Smart Libraries Newsletter

News and Analysis in Library Technology Developments

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Smarter Libraries through Technology

The Challenges Ahead

By Marshall Breeding

The library technology industry will face one of its most challenging periods as a result of the global pandemic crisis. Libraries have rallied to protect their workers and their patrons through closures of their physical facilities and careful reintroduction of services that can be provided safely. Yet, there will undoubtedly be a more enduring economic impact on libraries and on the vendors that serve them. Libraries and their parent institutions will likely see painful budget reductions for multiple years. Each Library sectors may see different budget trajectories, but the library technology industry as a whole is not likely to remain unscathed.

Apart from the current crisis, the past few years have seen a downward trend in the number of major library system procurements in both the public and academic library sectors. The libraries.org database in Library Technology Guides tracks the number of new-system contracts for integrated library systems or library services platforms. The trajectory of new system procurements peaked in 2011 for both public and academic libraries in the United States, with a general pattern of slowing since then. The number of new contracts in the last few years was at one of the lowest points in the history of the industry. While the number of procurements was low, we also observe that many of these projects involved large numbers of libraries. The percentage of US public libraries purchasing new systems (1%) was substantially lower than US academics (6%). [See https://librarytechnology.org/products/procurements/ for data trends. A more detailed discussion of this topic can be seen in the forthcoming November/December 2020 issue of *Library Technology Reports*.]

The combination of the ongoing trend of decreasing sales opportunities and library budget constraints will place the library technology industry under enormous pressure. The normal levels of economic pressures have driven continual rounds of mergers and acquisitions. While it is difficult to predict the outcome of amplified economic pressure, we can anticipate some possibilities.

- Some libraries may defer planned system replacements unless they can produce short-term budget savings. These deferrals may come just as much out of the intense struggle to accomplish the ongoing work of the library while many personnel work from home and the many other factors disrupting existing procedures and policies.
- Transitions from individual library implementations to shared consortial systems may be able to produce lower technology costs per institution and increased impact of collection resources. Discrete institutional system implementations represent the most costly model of automation and may be a luxury many libraries will not be able to justify in times of extreme budget pressures.
- New or expanded resource sharing environments will likely emerge. Reduction of collection budgets will drive the need for efficient and expedited access to resources from a broader communities of libraries.
- A possible acceleration of mergers and acquisitions. Stagnant or lower revenue may drive companies to pursue new ownership or investment opportunities. The historical stability of

IN THIS ISSUE

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the library economy may likewise encourage higher-level companies to make strategic acquisitions even during a harsh short-term business phase.

- Libraries face urgent demands to provide ever more effective services for their patrons and gain operational efficiencies in response to reduced personnel budgets. These concerns will drive demand for technology products that meet these requirements. To build community support to sustain financial support, libraries will increasingly invest in advanced marketing tools. In an environment of mature resource management systems, new products must emphasize patron-facing capabilities. We can expect the next phase of technology development for libraries to focus intensely on patron services.
- New collection development patterns may drive the need for corresponding enhancements to technology and business systems. Examples include: analytics to help libraries identify priority subscription renewals; tools to manage accelerating transitions to open access content; and systems or integrations to support new or expanded resource sharing arrangements.
- In the immediate term, developers of library software must rapidly develop and deploy tools to help libraries cope with the pandemic crisis, supporting new workflows that ensure health safety and maximize access to materials and services. This issue of *Smart Libraries Newsletter* includes some recent accomplishments in this area.

Naturally, many of these assertions are speculative. The library community can hope for less drastic trends, but must also prepare for a harsh reality for some time. Look to this newsletter for reporting and perspective on any related events that play out in the next phase of the library technology industry.

OCLC Acquires Capira Technologies, Strengthening its Mobile Offerings

OCLC has acquired Capira Technologies, a small firm specializing in mobile apps for libraries. In a deal concluded on July 1, 2020, OCLC assumes responsibility for the company, including the development and support of its existing mobile apps. The four employees of Capira Technology also joined OCLC, including company founder Michael Berse.

OCLC has not been in an active phase of business acquisitions in recent years. Its last major transaction took place in January 2017, when it acquired Relais International. OCLC divested its QuestionPoint service to Springshare in May 2019. A visual representation of OCLC's history of mergers and acquisitions is available on Library Technology Guides (https://librarytechnology.org/mergers/oclc/).

Capira Technologies was founded in December 2012 with the purpose of developing customized mobile apps for libraries.

Though small in terms of the size of the business acquisition, this event represents an important move by OCLC to strengthen its offerings and development agenda for patron-facing mobile technologies. Products created by Capira Technologies have been implemented by more than 500 libraries. Prominent customers include the New York Public Library, Brooklyn Public Library, and the Minuteman Library Network. This move brings important patron-facing mobile technologies into OCLC's portfolio of public library products and services.

Capira Technologies launched its flagship mobile app in May 2013, including features such as ILS integration for real-time catalog search, requests, and patron self-check; self-registration, digital library card, and push notifications. In support of a library's mobile strategy, the app provides reports and analysis from Google Firebase Analytics, a web management console for the configuration and deployment of the app, as well as professional services for marketing and design for mobile user experience.

The Capira mobile app gained capabilities through additional development and integrations as well as partnerships. In November 2014, for example, Capira developed an option for features related to Apple's iBeacon technology. Based on Bluetooth low energy connectivity, iBeacon enables customized push messaging and other interactions based on a visitor's physical location within or proximity to its facilities. This technology has become widely adopted in the retail sector as part of mobile marketing strategies. In the library context, for patrons opting to enable the service, iBeacon can push general messages related to items they have borrowed or requested or location-specific messages related to exhibits, displays, or collection in areas of interest. Also in 2014, Capira partnered with

StackMap to take advantage of their tools for displaying maps and directions to collection items selected through the catalog search feature.

For libraries interested in a more basic mobile app at a lower cost, the company offers CapiraReady. This app can be deployed quickly since it is based on a set of pre-designed templates rather than the more involved customization provided with the flagship CapiraMobile app.

Capira Technologies has also created a web-based platform for patron requests and reservations. MuseumKey supports library partnerships with local museums, managing museum passes according to available times and dates. LendingKey helps a library manage requests for lendable devices, such as Wi-Fi hotspots, laptops, tools, or other non-traditional items. Both MuseumKey and LendingKey integrate with the circulation module of the library's integrated library system.

Products created by Capira Technologies have been implemented by more than 500 libraries.

More recently, the company developed the timely CapiraCurbside to assist libraries as they reopen following COVID-19 closures. Ahead of the ability to fully open their facilities, many libraries have opted to provide curbside pickup and checkout of materials requested online. Los Angeles Public Library licensed CapiraCurbside to facilitate the reopening of 50 of its branch locations offering this service. LAPL had previously contracted with Capira Technology for the creation of a custom mobile app. By August 2020 more than 200 libraries had implemented CapiraCurbside to support their reopening procedures.

OCLC has previously developed the Digby mobile app for WorldShare Management Services to assist library workers with selected activities, such as retrieval of requested materials from stacks, item-scanning for inventory reports, and collecting use statistics for items consulted but not checked out. Library workers can also use Digby to change item locations as materials are moved for relocation or shifting projects. Digby was recently enhanced to support mobile checkouts and returns, a helpful contactless option during the COVID-19 crisis. Digby is available to libraries using WorldShare Management Services without additional cost.

The partnership with Capira Technologies enhances OCLC Wise and its capabilities for public libraries. Wise takes a patron-centered approach, offering capabilities beyond standard ILS features to facilitate engagement and personalized communication channels with library users, supporting a wide range of library marketing activities. The mobile technologies acquired through Capira Technologies represent a natural extension of OCLC's product portfolio to address the pressing needs of public libraries to deliver ever more innovative and engaging services for their patrons.

Vendors Rush to Support Curbside Services

As libraries phase in access to their buildings and services in the midst of the COVID-19 pandemic, they strive to identify processes that give the greatest benefit at the lowest risk to patrons and library workers. Many have offered patrons the option to request items in advance through their online catalogs and collect them at a designated time with minimal physical contact. This curbside pickup model has become a routine service in the retail sector throughout the pandemic. The July 2020 issue of *Smart Libraries Newsletter* listed some of the efforts in the library community to develop or enhance technology products to accommodate the special circumstances surrounding the pandemic crisis. Such developments have continued.

The Equinox Open Library Initiative, a non-profit organization providing development and support services for the open source Evergreen ILS, completed a new Curbside Pickup. Funding for the development project was sponsored by the Pennsylvania Integrated Library System organization. This feature extends Evergreen's request features to enable patrons to select items from the catalog, place a hold, and designate a date and time for pickup. The library can then pull the items from the stacks and organize them according to patron requests. Upon arrival, the patron launches the Evergreen catalog on their device, signs into their account, and presses the button indicating they are ready to collect their materials.

Support for curbside pickup for the open source Koha ILS was created through collaborative efforts of ByWater Solutions and Equinox Open Library Initiative. This collaboration was based on specifications Equinox created, modeling what it has developed for Evergreen and was subsequently implemented by ByWater Solutions developers. Consistent with the sponsored development model, these new features were contributed

to Koha, benefiting all libraries using it regardless of support provider.

In September 2020, Springshare announced a new Pickup Manager for its LibApps suite of tools. Pickup Manager helps library workers manage patrons' holds and pickup, including scheduled notifications via SMS messages or email. The product integrates with the library's ILS to avoid any duplicate entry when managing holds. It leverages the capabilities of Springshare's LibCal and LibAnswers products. Springshare plans to release Pickup Manager in early October 2020.

Libraries using Carl.X, such as the Metropolitan Library System of Oklahoma City, Somerset County (NJ) Library, and OWLsnet in Wisconsin, were able to take advantage of its advanced customization features to adjust their circulation procedures for curbside pickup and other contactless ways of requesting and receiving materials.

Biblionix was early to deliver new features in Apollo in support of library responses to the COVID-19 crisis, with new features announced in June 2020. In addition to new self-service features for contactless checkouts, Biblionix created a set of new enhancements for its holds features, including pickup dates and new location options, such as curbside or drive-up windows. Other new capabilities are enhanced access to electronic titles and boosting their placement in search results. Circulation policies were enhanced with configurable quarantine intervals.

Note: this summary of systems and vendors offering new capabilities for curbside services should not be taken as comprehensive. These vendors have made public announcements; others may have communicated new features or products directly to their clients.

Smart Libraries Q&A

Each issue Marshall Breeding responds to questions submitted by readers. Email questions to Patrick Hogan, Managing Editor, at phogan@ala.org.

What are the main differences between an ILS and an LSP?

Many of the stories published in *Smart Libraries Newsletter* address ongoing developments of products belonging to the key categories of library software, known as *integrated library systems* and *library services platforms*. This question gives a timely prompt to discuss their differences and similarities.

Integrated library systems and library services platforms fall within the more general type of technology used by libraries to manage their internal work and external services. In other industries, these would be considered business process automation systems. These processes in the library context relate to acquiring and describing collection resources, making those resources available to their users through appropriate channels, and other areas of their operations. Business process automation software provides the interfaces and business logic to help an organization efficiently carry out their work. Reports or analytics assess efficiency and inform operational and strategic planning.

Historically, the term *library automation system* described this type of software, though its use is not as prevalent today. I also consider *resource management system* as a suitable term for the different types of technology applications libraries use to manage and provide access to collections. Examples of these product types would include institutional repositories, electronic resource management systems, archive management systems, digital asset management tools, as well as integrated library systems and library services platforms.

Integrated library systems and library services platforms embody many overlapping characteristics. Both are types of resource management systems and can serve as the primary business process automation environment for a library. Library services platforms might reasonably be considered just the next round of integrated library systems with expanded functionality and newer technology. I see more fundamental differences and consider these to be distinct genres. Despite many areas of overlap, a single category does not adequately characterize the library services platforms relative to the previously established field of integrated library systems.

Integrated Library System

The integrated library system is the long-established model of consolidated functionality for libraries. These products emerged following the pioneering era of library automation characterized by computer systems dedicated to a specific area of library operations. Early computerization efforts resulted in separate systems specifically to manage circulation, acquisitions, cataloging, serials processing, or patron access catalogs. These specialized automation systems were consistent with the

capabilities of computing of that era and of the resources available in the library sector for programming and equipment. As computer resources evolved and expanded, more powerful library automation systems emerged addressing a wider set of activities. The integrated library system emerged, either through fresh development or by building out the existing single-function programs. The mold of the integrated library system was cast at this time. Though this model of automation has evolved somewhat, its basic characteristics have remained intact ever since.

The *integration* of the integrated library system comes through database structures shared throughout the software application. The primary areas of library work are addressed by a set of programs organized into modules that share common databases. The modules of an integrated library system run on the same computing environment and share programming libraries, interface frameworks, and other technical components.

From its historic roots through today, the integrated library system has had an interesting history, and many products within this genre have come and gone over the last four decades. The integrated library systems currently available can be seen as the survivors of a linear evolutionary path. The products are mature, stable, and rich in features. The integrated library system, implemented in many tens of thousands of libraries around the globe, continues to thrive.

Some of the basic characteristics of the integrated library systems in use today include:

- Modular functional design:
  - Cataloging (usually based on MARC bibliographic records)
  - Acquisitions
  - Serials Management
  - Circulation
  - Reports or analytics
  - Online catalog
- Focus on print, though with increasing capabilities for electronic resources
  - No fully integrated module for electronic resource management
  - No built-in knowledge base of e-resource holdings
  - No linking services
  - Catalog addresses content directly managed in the ILS, though not the articles, chapters, or other electronic resources available through subscriptions or open access
  - Libraries using an ILS may also have a separate electronic resource management system, though interoperability capabilities have not been well developed.
- Replacement of the online catalog module of an integrated library system by a discovery interface with enhanced search or user interface features. Typical arrangements include:
  - A premium discovery interface provided by the vendor of the integrated library system, such as Encore from Innovative Interfaces or Enterprise from SirsiDynix
  - A premium discovery interface from a third-party vendor, such as BiblioCore from BiblioCommons, Primo from Ex Libris, and EBSCO Discovery Service
  - Open source discovery interfaces, such as the variants of VuFind and Blacklight
- Based on single-tenant software
  - Operates on a single server or cluster.
  - Serves a single organization, such as a single library, a multibranch system, or consortium.
  - Usually in a client/server architecture. Workstation clients are generally being replaced by web interfaces.
  - Multiple possibilities for server hosting: by the library if it has its own data center; by the parent institution of the library (university or municipal data center); by the vendor, through hosting hundreds or thousands of instances of a system for customers, gaining substantial efficiencies and cost savings through automation of administrative routines, virtualization, and other processes.
  - Because the server (or virtual server) is dedicated to a single installation, it is possible to enable access to the native database engines or operating systems. Many vendor-hosted and managed systems do not permit such access to ensure a well-controlled environment and to alleviate the organization's need for technical expertise.

The technology and functional scope of an integrated library system should not be considered obsolete. The products are generally reliable, stable, and can scale to support large organizations. They can include native or layered-on APIs, enabling smooth integration with external systems, discovery interfaces, reporting or analytics frameworks, or other scenarios. The integrated library system will likely continue its evolutionary development trajectory for decades to come.

The integrated library system continues as a viable and appropriate automation model for many libraries. It thrives especially in the public library sector, in which lending of physical materials continues as its primary service, supplemented by increasing proportions of audiobooks, ebooks, and streaming audio and video. Integrated library systems and

their associated catalogs and discovery interfaces have evolved and adapted to accommodate these digital services.

Not all integrated library systems are based on outdated technology architectures. The Apollo ILS from Biblionix, for example, delivers features consistent with the model of the integrated library system through a modern multitenant platform. Designed for small public libraries, Apollo does not need to bring in the additional capabilities and components needed to manage complex multiformat collections.

Library Services Platform

About a decade ago, a new type of library resource management application emerged. OCLC, Ex Libris, and ProQuest launched products significantly divergent from the existing functional model and technical design of the established integrated library systems. These products were introduced in about 2011, following a phase of functional design and technical development beginning in about 2009. Their scope of functionality aimed to address the fundamental disconnect in academic libraries between the dominance of electronic resources in collections and the integrated library systems' inherent focus on print materials. Rather than bridging the disconnect through a next step in evolution of the integrated library system, these new products reflected an ambitious effort to start fresh. By making a new start, development projects were able to take advantage of current software architectures and components without the constraints of the outdated technologies intrinsic to the legacy products.

The three products introduced at that time, Ex Libris Alma, OCLC WorldShare Management Services, and ProQuest's Intota, had distinctive features but shared in common fundamental characteristics that set them apart from the legacy ILS products and constituted a new category of library technology. Each vendor posted their own terminology to characterize this new breed of system. OCLC referred to their products as *web-scale management services*; ProQuest called their proposed product a *web-scale management solution*; and Ex Libris preferred the phrase *unified resource management framework*. Rather than adopt any of these vendor-specific terms, I suggested *library services platform* to name this new category of systems (see August 2011 *Smart Libraries Newsletter*). This term has since been generally adopted by the library and vendor community.

The functional scope and design of the library services platforms address the complex multiformat collections that libraries now manage, requiring an expanded set of business processes, metadata formats, business models, and access scenarios. Especially for academic and research libraries, electronic resources represent the highest proportion of new content added to their collections, though almost all manage extensive legacy print collections and continue to purchase print materials. Library services platforms have been designed with capabilities oriented to these complex collections, many of which would not be feasible to accomplish through evolution of an integrated library system.

The functional characteristics of the library services platform include:

- Flexible metadata structures able to describe different formats of content
- Acquisitions and cataloging workflows that accommodate electronic and print resources and their associated business and legal frameworks
- Integrated knowledge bases for the managing electronic resources at the product or portfolio level rather than as individual journal titles
- Workflows following multiple procurement models:
  - Subscriptions to electronic resources
  - Selection of open access materials
  - Management of article payment charges
  - Demand-driven acquisitions
  - Purchase of physical materials

The technical architecture of library services platforms follows the modern approach of software-as-a-service with the following characteristics. (Note that while many vendors promote their hosting services for legacy systems as SaaS, there are important technical distinctions.)

- Mutlitenant platform able to support all libraries using the product on a single instance of the system (though, under special circumstances, separate instances of the platform support specific communities of libraries apart from the primary instance)
- A single code-base so that all organizations use the same version of the software
  - Activation or deactivation of features accomplished through configuration options by site or individual users
- Software updates are deployed at regular intervals with no technical installation routines required by users. There may be processes where new features are tested and deployed for individual institutions or users.
- Native web interfaces for all staff and patron features
- Application programming interfaces (APIs) exposed for all or at least most system functions and data elements
- Usually will be hosted by the vendor or (or its hosting provider)

- Access to native database tables is generally not permitted in mutlitenant environments (use APIs instead).
- Access to operating systems or other underlying components not provided to non-developers
- Ability to separate institutional data as needed
  - User data
  - Financial records
  - Local collection data
- Ability to aggregate data as needed
  - Shared knowledge bases
  - Discovery indexes
  - Social or community resources

Library services platforms support the work of library personnel and do not directly provide interfaces for library users, which are provided by discovery services. The library services platform provides APIs and other technical capabilities in support of discovery interfaces. While in theory, it is possible to user library services platforms and discovery services from different vendors, in practice most implementations bundle products from the same vendor.

The initial set of products designed according to the library services platform model were mostly oriented to academic, research, and national libraries. These libraries were overdue for a better way to manage their complex collections with growing proportions of electronic and digital content. This product category has recently expanded with a public library twist to include Axiell's Quria, a digital-first functional design for public libraries.

Hybrid Products

In addition to products that neatly fit into the categories of integrated library systems or library services platforms, others have followed a hybrid model. These products embody a subset of the qualities associated with the library services platforms, though still rely on a foundation of the integrated library system. Prominent examples are the BLUEcloud platform from SirsiDynix and OCLC Wise.

BlueCloud is a mutlitenant platform interoperable with SirsiDynix's Symphony and Horizon, providing web interfaces, streamlined workflows, and new layers of functionality. Bibliographic and operational data and core business logic resides in an instance of Symphony or Horizon. As such, BLUEcloud lacks the complete set of characteristics to be considered a full library services platform, but can be seen as a hybrid environment that bridges the benefits of a modern, web-native, mutlitenant platform with the mature capabilities of a legacy ILS. Once the development of BLUEcloud reaches completion, the presence of the legacy ILS will become increasingly transparent.

OCLC Wise, established in Europe and more recently introduced in the United States, layers a modern set of patron-facing services on top of a core integrated library system. Positioned as a patron engagement system, this combination of patron-facing interfaces, multiple communications channels, and targeted marketing features delivered via a modern technology platform complements the underlying ILS modules.

Questions or suggestions for topics in future issues?

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