one FOSS ILS installation, which results in a similar minimizing of hardware expenses with remote access (Helling, 2010; Longwell, 2010; Rapp, 2011). These trends require robust and consistent Internet access, which might be a barrier to rural libraries. These topics need more evaluation and deserve close monitoring.

Evaluation Methods

ILSs are continually changing, the systems are a moving target, and every library has different needs. How do libraries evaluate ILSs to decide upon the right choice at the right time? Two researchers have proposed specific, reusable methodologies for libraries to choose a FOSS ILS, because each evaluation situation is unique. In 2008, Balnaves proposed a FOSS ILS evaluation system for libraries. It described five dimensions to be examined. The first two dimensions had previously been used to evaluate proprietary systems: features of the system, and the platform. This new approach for FOSS added three dimensions: developer and support community activity, source code robustness and documentation, and the information schema and design (Balnaves, 2008).

In 2011, Müller described a multi-step process of elimination to evaluate FOSS ILSs. In this method, a long list of ILSs is narrowed successively. In the first step, the licensing agreement and community usage privileges are examined to ensure that the ILS is truly free and open source. The second step examines the project developer community for adequate size and activity, amongst other criteria. The final stage examines functionality with an exhaustive table of 799 criteria (Müller, 2011). It is notable that in this study's example evaluation, some ILS feature lists are already out of date, proving the point that each library must evaluate based on its own situation and time.

These concrete methodologies for choosing a FOSS ILS are helpful. But there is more behind this selection than financial calculations and functional aspects. Such a pivotal decision should be evaluated on additional, less quantitative levels as well. As libraries are more than a collection of books, and the mission of library workers is larger than merely lending these books, so should operational decisions be more than a checklist of features and prices. The philosophical dimension will now be considered.

Philosophical Alignment

A significant philosophical component exists in the discussion of open source software in public libraries. There is a striking alignment between the core values of the open source movement and those of librarianship. Philosophical debates are often abstract, with no clear conclusion. But in this case, the philosophical decision is so clear as to be undeniable, and supported in multiple ways. There is also strong guidance from library leadership and precedent from research.

In his third law, S.R. Ranganathan, possibly the most well-known library science theorist, advocates for open access to library resources.

> "By 'Open Access' is meant the opportunity to see and examine the book collection with as much freedom as in one's own private library. In an open access library, the reader is permitted to wander among the books and lay his hands on nay of them at his will and pleasure" (Ranganathan, 1931).

This access is also a fundamental principle of open source software, whose code is by definition freely accessible to examination.

Ranganathan's fifth law, "The Library is a Growing Organism," fits well with the collaborative nature of open source development. Public libraries are built, organized and used by people, not corporations. People in libraries large and small work together to share knowledge with patrons. Why shouldn't librarians be able to work together to share ILS ideas, build improvements, and fix bugs? A library can be as active in FOSS ILS development as it would like, so this information propagation adjusts organically to suit the growth of the library. Contrast this with the proprietary model, in which libraries in isolation from one another report needs one-way to the vendor, and the vendor chooses whether to incorporate this information into its software. The future use of that information is only accessible to future customers who pay for the software. This unidirectional flow of knowledge into a "closed-stack" goes against another of Ranganathan's tenets, "Books are For Use." In 1995, Gorman updated Ranganathan's laws to implore us to "Protect Free Access to Knowledge" and "Use Technology Intelligently to Enhance Service" (Gorman, 1995). These points also support the same openness.

The code of open source software and free access to it is just part of the picture. After all, library patrons will never see that code, and the ILS is just a means to an end. More importantly, the philosophical underpinnings of the FOSS movement can inform and support daily tasks. Steve Jobs of Apple described an inspirational story from his childhood, in which his father wanted the back of a new fence made with as much effort as the front. Even if no one else will ever see the back, the builder will know (Isaacson, 2011). Similarly, librarians' adherence to the principle of open access to information has a ripple effect that goes well beyond the checkout of an informational resource. Patrons do not know the ethical, moral and technical reasons why librarians do what they do, yet patrons gain from the knowledge transferred. Rubin (2010) points out:

> Certainly, any movement that welcomes open access to critical technical information and that, in turn, could lead to significant progress for all rather than serving proprietary interests, is consonant with librarianship's values. In fact, libraries have significant potential to employ open source systems, especially given the high costs of online systems purchased from traditional vendors. (pp. 340–341)

Unpaid and unfettered access to knowledge is a fundamental tenet of librarianship. Similarly, unpaid and unfettered access to software is a fundamental tenet of the open source movement. Libraries exist to provide information and the tools to use it. Software is not only a form of information, but also a tool used to deliver it. Now that adequate free alternatives exist, spending part of a limited budget on a proprietary ILS undermines the very principles of librarianship. As stated in ALA's "Economic Barriers to Information Access: An Interpretation of the Library Bill of Rights," any barrier to information access goes against the very nature of librarianship (American Library Association, 1993). If an open source ILS can provide an equal level of patron access to that provided by a proprietary ILS, the open source choice is the clear path. Money is better spent elsewhere. Removing profit from the equation as much as possible increases efficiency.

FOSS ILSs also strengthen the library's authority as an independent information source. By removing a significant financial force from the operational picture, libraries

can more easily uphold principles of independence and liberty of opinion. Open source software furthers goals set by ALA in 2007, which identified FOSS as one way to foster media diversity and to counteract media consolidation:

> FOSS is developed and maintained by a community of developers that crosses various communities and national boundaries rather than a single corporation. As such, FOSS has openness and the concept of access to information embedded in its structure and design… Free access to information is inherent in these technologies. (American Library Association, 2007, p. 14)

And to hammer home this point, immediately following the publication of these guidelines, the consolidation of the proprietary ILS business mirrored that of mass media. Fewer choices mean less diversity for the people and more profit extracted from libraries.

On a managerial level, the people working in libraries and the open source community are well suited to collaborate. Common traits found in successful open source development communities are altruism, perseverance and clear assignment of responsibility (Baytiyeh & Pfaffman, 2010; Midha & Palvia, 2011; Stürmer, 2005). One might reasonably argue that librarians are more likely to be altruistic and perseverant by nature. They are clearly obsessive about sharing information. What could be more altruistic than a career spent giving away life-changing information? Clear assignment of responsibility in FOSS development means that important roles, such as responsibility for a particular feature, or for documentation, must be appropriately assigned. Hierarchical organization is clearly a fundamental aspect of library science. This confluence of traits predicts a good working match between LIS professionals and open source developers. These two communities are in attitudinal alignment. They share common approaches, goals, and values. That is a strong foundation to build upon.

The alignment of these two groups will benefit libraries large and small. Library-derived improvements to a proprietary system (through bug reports and feature requests) only benefit the software company and, indirectly, later paying customers. In contrast, library-derived improvements to a FOSS ILS benefit all subsequent users of the system, regardless of their size. Input from small, one-branch libraries to the code or documentation will be applicable to larger libraries. Investments by large libraries and grants will trickle down to small libraries. Rather than hoarding improvements, it is in the community's best interest to share them. This is a completely different paradigm from that of proprietary ILSs. This elimination of developmental redundancy creates an additional cost savings. And as shown earlier, once the initial conversion and installation period is completed, ongoing upgrades will come at significant savings when compared to proprietary systems. While the up-front costs may be similar, the long-term savings will grow for many reasons.

In addition, there is the indisputable benefit of fundamental rights. People have the right to access information, and libraries have the mandate to enable that access. To that end, we must question the relationship with proprietary software. Should libraries continue to be subject to external change, or should they themselves become empowered by self-driven growth and learning? Just as information literacy instructs patrons to take charge of their knowledge growth, so should independence through FOSS spur libraries to grow. This virtuous cycle of mutually beneficial growth can only benefit society.

There is a philosophical appropriateness to libraries sharing with other libraries what they have learned, developed and organized. After all, software is just another type of information, and libraries deserve to learn and grow just as patrons do. Strengthening the community of libraries is essential to ensuring the ability to strengthen the minds of patrons everywhere. That is a clear, long-term benefit that will not appear on any budget spreadsheet.

A Proposal: Buy Back America's Libraries

A proposal is now offered, based upon these summary points from this report:

- Conversion to a FOSS ILS has been estimated to be equal to or lower in cost than one year of an equivalent proprietary ILS.
- After the conversion, that ILS costs $0 per year, but does require ongoing support and hosting costs, totaling significantly less than a proprietary ILS.
- In one small library's example, switching to a SaaS hosted FOSS ILS cut annual costs from $60,000 to $7,000 with satisfactory results.
- The San Francisco Public Library system spends $254,000 every year to rent a proprietary ILS.
- It cost the "Empowered by Open Source" grantees about $333,000 per year ($1,000,000 over three years) to update a FOSS ILS to work for the largest public systems in the U.S.
- That ILS is now free to all libraries.
- There are more than 9,000 public libraries in the United States using an ILS.
- About 86% of those public libraries use proprietary ILSs, and 14% use FOSS ILSs.
- This approximates to 7,740 libraries spending more than is necessary.

This data inspires a proposal: A tiny fraction of U.S. public libraries' buying power could be channeled for just two years into a national effort to "Buy Back America's Libraries." If a library is planning to switch ILSs anyway it could join the effort, and switch to a FOSS ILS. If it cannot afford to take a leading development role, it can just switch to the latest version of a FOSS ILS. After two years, hundreds of libraries will have saved considerable amounts of public money. If only a fraction of that money saved would be put back into improving FOSS ILSs, the gap between FOSS ILSs and proprietary ILSs would close. This coordinated effort could further accelerate the development of advanced features, and boost the adoption rate. These libraries will have joined together to return ownership of the keystone of our public information infrastructure to the people. The effort to Buy Back America's Libraries (BBAL) has clear long-term advantages.

BBAL could begin with a simple informational campaign by national library organizations such as the ALA to educate library professionals about how open source software works. It is a different model, which takes time to understand. A central website could offer an independent clearinghouse of general information and tips. The next phase could entail a survey of libraries that are already considering an ILS change. Those libraries that choose to switch to a FOSS ILS during the two-year period could qualify for conversion funding, and be spotlighted in national press releases.

BBAL could be funded by applying for grants from organizations such as the IMLS. The IMLS in particular has funded many previous efforts to empower libraries, and has specifically funded FOSS ILS development. BBAL could face resistance from the companies that sell proprietary systems and support. It would also be important to avoid any conflict of interest, such as sponsorship from open source support companies.

Conclusion

This examination has made a strong case for FOSS ILSs by showing clear financial, functional, and operational benefits. Examples of recent successful implementations, and sharply increasing FOSS ILS adoption further support this argument. The trend is clear: more libraries are switching to a FOSS ILS, with 14% using one as of 2012. In addition, the philosophical exploration found a very complementary fit with the ethos of librarianship.

A transformative change is underway. It is time to Buy Back America's Libraries. A library that chooses the FOSS path will see that progress, like learning, is not easy and never stops. But certain truths will always remain. From Ranganathan's Laws, to the ALA's Library Bill of Rights, to open source software, information freedom has come in different forms but will always be a core value of librarianship.

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