Dis-integration and Re-integration: ERMs in the Wider Context – Predictions

Robert Bley[1]

When looking at the future, it is often instructive to look at previous authors' predictions for our times. Coyle (2007) conducted a brief survey of articles about the future of academic libraries, written by library and information professionals and academics between the 1940s and the 1970s. Not surprisingly, authors writing before the dawn of the true "computer age" found it hard to envisage some of the developments we now take for granted. However, many were remarkably prescient, and almost all predicted correctly that it would be possible to interact with libraries remotely (although various devices were predicted for this, including teletype terminals and domestic TV sets). They also predicted that physical storage needs would diminish, and that better systems would facilitate more efficient inter-library loans.

Other predictions were correct to different degrees. For example, speech interfaces and text mining (although not referred to as such) were predicted and are now available. However, the advent of the true "thinking machine" is still some way off. The common assumption that computers would take over libraries' back-room administration functions—such as ordering, cataloguing, etc.—has occurred to some extent, but substantial human intervention is still needed. The consequent bright future envisaged for library and information professionals as "information consultants" (freed from the drudgery of back-end processes) has become a reality, but to a more limited extent than envisaged. Some back-end processes have declined or become more automated, but these have often been replaced by new types of administrative work.

There were some clear "misses" in the writers' predictions, concerning both end-user services and "back-end" processes. So far, back-end processes have tended to become *more* labour-intensive as a result of the advent of e-resources. Intellectual property rights issues were not foreseen to any degree at all, but then, neither was the Internet (although some forms of computer interoperation across institutional boundaries were foretold). End-user services are no longer centered on the development of libraries' online public access catalogues

[1] Sales Account Manager, Ex Libris (UK).

(OPACs), and no writers foresaw the development of a competitive information landscape, where users were autonomous and able to access information independently of any library service.

The clear lesson is that—in the futurology business—we have to look beyond our immediate environment, and take account of wider technological, economic and societal developments. Keeping this lesson in mind, I will go on to attempt some predictions.

It is helpful—from the point of view of managing the size of the academic library futurologist's task—to divide predictions into "internal" and "user facing functionality", although we will see later how technological developments have facilitated the integration of these two "ends".

The Future of Internal Processes in Libraries

Starting with "internal" functionality, the most significant development in recent years has been the development of Electronic Resource management (ERM) systems.

An ERM system was defined by Ivy Anderson, Robin Wendler (Harvard University Library) and Ellen Duranceau (MIT Libraries) as

> A system that supports management of the information and workflows necessary to efficiently select, evaluate, acquire, maintain, renew/cancel and provide informed access to e-resources in accordance with their business and license terms (Jewell et al., 2004).

Anderson, Wendler and Duranceau were key players in the Digital Library Federation (DLF) Electronic Resource Management Initiative (ERMI), and it was the DLF that came up with the model that has instructed the development of ERM systems.

ERM systems have been developed because libraries have been struggling with the extra internal processes and data elements required for managing electronic information products. Combinations of paper filing systems, spreadsheets, homemade database systems and commercial library systems have proven unequal to the tasks in hand.

ERM systems take account of the fact – for example – that a library's financial relationships may be separate from their legal and consortial relationships as far as acquiring e-resources are concerned. A license agreement for access to content may be with a publisher, but the payment may be to an agent or via a consortium. To complicate matters further, the publisher may not be the provider of the actual interface the library uses to access the publisher's content. A further license and/or payment may be required by another third party for access to the interface. Libraries also need to deal with complex financial deals such as "price caps", "no cancellation", "limited cancellation", "substitution of titles of the same value allowed / not allowed", "no cancellation of print version allowed" and so on. Where a consortial deal with a publisher has been negotiated, managing all this without a dedicated system becomes even more difficult.

Getting Data in and Out

As more libraries acquire ERM systems, it becomes just as important for content providers and vendors to exchange information with such systems, as it was for them to exchange data (via EDI) with "traditional" library management systems / integrated library systems. The fact that many ERM systems are linked to libraries' link resolvers (which ensure that end-users obtain appropriate access to publishers' content) makes this even more imperative. The priorities for EDI with traditional systems were electronic claiming, ordering, invoicing and e-checking of print issues.

The priorities now are:

1. A smooth and accurate flow of holdings and publication data from publishers and aggregators to ERM systems. Libraries need to know exactly which titles are available in which packages and interfaces, and how far back the backfile of each title goes. This data flow needs to be at two levels:
    a. From content providers to the vendors of ERM systems and link resolvers, so that such systems can be pre-populated for libraries with information about content providers' total output – effectively their "catalogue".
    b. From content providers to libraries. In cases where the library has signed a license or paid for content that differs in some way (for example, selection of titles, extent of backfiles or embargoes) from the publishers' "full" standard offering, this information needs to be made available in a manner that will allow the library to easily "localize" their ERM and link resolver system with *their* particular

holdings quickly and easily. Simple spreadsheets can often be all that is required here. It is worth noting that the results of a research commissioned by the UK Serials Group (UKSG) are now available (Culling 2007).

2. License exchange format[4]. The ability to express license terms and conditions in a standard XML schema will ensure that publishers' licenses can be loaded easily into ERM systems, therefore making it easier for libraries to tell users what they can or cannot do, and to ensure compliance by linking license terms to link resolvers, proxy servers and authentication systems.

   Students and researchers will be able to see rights and restrictions at a glance on end-user-facing interfaces such as link resolver menus, title lists, reading lists, federated searching, virtual learning environment (VLE) and course-management systems.

   Reduced ambiguity in this area will benefit all players in the scholarly information chain, although it remains to be seen how swiftly publishers and other content providers are able to codify their current licenses according to the schema. This may be an area where intermediaries will find a role.

3. SUSHI,[5] the NISO Standardized Usage Statistics Harvesting Initiative. This will enable true evidence-based librarianship, automating the collection of content providers' COUNTER-based usage statistics. Many ERM systems are now developing sophisticated data warehousing modules that allow librarians to derive the meaningful performance metrics (such as true "costs per download") that their funding organizations now demand of them.

   The developing standard should include a method for dealing with statistics for "pay per view" content that will allow libraries to make intelligent decisions about whether to access content by subscription or by

---

[4] *See* "ONIX for Licensing Terms," http://www.editeur.org/onix_licensing.html (accessed January 10, 2008).

[5] NISO Standardized Usage Statistics Harvesting Initiative (SUSHI), http://www.niso.org/committees/SUSHI/SUSHI_comm.html (accessed January 10, 2008).

pay per view. In the case of both models, transparency about pricing will be required from content providers.

4. A unique collection identifier for aggregations and databases: like an ISBN per e-package.

5. A standard for libraries to communicate IP address changes to content providers.

6. A standard for vendors to communicate real-time availability, so that end-users are better informed about downtime and uptime.

7. A sub-library level, unique library identifier to identify subscribing institutions and their sub-units.

So far, I have concentrated on the exchange of data with content providers and aggregators, but it should be remembered that it is no less important for library ERM systems to be able to exchange data with other internal systems, such as university finance systems and "virtual learning environment" software such as Blackboard, WebCT and Moodle. Although data may be stored in a multiplicity of different physical locations, it should only need to be *maintained* in one place. Modern technology standards ensure that data can then be shared with other applications.

What Can We Learn from Other Sectors?

One of the most notable developments in business IT in recent years has been the development of "web services"—a standardized way of integrating web-based applications.

Web services means that XML is used to tag data and a protocol called SOAP (Single Object Access Protocol) is used for their transfer. Web services are used primarily as a means for businesses to communicate with each other and with their customers, but also (because web services are independent of particular operating systems or programming languages) allow organizations to communicate data without detailed knowledge of each others' systems. It therefore becomes easy for developers to pull data with diverse provenance together into an end-user focussed interface or application, without having to worry about the structure or interfaces of the "back-end" systems they pull the data from.

Web services are well used in enterprise-level business computing, and in many of the popular commercial sites used by the public today (think, for example, of how so many travel websites bring together diverse hotel and flight information from multiple vendors).

The trend in business is to create *service-oriented* business applications using Web services for all aspects of communication among the many applications involved in an organisation's business & information infrastructure.

The future of external library interfaces, and their relationship to ERMs: some thoughts and predictions

The application of Web services in the library world is clear. Web services allow back-end systems to feed presentation systems. They allow data useful to end-users (held in ERM systems), to be displayed to end-users. This information may include license terms, technical information, and information about downtime windows.

Moreover, Web services facilitate innovative and attractive presentation and interpretation of data from diverse repositories and allow a layer of "social computing" / Web 2.0 functionality to be made available.

The systems used by library end-users are diverse, including traditional library OPACs, institutional repositories, other local data repositories and archives, remote e-journal, e-book and aggregator sites, the library's federated search portal, their institution's Virtual Learning Environment, their institutional portal, but more often, Amazon, Google, Ask, Flickr, FaceBook, Connotea, YouTube, del.icio.us, and many other Web 2.0 services.

The most "Web 2.0" functionality of current library systems is the OpenURL[6] that can generate links to take users from a catalogue record through to appropriate services for obtaining the item or to related services. OpenURL / link resolver systems are of course closely tied to ERM systems, and often share the same knowledge base.

Web services enable back-end systems to feed presentation systems using mainstream formats (e.g. XML). They allow innovative presentation/interpretation and "social computing." Libraries are now able to offer such advice as "did you mean?, "people who searched for x also searched

[6] *See* http://www.exlibrisgroup.com/sfx_openurl.htm (accessed January 10, 2008).

for y," easy options for refining searches, tagging, reviewing and exporting—and they allow clear display of license terms etc. to end-users.

Technology standards *now* enable provision of all these features on the *front end*, while facilitating better *internal* resource management.

The new generation of the Web involves not just a more interactive (Service Orientated Architecture) approach (e.g. social computing), but also facilitates dynamic communication between systems behind the scenes.

References

Coyle, K. "The Future of Library Systems, Seen from the Past." *Journal of Academic Librarianship* 33, no. 1 (January 2007): 138-140.

Culling, J. *Link Resolvers and the Srerials Supply Chain: Final Project Report for UKSG* (21 May 2007). http://www.uksg.org/projects/linkfinal (accessed November 30, 2007).

Jewell, T.D., et al. *Electronic Resource Management: Report of the DLF Electronic Resource Management Initiative.* Washington, D.C.: Digital Library Federation, 2004. http://www.diglib.org/pubs/dlf102 (accessed November 30, 2007).