

# Introduction

## Abstract

*Chapter 1 of Library Technology Reports (vol. 50, no. 3) “Electronic Resource Management Systems: A Workflow Approach” covers background and provides an overview on electronic resource management, including the DLF-ERMI report, a definition of ERMS, and the methodology employed in writing this report. Electronic resources management is both different and more difficult than print materials management. New software such as ERMS has been developed to help with this complex management process, but this software is only helpful if the process of resource management is rethought from a workflow perspective.*

Electronic resources such as e-journals, e-books, and databases are now a major component of library holdings. Managing these resources is both different from and more complicated than managing traditional print journals because of the large number of titles and quickly changing holdings and environment.

Libraries have always specialized in tracking and communicating information, but the sudden rise of electronic resources required extensive changes over a short period of time. The pace of change means that some libraries have struggled simply to keep up without having an opportunity to analyze long-term impact on services, collections, and workflow. The requirements for managing print were fundamentally different from those for managing the electronic environment of today. As libraries attempted to come to terms with electronic resources, procedures and workflows developed. In many cases, these procedures grew organically from print management and were either insufficient or not optimal, even as collection budgets and workload shifted. Libraries recognized

the need for an easier way to track and manage these resources, in some cases developing homegrown databases and systems or requesting additional software from vendors. Library software vendors recognized and responded to this need by adding or developing additional functionality for their software. These new systems go by the name *electronic resource management systems* or *ERMSSs*, which can refer to either completely new software systems or new functionality added to existing software.

Currently there are many different systems to choose from. Commercial systems are available from almost all library software vendors, and there are multiple open-source options. These systems can be complex stand-alone software, additional modules added into an integrated library system or link resolver, or simply a local Microsoft Access database used to collect statistics. However, no system is perfect, and each one, be it homegrown, commercial, or open-source, has its own complexities and idiosyncrasies. The key factor for electronic resource management (ERM) success is not the software, but the structure and convenience of the library workflow. Analyzing workflow for electronic resources is one of the most important pieces of any electronic resources software implementation. Therefore, it is important for a library interested in an ERMS or workflow reevaluation to think carefully about priorities and to become familiar with the pluses and minuses of each option being considered.

My impression, formed through research and interviews with staff at eleven libraries, is that the ERMS implementation is most successful and workflow is most satisfactory when workflow is considered from the beginning. It is important to not only look at a macro view of the workflow, but also to analyze each step for problems or gaps in communication.

Sometimes the result of this analysis might point to an ERMS as the solution, but not always. In general, an ERMS will be helpful if the software can fill gaps in tracking or communication, eliminate a data silo or aggregate all important data together, or replace tedious manual tasks or duplicate systems.

The purpose of this report is to provide some general outlines, best practices, and important points to consider with regard to ERMS implementation. It contains a summary of major ERMS software and some of the pros and cons of the popular options as articulated by librarians who use those systems. Above all, it discusses the importance of workflow—the component pieces of electronic resources management—and ways to break down technical service department processes to examine and improve workflow. This report came out of frustration at having to reinvent the wheel in order to implement an ERMS or think strategically about workflow. My intent is to suggest some questions worth considering and a place to start the process, to discuss the pros and cons of various ERMS solutions, and generally to give an overview of the current situation of the ERM environment and the various factors that impact it while highlighting some of the major resources available for more information.

## Background

Managing electronic resources presents many challenges, the primary being their complex and frequently changing nature. Electronic subscriptions to journals and e-books for purchase have existed for less than twenty years. Managing a few subscriptions is a much different matter from monitoring the titles in large aggregator databases from content providers such as EBSCO, Gale, and ProQuest. Librarians are used to tools developed in the print world, such as integrated library systems (ILSs). The print world had its challenges, such as individually cataloged or analyzed serials, but ILSs were built to manage such items, and these processes have been well understood for decades. ILSs are very good with the progress of a physical item through physical space, tracking where that physical book is at any given time. But the very physicality of the book makes its management simpler: the book is on order, then it is in processing, then on the bookshelves, checked out, returned, repaired, and finally discarded. Electronic resources have no such simple life cycle. Their workflow includes multiple iterative and repeated steps and is difficult to track in an ILS without some extension of functionality for electronic resources. An additional complication is the need to communicate this complex, frequently changing information to a wide variety of stakeholders, including vendors, publishers, library staff, and patrons.

Additionally, the information required to manage

electronic resources is complex and rich, ranging from individual titles to journal holdings to subscription and admin information, some of which is common to many libraries and some of which is specific to only one. The information may be spread across a variety of software systems such as the ILS, the link resolver, the ERMS, the budgeting system, and the A–Z list. These software systems may share information or not and may have overlapping information or contain related information. All of these systems need to be managed and updated and may get information about resources from a variety of sources, which include proprietary vendor updates. For a complete literature review of the stakeholders and current situation of electronic resources, see the recent issue of *Library Technology Reports* written by Jill Emery and Graham Stone (vol. 49, no. 2).

*“Techniques for Electronic Resource Management” by Jill Emery and Graham Stone*  
[www.alatechsource.org/taxonomy/term/106/techniques-for-electronic-resource-management](http://www.alatechsource.org/taxonomy/term/106/techniques-for-electronic-resource-management)

## Digital Library Foundation— Electronic Resource Management Initiative

The foundation for the development of electronic resource management was the DLF ERMI report. The Digital Library Foundation (DLF) is a program of the Council on Library and Information Resources and consists of a network of libraries and stakeholders who are invested in all aspects of digital libraries, including electronic journals, digitization, digital library structures, standards, preservation and use, and resources for research, teaching, and learning. In 2001, a study by Tim Jewell found that many libraries were creating local systems to manage electronic resources.<sup>1</sup> The DLF organized the Electronic Resource Management Initiative (ERMI) to expand on the work of these libraries and encourage software development by vendors through standards, glossary, and needs documentation development.

At an American Library Association meeting in 2001, a project to discuss problems of resources management was organized and discussion began on the need for a report that ultimately became the DLF ERMI report.<sup>2</sup> This meeting also included the initial presentation of the National Information Standards Organization (NISO) standard proposal. A NISO and DLF workshop in May 2002 created the steering group to develop the ERMI and also asked librarians, library software vendors, and representatives from interested organizations for their input. This group put together a report,

available on the web both as a draft and as a final version, which became known as the DLF ERMI report.<sup>3</sup>

### *DLF ERMI Report*

<http://old.diglib.org/pubs/dlf102>

## Standards

The work of the DLF ERMI report and other initiatives gave rise to multiple standards governing library software, reports, and data collection. These standards include linking standards such as OpenURL, KBART, IOTA, and other standards that improve interoperability for electronic resources management software.

OpenURL is a standard from NISO designed for the creation of context-sensitive linking. This offers patrons a durable, flexible link between citation and full text, a link that is sensitive to the library holdings to ensure that patrons are linked to subscribed content instead of to payment or login pages. This technology is widely used by link resolvers such as 360 Link from Serials Solutions and SFX from Ex Libris. This standard is crucial to the modern library and was elucidated in an article by Rafael Kasprowski.<sup>4</sup> OpenURL relies on metadata from content providers collected by link resolver knowledge bases to create a dynamic link in real time to the full text. Paoshan Yue pointed out that this standard was an early entry into the concept of metasearch.<sup>5</sup> This standard is particularly important because incorrect metadata can lead to problems such as broken OpenURL links. For more information, see the standard on the NISO website and other articles within the library literature.<sup>6</sup>

The OpenURL standard has been very popular for long enough that supplementary projects are being developed to improve it. Sarah Glasser outlined three major standards projects that hold promise to improve the overall electronic resources environment for patrons, particularly use of the OpenURL standard to prevent problems such as broken links to articles.<sup>7</sup> She pointed to the Knowledge Bases and Related Tools (KBART) publication—a recommended practice of NISO that outlines sixteen simple fields for which content providers could provide information without creating a significant additional burden, which would greatly improve the quality of content metadata made available to libraries. Because the electronic resources world is so complex, this approach could be implemented in phases, with the first phase focused on a metadata format that simplifies and standardizes criteria for metadata, and the second on simplifying complex information such as consortial resource management. The KBART recommended practice is designed to address problems of insufficient metadata breaking OpenURL links to content. IOTA (Improving

OpenURLs Through Analytics), another NISO working group project, is designed to address the same problem by measuring OpenURL quality from specific content providers in an attempt to identify and address problems directly.<sup>8</sup> Rafal Kasprowski described the methodology of these studies of OpenURL quality in detail in a 2012 article.<sup>9</sup> Sarah Glasser also identified the recommended practice of PIE-J (Presentation and Identification of E-Journals) to encourage the more standardized and uniform presentation of title change information on provider websites in order to solve the issue of patrons receiving broken links due to ISSN and journal title changes.<sup>10</sup> Glasser's recommendations were published in 2013, and the article is available through the NISO website. Bob McQuillan also provided a write-up and description of recent standards updates, including the status of KBART, IOTA and PIE-J, in a 2012 article.<sup>11</sup> Todd Carpenter noted that standards implemented quickly generally provided a clear framework and did not require changing established practice, while other standards may have been delayed due to complexity of implementation.<sup>12</sup>

### *NISO OpenURL*

<http://dx.doi.org/10.3789/isqv23n1.2011.07>

### *NISO IOTA*

[www.niso.org/workrooms/openurlquality](http://www.niso.org/workrooms/openurlquality)

### *NISO KBART*

[www.niso.org/workrooms/kbart](http://www.niso.org/workrooms/kbart)

### *NISO PIE-J*

[www.niso.org/workrooms/piej](http://www.niso.org/workrooms/piej)

## Interoperability

Clear standards implemented uniformly are the only path toward true ERMS interoperability. Software interoperability is the ability of two systems to communicate data from one to the other in a somewhat automatic fashion. Without standards, there is no way to create software that can communicate information to any other system; programmers are left unable to write to any specification, and thus every piece of software must be handled completely independently. This has obvious implications in the realm of electronic resources, where there may be a budget-tracking system, a statistics-tracking system, an ILS, and a link resolver—all separate systems, each containing important information for decisions and for management of electronic resources. Interoperability, according to a 2008 DLF ERMI white paper by Medeiros and his colleagues, was a common goal for the libraries that contributed to the paper.<sup>13</sup> The paper noted that

interoperability was important for generating cost-per-use information and that each library in the survey was managing multiple knowledge bases of holdings, cost, and title information in a link resolver, an ERMS, and an ILS.

The need for systems that could consolidate e-resource information was a primary driver in the development of ERM systems.<sup>14</sup> Because the management of e-resources requires many tools developed by different vendors over the last ten years, interoperability between the disparate tools was an early request from librarians and problem for vendors. Marshall Breeding noted that software vendors were hearing this plea by libraries: “Companies that produce and provide service for proprietary products have redoubled their efforts to offer more flexibility, openness, and interoperability through Web services and other application programming interfaces (APIs).”<sup>15</sup>

In 2011, Jill Grogg and Maria Collins were still hearing about librarians’ needs for interoperable software. In their librarian survey, they found interoperability was sixth on the list of most commonly requested functionality.<sup>16</sup> Participants were asking for standards that better support communication of information from one system to another and more functionality for auto updates across systems without the need for manual data loading: “Indeed, lack of system interoperability has created a domino effect of problems. For instance, even as many librarians praised ERM systems for finally consolidating ERM-related data, others emphasized that the data traditionally housed in the ILS environment—such as cost, fund, and vendor data—remains segregated from the ERMS without easy means for data transfer.”<sup>17</sup> This lack of interoperability results in inconsistent information provided to patrons and the need for a lot of staff time to maintain and update information across multiple systems.

## ERM Systems

Although ERM systems will be discussed frequently throughout this report, it may be helpful to start with a brief definition. In 2005, Maria Collins defined the ERMS as a system that “provides a technical services backbone for controlling the entire life cycle of an electronic resource” and stated that the development of commercial systems was due to the DLF ERMI, “which has been instrumental in outlining the requirements for an ERM system. The DLF ERMI report has provided commercial vendors with a blueprint for development by noting functional specifications and best practices for ERM systems.”<sup>18</sup> The DLF ERMI project is certainly the definitive resource on what an ERMS is and what it contains. Jill Emery described the ERMS through functionality: “The basic elements of these management tools help a library

capture not only the payment and invoice information but also essential metadata elements in regards to the licensing of products.”<sup>19</sup>

ERMSs have been developed by many of the major library software vendors in the past several years. Vendor-created ERM software is specifically designed to manage one or more elements of electronic resources workflow. ERMSs come in two major categories. One is built to integrate into the ILS. Not surprisingly, the companies that went in this direction are known for their strong, well-developed ILSs, such as Millennium’s Innovative Interfaces. The other approach to the ERMS is to integrate it with specific electronic resource management functionality instead of with management of all resources. An example of this method is integrating an ERMS with a link resolver and A–Z list and sometimes with resource budgeting and COUNTER statistics as well. This is the direction taken by Serials Solutions, OCLC, and EBSCO. Development of this software has been going on for the last five to ten years in most cases, but the available functionality and standards have changed drastically during that time. Ex Libris also deserves a brief mention, as its approach began with stand-alone ERM software (Verde) to complement its two ILSs, Aleph and Voyager, but it then redeveloped Verde along with the SFX link resolver and federated search tool MetaLib to produce a new product called Alma.

Because these systems are designed from the strengths of the vendor’s original software and because electronic resources are so complex to manage and have so many different parts, many of these software solutions still do not fulfill every need. It is common for libraries to use one of these ERMSs but still maintain some supplemental systems or work-arounds to fill all required functionality. A good example would be maintaining an ERMS of budget data but also keeping a spreadsheet of the financial data that senior management would like to see. The goal of all systems is for these work-arounds to be unnecessary, but the library, the library workflow and requirements, and the software implemented will determine whether this is possible.

Some of the earliest ERMSs were developed in-house by individual libraries and this remains a good option for many libraries. Much of the initial work analyzed by the standards committees and in the DLF ERMI report came from early systems developed by individual libraries, such as MIT’s VERA system and ERLIC at Penn State, before ERM software was commercially available or developed.<sup>20</sup> Twenty other libraries have developed individual systems that turned into widely implemented open-source software ERMSs, such as the CORAL system developed by the University of Notre Dame, the CUFTS system from the Simon Fraser University Library, or the ERMes system from the University of Wisconsin-La Crosse.

## CORAL

<http://erm.library.nd.edu>

## CUFTS

<http://researcher.sfu.ca/cufts>

## ERMeS

<http://murphylibrary.uwlax.edu/erm>

One thing of note after examining these different systems is that while most of them contain some information about all the aspects of electronic resources management, very few do everything, just as with commercial software. When deciding if a library should develop an in-house system, it is important to consider the need to maintain the knowledge base and avoid duplicating information. It is easy to create a new system only to realize that a new data silo now needs to be maintained, duplicating effort. A library debating creating its own ERMS should carefully consider issues such as whether the library has the ability to support and develop the ERMS going forward and whether the gain in customizability outweighs the disadvantage of doing all the support.

For the purposes of this report, I am defining an electronic management resource system (or software), or ERMS, as any software that helps to manage electronic resources. I find it useful to think more broadly about these resources because doing so allows discussion of all the important pieces for resource management, even if they are not traditional vendor stand-alone ERMSs. Defining ERMS this loosely means that it can consist entirely of home-created databases and spreadsheets, can incorporate pieces of different software such as the ILS, a link resolver, or ILL system, or can be a stand-alone vendor-created system. The important thing is that the library possesses the software systems necessary to manage the knowledge bases of data, the budget and acquisitions process, the administration and contact information, and license information and to compile reports on usage and budget.

## Methods

My experience implementing an ERMS and my research on product options have pointed me towards an approach that emphasizes the need to rethink workflow within the technical services department when software like an ERMS is introduced. If workflow has not been adjusted significantly since the shift to electronic resources, adding an ERMS will not solve the library's ERM problems. Therefore, the concept for this report evolved to incorporate my own attempt to learn how to do a workflow redesign and the slow process of figuring

out questions to ask during the redesign. Starting without a guide is confusing and requires a great deal of research. This report is an attempt to lay out not only what ERMSs are available, but when an ERMS might be a helpful tool for the library, what questions to ask to see if one would be useful, what criteria to use in selection, and how to determine where in the workflow new tools would be most helpful. I owe a significant debt of gratitude to the librarians who granted me interviews:

- Ian Walls, web services librarian, University of Massachusetts
- Karen Yacobucci, content management librarian, NYU Health Sciences
- Marie Kennedy, serials and electronic resources librarian, Loyola Marymount University
- Alexis Ackel, electronic resources librarian, UNT Health Science Center
- Adam Traub, electronic resources librarian, Rochester Institute of Technology
- Joanne Blais, reference, Hanover Public Library
- Marysue Schaffer, associate director for collection management, Washington University School of Medicine
- Amber Hunt, Marlboro College
- Stephen Kline, digital services librarian, CUNY Graduate Center
- John Maier, head of technical services, Pratt Institute of Art
- Judy Maynes and Cecilia Tittlemore, Dartmouth College

We discussed not just ERM systems but also technical services workflow and process. Without their help, this report could never have been written. I would also like to thank Alan Krissoff, Stephen Maher, Jordan Wilcox, and Petya Mattys for their extensive help and expertise.

All interviews were conducted between October 2012 and January 2013 using the following questions:

1. What ERM system do you use?
2. What systems is your ERM integrated with? ILS, link resolver, ILL?
3. What is your electronic resources workflow process? Is the workflow the same for ejournals and ereports? Different processes or departments?
4. Has your library done any workflow analysis and redistribution to handle electronic resources?
5. What is your general opinion of your ERMS?\*
6. ERMS strengths?\*
7. ERMS weaknesses?\*
8. Have you had to create any work-arounds to compensate for software functionality gaps?\*

\* Some libraries interviewed preferred not to comment directly on the software they used and skipped these questions.

9. Do you have a process of link checking, statistics gathering or analysis?
10. What are your library's future software plans for ERMS?

## Notes

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