CORAL ERMS: Technology Adoption Proposal

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In 2010, after attending the Annual Electronic Resources & Libraries Conference in Austin, TX, Xan Arch, Electronic Resources and Technology Librarian at Stanford University teamed up with Elizabeth Lorbeer, Medical Librarian at University of Alabama Birmingham, to survey academic librarians about the “hot-button issues with ERM” systems. The overwhelming answer from the survey respondents was: “Librarians want one system for all library processes” (Arch, 2010).

While almost all proprietary integrated library system vendors attempt to accommodate the one-for-all approach by offering electronic resources management (ERM) options—including “complex stand-alone software” and “additional modules added into an integrated library system or link resolver” (Andersen, 2014, Introduction)—many libraries struggle or hesitate to implement commercial systems. The 2007 survey conducted by Hawthorne and Watson to analyze the electronic resources management system (ERMS) adoption challenges found that 47% of library respondents believed that commercial ERMSs were too cost-prohibitive; 28% reported commercial ERMS interoperability; with 27% and 25% having reported functionality and staffing challenges, respectively (Whitfield, 2011, p. 19).

These findings are consistent with the University Library’s ERM issues in the recent years. After unsuccessful attempt to implement the ERM system provided by the Library’s ILS vendor, Ex Libris, we have chosen to manage Library’s electronic resource holdings using homegrown databases that, with the increase of the electronic holdings’ ratio in the Library collection, have become disconnected, unmanageable, and chaotic. Library has reached a tipping
point at which our old system’s capacity is no longer sufficient to sustain proper management of the e-resource holdings.

This proposal is intended to address the void and examine open-source CORAL ERM system as a solution to the homegrown electronic resources management system’s crisis. Information used in this proposal is based on several sources, including vendor’s website, published vendor reviews, and implementation reports at peer institutions. The author is asking the Library Board, the Trustees, the Partners, and the University to consider the arguments provided in this paper and support adoption of CORAL in place of the current homegrown ERMS.

University Library: Background

The Library serves population of a medium-sized private, research-intensive University, with a particular emphasis on graduate and doctoral programs, and digital scholarship. The University faculty encourages graduate and doctorate students to master the complex theories and research methodologies in order to advance digital scholarship and research and achieve recognition in the global scholarly community. The Library’s mission is to support the University academic programs and to serve the instructional, research, and information needs of the campus population.

User needs

The user needs are driven by the research focus of the University. Main user groups—graduate students, faculty, and visiting scholars—search and retrieve information of scholarly nature, with full-text scholarly articles, scholarly databases, and e-books being of particular importance. Users expect to download the full-text articles and e-book chapters for personal use and study, with the scholarly information conveniently and readily available. Most of the Library
users access and retrieve information online, using the Library website. This user behavior is consistent with the 21-st century trends in the research-intensive institutions: “A web based survey of 15,000 users at four academic health science libraries reported that for every in-house user, there were four remote networked users (Franklin and Plum, 2004),” according to Tripathi and Jeevan (2013, pp. 140-141).

**Library collections**

Due to the research and digital scholarship focus, in addition to traditional, print collection, Library maintains a large collection of electronic resources, including all three major categories of e-resources of importance in the context of higher education and research libraries, as noted by Tripathi and Jeevan: electronic journals, e-books, and e-databases (2013, pp. 134-135). “The availability of e-journals has increased exponentially in the last decade,” the authors point out. “These have become a pivotal part of the libraries’ collection. It is now being estimated that 96.1 percent of journal titles in science, technology and medicine and 86.5 percent titles in the arts, humanities and social sciences are available online. […] Thus, academic libraries have increased their budget manifold for e-journals, partly out of market trends and partly due to user demands” (ibid., p. 135).

In line with the current trend, over 70% of the last year’s Library budget was spent on electronic resources. The Library subscribes to multiple electronic journals that are available in full text, and subject-specific e-databases, including ProQuest and EBSCOhost subscriptions.

**Library automation**

The Library uses Ex Libris’ Voyager Integrated Library System (ILS) to manage its traditional collection holdings. The system includes OPAC/Public Catalog, multiple subject-
specific and interdisciplinary databases that offer indexes, abstracts, and full-text documents, and document delivery services (ILL).

The electronic resource holdings are managed in a separate knowledge base using the SFX link resolver, also on subscription from Ex Libris. Originally, Library subscribed to Ex Libris’ ERMS as well—Ex Libris Verde. Due to lack of interoperability, insufficient workflow capacity, and overall difficulty of Verde, however, Library decided to opt out of Ex Libris’ ERMS. Instead, Library uses various tools for e-resources management including homegrown databases in Excel and Access formats, Word documents, and email archives.

The Library uses Linux Operating System and Apache Web server.

**Rationale for change**

Top Library priorities in electronic resource holdings management calling for implementation of CORAL ERMS are consistent with the findings of 2010 electronic resource management survey conducted by Maria Collins of North Caroline State University and Jill E. Grogg of University of Alabama Libraries: “workflow management, communications management, license management, statistics management, administrative information storage, and acquisitions functionality” (Whitfield, 2011, pp. 19-20).

Based on these priorities, the new ERM system of the University Library should be able to meet the following library needs:

- Handle multiple types of e-resources from multiple vendors
- Provide a centralize database for vendor information
- Allow for a standardized workflow in electronic resource management, including licensing, ordering, payment, and activation
- Allow for use statistics harvesting
• Have an easy-to-use interface

CORAL ERM: Vendor Overview

Background

CORAL (Centralized Online Resources Acquisitions and Licensing) ERMS is an open-source cloud-based electronic resources management system. It was developed by the University of Notre Dame’s Hesburgh Libraries in 2010 and licensed under a GPLv3 license (CORAL, 2015). It runs on open-source server application: MySQL and PHP backend on Apache. In 2011, about 40 libraries used CORAL, according to Drake, Geller, Wentz, & Choy (2014). At the 5th Annual Meeting, CORAL User Group at ER&L 2015, the following usage statistics were reported: 299 subscribers to CORAL ListServe from 155 unique institutions; 48 institutions in production, and 18 institutions testing CORAL ERMS1.

Main features

CORAL consists of “interoperable modules designed around the core components of managing electronic resources.” It includes Authentication Module, Resources Module, Licensing Module, Organizations Module, and Usage Statistics Module3. In addition to the modules developed by the main developer—the University of Notre Dame’s Hesburgh Libraries—Texas A&M University developed CORAL Management Module, the release of which Eric Hartnett of Texas A&M announced at CORAL Users Groups Meeting, ER&L 20134.

Authentication Module. This module is required to assign proper privileges for library users to access the ERM system. Users from all other modules, listed below, need to be added to

1 http://electroniclibrarian.org/5th-annual-coral-user-group/
2 http://coral-erm.org/
3 http://coral-erm.org/documentation/
4 http://www.slideshare.net/bjheet/user-group-meeting-erl-2013-hartnett
CORAL Authentication\(^5\). In addition, users still need to be set up in each of the modules with specific permissions for access. The permissions levels vary based on user roles.

**Resources Module.** This module “aids in the management of the electronic resource workflow from the initial request through the acquisition process and into ongoing support and maintenance,” vendor’s documentation maintains. “CORAL Resources supports the completion of these workflow processes with a convenient task-based queue in which automated email alerts indicate to staff when new tasks are available.”\(^6\)

**Licensing Module.** Designed to provide “a way to store and access digital copies of current and expired license agreements and related documents as well as associated agreement metadata,” this module “helps make library license agreements more accessible to personnel through select searchable metadata fields and assists institutions in tracking and using specific pieces of information included in legal agreements.”\(^7\)

**Organizations Module.** This module “provides a way to store and manage names, contacts and account information for the many publishers, providers, vendors, etc. that libraries interact with on a daily basis all within a single searchable location,” CORAL maintains\(^8\). It provides the ability to search by organization’s Name, Contact Name, and Role, e.g. publisher, provider, library, etc.

**Usage Statistics Module.** “CORAL Usage Statistics provides a solution for storing and managing electronic journal full text download statistics reports,” vendor posits. This module “currently supports JR1 and JR1A reports (or any report in a JR1 or JR1A format)”

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Management Module. Developed by Texas A&M University, this module allows managing ERM-related documents, such as policies, procedures, etc., and search records by Name, Category, and Document Type.

Add-ons. In addition to main modules, CORAL offers two add-ons: CORAL Terms Tool and CORAL Usage Statistics Reporting.

CORAL Terms Tool. CORAL offers an add-on to the main Licensing module, CORAL Terms Tool. “The tool allows authorized users to retrieve license terms for a specific resource based on an ISSN or ISBN query,” vendor’s documentation explains. “The Terms Tool queries the openURL resolver for a specific ISSN or ISBN, retrieves the list of available providers for that ISSN/ISBN, and then queries CORAL Licensing for the license terms for each provider. It is a multi-step process but it all takes place behind the scenes and results in a seamless easy to use process for the user” (CORAL Terms Tool User Guide). User authorization is accomplished via CORAL’s Authentication Module.

CORAL Usage Statistics Reporting. In addition to the main Usage Statistics module, CORAL Usage Statistics also includes a “reporting solution allowing library personnel to retrieve statistics reports. This reporting solution is available as an add-on and must be installed separately” (CORAL Usage Statistics User Guide). This add-on allows a database user with proper access permissions to connect to MySQL CORAL Usage Statistics database, to retrieve and generate the usage reports.

Installation

9 https://github.com/ndlibersa/management
10 http://www.slideshare.net/bjheet/user-group-meeting-erl-2013-hartnett
All CORAL modules are available for free download on GitHub—a web-based Git repository hosting service. They can be downloaded separately or all-together, either through the web installation script or manual installation. “The program is a small database and must be installed on a server, but does not require a dedicated server of its own,” Anderson explains. “To use CORAL, the library needs to have access to a server and to have someone available to install and maintain the software” (2014, Electronic Resource Management Systems, p. 33).

The Authentication Module needs to be installed first; the installation order of all other modules can vary, Kutztown University Library team recommends (Stafford & Flatley, 2014, p. 175).

Available support

Being an open-source vendor, CORAL provides support via extensive online technical documentation and presentations, CORAL ListServe, GitHub forum, and live demos on the vendor’s website.

As of 2012, the University of Notre Dame Hesburgh Libraries no longer provide centralized vendor support for CORAL. They announced “via the CORAL mailing list that CORAL’s popularity had grown to the point where Hesburgh Libraries could no longer adequately support CORAL alone,” Hartnett, Beh, Resnick, Ugaz, and Tabacaru report. “As a solution, they asked for volunteers to form a steering committee for CORAL. Each volunteering library was asked to have two members—one technical and one non-technical—who would assist with answering questions sent to CORAL mailing list and posted on CORAL forums, provide occasional coding support to fix bugs and add additional functionality to the software,

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13 https://github.com/ndlibersa
14 http://coral-erm.org/documentation/
15 coral-erm@listserv.nd.edu
16 https://github.com/ndlibersa/CORAL-Main/wiki/CORAL-Technical-Documentation
17 http://coraldemo.library.tamu.edu/
and help shape the future direction of the product” (2013, p. 31). The volunteers included representatives of Texas A&M University, Duke Medical Center, and The College of New Jersey.

**Final recommendation**

**Benefits to Library**

Vendor documentation, product reviews in library literature, and peer reviews of CORAL implementation in academic libraries discussed below clearly demonstrate that CORAL ERMS is a good fit to the needs of the University Library and its user base. Several libraries that had implemented CORAL have reported positive results.

**Library technology.** CORAL is a perfect match to the Library’s technological setup: it is compatible with the Library’s operating system, Linux, and web server, Apache. In fact, as Whitfield points out, “the desirable operating system for CORAL is Linux. Many of the automatic jobs that allow CORAL administration are created as cron jobs, which only function in the Linux OS” (2011, p. 20).

Furthermore, CORAL is compatible with the Library’s SFX link resolver—another major benefit critical in the context of the Library. “An ERMS that draws on data found in its SFX knowledge base and matches it with more detailed holdings management information, including license terms, usage statistics, relationships between organizations, and acquisitions information, […] CORAL […] leverages the holdings information stored in SFX as a de facto knowledge base,” Blake and Collins report (2010, p. 247). This helps avoid duplication of knowledge base resulting from implementation of ERMSs that use different openURL resolver types, as Fenway Libraries Online Consortium\(^\text{18}\) (FLO) pointed out during EBSCO testing phase: “Its dependency on EBSCO’s link resolver in the FLO environment where we use Exlibris’ SFX meant duplicate

\(^{18}\) [http://www.flo.org/members](http://www.flo.org/members)
maintenance of a second knowledgebase and being limited to only what EBSCO included in their knowledgebase did not allow for multiple types of e-resources. Ultimately, the system did not accommodate our needs at the time” (Drake et al., 2014).

**ERMS functionality meets top priority needs.** With the interoperability-focused design, CORAL ERMS functionality meets all top electronic resource holdings management priorities set forth by the University Library in the quest for the new ERMS, as outlined in the Rationale for Change section of this paper: workflow management, communications management, license management, statistics management, administrative information storage, and acquisitions functionality. In fact, these priorities laid the very foundation for the CORAL development at the University of Notre Dame Hesburgh Libraries (Whitfield, 2011, p. 20).

Three peer institutions reported CORAL’s ease of installation, flexibility, adaptability, ability to centralize the documents and records, and improvement in the ER workflow management: Southern Illinois University Carbondale (SIUC) Morris Library, Texas A&M University (TAMU), and Wake Forest University (WFU) (Hartnett et al., 2013; Imre, Hartnett, & Hiatt, 2013). While CORAL is “still missing some desirable functionality, such as payment history and more robust workflow functionality, […] nevertheless, CORAL has allowed TAMU Libraries’ electronic resources management to shift from a distributed environment to one that is more coordinated, open, and transparent and enables staff across the organization to play a more significant role in the electronic resources life cycle,” Hartnett et al. conclude (2013, p. 31).

The College of New Jersey and University of Texas at Tyler (UT Tyler) also report overall satisfaction with the CORAL installation (Whitfield, 2011; Mi & Wang, 2013; Hess, Ward, Duncan, & LeMaistre, 2013). “Some of the development we would like to see in the
future are more enhancements to the report options,” to “make CORAL more of a one-stop shop for electronic resource management,” UT Tyler notes (Hess et al., 2013, p. 252).

**User-friendly design, adaptability, consortial interoperability.** While comparing CORAL to proprietary EBSCO ERM Essentials, Fenway Libraries Online Consortium (FLO) reported CORAL’s easiness of use, pleasant aesthetic design, capability of handling variety of types of electronic resources, and consortial interoperability. As a result of a side-by-side trial of the open-source and commercial ERM systems, FLO reports the following advantages of CORAL over the proprietary ERMS:

“CORAL’s interface was straightforward and intuitive to navigate. It had all the basic functionality and could also accommodate multiple types of e-resources, through multiple platforms and from multiple vendors. The system was built modularly with interconnected parts, so it could be used in part or completely and reduced the need for duplicate data entry. Within the system’s administrative functions, there was room for customization. And in addition, when we looked at the CORAL community, we found potential advantages. Having been developed by the libraries at the University of Notre Dame, the system would continue to meet the needs, priorities, and limitations of academic libraries. The open source code made it possible to consider designing advanced customizations without getting vendor approval or waiting for someone else” (Drake et al., 2014).

**Cost-effectiveness, increased job satisfaction, community building.** The open-source benefits will further enhance CORAL’S appeal to the University Library. Fenway Libraries Online Consortium reports “lack of upfront monetary costs associated with a vendor-supplied system,” “absence of contract discussions and restrictions,” and “increased sense of job satisfaction and community building” within the Consortium (Drake et al., 2014).

**Benefits to users**

While this technology upgrade is aimed predominantly at streamlining the Library ERM operations, and therefore benefits the Library in the first place, its users will benefit from CORAL ERM implementation, as well. “Not only does CORAL serve as a tool for librarians but
it also impacts the experience of the end user,” Mi and Wang of The College of New Jersey (TCNJ) point out. “The information gathered in the ERM system provides end users immediate updates on resources and speeds up the trouble shooting process. License permissions information helps interlibrary loan staff and end users in their use of electronic resources. In addition, the process of implementing an ERM system leads to other benefits, such as helping prepare and generate ACRL statistics and forming better partnerships and alliances among consortia, publishers, vendors, and libraries” (2013, p. 79).

Resulting in better, more efficient electronic resources management and better planning of new acquisitions, based on the CORAL’s usage statistics, the new ERMS will allow the Library to reduce time and costs affiliated with the old ERM homegrown system and shift these to acquisition of new e-resources that will ultimately benefit the research-intensive needs of graduate students, faculty, and visiting scholars. CORAL’s ability to accommodate multiple types of e-resources, through multiple platforms, and from multiple vendors will afford acquisitions librarians with confidence in managing existing electronic collections and subscribing to new scholarly e-resources, in increasingly diverse formats. Because electronic resources are a major component of the University Library holdings, and due to the predominant user reliance on the online sources, as a result of CORAL implementation users of the research-driven college will receive better content, better discovery, and better delivery.

**Challenges and costs**

**Vendor support.** Several peer institutions found lack of centralized CORAL’s vendor support challenging. “A shortcoming of any open-source system or tool is that there is no dedicated customer support to turn to when there are problems,” Southern Illinois University Carbondale Morris Library reports (Imre, Hartnett, & Hiatt, 2013, p. 227).
“We also realize that we need to participate more in the larger CORAL community,” the Fenway Libraries Online Consortium notes. “However, while a few individuals in that community actively respond to questions and comments, based on the number of CORAL listserv subscribers, we know that many others don’t respond. CORAL discussions are dispersed across GitHub forums, the listserv, and a few other locations. It takes effort to track all of the conversations, as no single platform is definitive. This lack of a centralized place for interactions also contributes to our habit for internal FLO conversations” (Drake et al., 2014).

In her case study of CORAL implementation at The College of New Jersey Library, Sharon Whitfield also lists the vendor support issue as a major concern, while reassuring, however, increasing support from an invested community, and the developer’s commitment to CORAL (Whitfield, 2011, pp. 21-22).

**Time investment.** “For the entire value open source affords, we learned that open source projects also have a number of costs, primarily stemming from the time involved in the process,” FLO reports. “During the trial and implementation phases, we invested a great deal of time learning the system. Training and creating documentation, processes that would not have been necessary in a vendor environment, also required significant staff resources. In addition, we also made, and continue to make, a conscious effort to communicate with the larger CORAL community, which although a small time investment, is extremely important” (Drake et al., 2014).

Time required to enter data in the system, as well as inevitable margin of error during data entry, received critical feedback from the Southern Illinois University Carbondale Morris Library and the Kutztown University Library. “Collecting and entering data into CORAL is challenging because of limited staff time and no automated data loader,” Southern Illinois
University Carbondale Morris Library maintains (Imre, Hartnett, & Hiatt, 2013, p. 227).

“Another issue encountered was the sheer volume of information that must be entered,” Kutztown University Library adds. “There was no automatic data loader for CORAL. A data loader would allow for entering data directly from spreadsheets or word documents. Many open source software packages include data loaders, but CORAL did not. This meant that all data must be added via manual entry. This technique is problematic because of the potential for data entry errors. The Electronic Resources Librarian performed systematic spot data checks of the date entered by the student workers in an attempt to minimize errors” (Stafford & Flatley, 2014, p. 176).

Kutztown University Library team offers an economically sound solution to the time investment issue—using student assistants for data entry: “The Electronic Resources Librarian received approval for 40 hours of student assistant work to enter data from the many spreadsheets, text files, documents, emails and word documents that comprised the pre-ERMS system into the CORAL system. The student assistants began working immediately on entering data into the Organizations and Resources modules. Because of the complexity and variety of the license terms, the Electronic Resources Librarian chose to map the terms from the paper based contracts into the CORAL Licensing Module himself. This work was very detail oriented and time consuming and is ongoing” (Stafford & Flatley, 2014, p. 175).

**Resources Module shortcomings.** TAMU reports the lack of expenditure tracking and reporting in CORAL’s Resources Module. “CORAL was not designed for expenditure tracking and reporting because this was not a feature needed by Hesburgh Libraries,” Hartnett et al. inform. “Instead, CORAL stores only acquisitions information about a resource’s initial cost. Based on feedback from current and potential CORAL users received at CORAL users meetings...
held at various conferences and CORAL’s mailing list, there is demand for this functionality. […] Therefore, the implementation team decided not to depend on CORAL’s limited acquisitions information, and TAMU Libraries continue to rely on Voyager to track cost data” (2013, pp. 26-27).

**User authentication.** The case study of CORAL implementation at The College of New Jersey Library reports the lack of authentication system (Whitfield, 2011). CORAL has already addressed this problem, however, and developed Authentication module¹⁹.

**Conclusion**

Literature review demonstrates that “managing the life cycles of electronic resources within libraries, including licensing and acquiring electronic resources and providing reliable, discoverable access to them, is a continuous and complex process,” Hartnett et al. point out. “As such, electronic management does not fit into the traditional personnel structures or workflows, which evolved in a print-based world. […] It has become a truth near-universally acknowledged in libraries over the past decade that a tool to manage and organize such data on an institutional scale is essential” (2013, p. 18).

Feedback provided in the peer institutions’ CORAL implementation reports and case studies bestows strong arguments in favor of CORAL implementation in the University Library. The outcomes of this implementation will include all potential ERM benefits: “By subscribing to ERM systems, librarians can consolidate information, streamline the evaluation process, familiarize themselves with ERMI standards, customize serials holdings, and predict database use through benchmarking” (Condic, 2008, p. 134). By consolidating the electronic resource holdings information, CORAL will allow the Library to unify its holdings in a single knowledgebase.

Based on the peer reviews and the analysis of the benefits and costs outlined in this proposal, the author is confident that CORAL will not only provide a robust electronic resource management alternative to the antiquated house-grown database-driven arrangement; it will also afford the Library to be innovative, efficient, and self-reliant in providing access to its growing e-resources to the University user base, strategically use CORAL statistics while planning for future electronic acquisitions, and contribute collaboratively to the open-source library community.

References


