

# THE AUSTRALIAN ACADEMIC AND RESEARCH LIBRARY NETWORK (AARLIN): LIBRARY SERVICE FOR THE 21ST CENTURY<sup>1</sup>

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The AARLIN project is a national project funded by the Australian Government and has the support of over 20 Australian universities and the National Library of Australia. The primary purpose of AARLIN is to establish collaboratively a new model of library service that endeavours to integrate the delivery of print and digital resources seamlessly using portal technology. A description of the AARLIN service model is provided, together with a brief discussion of proposed future developments. The rationale for AARLIN and the advantages of national collaboration are also discussed.

## **Introduction**

Higher education in Australia is undergoing a "sea change", caused in part by a huge increase in student numbers accompanied by a decline in government funding in real terms. Its traditional role of cultivating the intellect, promoting research and encouraging liberal education is being subverted by the incessant demand for training for the job-market. Students are increasingly studying part-time, are time-poor, and so favour more access to flexible learning courses. Improvements in ICT (information and communications technology) in recent times have accelerated the move towards flexible learning. For instance, the growth of the Internet as an important communications medium has encouraged a number of universities to use it for the delivery of courses, for electronic mail communication with their students, and for accessing library catalogues and other electronic information resources. Educational administrators have generally looked favourably upon the use of technology for distance education and open learning in the belief that this will lead to lower costs and more effective teaching, as well as provide a more flexible learning environment for students by making it possible for teacher-student interaction to take place without the constraints of time and space. (Lim & Van Dyk, 1997, p.63).

The fluidity of the job market has also meant that lifetime jobs are no longer the norm. It is expected that within their lifetime, most workers will change jobs many times, and these jobs will require constraint re-training and the acquisition of new skills. It is therefore not surprising that with the trend towards lifelong learning, there is an increasing demand for tailored training courses geared towards the acquisition of new skills and knowledge. At the same time, globalisation has led to increased competition from non-traditional institutions and private niche-market operators in the provision of courses that can attract full fee paying students.

All these changes have had a significant impact on academic libraries, which have been forced to modify their service models to meet the demands of their users. These

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<sup>1</sup> Conference on New Information Technologies: Information resources integration: an agenda for change, 24-27 Sept 2002, Universiti Brunei Darussalam

changed demands have been complicated by library budgetary problems, caused in part by the devaluation of the Australian dollar and severe cuts in library budgets by their parent institutions. These in turn have made it difficult for libraries to cope with the tremendous growth in scientific literature and the inexorable increase in serial costs every year. At the same time, the remarkable growth in electronic publishing and the availability of print publications in digital formats, as well as the increasing reliance on the Internet to deliver educational and information services have created a different set of problems. For instance, university libraries now have to run "parallel" or hybrid library services, one based on print and the other on digital information resources, and these have increased the costs of providing library services. The increasing diversity of electronic information resources with their different interfaces and search syntaxes also cause confusion among users and increase the need to devote more "expensive" human resources towards training users and the development of information literacy programs.

The above developments have made it necessary for libraries not only in Australia but also elsewhere to consider new ways of delivering library services to their users. In particular, there is a requirement to provide seamless and integrated access to analogue and digital information resources.

Brian Hawkins and Patricia Battin (1998, p.9) have pointed out digital technology has created a transformational change which may make present organisational structures invalid. Current organisational structures reflect the characteristics of print-on-paper technology which include the following:

- site-based information resources
- class and lecture-based teaching techniques
- discipline-oriented departmental structures
- compartmentalized financial formulas and budgets based on predictable stability of print-on-paper technology

But digital technology has vastly different properties, including the following:

- rapid, unpredictable and continuing change of hardware/software
- the capacity to combine print-on-paper with multi-media representations of human creativity
- the capacity to customize information services on demand
- continuing changes in learning, teaching, and research methodologies with the application of technology
- the site-independent nature of information resources, teaching, and learning

Hawkins (2000) in his keynote address at the Australian Library and Information Association Conference states that the current library model is no longer affordable intellectually or economically. Thus a new type of library has to be constructed to meet the future requirements of students and scholars. Other writers have commented that the traditional library model is based on the concept of "acquire-catalogue-store-lend", but what users in the flexible learning environment now demand is something quite different - "discover-locate-request and deliver".

The new model has to take into account a number of preferences of the new learners. These new learners generally working part-time, and so would prefer access to virtual learning and information resources. They demand convenience because they are time-poor, and they want courses that are tailored to suit them as well as access to information resources, both analogue and digital, without having to visit a physical site.

In 1999, a group of experts, who were members of the Library and Information Technology Information (LITA), a division of the American Library Association, identified a number of emerging trends that would impact on future library services. (LITA, 1999). Some of the more important trends are:

- The use of technology to help users to customise their access to information resources. Library users who are web users expect customisation, interactivity and customer support. In other words, the approach should be user-focussed rather than library-focussed. Like flexible learning, access to information resources should be driven by user needs rather than institutional imperatives. The traditional library policy of one-size-fits-all should be abandoned.
- The use of "push technologies" to assist overloaded information users to select and evaluate resources as well as draw their attention to resources which may be of interest to them on the basis of user profiles or past use of resources in specific subject areas.
- The need to put a human face on the virtual library. Many library web sites place too much emphasis on resources, collections and facts, while users really want an easy means to identify and contact staff who might be able to help them.
- The need to co-opt existing technologies that have not been used in libraries, and take advantage of cooperative efforts in information access.
- An increasing need for authentication and rights management systems.

Thus the traditional "bricks and mortar" model which is built around site-based services must be replaced by the "clicks and mortal" model, which is built around the e-commerce model of library service delivery. The key e-commerce technology that libraries should adopt is the portal. This will allow the library to know who its users are. This in turn will allow the library to inform the users of relevant information resources which fit the profile of the user, when the latter logs on to the portal. At the same time, the portal will allow users to customise their interface so that they need only view those resources in which they have an interest. The portal also has the capability of providing "human interaction" through chat, email and video conferencing facilities.

It is this desire to build a new model of library service using portal technology that is at the heart of the AARLIN project.

## **What is AARLIN**

AARLIN is an acronym for Australian Academic and Research Library Network, a strategic framework for cooperation and collaboration developed by CAUL (Council of Australian University Librarians) in 1999, as a key plank in its 5-year strategic plan. The main aim of AARLIN is to develop a national portal to facilitate access to digital and analogue resources owned by CAUL member libraries. In 2001, La Trobe University, with the support of 18 universities and the National Library of Australia, obtained funds from the Australian Research Council to conduct a pilot, with the aim of demonstrating proof of concept. To keep the project manageable, the pilot involved only six universities (selected using specific criteria) and about 120 researchers from those universities. The scope of the pilot, which was carried out during the period June 2001-June 2002, covered the following:

- ascertain whether any commercial software product was available which incorporated the functionalities required of the portal
- identify deficiencies in the off-the-shelf software with a view to further developmental work
- develop work processes and procedures which will ensure that configuration and maintenance of targets can be achieved collaboratively and without duplication of effort
- examine whether the system is scalable

A survey of researchers was also conducted as part of the pilot to ascertain the extent of their satisfaction with the proposed model of library service using portal technology. As would be expected, the survey showed considerable support for the proposed model. The pilot revealed that none of the existing off-the-shelf software could meet all the functionalities required of the AARLIN portal and that some local developments and enhancements were necessary.

In the light of the success of the pilot, a further application was made for funds under the Australian Government's Systemic Infrastructure Initiative in 2001 with the aim of rolling out a fully implemented system to all Australian universities that supported this model of service. The application, with La Trobe University as the lead institution, had the support of 20 Australian universities and the National Library of Australia, and was successful.

## **Why AARLIN?**

As stated earlier, the principal aim of AARLIN is to develop a portal framework for resource sharing among Australian academic and research libraries. A key feature is to provide researchers with streamlined and integrated access to research information resources in both analogue and digital formats, regardless of where these resources are located.

Anecdotal evidence suggests that researchers are finding it increasingly difficult to find the appropriate resources to support their work from an increasing number of digital and analogue resources. The multiple search interfaces also cause confusion

among users. A survey of database use at Monash University in 2001 (Huggard, et al, 2002) revealed that users had difficulty in deciding which database was relevant, found access too complicated, and complained that too many signons were required, and that the search screens were too confusing. Added to this complication, some studies in the USA have revealed a phenomenon which Brian Hawkins, formerly President of Educause, has called "the tyranny of the two searches". According to Hawkins, users are either too lazy or too ignorant to search for information from more than a single source. Unfortunately, however, they tend to use the Internet as the information resource of first resort, and when they fail to find the information that they require, they usually do not undertake further searches using other resources like library online catalogues (OPACs) or other relevant databases. There is therefore a need to provide users with resource discovery tools to find accredited and quality information resources, which match the ease of use of Internet search engines. This implies the use of a single search query across multiple databases. Finally, of course, Australian researchers nowadays are time poor, partly as a result of increased teaching loads, and partly because they have to spend a lot of time preparing applications for competitive research grants. Any tools, which can reduce the time taken by researchers to find relevant information, would therefore be welcome.

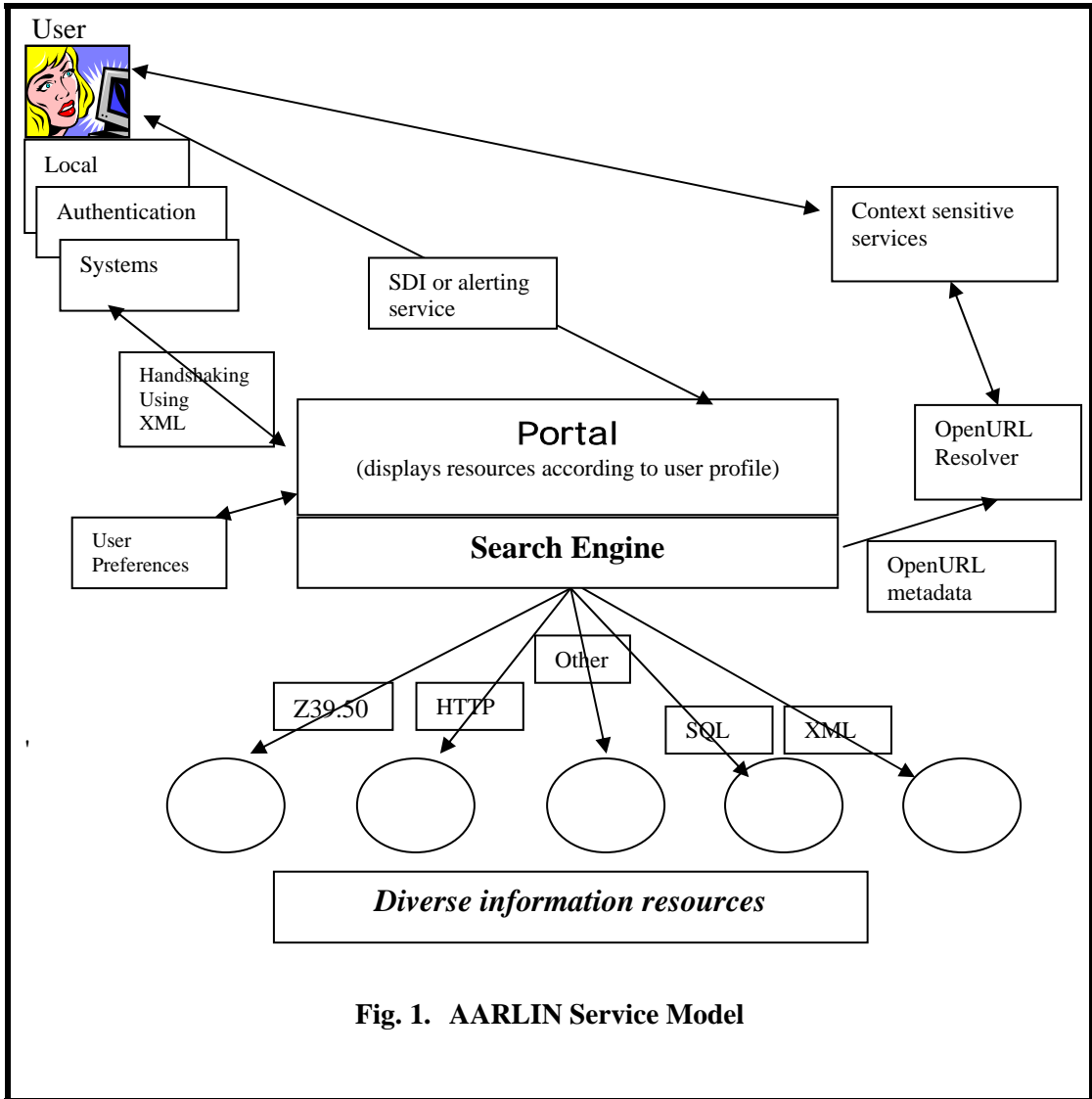
### **The AARLIN Service Model**

One of the cornerstones of AARLIN infrastructure is the national portal with context-sensitive and open reference linking software, which will permit researchers once authenticated to:

- access a context-sensitive and "standardised" search interface and undertake concurrent searches of electronic databases, web sites, online library catalogues and other electronic information resources;
- pass appropriate metadata for an unmediated document delivery request and generate a document delivery request, if required;
- access a range of appropriate or extended services (including deeplinking to full-text where available) using context sensitive reference or OpenURL linking software;
- personalise their search "environment", including access to the information resources which are relevant to their research interests, the capacity for them to suppress and expand various resources presented to them as a default, and the capacity for them to add their own bookmarks;
- have pushed to them the relevant "information landscape" or suite of information resources as determined by their authenticated user profile;
- establish or modify profiles for, and receive literature alerts informing them of newly available material matching the criteria specified.

As shown in Fig. 1, the AARLIN Service model is built around a national portal, which is linked to the local authentication systems of the participating universities. When a user logs on, the portal ensures that the user is an authorised user by communicating with that user's authentication system. At the same time, the authentication service passes to the portal the "user's profile" – which would include information such as the subject interests of the user and his/her status (e.g. undergraduate, postgraduate, academic staff). On the basis of that profile, the portal

"pushes" to the user a suite of relevant information resources (also called information landscape). Thus all users would actually have access to a different set of information resources, according to their profile. Individual users can further refine their access to the relevant resources by adding or deleting individual items from their list of favourite resources.



**Fig. 1. AARLIN Service Model**

The portal includes a search engine, which allows parallel searching of a diverse range of databases, information resources and websites using multiple protocols. These protocols include Z39.50, Http, SQL and XML gateways. Consequently, it would be possible for a user with a single search argument to search across citation and full text databases, online library catalogues, Internet search engines, websites and subject gateways, and to get a uniform search outcome from this parallel search.

In addition to being able to conduct parallel searches, the portal can pass relevant metadata to openlinking software using the OpenURL protocol. The openlinking software will use the metadata to "resolve" what types of extended services the user is entitled to according to the user context. For instance, it might display links to full text resources, which the user's library system has subscribed to, but not to other relevant resources, which the user is not entitled to use. Similarly, if there is no full text access, the openlinking software might display a document request form, if the user is an academic staff, but will not display this form if the user is an undergraduate and not entitled to document delivery services.

Finally, the portal also has an SDI or Alerting service, which users can use to be kept, informed of new information resources in their fields of interest.

### **Why Collaborate?**

AARLIN is a collaborative project, and there are many benefits in approaching the development of a national portal collaboratively rather than individually or independently. Some of the benefits include the following:

- Political
- Financial
- Staffing
- Scalability

**Political.** Australian university libraries have frequently (and unfairly) been accused of not being willing to cooperate or share resources. This kind of criticism, which has come from Government ministers as well as bureaucrats is not surprising in view of the competitive environment in which universities are required to operate. It is patently unfair because Australian university libraries, through CAUL and other regional cooperatives in fact participate in many cooperative projects, including interlibrary lending, cooperative storage, reciprocal borrowing, and consortium purchases of electronic resources. Unfortunately, however, many of these cooperative projects are unknown outside the sector because of their lack of visibility. AARLIN will provide a tangible framework on which these collaboration and co-operative projects can hang. Some recent examples include national site licences, reciprocal borrowing, document delivery, cooperative acquisitions, and online reference and help services, and these will send a powerful political message to the Australian government in Canberra.

**Financial.** The financial imperatives for establishing a national system are overwhelming. It costs anything between AUD300,000 and AUD1.0 million to set up a portal individually. These include hardware and software costs only and do not include staffing costs. On the other hand, the cost of a national system works out at less than one third per institution. The costs savings are not only in hardware and

software but include potentially large time and salary savings. These are achieved through collaborative work in identifying databases and websites, and in configuring targets and writing software scripts, adapters or drivers. The work involved in identifying and configuring targets is often under-estimated. By collaborating we only need to configure targets or write “scripts” once, and share the results among all the participants

**Staffing.** A collaborative project creates a positive environment and generates considerable goodwill among the collaborating staff. The AARLIN pilot has generated a lot of positive vibes among participants resulting from the sharing of expertise. There are also staff development opportunities arising from the ability to learn from one another, and from the development of individual skills that previously did not exist. A consortium approach also strengthens the participants' ability to communicate with database and software vendors about deficiencies in their implementation of standards and protocols, and to pressure them to make changes.

The AARLIN pilot also demonstrated that scalability is not a problem. The hardware and software architecture permits the following typologies:

- Centralized
- Distributed
- Centralized with distributed web servers located in individual institutions or state

Hardware and software now exist to cope with loads exceeding 1000 simultaneous users without any difficulty.

From a technical perspective, AARLIN is concerned with how interoperability can be achieved

- between the various components of the AARLIN portal
- between the AARLIN portal and other portals
- between AARLIN and e-learning systems
- between AARLIN and other systems

For the various components of the portal to work, various standards and protocols have to be adopted. The primary ones are:

- For interfacing with local authentication or authorization systems, e.g. LDAP, EZProxy, SIP
- For distributed searching and resource discovery – Z39.50, http, SQL, XML
- For document delivery services – ILL protocol
- For context sensitive services – OpenURL
- For interfacing with e-learning systems – IMS

Unfortunately, many vendors do not implement these protocols fully or correctly

The AARLIN Portal can incorporate a number of additional features, although these are not within the scope of the current project. They include:

- Integration with university wide portals
- Integration with e-learning systems like WebCT and Blackboard
- Distributed searching of learning objects repositories or open archive systems (including e-print) Chat, email, interactive and video conferencing facilities (to provide human interaction) Web delivery of documents Shopping cart for selection of services/documents
- Secure payments (user pays) Rights management (to compensate publishers)
- Provision of 24x7 collaborative reference and help services on a national scale

### **Concluding Remarks**

Libraries have been evolving. In the days when books were in closed stacks, users relied on library staff to fetch the books for them. The library operated like a retail shop, where all the articles of value were kept under lock and key or behind the counter, and delivered directly to the customer by the retailer. We then moved into the era of open access or open stacks, when users could browse in the stacks, select the book or books that they wanted to read, and then check them out at the loans counter. This is the supermarket model, and it is this model that we continue to use today. However, to remain relevant we have to develop a new model for providing services. I call this the e-commerce or "clicks and mortar" model - which requires us to deliver goods and services to remote users wherever they are located, and this is the model that will serve the flexible learning environment very well. The products that libraries deal with -- information products like electronic documents and digital objects -- have been called "the purest form of Electronic Commerce". (Schutzer, 1996) and consequently, e-commerce technologies are particularly suited in the library environment.

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