Chapter 3

Products and Services

Abstract

Chapter 3 of Library Technology Reports *(vol. 49, no. 1) "Resource Sharing in Libraries: Concepts, Products, Technologies, and Trends" provides profiles of the various products and services available to libraries that facilitate resource sharing. Each profile includes background information on the organization that provides the product, a general description of the product or service and its capabilities, the architecture or technologies involved, and a summary of the numbers or types of libraries that have adopted it Much of this chapter reflects information the author has collected over years of monitoring the field of library automation. Interested readers can find more comprehensive information on the author's website Library Technology Guides at www.librarytechnology.org.*

OCLC

Company Background and Perspective

OCLC stands as the largest organization providing services to libraries, with more than 25,900 members spanning 170 countries. A global organization, it operates as a nonprofit based in Dublin, Ohio, with multiple layers of governance, including a board of trustees, a Global Council, and a set of regional councils. One of the key principles of OCLC, underlying all of its products and services, involves facilitating cooperation among libraries to gain efficiencies and to increase their impact on their patrons.

OCLC was founded in 1967 as the Ohio College Library Center with an initial purpose of providing a source of cataloging records. The bibliographic database and the number of member libraries has steadily increased over the organization's history. Its bibliographic services allow subscribing members to catalog efficiently using MARC records in the massive WorldCat. In 1979, OCLC introduced its interlibrary loan service, which continues to stand as one of its core services.

One of the key roles of OCLC since its inception has been to facilitate resource sharing among libraries. The organization has a variety of products and services in this area, including its core interlibrary loan subscription service as well as those for facilitating resource sharing within consortia. More than 10,000 libraries spanning forty countries participate in WorldCat Resource Sharing.

The realm of interlibrary loan and resource-sharing technology includes only a very small number of players, with OCLC holding a dominant position. Other national and regional interlibrary loan services continue to flourish, many with close relationships to OCLC. Other bibliographic services and resource-sharing services that previously co-existed with OCLC have been subsumed. In July 2006, OCLC acquired RLIN, a competing organization in both the bibliographic services and interlibrary loan sectors. The WLN (Western Library Network), based in Lacey, Washington, merged into OCLC in January 1999. (For a more detailed history of OCLC's resource-sharing activities, see "An Ongoing Revolution" by Kate Nevins.[1])

OCLC is also involved with products that support peer-to-peer interlibrary loan or consortial resource sharing within participating members. This genre of consortial resource-sharing applications includes such products as URSA, Auto-Graphics, VDX, and Relais D2D. SirsiDynix has withdrawn URSA, and most of the organizations using it have moved to other solutions.

OCLC acquired Fretwell-Downing, which included the VDX technology, in 2005, expanding its portfolio to include both centralized and consortial resource-sharing products. The ILLiad interlibrary loan workflow management application developed by Atlas Systems is exclusively distributed by OCLC. In the document delivery arena, OCLC also distributes the Odyssey software, developed by Atlas Systems, that competes with other established products such as Ariel.

OCLC offers products and services across almost all areas of resource sharing and ILL. The domain of interlibrary loan and resource sharing falls well within OCLC's public purpose, which includes the statement "that we will work together to improve access to the information held in libraries around the globe, and find ways to reduce costs for libraries through collaboration."[2]

WorldCat Resource Sharing/WorldShare Interlibrary Loan

WorldCat Resource Sharing is the product name for OCLC's core interlibrary loan service, which will be migrating to a new technology platform in 2013, after which it will be known as WorldShare Interlibrary Loan.

The resource-sharing capabilities are based on the fundamentals of the WorldCat database, which provides MARC bibliographic records and details the libraries that hold each title. As libraries use WorldCat as their cataloging utility, part of the process involves updating the holdings statement for the bibliographic record with their OCLC symbol. The combination of this massive bibliographic database with current data on which libraries own each item provides a solid foundation for OCLC's interlibrary loan services.

The WorldCat bibliographic database, accessed through the FirstSearch interface or through WorldCat.org or WorldCat Local, serves as the discovery layer for this interlibrary loan environment, providing access to more than 270 million bibliographic records, representing 1.8 billion individual holdings. An extremely large portion of the materials that library patrons might request would be available through the OCLC WorldCat Resource Sharing service, with fill rates reported at well over 95 percent. Access to the service is available to OCLC members through an annual subscription fee based on the library's anticipated transaction volume. More than 10,000 libraries participate in WorldCat Resource Sharing.

WorldCat.org also includes article-level metadata, currently more than 150 million records. Library staff can set up a link to their OpenURL resolver from WorldCat.org, while WorldCat Local includes link resolution functionality as part of the service.

WorldCat Resource Sharing offers a feature called Article Exchange that provides a mechanism for libraries to deposit scanned articles as part of their document delivery services. This storage is temporary, with files deleted after thirty days or five views. OCLC offers an application programming interface (API) that allows third-party products to upload documents using Article Exchange.

ILL Fee Management

OCLC offers an ILL Fee Management service that allows libraries to pay any charges assessed by lenders and to receive payments it assesses for materials lent through debits and credits applied to their regular OCLC invoice. By channeling these transactions through OCLC, the library saves significant overhead relative to processing its own invoices and payments for each individual transaction.

According to Katie Birch, Director, OCLC Delivery Services, OCLC is exploring additional scenarios that could use IFM for other transactions in addition to transactions related to interlibrary loan. Decoupled from resource sharing, IFM could work for libraries in a similar way that PayPal supports consumer payments. Libraries could, for example, associate services from trusted partners to automatically charge the library through IFM to subsidize pay-per-view content.

Technologies and Standards Employed

WorldCat Resource Sharing supports the ISO ILL (ISO 10160/10161) protocol for the interchange of interlibrary loan transactions. External systems can submit a request into the service as a direct request to a supplying library using this protocol. The use of ISO ILL is currently limited, with interoperability with third-party systems increasingly taking place through the Resource Sharing Web services. OCLC will continue to support ISO ILL for as long as it is a recognized industry standard but will transition away from the older ISO ILL protocol once alternative mechanisms are in place for the few organizations that continue to use it. OCLC reports that ISO ILL represents only about 2 percent of WorldCat Resource Sharing transactions.

OCLC also develops APIs to enable interoperability with third-party systems. These APIs, implemented as Web services, are consistent with current expectations in the ways that information systems interoperate. Two packages of APIs relevant to these products include the WorldCat Search API and the Resource Sharing Web services. The WorldCat Search API enables read-only access to bibliographic and holdings data from WorldCat and is available to OCLC members and authorized third parties;[3] the Resource Sharing Web services are used by OCLC's business partners.

WorldShare Interlibrary Loan and WorldCat Local make use of Z39.50 to communicate with a library's ILS to determine current availability status and related tasks.

Libraries Using the Service

As noted above, more than 10,000 libraries participate in OCLC's WorldCat Resource Sharing service.

Transition to WorldShare Interlibrary Loan

One of OCLC's major strategic initiatives since 2009 has been the development of an entirely new infrastructure that underlies many of its services. OCLC has created a highly scalable environment, branded the WorldShare Platform, built with a modern architecture and capable of supporting a variety of applications that OCLC is creating; it will also be available for libraries and other third-party organizations to create applications. The WorldShare Platform will enable OCLC to combine its now-varied business applications into a unified architecture with common underlying data structures and staff interfaces.

The initial application delivered on this platform was WorldShare Management Services, a new product introduced in July 2010 that displaces the functionality that would otherwise be handled by an integrated library system. In January 2012, OCLC launched the WorldShare License Manager, which provides support of the management of electronic resources. An initial set of functionality for the WorldShare Metadata collection management was released in September 2012; it provides libraries the ability to manage metadata associated with packages of electronic materials.

OCLC has already begun the transition from WorldCat Resource Sharing to its eventual replacement, WorldShare Interlibrary Loan. Beta testing was conducted from January through June 2012, and the migration to the production service will take place through the end of 2013. Moving to the service on the WorldShare Platform will not alter the fees libraries pay.

WorldShare Interlibrary Loan will initially be deployed with features similar to those of the current service, but it will enable the creation of many new capabilities not previously possible. In broad terms, the new WorldShare Interlibrary Loan service aims to provide resource-sharing and fulfillment capabilities across all formats, including print, electronic, and digital items. Although the initial roll-out of WorldShare Interlibrary Loan aims to provide the functionality of WorldCat Resource Sharing, in the longer term we can anticipate that OCLC will shift the functionality of its other resource-sharing products to the WorldShare Platform.

The transition will be largely transparent for libraries that run their interlibrary loan operations through ILLiad. The Resource Sharing Web services that connect systems such as ILLiad or Clio to WorldCat Resource Sharing will remain largely unchanged through the platform migration.

Interlibrary loan staff will interact with WorldShare Interlibrary Loan through Web-based interfaces that differ somewhat from those of the current system, but are consistent with those employed for other WorldShare Platform applications such as WorldShare Management Services.

Some new features will be part of the initial production release, including the ability to display real-time availability and lender costs. WorldShare Interlibrary Loan includes the ability to interact with the ILS of lending libraries where the library has a subscription to WorldCat Local, using NCIP or other connectors, to determine item availability. The ability to view real-time status will be enabled for libraries that use WorldCat Local in conjunction with a supported ILS, including those using WorldShare Management Services, Millennium, SirsiDynix Symphony and Horizon, and Aleph and Voyager from Ex Libris. This real-time status information improves efficiency for the lending library, providing all the information required through a single interface.

The new WorldShare Interlibrary Loan service will also eliminate some of the workarounds that have been necessary in the previous version. Some libraries, for example, have traditionally required that their symbol be entered multiple times in a lender string to give them more time to respond to requests (EMST or "enter my symbol twice"). The new service will accommodate the underlying needs without libraries having to manually manipulate the lending strings for a request transaction.

New functionality expected in the short term includes an option for ILL personnel to purchase materials in addition to requesting them from another library. As the WorldShare Platform matures and as OCLC continues to develop new applications on its foundation, products such as WorldShare Interlibrary Loan can be expected to expand in functionality and be more integrated with other related services. For update information on the transition to WorldShare Interlibrary Loan, see the page on the OCLC website.

WorldShare Interlibrary Loan migration
www.oclc.org/migrate-worldshare-ill

The end-user discovery component of the WorldShare Interlibrary Loan service will continue to rely on WorldCat.org. Currently, many of the patron-initiated requests come in through the FirstSearch interface. In the same way that OCLC is shifting its staff-oriented applications to the WorldShare Platform, patron-oriented interfaces are consolidating on the WorldCat interface. FirstSearch will be phased out as part of the consolidation on WorldCat.[4]

WorldCat Navigator

OCLC also offers a resource-sharing environment that

provides the infrastructure to support consortia comprised of libraries that have separate ILS implementations. WorldCat Navigator uses WorldCat Local or WorldCat group catalog as its discovery component and includes capabilities to manage patron requests for materials and the interoperability components to process requests through the circulation modules of the integrated library systems of the participating libraries.

WorldCat Navigator is based on the VDX (Virtual Document eXchange) product that became part of OCLC when it acquired Fretwell-Downing in November 2005. Fretwell-Downing initially created VDX in 1998. The VDX product currently serves as the Navigator Request Engine (NRE) component of WorldCat Navigator.

Fretwell-Downing also offered portal products, including ZPORTAL, that were often paired with VDX as their discovery component. Although OCLC does not actively market these portal products, a number of existing implementations continue to make use of ZPORTAL and VDX rather than the current WorldCat Navigator offering.

Libraries Using the Service

Some of the libraries using VDX or WorldCat Navigator currently include

- The Orbis Cascade Alliance supporting its Summit catalog
- The Texas State Library and Archives Commission
- Te Puna, a national interlibrary loan service in New Zealand
- Southern California Electronic Library Consortium (SCELC), branded as CAMINO
- Boston Library Consortium
- Library Link Victoria (Australia)
- Eastern Australian Group of University Librarians (EAGUL)
- Western Australian Group of University Librarians Consortium (WAGUL)
- Queensland Health (Australia)
- Libraries Australia Document Delivery (LADD)
- Conference of Rectors and Principals of Quebec Universities
- AccessPA (Pennsylvania, USA) VDX with Millennium-based discovery interface
- Minitex (Minnesota) MnLink
- Chinook Arch Regional Library System
- Southeastern New York Library Resources Council
- WyldCAT (Wyoming)
- Netherlands Public Library Association
- Ontario Council of University Libraries
- State Wide Interlibrary loan Fast Track (SWIFT) in Colorado
- California Digital Library (WorldCat Local union catalog)

OCLC continues to provide ongoing maintenance development and support for VDX and WorldCat Navigator and has not announced an end of life for this product suite. That said, WorldCat Navigator, based on a product—VDX—originally developed in 1998, is approaching the natural end of its life cycle. We can expect the resource-sharing functionality currently embodied in the Navigator Request Engine and VDX eventually to be subsumed within the WorldShare Interlibrary Loan platform or other WorldShare applications. OCLC has created Groups functionality for WorldShare Management Services that will support the automation and resource sharing of libraries organized in consortia, which may appeal to some libraries that use VDX or other consortial borrowing systems.

CBS

OCLC's arsenal of resource-sharing products also includes Central Bibliographic System (or Centraal Bibliotheek System in Dutch), an application designed to create very large union catalog implementations. CBS was originally developed by PICA, an organization based in Leiden, the Netherlands, that was merged into OCLC in 1999.

CBS currently forms part of large union catalogs, including the Dutch National Catalog, the UnityUK union catalog for the United Kingdom, Libraries Australia, four union catalogs in Germany (Gemeinsamer Bibliotheksverbund GBV, Die Deutsche Bibliothek DDB, Hessisches BibliotheksInformationsSystemHeBIS, and Bibliotheksservice-Zentrum Baden-Württemberg BSZ), and ABES in France.

With several very large-scale active projects, OCLC's support for CBS continues. As with other longstanding products, we might expect OCLC to guide future large union catalog projects toward WorldCat and WorldShare Platform.

CBS
www.oclc.org/cbs/default.htm

TouchPoint

TouchPoint is a patron interface developed by SISIS Informationssysteme, acquired by OCLC in 2005. OCLC does not continue to perform ongoing development of this product, though it does remain in use, often as a front-end interface for CBS union catalogs.

ILLiad

ILLiad, originally created by Atlas Systems and exclusively distributed by OCLC, adds functionality to WorldCat Resource Sharing, automating many of the

routine tasks involved in processing materials. It is a full-featured interlibrary loan management system that provides significant time savings for libraries using WorldCat Resource Sharing. ILLiad does not fundamentally change the model of resource sharing, but it provides an environment that automates the tasks that take place within an interlibrary loan department.

Around 1,200 libraries currently use ILLiad. ILLiad can exchange requests with other services, such as Rapid and Docline, in addition to WorldCat Resource Sharing.

The migration to WorldShare Interlibrary Loan will not lessen the need for products such as ILLiad that address a different scope of functionality. For libraries that rely on ILLiad, the transition will be largely transparent. The transactional database underlying WorldCat Resource Sharing will remain unchanged as the higher-level business application changes to the WorldShare Platform. That transactional database is based on modern technology and has been optimized for the current and anticipated transaction loads. OCLC will not need to migrate data for this transition, and both platforms can operate using it simultaneously.

OCLC indicates that ILLiad will continue with ongoing development from Atlas Systems while OCLC will continue marketing and support. The specialized functionality in ILLiad for libraries processing high volumes of interlibrary loan activity is not in the current roadmap for WorldShare Interlibrary Loan.

Odyssey

Odyssey is a document transmission utility developed by Atlas Systems, which also created ILLiad. OCLC is the exclusive distributor for Odyssey and offers it to its members without charge.

In support of document delivery components of a library's resource-sharing services, Odyssey receives and transmits scanned documents, with some image manipulation capabilities. Odyssey exchanges documents via the Internet with other document systems that use its protocol, including other Odyssey systems, those that use ILLiad, and any third-party systems that use the Odyssey protocol. Ariel, a similar product offered by Infotrieve, uses a different protocol and cannot exchange documents with Odyssey.

Odyssey's core functionality involves transmitting and receiving scanned document files. When it is used in conjunction with ILLiad, more sophisticated management access features can be enabled.

OCLC's recently launched Article Exchange API offers an alternative to document transmission networks such as Odyssey and Ariel. Scanning or posting documents to controlled cloud-based storage saves some effort relative to exchanging documents with Odyssey. OCLC is working with Atlas Systems to integrate Article Exchange into ILLiad.

Atlas Systems: Odyssey
www.atlas-sys.com/odyssey

Additional information on Odyssey
www.oclc.org/odyssey

SirsiDynix: URSA

Although not a currently supported product, URSA, or Universal Resource Sharing Application, stood many years as one of the dominant resource-sharing platforms for consortia, with some remnant installations remaining. This resource-sharing product, originally developed in Australia by CPS Systems, launched in mid-1997. Its key capability involves direct consortial borrowing, supporting the ability for patrons to place requests for materials held in other libraries within a consortium for direct processing without staff intervention. The product makes extensive use of the NCIP protocol for interoperability with the integrated library systems of the participating libraries. Modules of URSA ultimately included an interlibrary loan system and a reciprocal borrowing module based on NCIP.

In November 1999, URSA was acquired by Ameritech Library Services. URSA followed the subsequent corporate path as the company changed identities to epixtech and then to Dynix. The company continued development of URSA, releasing version 4.0 in November 2004. When Sirsi Corporation acquired Dynix in June 2005, URSA become one of many products of SirsiDynix. Development slowed, with Version 4.2 not released until May 2009. URSA was offered by SirsiDynix as a hosted service, with a separate instance for each consortial implementation. Support of URSA was discontinued around mid-2011.

Some of the consortia that implemented URSA included

- Boston Library Consortium
- Borrow Direct
- Capital District Library System
- MassLNC operated by Massachusetts Library Network Cooperative
- Maryland Interlibrary Loan Organization
- Tampa Bay Library Consortium
- North Bay Cooperative Library System
- NorthNet Library System
- Network of Alabama Academic Libraries
- COIL (Consortium Of Irish Libraries)

SirsiDynix has recently launched a new product called SirsiDynix Reciprocal Borrowing, which is in its early development and marketing cycle.

Innovative Interfaces

Innovative Interfaces is one of the leading companies involved in developing automation products for libraries. The company was founded in 1978, with an initial product that connected CLSI circulation systems with the OCLC cataloging system, and went on to produce an acquisitions module that eventually grew into the full-featured INNOPAC integrated library system. Innovative introduced the Java-based Millennium ILS in 1997, which served as the company's flagship library management product through 2011, when it introduced Sierra as its new-generation library services platform.

The company offers the Encore discovery product, initially introduced in 2006, as a new-generation interface that featured a single search box with relevancy-ranked results and faceted navigation. Encore Synergy, released in 2010, added the ability to extend search results to a library's subscribed electronic resources through Web services connections to content providers. Research Pro is the company's federated search application. Innovative introduced its Electronic Resource Management application in 2002. Other products include the Content Pro digital collections management application and Content Pro IRX institutional repository platform.

INN-Reach

Innovative entered the consortial resource-sharing arena with the introduction of INN-Reach in 1991 in partnership with OhioLINK, a group of academic libraries in Ohio. INN-Reach was designed with the vision of allowing multiple libraries in a consortium to share resources efficiently.

OhioLINK formed in the mid-1980s with the goal of ultimately building a statewide union catalog for the academic libraries. Innovative Interfaces was selected for this project with a contract beginning in 1990. The contract included implementing the Millennium ILS in each of the libraries and developing the infrastructure for the union catalog and consortial borrowing. This pioneering project in the domain of consortial borrowing today supports the libraries' eighty-eight public and private academic institutions, with combined collections of 49.5 million books and other materials.[5]

INN-Reach was originally designed to work in conjunction with INNOPAC (later Millennium) ILS implementations in each of the participating institutions. Many INN-Reach implementations subsequently included participants with systems other than those provided by Innovative. NCIP support was added to INN-Reach in 2010, facilitating its operation with non-Millennium ILS implementations.

The INN-Reach system involves a central server that provides a physical union catalog populated and synchronized from the ILS of each of the participant institutions and an additional central server that brokers resource requests and fulfillment through real-time connectors.

The direct consortial borrowing implemented through INN-Reach follows a workflow that begins with users searching the central union catalog, with the ability to place a request for items held by any institution in the consortium. Once the user initiates a request for an item, INN-Reach performs a series of interactions that validates the authentication of the patron, creates temporary patron and item records as needed on the lending and borrowing ILS, and generates paging slips for the lending library. The item can then be pulled and delivered to the library associated with the borrower and then circulated through the same processes as locally held items.

Some of the implementations of INN-Reach include

- OhioLINK (academic libraries in Ohio)
- InMICH (Michigan)
- InRhode (Rhode Island)
- LINK+ (California)
- Maine InfoNet
- MOBIUS (Missouri)
- Ohio private academic libraries
- Plus (Colorado Public Libraries)
- Prospector (Colorado academic libraries)
- San Diego Circuit California
- ConnectNY (New York)
- Hong Kong Academic Library Link (academic libraries)
- Partnership among South Carolina academic libraries
- Catalonian Public Reading System (Spain)
- BONUS (New South Wales, Australia)
- LIWA (United Arab Emirates)

ArticleReach

ArticleReach provides many of the same capabilities as INN-Reach, but is oriented to articles. ArticleReach maintains a central database of the holdings of the participating libraries.

Patrons place requests directly into ArticleReach, which automatically processes the item against the central database to determine if it is available within the consortium. If the item is held in the user's own library, ArticleReach can either generate a message to the user or notify the local interlibrary loan office for fulfillment. Most ArticleReach transactions require no intervention from interlibrary loan personnel of the borrowing library. Staff in the library selected to fulfill the request pull and scan the article and transmit it to the requestor's library via Ariel or other document transmission utility. The requestor is notified via e-mail and can log into My Millennium to view the link to the scanned article.

Auto-Graphics

Auto-Graphics, a company that today specializes in library automation and resource-sharing systems, traces its beginnings to 1950 as a business involved in publishing as a hot-metal typesetter. With a history of almost sixty-two years, its survival has depended on its ability to navigate through many cycles of media and technology and to continually evolve its product and service offerings. The company has continually enhanced and expanded its offerings through a long series of technologies, beginning with CD-ROM catalogs and advancing through networked and Internet-based products, culminating with the full-featured Web-based large-scale interlibrary loan and resource-sharing services that currently comprise its product line. Mary E. Jackson, an internationally recognized expert on interlibrary loan, joined Auto-Graphics in September 2006 as product manager for the company's resource-sharing offerings.

The company now known as Auto-Graphics was founded as Cope Typesetting by Ira C. Cope in 1950. It initially provided typesetting and printing services for the religious publishing industry. Beginning in 1970, the company became involved in the creation of library catalogs using computer databases. These catalogs were produced in different media over the years, beginning with computer output microfilm (COM), then CD-ROM, and eventually online and Web-based services. Auto-Graphics has created products based both on technologies it has acquired and on technologies that resulted from its own development efforts. The company's products span library management, resource-sharing, and bibliographic services. In 1970, it acquired a company called Leaps as the basis for its start in computer-based printed library catalogs. Later, the company developed microform capability, including a patented roll-fiche reader.

Auto-Graphics acquired the LIBerator Library Management System in 1990 from Denver-based LIBerator Information Systems and Services; it became the Impact/SLiMS automation system that the company sold to mostly small libraries through the 1990s. In February 2001, it acquired Maxcess Library Systems, redeveloping that company's technology into the AGent VERSO ILS.[6]

History of Auto-Graphics ILL Products

In 1986, Auto-Graphics introduced an interlibrary loan product based on a union catalog provided on CD-ROM. This product, named Impact/CD, incorporated the IMPACT interlibrary loan module and allowed a library to create and exchange interlibrary loan requests. This product was implemented by the Northwest Regional Library Cooperative in New Jersey in December 1988.

Auto-Graphics developed a product called SharePAC, released in October 1990, through a joint venture with OCLC. SharePAC combined Auto-Graphics' CD-ROM catalog with the OCLC ILL subsystem, allowing patrons to search its CD-ROM–based union catalog of participating libraries. For items not found, the patron could then be automatically linked to the OCLC ILL system for holdings, with an option to place an interlibrary loan request.

In 1992, Auto-Graphics introduced a new version of its interlibrary loan software that began adopting network technologies. The IMPACT software searched the union catalog mounted on CD-ROM discs, but used a centrally mounted file server to manage requests.[7]

Beginning in 1994, Auto-Graphics implemented a client/server product called Impact/ONLINE, introducing search of the union catalog via the Internet (instead of on CD-ROM discs) and support for patron-initiated requests. For libraries without Internet access, the company offered a connectivity plan called Impact/NET. Online access to databases was added as an option through a 1995 partnership with EBSCO.

Auto-Graphics introduced Z39.50 client and server modules for Impact/ONLINE in June 1996. This capability allowed Auto-Graphics to extend a union catalog to additional participants and to check holdings of library catalogs.

In August 1997, Auto-Graphics, Canada, acquired Library Information Services Division of ISM Information Systems Management, which was the largest bibliographic services and interlibrary loan firm in Canada at the time, continuing the legacy of UTLAS, created originally in the mid-1970s as the University of Toronto Library Automation Systems. The bibliographic services of ISM were oriented primarily to academic libraries, complementing the company's existing focus on public and school libraries. The bibliographic database included 57 million records. ISM offered the AVISO interlibrary loan software. ISM, an independent operating company owned by IBM, had acquired UTLAS from Thompson Corporation in Fall 1992. Auto-Graphics eventually phased out AVISO as it enhanced its own ILL management products.

The year 1998 saw the launch of Impact/MARCit, offering the CATSS bibliographic database and services acquired from ISM on a new technology platform. Impact/TRACEit was introduced to replace the RefCATSS product from ISM, using the Impact search engine to locate difficult-to-find ILL sources in the large database of bibliographic records and holdings maintained by Auto-Graphics.

In February 2000, Auto-Graphics introduced Impact/ISO, incorporating support for the ISO 10160/10161 protocol. This product was a Web-based request management system in support of interlibrary loan, document delivery, and consortial resource sharing. Combined with Impact/ONLINE and the Impact/Z39.50 Gateway, Auto-Graphics offerings included a

full-featured ISO-compliant interlibrary loan system with Z39.50 and union catalog capabilities. Impact/ISO was based on components, licensed from Pigasus Software, that provided the ISO ILL support layer and request management features. In June 2001, Auto-Graphics purchased the Wings Request Management System from Pigasus Software to take advantage of its ISO ILL technology. This deal eventually unraveled due to dissatisfaction with the quality of the software, which required considerable redevelopment.[8]

In March 2002, Auto-Graphics announced a contract with the state of New Jersey to provide a statewide interlibrary loan system based on Impact/ONLINE and the AGent portal.

Auto-Graphics introduced a feature in its AGent suite of products enabling libraries to offer a book-buying feature for their patrons in 2006. This capability was originally implemented in partnership with Baker & Taylor, with a portion of the proceeds of sales going back to the patron's home library.

In May 2008, Auto-Graphics introduced is Circulation-Interlibrary Loan Link module (CILL) that, based on NCIP, provides interoperability with the circulation module of an ILS to exchange messages to simplify the processes of lending and borrowing.

Auto-Graphics released Iluminar in 2009, a new-generation patron interface, based on the Adobe Flex framework, that uses the Adobe Flash multimedia platform to deliver a rich user interface through a web browser. The company is currently working on updating the Iluminar interface to operate through HTML5 rather than Adobe Flash.

In support of its interlibrary loan implementations that cover an entire state or other large geographical area, Auto-Graphics partnered with Quova to provide geolocated authentication. This technology provides a level of authentication needed when access to a service is restricted to residents of a given state. Quova performs analysis of the IP address of the user to determine whether it originates from the authorized geographic service area.

SHAREit/AGent Resource Sharing

Auto-Graphics' flagship interlibrary loan and consortial resource-sharing product, previously known as AGent Resource Sharing, was rebranded as SHAREit in June 2012. SHAREit represents the culmination of the development work that Auto-Graphics has performed across its twenty-five years of involvement with resource-sharing products. The product supports both centralized interlibrary loan and consortial borrowing, including both staff-generated and direct patron requests. Through the CILL product, SHAREit can interact with the ILS circulation modules of libraries participating in a consortium to automate borrowing and fulfillment tasks. Through its support of ISO ILL and related protocols, it is able to interoperate with external systems including WorldCat Resource Sharing, Relais, Clio, and the Library and Archives Canada ILL system. The resource discovery component of SHAREit can be configured as a physical union catalog of records transferred and synchronized from participating library systems, a virtual union catalog based on broadcast Z39.50 queries, or a hybrid of the two.

Auto-Graphics also offers a federated search portal recently branded as SEARCHit, based on Z39.50, to search across library catalogs and other resources. Auto-Graphics offers custom-built connectors for target resources that do not support Z39.50 or other standard search-and-retrieval protocols. SEARCHit also includes features to authenticate patrons using their library card barcode number and password through NCIP or SIP queries to their ILS or through usernames and passwords managed directly in the application. Library patrons can set search preferences through their My AGent profile. The system maintains detailed statistics to track use patterns and performance of content resources.

The resource-sharing products of Auto-Graphics are offered through a hosted software-as-a-service option.

Some of the major resource-sharing projects based on Auto-Graphics products include these:

- The Tennessee State Library and Archives uses VERSO as the basis of a statewide opt-in ILS. It is currently used by about 100 public libraries in the state and for the automation of the state library. Tennessee also uses AGent Resource Sharing for its statewide interlibrary loan system. The configuration makes use of the CILL module, representing one of the largest implementations based on the NCIP protocol.
- Connecticut uses Auto-Graphics SHAREit for its statewide interlibrary loan system, as well as using SEARCHit as a federated search environment for information resources available to residents.
- New Jersey uses Auto-Graphics SHAREit for its JerseyCat statewide interlibrary loan service.
- Wisconsin bases its WISCAT statewide interlibrary loan system on SHAREit.
- The Mississippi Library Commission operates a statewide virtual union catalog and interlibrary loan system based on SEARCHit and SHAREit.

Connecticut's statewide library search page
www.iconn.org

More information on Auto-Graphics' resource-sharing products
http://www4.auto-graphics.com/web_solutions/agentresourcesharing.asp

Relais International

Corporate Background

Relais International, based in Ottawa, Canada, specializes in interlibrary loan and resource-sharing products and services. The company traces its roots to 1994 and the development of the IntelliDoc document delivery infrastructure for the Canadian Institute for Scientific and Technical Information (CISTI) performed by a company called Network Support International (NSI). The application included functionality for supporting the scanning and automated delivery of document delivery requests. Clare MacKeigan served as the project manager in CISTI who coordinated the development and implementation of the system provided by NSI. As part of the National Research Council of the Canadian government, which includes as one of its priorities investing in and supporting small businesses, the ownership of the source code for the project was transferred to NSI to develop into a commercial product beginning in 1996. MacKeigan accepted a two-year assignment at NSI to participate in the subsequent development of the software that eventually became the initial Relais product, and she has been with the company since that time. The University of Alberta was the first site to use the Relais system outside of CISTI.[9]

As early as the NASIG 1997 annual conference, MacKeigan articulated a broader vision for the direction of Relais as a "multi-catalog searching, interlibrary loan protocol standards processing, and modified auction model utilization."[10]

In February 1998, Network Support International was acquired by EBSCO Industries to become part of its EBSCO Document Services division. That arrangement was short-lived, ending with the demise of that division of EBSCO Industries later that year. Relais International executives Clare MacKeigan and Kevin Stewart gained ownership of the company in 2001.

Although the company's origins go back to 1996, the Relais software has seen considerable redevelopment since its early versions. The company is currently working toward moving away from Microsoft Windows–based clients to Web-based systems. Relais International has also shifted to primarily offering its products as a hosted service. While some older locally installed installations remain, all new sites are now hosted by Relais International. The Relais products, while hosted, have a separate instance for each customer implementation.

Relais International has formed business partnerships both for technology components and for marketing and support arrangements. In 2008 the company entered a joint development partnership with Index Data, which resulted in the Relais D2D product. Lyrasis entered a partnership with Relais International to market its products to its members in February 2010; a similar arrangement has been in place with Amigos since October 2008.

Relais has also developed constructive working relationships with OCLC, even though these organizations are competitors. In March 2012, OCLC agreed to provide access to APIs to Relais for more efficient interoperability between their respective products. Relais ILL has the ability to search WorldCat using Z39.50 and to submit requests through the ISO ILL protocols. The OCLC WorldCat Search API provides a more efficient mechanism for Relais products to retrieve holdings data or include WorldCat in their discovery components; the WorldCat Resource Sharing API provides a more efficient way to transmit requests into OCLC WorldCat Resource Sharing. Once implemented, it will be possible for Relais customers that subscribe to the corresponding OCLC services to activate these APIs.

In 2008, Relais International announced it would release its software through an open source license. To date, the company has not released any of its products as open source software, but has focused on making its products more open through the use of standard protocols and APIs, NCIP, Z39.50, OpenURL, and ISO ILL (ISO 10160 /10161), and through the development and use of Web services.

Relais ILL

Relais ILL, the original product of the company, provides a full set of tools for the automation of the processing of interlibrary loan requests, both for outgoing requests made by the library's patrons and for requests submitted by other libraries. Relais ILL fits well into libraries that participate in peer-to-peer interlibrary loan arrangements. Its key functionality surrounds managing and monitoring interlibrary loan requests, including both physical and scanned materials.

Library patrons experience Relais ILL through a web form that allows them to place a request for an item. Depending on how they enter the Relais ILL request form, much of the information may be prepopulated. In many cases, the patron will come to the Relais ILL request page through a search performed on a discovery service or aggregated content platform. Relais ILL is compatible with the OpenURL standard as implemented by link resolvers such as Ex Libris SFX, Serials Solutions' 360 Link, and EBSCO's LinkSource. A library can configure its link resolver menu to establish Relais ILL as a target service. If a patron searches one of the library's subscribed databases, selecting the interlibrary loan request will bring the user into the Relais ILL form with the bibliographic data transported by the OpenURL along with the user's account data.

Relais ILL can use NCIP to authenticate library patrons based on their user account and password credentials maintained in the ILS or through a campus authentication service.

The staff side of Relais ILL manages the workflow

related to incoming and outgoing requests. Relais ILL can send requests to external interlibrary loan systems, including OCLC WorldCat Resource Sharing or peer-to-peer resource-sharing networks, such as those based on VDX. Libraries can work to mitigate their ILL fulfillment costs by creating a routing list for their requests that steps through their own holdings and local partners before submitting the requests to external services with higher transaction costs.

Relais ILL includes an automated searching capability based on an integrated Z39.50 client to determine what string of libraries would be the best candidates to fulfill a request. The system can be configured to search the library's own catalog to verify that the requested item is not held locally, to then search other specified catalogs of nearby libraries that can fulfill the request quickly and at lower cost, and then as a last resort to search an external service such as OCLC WorldCat Resource Sharing.

Relais transfers requests with any system capable of using GSM (Generic Script Messaging) or the ISO ILL protocol. GSM is a protocol, developed by CISTI in the mid-1980s and based on messages encoded as tagged text, that has been used mostly in Canada. Relais is currently developing the capability to exchange requests with WorldCat Resource Sharing through its API.

Relais ILL fits in approximately the same product space as OCLC ILLiad.

On the lending or supply side, Relais ILL can receive requests from a variety of sources, including OCLC WorldCat Resource Sharing, through web forms or through other resource systems using the ISO ILL protocol or GSM. Once an incoming request has been ingested, Relais ILL automatically searches the local library catalog, using its internal Z39.50 client. If it finds a single match, it prints a slip that ILL staff will use to pull the item for physical lending or scanning. This automated searching can determine if the library owns the journal that matches a citation, though it may not be able to verify the exact volume and issue. ILL personnel can also manually search to determine whether or not the request can be fulfilled.

In support of requests for articles or book chapters, Relais ILL has an integrated scanning capability. Once ILL personnel have retrieved the appropriate print volume, they would use a workstation equipped with a scanner and the Relais ILL scanning module to scan the requested item and send it to the designated address. Supported delivery options include Odyssey, Ariel, e-mail attachment, or posting to a secured webpage.

Relais ILL has flexible workflow options, with the ability to have ILL personnel manually review or approve transactions or to have the transactions pass through without mediation. For outgoing requests, most ILL offices, for example, prefer to review requests before they are sent to an external organization for fulfillment.

Relais Express

Relais Express is a subset of the Relais ILL product including the components related to the fulfillment of document delivery requests. This product does not include the functionality of the full Relais ILL related to managing the full range of potential requests, but rather is limited to those related to scanning and transmitting documents to fulfill outgoing requests as well as receiving documents sent via Ariel and Odyssey. Relais Express competes with products such as Ariel or Odyssey. The delivery mechanisms integrated into Relais Express include FTP transfer to Ariel or Odyssey, posting to a secured webpage, e-mail attachment, or fax. Relais Express would be appropriate for libraries that have high-volume document delivery operations but that might have other systems in place for general interlibrary loan management. Relais Express Plus supports printers or scanners attached via a network.

The Relais Express software is operated from a desktop computer equipped with a scanner and printer. Once a document is scanned, the software converts the digitized document into the appropriate format as needed by the destination system and then automatically transmits the file.

The company also offers the Relais Scanning Station, a computer workstation integrated with a scanner and software designed to efficiently support the workflow involved in electronic document delivery fulfillment.

Relais D2D

Relais's most recent product offering, Relais D2D (Discovery to Delivery), blends selected aspects of the company's existing ILL functionality with federated search technology from Index Data to create a resource-sharing environment supporting unmediated patron requests for consortia where the participating libraries operate separate integrated library systems. Relais D2D, introduced in January 2010, fits in about the same product space as the former SirsiDynix URSA. It includes a union catalog discovery service that spans the catalogs of each of the institutions participating in a consortium, provides current availability status, allows patrons to place requests directly with a library that owns the item, and tracks the fulfillment of the request.

Relais D2D includes a virtual union catalog discovery service based on the MasterKey technology developed by Index Data. The D2D discovery environment can be configured to span the online catalogs of each of the participating institutions. Libraries can also choose to include other search targets, such as subscribed databases of electronic resources, Google Books, Amazon.com, and WorldCat.

Once a user has selected an item from the discovery component, the Relais D2D application executes

a set of routines to determine if the item is available within the consortium. The mechanisms used include the circulation status of the item, the patron type, and the location and type of the item to validate that it is eligible for request by that patron. The application will also verify whether the item is available in the patron's own library, with the option to link to that item in the local online catalog, allowing the user to place a hold request.

For items in use or not available within the consortium, patrons can optionally have the system place a request in an external system such as WorldCat Resource Sharing. Relais D2D can link with other interlibrary loan management systems, including Relais ILL, ILLiad, and Clio. Items requested through external ILL systems will take longer to fulfill than those supplied by other libraries in the consortium. The product aims to eliminate dead ends for patrons and fulfill requests by the fastest means possible. By supplying materials from a consortium with reciprocal borrowing arrangements, the participating libraries can lower their overall resource-sharing costs by providing a completely unmediated requesting service at the requesting library and by lowering reliance on interlibrary loan systems that assess per-transaction fees. When multiple copies of the item are available within the consortium, the system follows a load-balancing algorithm to help even out the burden of fulfilling requests.

Relais D2D requires only a subset of the Relais ILL functionality. Since a specific library is selected during the unmediated consortial borrowing request, the components of Relais ILL related to searching for an item among potential supplying libraries are not needed. Relais D2D does make use of the components related to updating and tracking the request. The system will send automated messages to the patron as needed.

It is also possible for a library to implement both Relais ILL and Relais D2D. The Marina consortium, for example, acquired both products to allow it to share materials within the consortium and to have requests that cannot be fulfilled automatically routed to external suppliers, such as OCLC WorldCat Resource Sharing.

Some of the major implementations of Relais products include these:

- Borrow Direct, a partnership including Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, Princeton University, University of Pennsylvania, and Yale University, is based on Relais D2D.
- E-ZBorrow, operated by PALCI (Pennsylvania Academic Library Consortium, Inc.), relies on Relais D2D underlying the resource-sharing service supporting its fifty-two academic library members.
- The Committee on Institutional Cooperation uses Relais D2D to power the discovery component of its resource-sharing environment, which also uses ILLiad to manage request processing.

Clio

Clio Software was founded in 1996 as Perkins and Associate, a family business run by Larry and Dotty Perkins. Since its founding, the company has had a sole focus on software in support of interlibrary loan operations. Clio was originally developed for use at the University of California Davis library and was then marketed to other libraries. The company began operating under the name Clio Software in 2000. Clio Software is based in New Boston, New Hampshire.

Clio Software
www.cliosoftware.com

The initial versions of Clio were based on a ColdFusion application server with data managed through Microsoft Access. Current versions are based on the Microsoft's .Net framework. Clio has undergone continual development since its initial release in 1996. The company currently offers two versions, ClioBasic with limited functionality and the Clio System that includes robust features needed for larger libraries. Until recently, what is now offered as the Clio System was called Clio Advanced. In January 2000, Clio formed a partnership with Endeavor for integration with the Voyager ILS.

Components of the Clio System include ClioWeb for patrons to submit new requests, ClioRequest for the management of incoming requests, Clio for managing lending tasks, and ClioEDelivery for transferring documents through Ariel.

ClioWeb is the patron interface based on Microsoft .NET technology for placing and managing requests. Patrons can request both books and articles through the request forms provided and can view the status of requests previously placed. ClioBasic transmits incoming requests to the ClioRequest module via a formatted e-mail message to a designated account monitored by the system; the full Clio System uses the ISO ILL protocol.

ClioRequest provides functionality to assist interlibrary loan personnel with tasks related to the submission and tracking of new borrowing requests. Clio features include the ability to monitor the status of requests, produce statistical reports, produce invoices and record payments related to ILL transactions, generate notices to patrons, and exchange request data with interlibrary loan systems.

One of the key functions of ClioRequest involves routing requests to OCLC WorldCat Resource Sharing. In most cases, incoming requests are submitted to the library's review file in WorldCat Resource Sharing. Once a request is in the review file, ILL personnel toggle to WorldCat Resource Sharing to find the specific item in WorldCat and finalize the request.

Once the item has been submitted, Clio downloads the requests transaction from WorldCat Resource Sharing for the ongoing monitoring and processing of the request.

If a valid OCLC record number is available for the item requested, the operator can choose to submit the request using Direct to Profile or Direct to Lender options.

ClioRequest can also be used to submit requests to another interlibrary loan or resource-sharing system, such as Docline or the British Library.

Staff can automatically launch a local catalog search window from ClioRequest to verify whether the requested item is held locally. Clio can also be programmed to launch searches to a union catalog or other relevant resources.

Clio also includes features in support of fulfilling requests for materials received by other libraries. Clio automatically downloads requests from OCLC, Docline, or other systems supporting ISO ILL, or staff members can manually enter requests submitted through e-mail. Clio allows the library to review pending requests, respond whether it can fill a request (no, conditional, or yes), and print pull slips for those to be filled. The system can also generate overdue notices and handle billing. Clio maintains a table of libraries that make borrowing requests to the library with the needed address and contact information for shipping requested materials.

ClioEDelivery is used by interlibrary loan personnel to transfer document requests to and from Ariel.

FulfILLment

An initiative to develop an interlibrary loan lending system based on open source software is underway, led by OhioNET, with funding from a number of other collaborative participants, including the states of Ohio, Kansas, Illinois, Indiana, Iowa, Missouri, and South Carolina, as well as the Wisconsin Library Service.[11]

Equinox Software was awarded a contract to develop the resource-sharing environment in November 2009, with development beginning in January 2010 and with completion of the initial version scheduled for December 2011.

Equinox Software was originally formed to support and enhance the open source Evergreen integrated library system. Evergreen was originally developed by the Georgia Public Library System for a very large consortium of public libraries throughout the state. It has subsequently been implemented by a variety of other consortia in the United States and Canada. Evergreen was designed specifically to support consortia, with the ability for direct consortial borrowing among participating libraries.

The general design of FulfILLment involves enabling the same kind of resource sharing for a consortium comprised of libraries using separate ILS implementations from different vendors as is possible within a single implementation of Evergreen.

One component of FulfILLment will include a "Next Generation Discovery Interface" that serves as a union catalog based on Evergreen. The union catalog blends the characteristics of a physical union catalog and a virtual catalog that is based on live interactions with each participating ILS. Records are extracted, deduplicated, and loaded from each underlying ILS using protocols such as OAI-PMH or Z39.50.

The FulfILLment system will communicate with each of the ILS implementations that will be developed. The project includes the development of a connector, termed a Local Automation Integrator, for each major ILS product that communicates with its circulation module using NCIP, Z39.50, and other APIs and using the OpenSRF protocol with the central Evergreen-based system. The connector will manage the synchronization of the central bibliographic and holdings database, provide real-time availability status for items as they are viewed in the central catalog, and manage the messaging related to consortial borrowing transactions. The initial phase of the project includes creating connectors for Millennium, SirsiDynix Symphony, Polaris, Ex Libris Aleph, and Koha. The initial version of FulfILLment will not support ISO ILL, but that may be addressed in future development.

FulfILLment applies the workflows associated with circulation in Evergreen to the problem of consortial borrowing. Library personnel will use the standard circulation module of their local ILS to manage requests. In response to a request, the system will automatically issue a hold request in the ILS of the library that owns the item and will create a temporary item record in the ILS of the library associated with the requestor.[12]

As of October 2012, the development of the initial version of FulfILLment was complete, but it had not yet been put into production in OhioNET. A group of libraries in California—Los Gatos Public Library, the San Mateo Public Library (representing the Peninsula Library System), and the Santa Cruz Public Library—are evaluating the software.[13]

More information on FulfILLment
www.fulfillment-ill.org

RapidILL

Following a devastating flood in 1997 that damaged much of its serial collections, Colorado State University began the development of a system designed to provide very fast and efficient interlibrary loan support of journal articles. This effort has resulted in the creation of the RapidILL service.

The RapidILL service is supported by custom-developed software, but more importantly relies on service-level agreements where participating institutions agree to respond to borrowing requests within twenty-four hours. One of the organizing principles of the RapidILL service involves libraries participating in peer groups called Pods that exchange requests. Rapid closely monitors performance statistics of each participant. The scope of the service is limited to journal articles and aims for end-user fulfillment in less than forty-eight hours.

The RapidILL software includes features optimized to support the service, including automated processing of requests among the participants, routing of requests to lenders, and load balancing to evenly distribute borrowing or document delivery requests. The software automatically selects potential lenders and verifies holding libraries.

In support of streamlined processing for the library fulfilling requests, the RapidILL system channels only those requests where it can verify that the library owns the item. The lending request form will include all the information needed to pull the item, such as the library's assigned location and call number. The service aims to gain any efficiency possible. To simplify the fulfillment of articles, for example, the request form includes the Ariel address of the borrowing library encoded as a barcode to eliminate the need for manual entry.

The service includes a component called Easy-Lending that processes requests through a database of three million open access articles. If the system finds a match, the article is automatically delivered to the requestor with no manual intervention.

The business model of RapidILL involves an initial setup fee to join and an annual membership fee. Requests made through the system do not incur transactional fees, given the reciprocal borrowing agreements stipulated as part of joining the service.

A key component of the supporting infrastructure for RapidILL includes a database that contains all the holdings of the participating institutions. This database is designed specifically for resource sharing, including selective bibliographic elements and up-to-date holdings data on eligible materials available in each participating institution. The holdings are specified down to the years available for each title. The service relies on this database to route requests only to institutions where the item is available.

Users place requests using a web form that is authenticated within the borrowing library's environment. First-time users create a personal account on the Rapid system that includes contact information needed for fulfillment.

Rapid has recently introduced RapidX, a new delivery option for articles where the supplying library simply uploads the article into the Rapid routing service, which then transmits it to the borrowing library's Ariel, Odyssey, or Relais receiving station.

More information on RapidILL
http://rapidill.org

Ariel

Ariel is a utility, used in document delivery workflow, that provides support for the conversion and transmission of scanned articles and other resources over the Internet. Ariel was developed by the Research Libraries Group (RLG) and released in 1991 as an alternative to faxing in the transmission of documents among interlibrary loan offices. The introduction of Ariel made a dramatic impact on the fulfillment of journal article requests in interlibrary loan offices, providing a mechanism that was faster and less expensive than the physical delivery of photocopied articles or the use of fax.

Ariel was acquired by Infotrieve in January 2003. At the time of the sale, there were 9,400 installations of Ariel worldwide. Use of Ariel has diminished somewhat with the adoption of competitive products such as Odyssey and as options have emerged for document delivery, such as OCLC's Article Exchange service. In February 2011, the OCLC Policies Directory reported 1,250 sites continuing to use Ariel.[14]

Scannx

Scannx provides a product, Book ScanCenter 2.0, that includes features that can result in some efficiencies in interlibrary loan processing. The company's Book ScanCenter product includes software and drivers that allow library patrons to scan directly to convenient destinations, such as USB drives, PDF files sent to their e-mail accounts, or cloud-based services such as Google Drive, or Google Docs. When used by interlibrary loan personnel, Scannx Book ScanCenter can be used to scan articles directly into ILLiad or Odyssey. Scannx has recently partnered with OCLC to make use of OCLC's Article Exchange API, allowing articles to be scanned directly to OCLC's cloud-based temporary staging area for direct delivery to library patrons, providing some possible new efficiency in fulfilling document delivery requests.[15]

Notes

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