



# Smart Libraries™

Formerly Library Systems Newsletter™

50 East Huron Street, Chicago, Illinois 60611-2795, USA



## Smarter Libraries through Technology: Enhanced Self-service and Automated Materials Handling

By Marshall Breeding

The companies that provide self-service kiosks, sorters, theft detection, and related products for libraries constitute an important niche within the library technology industry. These products can play a crucial role for libraries, often providing the direct point of contact with patrons through self-service kiosks. For busy public libraries, the additional automation provided by sorters and other types of automated materials handling equipment can provide much needed

efficiency and cost savings for processing high volumes of returned materials.

Self-service loans have become routine in public libraries. Library patrons are well acclimated to self-service, which is pervasive in ever more aspects of daily life. Banks gas stations, grocery stores, and an increasing number of retail establishments rely on customers to use automated systems, saving on labor costs. Libraries face similar challenges. While commercial organizations may be more motivated by increased profits, libraries, as mostly non-profits with lean budgets, must also take advantage of any means available to work efficiently and provide the best service. Public library patrons may appreciate quickly and privately checking out their own materials rather than waiting in line for personal service. Library personnel at service counters can focus their attention on those that experience a problem, have complicated transactions, or simply prefer the traditional in-person experience.

Investing in self-service and inventory productivity equipment can enable a library organization to make the best use of its finite personnel budget. Aided by increased automation, the library may be able to increase the quality of its service by focusing less on routine transactions and concentrating on

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more in-depth research services, more pro-active attention to patrons, expanded programs and services, and additional hours of operation. Such automation should be approached strategically, carefully considering the total balance of costs and its impact on the quality of the library's services it offers to its community.

As self-service takes more of a direct role in patron interactions, it is essential to provide a positive experience that presents the library in the best possible way. These stations have to be easy to use with the least possibility of frustrating technical difficulties, branded to the library, and generally provide the quality of service comparable to a staffed station. The state-of-the-art for self-service equipment has improved enormously since the first models were introduced in the early 1990s. In addition to simply checking out an item, these stations provide personalized experience, including presentation of cover art for items charged or returned, the ability to pay fines and fees, to offer recommendations for future loans, and to place holds on items of interest. These enhanced features increasingly differentiate these products.

RFID technology provides a more robust foundation for self-service and automated materials handling than barcodes. The ability to identify items without physical contact and handle multiple items simultaneously provides a more forgiving environment for self-service and a more efficient basis for automated sorting. It's important, however, to keep in mind that RFID isn't necessarily required for these operations and that equipment is available that works with barcodes. The cost of RFID tags, though declining, can be considerable for very large collections. Large multimillion volume research collections with modest rates of circulation are generally better suited for barcodes than for RFID.

Academic and public libraries, though they share many fundamental qualities, also have become increasingly different. While academic libraries concentrate increasing proportions on access to electronic resources and see very modest levels of circulation of physical materials, public libraries continue to emphasize the acquisition and circulation of print materials, supplemented by e-book lending services. These dynamics translate into public libraries—especially the mid-sized and large organizations with high volumes of circulation—being better candidates for self-service and automated materials handling equipment. Academic libraries tend to have more of an interest in the security products that help them reduce losses from unchecked items being removed from the library. Electromagnetic security and barcodes continue to endure in academic libraries.

The needs for these kinds of technologies also vary by size of library. Those with small collections and light volumes of

circulation transactions are not likely to find as much value in productivity products. The threshold for automated materials handling is generally higher than that for self-service. Even relatively small libraries may benefit from having a self-service station, while implementing a sorting system would be overkill for their needs.

Large public library systems need all the help they can muster in managing returned items. A busy single-building library system can benefit from equipment able to automatically check in materials and sort them into bins for each section of the library, ready for staff to re-shelve. Multibranch systems may have a more centralized processing center where items are collected from each facility to be discharged and sorted. Busy central or regional processing centers must handle extremely large volumes of materials and rely on high-end equipment that may cost many hundreds of thousands of dollars. Even at this level of expense, these facilities can provide considerable savings compared to manual operations. (See study performed by Lori Bowen Ayre "Cost comparison of automated versus manual materials handling operations at King County Library System" January 2009.)

The National Library Sorting Championship illustrates the incredible challenges faced by the top tier of public libraries serving urban areas in managing incredibly large numbers of items loaned to and returned by patrons. The King County Library System in Washington, serving the urban area surrounding Seattle, and BookOps ([bookops.org](http://bookops.org)), a processing center serving the New York Public Library and the Brooklyn Public Library, manage the largest volumes of circulation transactions in the country. These two library systems for the last several years have staged a friendly competition for the highest number of items their respective systems can process in an hour. Both BookOps and KCLS have implemented centralized processing centers with top-of-the-line sorting equipment manufactured by Lyngsoe Systems. New York's acquired its equipment for \$2.3 million and routinely processes around 30,000 items per day. KCLS installed its equipment in 2005 for \$3 million. KCLS, including 28 branch libraries, reports annual circulation transactions of around 21 million. This year KCLS won the competition sorting 12,572 books per hour versus 12,371 achieved by BookOps (as reported in the *Seattle Times*). While this competition is between organizations at the very high end of automated materials handling in public libraries, it highlights the challenges faced by many other libraries serving large urban communities.

The industry of self-service and automated materials handling products continues to evolve. Not unlike other sectors, it has seen multiple rounds of consolidation where a fewer number of larger companies dominate. This issue of *Smart*

*Libraries Newsletter* features the recent sale of 3M Library Systems to One Equity Partners and its merger into Bibliotheca. This event expands the strength of Bibliotheca as the dominant force in this sector, though still facing significant competition. Consolidation brings a tradeoff between a narrower

slate of companies and the increased capacity for development and innovation in larger organizations. It will be important to continue to follow this sector and observe whether these changes eventually deliver results through the development of products and services benefiting libraries.

## Consolidation in the RFID and Self-service: Bibliotheca Acquires 3M Library Systems

Bibliotheca, a company specializing in self-service, sorting, and other productivity products for libraries, has continued its global expansion through the merger of 3M Library Systems into its organization. This move brings together the two largest competitors in this sector. Prior to this merger, Bibliotheca and 3M Library Systems dominated the market, competing head-to-head in many international regions. Now a single, much larger entity operates globally, with competition provided through mid-sized and smaller companies in each market.

One Equity Partners, a private equity investment spin-off of JPMorgan Chase (formerly Bank One) with over \$10 billion in capital, is the owner of Bibliotheca and provided the financing for the purchase of 3M Library Systems from 3M Company. Bibliotheca has grown globally through the acquisition of multiple companies providing products and services to libraries for self-service, automated materials handling, and other productivity equipment. The initial set of companies included Intellident, based in the United Kingdom, Bibliotheca RFID Library Systems, operating in Europe, and ITG from the United States. 3M Library Systems is by far the largest of One Equity Partners' acquisitions for merger into Bibliotheca, representing a substantial expansion of the company in terms of products, library customers served, and capacity for development and support.

Bibliotheca now ranks by far as the largest company in the self-service and automated material handling industry. Following this acquisition, the company's workforce is estimated to total more than 350 employees and will operate offices in 11 countries. The company reports that it provides its products to more than 30,000 library sites with 50,000 hardware implementations globally. It operates hardware manufacturing facilities in Germany, the United Kingdom, and the United States.

### Details of the Purchase

Through this transition, One Equity Partners purchases the business assets of the library systems divisions from 3M

Company and will integrate them into Bibliotheca Group, one of its wholly owned portfolio companies. Assets include all of its products and customer contracts. Its executives and workforce will become employees of Bibliotheca. Libraries should not experience any disruptions to the support they receive and the current product lines offered by the former 3M Library Systems will continue to be developed, enhanced, and marketed as it becomes part of Bibliotheca.

3M Library Systems has previously operated as a business unit of 3M Company, a large publicly traded diversified global corporation valued at \$97 billion with \$32 billion in annual sales and 90,000 employees globally. Divestment from 3M also means displacement from its facilities on the 3M campus in Minneapolis and separation from its administrative, research, and manufacturing support. The Minneapolis-based staff will move to a new dedicated facility in the area. The team will remain intact under the leadership of Matt Tempelis, who has been named President Americas for Bibliotheca Group. According to Tempelis, the company expects even more investment in product development under the new ownership structure than was previously possible while owned by 3M.

As part of 3M, the library-oriented business was organized into two separate divisions, one for North America and one international, with combined revenues of around \$100 million. This organizational structure required two separate transactions to transfer the ownership of 3M's library-related business to One Equity Partners. The sale of the North American division was completed in October 2015 and acquisition of the international components closed in November 2015. Following the transactions, both the North American and international divisions will be folded into one as they are integrated into Bibliotheca Group.

The transaction does not include ongoing access to the 3M brand or trademarks. The 3M products and assets will begin to assume the Bibliotheca brand gradually.

## Bibliotheca Corporate Background

Bibliotheca Group has been assembled through a process of acquisitions and mergers backed by One Equity Partners. This company was formed from a variety of companies that mostly competed in specific regions to operate globally offering a broad range of products for libraries related to self-service, automated material handling, and digital platforms.

The initial set of transactions began in April 2011 with One Equity Partners acquiring the assets of Integrated Technology Group (ITG) from its owner Shai Robkin and Bibliotheca RFID Library Systems from a group of private investors. ITG was based in Atlanta, GA and operated mostly in the United States, with much smaller share of the library self-service market than the North American division of 3M Library Systems. Bibliotheca RFID Library Systems, based in Switzerland, was especially prominent in Europe with a smaller presence in other regions including Australia and North America. In June 2011, One Equity Partners also acquired Intellident, an RFID company based in the United Kingdom along with its French subsidiary.

In February 2012 Bibliotheca acquired Trion Library Systems AG. A major supplier for Bibliotheca's antecedent companies, Trion manufactures automated material handling equipment. Based in Dübendorf, Switzerland, Trion was founded 1999 (see *Smart Libraries Newsletter*, March 2012).

In March 2012 Bibliotheca was established as the global brand for the company. Going forward from this date, the existing company and its new acquisitions would become part of Bibliotheca Group.

Additional acquisitions and partnerships have continued steadily since the initial formation of Bibliotheca Group.

- In May 2013 Bibliotheca announced its partnership with Ecole Solutions, an established provider of learning technology products in India to expand its products in south Asia.
- A joint venture was formed in August 2013 with MultiSystems, a systems integrator based in Brazil, to sell and support Bibliotheca products in South America. MultiSystems was founded in 1995 and has established around a 40 percent market share in Brazil. The company originally offered a proprietary access control system for libraries, expanding in 1999 to also offer closed-circuit television as well as EM and RFID-based theft control products for libraries. EM technologies have been more widely adopted in South America than those based on RFID.
- With its sights on Asia, Bibliotheca established a new strategic partnership in South Korea in November 2014. Bibliotheca South Korea was created under the leadership of former executives and employees of ECO, including JongMin

Lee, Seung Cheol Kim, and Geon Hee Han. ECO continues to operate as a major provider of RFID and other library automation products in South Korea.

- Bibliotheca acquired Aturis Group in January 2015, increasing its presence in The Netherlands, Belgium, and Germany. Aturis was founded in 2002. Wim Markus, former Managing Director of the company, joined Bibliotheca Central Europe.

## Cloud Library

Branching outside of the products oriented to assisting libraries with their physical materials, 3M had also entered the e-book lending arena. The development of the Cloud Library platform will see accelerated development and expansion under Bibliotheca. Tom Mercer, responsible for the 3M Cloud Library, now serves as Director of Digital Products for Bibliotheca. Bibliotheca states that it will position the Cloud Library as its strategic digital platform and will incorporate the unique features of its "opus" systems into Cloud Library. Launched by Bibliotheca in early in 2015, opus was only available in the UK at the time of the merger.

3M entered the library e-book lending arena in May 2011 with the creation of its Cloud Library platform. (see *Smart Libraries Newsletter*, July 2011). Established to compete with OverDrive and similar companies, the 3M Cloud Library provided a platform for libraries to acquire digital titles and to lend them to patrons. The product suite included multiple channels for delivering this service, including Web-based interface for patrons, kiosks that could be placed in the library, as well as mobile apps for iPhone and Android. These kiosks provided an interface to feature and select digital titles as well as software for easy transfer of loaned materials to the patron's device.

Many of the technologies that 3M developed for self-service and automated materials handling facilitated the Cloud Library platform. The lending of e-books, for example, requires many of the same behind-the-scenes technical interactions with the library's integrated library system as self-service kiosks. Also, 3M was able to exploit its existing customer contacts and sales channels to promote its Cloud Library.

The 3M Cloud Library generally received a warm reception by libraries as a competitor to OverDrive, which virtually monopolized the library e-book lending arena. OverDrive's products were not regarded as especially user friendly, with little possibility for integration with existing library interfaces. Leveraging 3M's existing integration expertise, integrated library systems providers such as Polaris (see *Smart Libraries Newsletter*, May 2012) were able to offer fully integrated lending services for physical and digital titles through a single

interface. On the content side, 3M completed agreements with each of the Big Five publishers (Penguin Random House, Hachette, HarperCollins, Macmillan, and Simon & Schuster) as well as many smaller publishers.

Under 3M, the Cloud Library product was offered primarily in the United States. The product was offered to libraries in Canada beginning in January 2014. In April 2015, 3M announced that it would be made available to public libraries in the United Kingdom and Australia. The change of ownership creates the opportunity to expand the Cloud Library into additional geographic regions. This anticipated expansion will require additional agreements with publishers to provide access to their content in each country or region. Even though significant advancements have been made in the technical infrastructure for more patron-friendly e-book lending, the business component of this sector remains complex and restrictive.

## Background of 3M Library Systems

3M has been developing products oriented to libraries for more than 45 years. The 3M Library Systems division has steadily evolved through multiple generations of technology developing diverse lines of products, including those based on electromagnetic technologies, RFID, and digital content platforms.

Its early library products helped protect collection materials from theft. Using electromagnetic technology, books implanted with its metallic strips would cause exit gates to alarm if the item had not been desensitized as part of the circulation loan transaction. 3M Tattle-Tape was introduced in 1970 and remains the leading theft detection product based on electromagnetic (EM) technology.

3M demonstrated its first self-check stations in 1989, with its functional products available beginning in about 1992. As a pioneer of self-check systems, 3M not only developed the hardware and software involved, but also created communications protocols needed to interface with a library's integrated library system. Rather than creating proprietary interactions between its products and each ILS, 3M developed the Standard Interchange Protocol (SIP), which eventually became an industry standard.

Early self-service stations were based on barcodes for item and patron identification and EM, with optional EM desensitization for libraries that had implemented its anti-theft security systems. The company began developing RFID-based products by about 2007.

3M Library Systems acquired the library security products of Checkpoint Systems in October 2007, representing a major consolidation of two key competitors active at that time (see

*Smart Libraries Newsletter*, December 2007, "Checkpoint Systems and 3M Library Systems Converge on RFID").

While Bibliotheca has focused more on RFID-based products, 3M Library Services continued to sell and support those based EM technologies and barcodes. Electromagnetic products from 3M, such as the widely used Tattle Tape security strips and corresponding exit control gates, will continue to be developed, supported, and marketed by Bibliotheca.

3M filed a patent infringement lawsuit against EnvisionWare in June 2009 which was settled in August 12, 2011 (see *Smart Libraries Newsletter*, December 2009).

## Status of the SIP Protocol

The SIP protocol, originally created by 3M, plays an instrumental role in the integration between self-service and sorting products with integrated library systems. 3M has been a key participant in the ongoing development of the SIP protocol, which stands as a de facto industry standard. 3M Library Systems created the initial version of the Circulation Interchange Protocol in 1993. In 1996 the company granted permission for any organization to use its Data Transfer Protocol, created for the communications between its self-check stations and integrated library systems (see *Library Systems Newsletter*, June 1996). This protocol was enhanced to become SIP2 in April 2006. In March 2014 3M Library Systems announced that it would lead the development of a new version 3.0 of the Standard Interchange Protocol. ([librarytechnology.org/repository/item.pl?id=14656](http://librarytechnology.org/repository/item.pl?id=14656))

Though this protocol traces its origins to 3M, it is used by almost all competing self-service products. 3M donated SIP protocol to NISO in June 2012. The SIP2 protocol overlaps considerably with the NISO Circulation Interchange Protocol (NCIP), it continues to dominate in the self-service arena, while NCIP finds greater use for interlibrary loan and resource sharing applications.

Bibliotheca had previously supported the SIP2 (and NCIP) protocols in full, but is also one of the founding members of the LCF consortium. Currently led out of the United Kingdom, LCF is tasked with creating the next level communication framework ([www.bic.org.uk/146/LCF-Consortium](http://www.bic.org.uk/146/LCF-Consortium)). It is anticipated that the 3M merger will add further gravitas to this project and help the framework find broader international adoption.

## Competitive Landscape

On first blush, the consolidation of Bibliotheca and 3M Library Systems may appear to be a monopoly in this sector

of the library industry. While the merger represents a major consolidation in the self-service and automated materials handling niche, it does not result in the lack of multiple viable choices in the international regions in which Bibliotheca operates. In most regions, Bibliotheca and 3M Library Systems did not substantively overlap or directly compete.

The United States component of Bibliotheca comprises primarily the former ITG business, which was a mid-sized company. 3M Library Systems had a much larger presence than Bibliotheca in the United States. Other companies offering self-service, RFID, and automated materials handling products in the North America include mk Solutions, TechLogic (a wholly owned subsidiary of The Library Corporation), EnvisionWare ([www.envisionware.com](http://www.envisionware.com)), Library Automation Technologies ([www.latcorp.com](http://www.latcorp.com)), and D-Tech International.

Other international companies offering products in the library inventory management sector include:

- mk Solutions, formerly known as mk Sorting Systems, is a global company based in Köln, Germany, which manufactures a variety of productivity and security products for libraries, based on barcode, RFID, and electromagnetic technologies. mk Solutions acquired TagVision ApS in April 2015, strengthening its position in Denmark ([www.mk-solutions.com](http://www.mk-solutions.com)).
- Libramation, based in Alberta, Canada, creates and distributes RFID-based products for a variety of business sectors, including libraries ([www.libramation.com](http://www.libramation.com)).
- D-Tech International, based in the United Kingdom with its US office in Wildwood Crest, NJ, provides a variety of products for libraries based on RFID, electrometic, and radio frequency technologies ([d-techinternational.com](http://d-techinternational.com)).
- Lyngsoe Systems, based in Denmark with a U.S. office in Maryland, provides RFID products ([www.lyngsoesystems.com](http://www.lyngsoesystems.com)).
- PV Supa, offers RFID-based self-service and sorting systems for libraries, operating primarily in Scandinavia, North America, and Japan ([pv-supa.com](http://pv-supa.com)).
- ECO, Ltd. provides RFID products to libraries in South Korea ([www.eco.co.kr](http://www.eco.co.kr)).
- Invengo, a major producer of RFID products in China spanning many business sectors, also offers a set of products for RFID Library Management ([www.invengo.com](http://www.invengo.com)).

- Shenzhen Seaveer Intelligent Technology Co., Ltd., offers a variety of RFID-based self-service products for libraries, including free-standing lending units that can offer automated library lending services from locations apart from existing library facilities ([www.seaveerit.com](http://www.seaveerit.com)).

This list of companies is not intended to be comprehensive. Rather, it demonstrates that while the number of companies offering products for self-service and automated materials handling to libraries is relatively narrow, significant competition to Bibliotheca remains.

Prior to the creation of Bibliotheca in 2011, the library-oriented RFID and self-service industry fragmented, with mid-sized companies mostly operating within limited geographic regions. 3M Library Systems was at that time the company with the broadest international involvement. With the joining of multiple of companies to form Bibliotheca and now its absorption of 3M Library Systems, fragmentation has given way to consolidation. In fragmented industries, companies compete for small slices of the pie of any given niche or geographic market. Consolidated global companies have a larger potential market as well as deeper resources to develop products and services.

The market dynamics of the library e-book lending sector follow a different pattern. In this sector, Bibliotheca plays the role of the underdog. OverDrive overwhelmingly dominates the e-book lending arena. The Cloud Library ranks as a distant second-place competitor. Baker & Taylor's Axis 360 product also has a minority share of the library e-book lending market. Odilo, a Spanish company based in Madrid with US offices in Miami and New York, has been able to land some key e-book lending programs in the United States in addition to its projects in Latin America, Spain, and other international regions. The consolidation of 3M Library Systems with Bibliotheca can be seen as a lateral change of ownership that does not substantially alter the competitive dynamics. It does provide opportunities to strengthen the Cloud Library both in future development of technology, licensing of content, and global market opportunities. Expanding upon Bibliotheca's early efforts in digital lending with the addition of Cloud Library will increase opportunities for international distribution and may eventually result in a greater challenge to OverDrive. In the digital arena, this transaction results in a more competitive market.

## Library Technology News

*Selected announcements from Marshall Breeding's Library Technology Guides website. For the latest industry news, visit [librarytechnology.org/news](http://librarytechnology.org/news).*

### YBP Library Services and University of Chicago improve Kuali OLE acquisition workflow

CONTOOCOOK, N.H.—November 9, 2015—Libraries using Kuali OLE and GOBI (Global Online Bibliographic Information) from YBP Library Services will be able to use the new OLE GobiAPI, which will allow the real-time transfer of bibliographic and order details for all print and electronic orders placed via the GOBI platform.

Developed by the University of Chicago on behalf of the OLE project, The OLE GobiAPI provides comprehensive OLE order data mapped from any field in the GOBI order screen. This saves librarians from having to manually transfer the order information from GOBI to Kuali OLE and from loading daily MARC files, giving them immediate access to order information in OLE. This process also allows GOBI to harvest a library's OLE order number for display in GOBI and subsequent invoice matching.

YBP Senior Vice President of Sales and Operations Mark Kendall says that YBP, an EBSCO company, noted that the development of the OLE GobiAPI is in line with EBSCO's support of open resource integration through technology development.

The University of Chicago Library will offer its API development for incorporation into the base product pending approval by the project's Functional Council. The programming funded by Chicago and developed by HTC Global

Services will allow other OLE partners seamless integration with YBP's GOBI and will be easily adaptable for use with other vendors who support the API standard.

### ProQuest introduces Access-to-Own demand-driven ebook acquisition model

Mountain View, CA—November 4, 2015. In collaboration with libraries and publishers, ProQuest will pilot a new ebook acquisition model called "Access-to-Own." Access-to-Own facilitates title ownership by applying budget dollars spent on rentals to perpetual purchases. The model, which utilizes Demand-Driven Acquisition (DDA), addresses short-term loan (STL) pricing concerns and provides access to more front list content than may be available with short-term loans, and results in more content ownership.

A recent ProQuest-sponsored survey of more than 460 librarians illustrates the need for DDA's just-in-case approach to building a comprehensive collection for users. A majority of librarians surveyed use this evidence-based form of acquisition—with 48 percent using purchase and 21 percent using STL. More than 40 percent of these librarians state their primary reason for choosing DDA is to ensure that their limited budgets better align with patron needs.

The pilot for Access-to-Own will launch in mid-2016, with 14 publishers already signed on and many more expected to participate: Cambridge University Press, Oxford University Press, SAGE, Taylor & Francis Group (which includes Routledge, CRC Press, and Ashgate), Wiley, Berrett-Koehler Publishers, De Gruyter, Guilford Press, John Benjamins, World Bank Publications, University of Pennsylvania Press, Indiana University Press, University of North Carolina Press, University Press of Colorado, and Fordham University Press.



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### *Smart Libraries Newsletter*

Marshall Breeding's expert coverage of the library automation industry.

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