

## The Hybrid Library: a view from the UK

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This paper aims to provide an overview of digital library development in the UK, concentrating on the eLib (Electronic Libraries) programme.<sup>1</sup> It also discusses the idea of the Hybrid Library and considers how it fits into current electronic library developments. The paper is divided into the following areas. First, it summarises the background to the eLib programme and discusses some of its preliminary findings. It then discusses the concept of the Hybrid Library, followed by a summary of the current eLib (Phase 3) projects which include hybrid library development projects. Finally, it identifies a number of common themes between the different projects which are currently being investigated.

### eLib

The eLib programme was set up in 1994 following recommendations made in the Follett Report.<sup>2</sup> This was a national report on the future of university libraries which recommended that (amongst other things) more research and development should be carried out in the area of the electronic library. The eLib programme was set up to co-ordinate this activity.

Phases 1 and 2 of eLib included a number of strands:

- Electronic publishing: including projects developing e-journals, pre-prints, electronic short loan, on-demand publishing, digitisation, digital images, quality assurance
- Resource access: including document delivery, access to network resources
- Training and awareness
- Supporting studies

Most of the projects in these strands officially fell into eLib Phase 1. Phase 2 followed soon after with the aim of plugging perceived gaps in the programme. Between them the first two phases comprised 60 projects, most of which were relatively small-scale practical development initiatives. They were funded for 3 years (in the first instance) and accounted for £15 million.

Chris Rusbridge, the Director of eLib, commented in 1998 that it was perhaps too early to draw definitive lessons from these phases of eLib as some of the projects were granted extended funding and are not yet complete.<sup>3</sup> Nevertheless, he identifies a number of key preliminary outcomes which have emerged from the different projects already. These relate to a wide range of issues, such as quality („quality costs but users demand quality“), costs („digitisation is not free“), management („new services are hard to produce to service (not pilot) quality“), and people („people, not technology, represent the important issue“).

One of the most significant lessons to have emerged from electronic library development in the last 5 years is the need for integration. Users now have to cope with a much wider range of resources than ever before which are made available in varying ways with varying access routines. Rusbridge divides these into four categories:

- Legacy: non-digital, particularly printed, resources

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<sup>1</sup> <http://www.ukoln.ac.uk/services/elib/>

<sup>2</sup> Joint Funding Council's Libraries Review Group: Report (chairman Sir Brain Follett), 1993, <http://www.niss.ac.uk/education/hefc/follett/report/>

<sup>3</sup> Chris Rusbridge „Towards the hybrid library“ *D-Lib Magazine*, July/August 1998, <http://www.dlib.org/dlib/july98/rusbridge/07rusbridge.html>

- Transition: digitised resources, legacy resources which have been converted and made available in some electronic form
- New: digital resources
- Future: object-oriented digital items

All of these different categories of resources are accessed in different ways. Even within a single category there are different formats of material: New resources, for example, may take the form of CD-ROMs or Web resources. Each different resource will have its own user interface and access routines. Furthermore, all of these different categories include different types of resources: full-text, bibliographical, statistical. All of these factors often mean that information resources are managed and made available as, what Lorcan Dempsey calls, „islands“, which remain disconnected from each other.<sup>4</sup> There is then a need for greater integration of resources so that users may access and utilise them in a more seamless way. The concept of the hybrid library has been developed in response to this problem.

### The Hybrid Library

The hybrid library is on the continuum between the conventional and the virtual library. The aim of the hybrid library should be create an environment within which information of all the different categories above can be used more seamlessly. The hybrid library, as Rusbridge puts it, should be „designed to bring a range of technologies from different sources together in the context of a working library, and also to begin to explore integrated systems and services in both the electronic and print environments.“<sup>5</sup>

This explanation of the hybrid library is reinforced by Dempsey who, continuing the analogy of ‘information islands’, states, „the hybrid library can be understood as an organised attempt to come to terms with the multiple islands that library services are increasingly becoming and to reduce the differences in patterns of access and management between those islands.“<sup>6</sup> In both of these definitions, the hybrid library is a vision rather than a reality. It provides a focus for further development, rather than a description of the current situation.

The hybrid library is then not a fixed product. Rather it is a process. The process involves continual integration. An important aspect of this is the integration of *electronic* resources with the aim of allowing users to access a variety of resources (perhaps simultaneously) through a single user interface. Much current hybrid library research is concentrated in this area.

### eLib Phase 3

In view of the need for integration, Phase 3 of eLib has this as one of its major themes. Like Phases 1 and 2, Phase 3 has a number of related strands:

- Hybrid libraries: aiming to set up models and exemplars of the hybrid library
- Clumps: implementing Z39.50 to create virtual union catalogues
- Digital preservation: investigating issues, promoting awareness and making recommendations
- Projects to services: allowing selected Phase 1 and 2 projects to continue their service with the aim of becoming self-supporting

<sup>4</sup> Lorcan Dempsey „The library, the catalogue, the broker“ in Lorcan Dempsey, Sally Criddle and Richard Heseltine (editors) *Information landscapes for a learning society: networking and the future of libraries 3* London: Library Association Publishing, 1999. Forthcoming. Thanks to Lorcan Dempsey for showing me proofs of this essay.

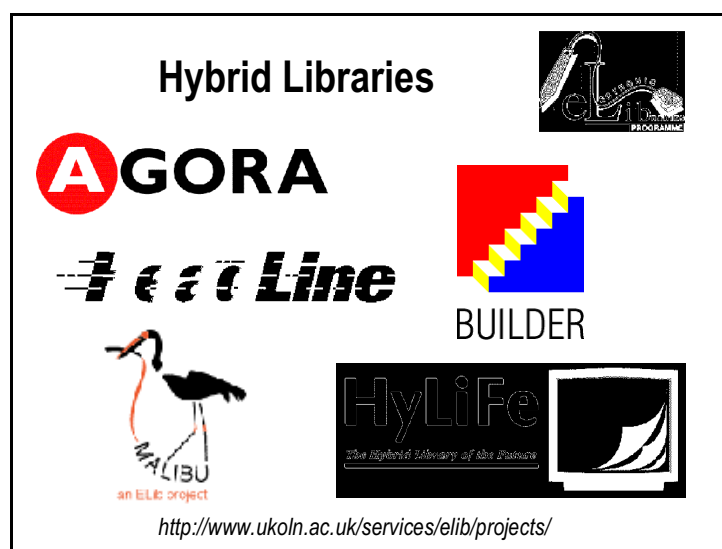
<sup>5</sup> Chris Rusbridge op cit. This quote is talking specifically about the nature of the eLib hybrid library projects but applies to the hybrid library in general.

<sup>6</sup> Lorcan Dempsey op cit.

Proposals for Phase 3 were invited in the Summer of 1997. Successful new projects began in early 1998 and are mostly due for completion in the second half of 2000. In total there are 20 projects accounting for £5 million of expenditure.

The projects within the different strands have their own unique features. They involve partners from across the country and include commercial companies, and public libraries as well as university institutions. It is becoming clear that they also have a great deal in common within and across the strands. Most hybrid library projects are, for example, making some use of Z39.50 technology as part of their developments.

### Hybrid Library projects



There are five hybrid library projects. The main features of each project are summarised below:<sup>7</sup>

**HyLiFe** (Hybrid Library of the Future)<sup>8</sup> is concentrating on the design and evaluation of six different hybrid library user interfaces. The six interfaces are being designed in different institutions for different user groups. The project is being co-ordinated and evaluated by staff at Centre for Research in Library and Information Management (CERLIM) at Manchester Metropolitan University, and the Department of Information and Library Management at the University of Northumbria at Newcastle.

**MALIBU** (MANaging the hybrid Library for the Benefit of Users)<sup>9</sup> has a subject area focus. It is developing a number of hybrid library prototypes particularly in the area of the Humanities. It is also investigating the organisational and managerial implications of the hybrid library. Once again this is a multi-site project, the key sites being Kings College London, and the Universities of Oxford and Southampton.

**HeadLine** (Hybrid Electronic Access and Delivery in the Library Networked Environment)<sup>10</sup> is focused on Economics and Business Studies. It is based at the London School of Economics, Lon-

<sup>7</sup> For further information, see Stephen Pinfield et al „Realizing the hybrid library“ *D-Lib Magazine*, October 1998, <http://www.dlib.org/dlib/october98/10pinfield.html>

<sup>8</sup> <http://www.unn.ac.uk/~xcu2/hylife/>

<sup>9</sup> <http://www.kcl.ac.uk/humanities/cch/malibu/>

<sup>10</sup> <http://www.headline.ac.uk/>

don Business School and the University of Hertfordshire. The project is building models of the hybrid library including a wide variety of different formats of material.

**BUILDER** (Birmingham University Integrated Library Development and Electronic Resource) <sup>11</sup> has an institutional focus. It is based at a single site, the University of Birmingham, although partner sites are involved in evaluation activities. The project is developing a model of an institutional hybrid library incorporating various technologies.

**AGORA**<sup>12</sup> is system led. It is an implementation of the MODELS Information Architecture (see below) which is constructing a hybrid library management system. The system will include facilities for search, locate, request and delivery services. The project is being led by the University of East Anglia in partnership with the UK Office for Library Networking (UKOLN), CERLIM and Fretwell-Downing Informatics.

### Clumps projects

In the UK there are few physical union catalogues. COPAC (which contains records from some of the largest research libraries in the UK) <sup>13</sup> is a notable exception to this. This fact has highlighted the need for 'virtual union catalogue' (or 'clump') development. A number of projects have therefore been funded by eLib to 'kick start' Z39.50 implementation in the UK. Most of these clumps projects are organised on a regional basis, although there is one subject-based clump. A number of test systems produced by these projects are already up and running.

**CAIRNS** (Co-operative Academic Information Retrieval Network for Scotland) <sup>14</sup> is the Scottish clump which aims to integrate 25 Z39.50 compliant catalogues in university institutions into a clump. As part of this it is investigating cataloguing standards and collection description methodologies. Development work is led by the University of Glasgow.

**M25 Link**<sup>15</sup> aims to create a virtual union catalogue of various libraries in the Greater London area (within the M25 motorway). In the first place developments are focused on 6 partners with the London School of Economics as the lead site. The project team are looking in some detail at using Z searching in relation to serials information.

**RIDING**<sup>16</sup> consists of 12 partners in the Yorkshire and Humberside region of England. The project aims to develop a large-scale demonstrator of a clump and also develop related services, such as inter-library loan. Its partners include university libraries, a large public library and the British Library Document Supply Centre. The University of Sheffield is the lead site.

**Music Libraries Online** <sup>17</sup> is the only subject-based clump which includes institutions from around the UK. It includes libraries from conservatoires and is looking at issues relating specifically to music bibliographic records. Like some of the other clump projects it is working with Fretwell Downing Informatics on technical issues.

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<sup>11</sup> <http://builder.bham.ac.uk/>

<sup>12</sup> <http://hosted.ukoln.ac.uk/agora/>

<sup>13</sup> COPAC is the CURL OPAC at <http://copac.ac.uk/copac/>. CURL (Consortium of University Research Libraries) comprises the largest research libraries in the UK.

<sup>14</sup> <http://cairns.lib.gla.ac.uk/>

<sup>15</sup> <http://www.M25lib.ac.uk/M25link/>

<sup>16</sup> <http://www.shef.ac.uk/~riding/>

<sup>17</sup> <http://www.musiconline.uce.ac.uk/>

## Digital preservation

The remaining new strand in eLib Phase 3 is digital preservation. The single project in this area, **CEDARS** (CURL Exemplars in Digital ArRchiveS),<sup>18</sup> is based at the Universities of Oxford and Cambridge, with the University of Leeds as the lead site. It is aiming to promote awareness of digital preservation issues, to identify strategies for long-term preservation and collection management and also text out a number of preservation techniques.

## Projects to services

A number of eLib Phase 1 and 2 projects have been very successful and it was recognised that they have provided a valuable service to the university community (and beyond). As the final aspect of Phase 3, it was decided to extend funding to services such as subject gateway, document delivery and electronic reserve projects for varying amounts of time. Most have plans to become self-funding in the near future. Subject gateways, such as SOSIG<sup>19</sup>, EEVL<sup>20</sup> and OMNI<sup>21</sup>, are now also being co-ordinated by a new Resource Discovery Network Centre. A new national service aiming to provide copyright-cleared digitised publications has also been launched. This project is called HERON (Higher Education Resources Online).<sup>22</sup>

## Common Themes

The eLib projects are investigating a variety of different areas but they have a number of significant themes in common which are features of the hybrid library. Some of these key themes are discussed below.

- Interconnectivity and interoperability
- Authentication and authorisation
- Metadata management
- Digital material management
- Partnerships
- Cultural and organisational issues

The first of these is discussed in most detail here as an example of the work being carried out.

### Interconnectivity and interoperability

The issues of interconnectivity and interoperability are at the centre of the integrated hybrid library. Electronic products and services are more likely to release their value if they can be used more seamlessly. Conceptually, the model of what needs to be achieved in this area has been investigated by a number of projects. Perhaps the most sophisticated conceptual architecture developed is the MODELS Information Architecture (MIA).<sup>23</sup> This is represented diagrammatically in Figure 1.

The MIA consists of three layers. The top layer, user access points, is normally assumed to be a Web browser. The bottom layer, the distributed library system components, represents the services to which users may wish to gain access. Various examples of these services are given, such as the local library catalogue, clump entry points, and networked CD-ROMs. Currently, users normally interact directly with these components, each using their own proprietary user interface and access

<sup>18</sup> <http://www.leeds.ac.uk/cedars/>

<sup>19</sup> <http://sosig.ac.uk/>

<sup>20</sup> <http://www.eevl.ac.uk/>

<sup>21</sup> <http://omni.ac.uk/>

<sup>22</sup> <http://www.stir.ac.uk/infoserv/heron/>

<sup>23</sup> MODELS (MOVing to Distributed Environments for Library Services), <http://www.ukoln.ac.uk/dlis/models/> The MODELS diagram is reproduced with permission.

routes. However, in an attempt to achieve greater integration, the MIA (in common with other similar architectures) places another layer between the user access layer and the services themselves. This layer is known in the MIA as the 'broker'.

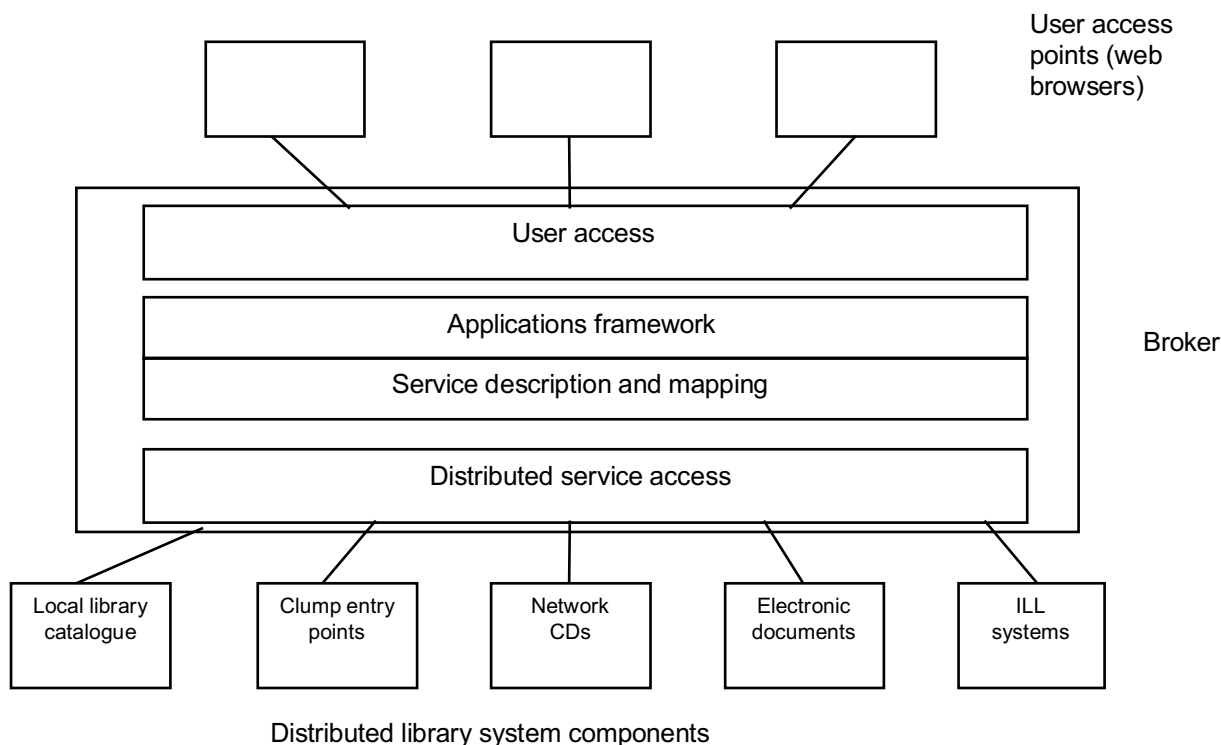


Figure 1: The MODELS Information Architecture

The broker negotiates on behalf of the user with the service components. Interacting with the user access layer, a user sends a query to a service (or services) via the broker. The broker then interrogates the service(s) on the user's behalf, delivering the results back to the user. The potential advantage of this mediated approach is the ability to create a seamless interface to a variety of services. All of these services would normally be delivered in different ways, the broker disguises the differences from the user.<sup>24</sup>

The broker consists of two main elements, metadata (see below), which describes what is available to users, and protocols, which provide access. In practical terms, these protocols may involve a number of facilities. For example, service specific Application Programming Interfaces (APIs) which allow subscribers to access to external systems in mutually agreed ways may play an important role here. This is an issue currently being investigated by projects such as BUILDER. A large number of the projects are also looking at Z39.50. Most of the clumps projects already have a test Z39.50 service up and running, AGORA has a test Z39.50 broker which will access library catalogues and Z39.50 compliant CD-ROMs. Z39.50 development is then going ahead but it must be said that it is a very complex protocol which requires a great deal of detailed work to implement successfully.

<sup>24</sup> Lorcan Dempsey, Rosemary Russell, Robin Murray and Richard Heseltine „Managing access to a distributed library resource: report from the fifth MODELS workshop“ *Program* 32, 3, July 1998, pp. 265-281.

The principle of brokered information access is becoming an increasingly significant factor which needs to be built into plans of the Distributed National Electronic Resource (DNER). The DNER is as yet no more than a set of plans but may become important in a more tangible way in the next few years in the UK. It will aim to provide access to a wide range of datasets across the country based on existing services which are made available in a form subsidised by the university funding councils.

### **Authentication and authorisation**

Most of the eLib Phase 3 projects are investigating issues of access management. This problem is, of course, not limited to library and information services. It is quite possible that a large commercial player may provide some kind of solution in this area that library and information services can adopt. Partly because of this, the UK Athens authentication system used for a number of popular datasets is seen as an interim measure only.<sup>25</sup> A number of the projects are, however, investigating workable access management systems in the short term. Jonathan Eaton has been investigating the problem for HeadLine and has provided a useful overview of the issues.<sup>26</sup>

The management of data about users (sometimes referred to as 'user metadata') is crucial here. This data could be used to authenticate users (to confirm they are who they say they are) and authorise them to use particular services. One problem associated with this is the fact that in many institutions user data is held in variety of different places by different parts of the organisation: the library, the computing service, the departments, the registry. Often it is in closed systems which cannot interoperate. It is becoming increasingly apparent that these different systems need to interact with each other, so that greater information exchange can take place and duplication be reduced.

Many of the projects are working on pragmatic solutions to the authentication problem with a view to finding ways of achieving 'quiet authentication' (where the system passes authentication details to an external service behind the scenes on the user's behalf). In the BUILDER project, work is being carried out to set up two authentication exemplars, the first based on the local library catalogue, the second which interacts with the institutions Novell Directory System (NDS) using the Lightweight Directory Access Protocol (LDAP).

### **Metadata management**

Various initiatives are underway to achieve the more integrated management of metadata. One important focus for this is the development of information landscapes. The view users are given of the resources available to them is a crucial feature of their success in information seeking. One aim that a number of the projects have is to try to present different views of the information landscape for different users. Creating 'user profiles' (as they are sometimes known) rely on three basic factors: firstly knowing who users are (going back to user data above), secondly, having suitable content metadata, and thirdly matching the two. This personalisation of information landscapes is likely to become increasingly important as information sources and formats continue to expand.

A second new element of metadata management being investigated as part of eLib projects is collection level description (CLD). The production of metadata has traditionally concentrated on producing descriptions of individual items. In a networked environment, descriptions of the collections of items are likely to become essential as a means of providing users with forward

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<sup>25</sup> <http://www.athens.ac.uk/>

<sup>26</sup> Jonathan Eaton „Making the gateway secure...and invisible“. Conference paper given at *Integrate, cooperate, innovate: eLib phase 3 hybrid libraries, clumps and digital preservation*, London: 15 and 16 December, 1998. The proceedings of this conference are due to be published in a forthcoming issue of the *New Review of Information and Library Management Research*.

knowledge about datasets which they may wish to search. As a result a draft CLD specification has been put together by representatives from eLib projects and other interested parties which is being used by a number of clumps and hybrid library projects.<sup>27</sup> The RIDING project has, for example, set up a CLD database containing CLDs of its partners' library collections. It is housed on a central server and can be searched using Z39.50.

### **Digital material management**

This category covers a broad range of issues from digital imaging to preservation of digital materials. In the hybrid library the management and also the production of digital materials will be an important part of its role. These will include Transition, New and Future resources identified by Rusbridge above. The development of Electronic Short Loan (or Electronic Reserve) is an example of this in the area of learning and teaching. High demand information goblets (journal articles, book chapters and other similar material) may increasingly be provided for undergraduates online. These may be digitised by libraries or perhaps provided in electronic form by publishers. In the UK, it is envisaged that the national HERON service will provide a central clearing house for the copyright clearance and digitisation of materials but institutions will still have to manage them at the local level. This will involve the setting up appropriate information landscapes, authentication gateways and infrastructures to achieve this.

The preservation of this and other kinds of digital material is an essential issue that is only now beginning to be seriously addressed. Apart from producing a number of technical demonstrators, the CEDARS project is producing recommendations for this aspect of the hybrid library. In the medium-term, a solution on a national or international basis seems preferable to local initiatives.

### **Partnerships**

Strategic and managerial aspects of the hybrid library within the university are as important as the technical. Most of the eLib projects are investigating aspects elements of this. One important element is the development of partnerships. Clumping, for example, implies enhanced co-operation between institutions over access and inter-library loan arrangements. In the UK, where universities have traditionally operated in a very independent way, this will involve a culture shift (although this is beginning to happen). Negotiating APIs with data providers is another example of partnerships. This involves improved liaison between libraries and suppliers.

As well as co-operation *between* organisations, the development of partnerships *within* organisations may also become increasingly important. Partnerships between the library, the computing service and the registry will be important in terms of user data and interoperability issues. Partnerships between these service departments and academic departments will become essential in the production tailored information landscapes and the management of learning and teaching materials.

### **Cultural and organisational issues**

It is clear that the hybrid library will have a significant impact on information professionals and the users they serve. For both groups, cultural change will be essential if the hybrid library is to be implemented successfully. The HyLiFe project is investigating these issues in some detail, following on from work in the IMPEL2 project.<sup>28</sup> BUILDER has also recently published two reports on its Web site dealing with the impact of the hybrid library on library and information

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<sup>27</sup> Andy Powell (editor) *Collection description working group: work in progress* 1998.  
<http://www.ukoln.ac.uk/metadata/cld/wg-report/>

<sup>28</sup> IMPEL2 (Impact on People of Electronic Libraries), <http://ilm.unn.ac.uk/impel/>



services staff and on university strategy. The importance of training for both staff and users are highlighted in these.

### **Conclusion**

The concept of the hybrid library is an ambitious one. It presents a number of major technical and managerial challenges. The eLib programme is making some significant attempts to move this forward in the UK. However, many of these challenges, and their possible solutions, cross national boundaries, just as networked information increasingly cannot be limited to individual countries. There have always been links between UK electronic library development and that in the other parts of Europe, in the USA and other areas of the world. However, it will be essential that these are improved if development outcomes are to be useful on an international level.