



Redeveloping Kinetica: towards a more innovative future

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Abstract

The Kinetica service includes the Australian National Bibliographic Database (NBD), the largest bibliographic database of Australian resources. With around 6 million searches a year it is at the heart of resource sharing and cooperation between Australian libraries. Kinetica is being redeveloped with a new architecture based on a combination of a bibliographic data management system and a resource discovery system.

This paper describes the redevelopment, focussing on the improved search services and interfaces which the Library is building using the resource discovery system. It also describes the modular architecture utilised to deliver a two stage development. In redeveloping the system the National Library is providing a national information service which, combined with work on quality and cataloguing workflows, can much better support national resource discovery and sharing.

Introduction

For the past twenty three years the National Library of Australia has provided an online service to support resource sharing and collaboration between Australian libraries. The development of a national online resource discovery service in 1980 fulfilled a major goal of developing greater cooperation between libraries, which, with the development of the Internet has become more widely available.

The service built upon a history of national initiatives identifying collections held around the nation – these were originally published in print and then microform, such as the *National Union Catalogue of Monographs* and *Serials in Australian libraries: Social Sciences and Humanities*. Kinetica enables Australian libraries, wherever they are, to contribute to the national online catalogue and to benefit through shared collection building, cataloguing and interlending. It has also enabled libraries to link to other networks such as those of RLG, OCLC and the National Libraries of New Zealand and Singapore.

The service is an essential part of the Library's strategic aim to:

“ provide rapid and easy access to the wealth of information that reside in libraries and other cultural institutions – and to break down the barriers that work against this”

National Library of Australia, *Directions 2003-2005*

Australia is a large country, with a network of public, state, university, research and special libraries spread across 7.7 million square kilometres. Libraries in Australia have a strong history of cooperation, built on the recognition that the national collection would inevitably be distributed with a range of strengths held by in libraries across the nation. Kinetica has a key role in contributing to this collaboration.

At the heart of the Kinetica service is the National Bibliographic Database with over 36 million items held against over 14 million bibliographic records. The expansion of the database has occurred through two major developmental periods. The first phase was based on the use of the WLN software, and access through a dedicated private network. During this period development focused on increasing coverage of Australian library collections and implementation of an interlending module.

The second phase resulted in an Internet based service offering resource discovery, resource sharing (through automated interlending) and a basis for extended cooperation in collection building. Creating links to international services to enable Australian libraries to participate in the world's library network has also been a feature of this phase.

The third phase, described in this paper, will be achieved through modularised redevelopment over the next two years, using contemporary standards and technologies. In addition, record exchange for the union catalogue will move to a harvesting model, enabling more effective contribution of records, particularly metadata for digital content and special materials. The most significant benefits from the move to a new technological base will be:

- improve response time for searching and all other services;
- better searching through an easy to use interface offering, via simple and advanced screens, easy access to sub sets of the NBD (such as theses and newspapers);
- better display of results through the new results screens and in addition investigate implementation, initially in a pilot, of a new display of bibliographic records, pulling together related resources through FRBR (Function Requirement for the Bibliographic Record)¹ principles to present like material, such as different editions and formats (book, sound, video etc);

- less duplication through better display of results and record management;
- value added services such as saved searches which can be scheduled to run regularly, enabling users to automatically obtain reports of new publications in subject area;
- easier access management through implementation of IP authentication; and
- easier access to a range of free and subscribed services – through simple selection for searching across multiple databases.

By undertaking these developments the Library will enable users to *as easily as possible* find resources in Australian libraries and online, and to access or 'get' the range of information resources that are available to them.

Redevelopment of a national resource discovery service

Kinetica operates as a truly national service, providing access to subscribers, libraries and individuals, to identify and request a wide range of resources. Metadata describing Australian library collections and Australian online resources is stored in a central database, the Australian National Bibliographic Database. This database is currently in two separate systems because of the need to store Chinese, Japanese and Korean script records as well as records in Romanised scripts. One of the key drivers for the redevelopment is to provide an integrated architecture bringing these two components of the national database together.

The prime services available through Kinetica are:

- resource discovery of Australian collections in the National Bibliographic Database, searchable via a web interface and Z39.50 systems such as local OPACs and portals;
- resource sharing through a national interlending system which incorporates a payments module, enabling libraries to both request and supply to each other, and to order from commercial suppliers such as Infotrieve and CISTI;
- contribution of records to the National Bibliographic Database through web forms (holdings update and web input form), batch loading of records and a cataloguing client;
- products of files for Australian libraries to enable them to add MARC records to their local catalogues and other products such as non MARC record sets for acquisition and Recent Australian Publications, a free service enabling easy identification of new Australian resources; and
- a gateway to international resource discovery and bibliographic services such as OCLC's WorldCat, the RLG Union Catalogue, the national union catalogue of Singapore and the national union catalogue of New Zealand.

While Kinetica is a subscription based service, an increasing number of end users, such as staff and students in the majority of Australia's universities and members of public libraries, have free access from off and on site. Many other libraries permit use from terminals within their library buildings.

Demand for a comprehensive range of services and the high level of use (approximately 6 million searches per annum) has formed the background to the National Library's analysis of the future of the service. The Library approached consideration of future directions by examining both the current demands of users and the opportunities provided through new developments in technology to meet new demands. Kinetica users, over 1000 Australian libraries, were consulted during 2002 about their

requirements for future development. The consultation occurred through an Expert Advisory Group on Enhancements including workshops conducted in every Australian state and territory. The results of the investigation were a prioritised list of 166 enhancements or developments. The report is available online at http://www.nla.gov.au/kinetica/eag_enhance.html.

Perhaps more significantly, the National Library took the opportunity to strategically review the service. It concluded that a centralised database and national service, connecting users to library collections in Australia and to international services, remained essential for the nations libraries to truly access information on a global basis. Additional services and functionality were also identified to enhance the strategic objectives of resource discovery for end users and greater relevance to Australian libraries.

In summary the reasons for the redevelopment of Kinetica are:

- to introduce improvements for customers in areas such as search functionality and online performance (response time);
- to give the Library an improved capacity to innovate, and thus introduce further future improvements;
- to integrate the Kinetica Chinese Japanese and Korean (CJK) service into the core system, and to provide the ability to handle all non-roman scripts supported by the Unicode standard;
- to develop new search interfaces to meet the needs of individuals; and
- to provide an affordable solution, supporting service development within the available budget and appropriate risk management approaches..

Characteristics of the new Kinetica service will be 24x7 availability, integration of the CJK database, better searching, increased functionality and better user management. The software which will be used to support the service has been well proven, however the unique combination on new and existing services is an example of innovative use of these technologies.

Over the next two years the redevelopment will deliver, through two phases a solution which more closely realises the wishes of Australian libraries and users, and provides an innovative solution to using technology in a modular approach to enable resource discovery and resource sharing across the nation.

Kinetica redevelopment: searching and service innovation in phase 1

Having taken the decision to redevelop in phases, the primary aim of the first phase of the project is to introduce a much better search service, including additional functionality and improvements to the display of result sets, responsiveness and access management, including IP authentication. A diagram of the proposed architecture at the completion of Phase 1 of the project follows. The shaded areas of the diagram indicate the developments which will occur in this phase.



Figure 1: Proposed State 1 Architecture

The primary areas of development and innovation for this phase are described in more detail below.

Improved Searching:

1. KineticaWeb interface

Used by librarians and end users, this interface is essentially a resource discovery service. In the redesign and redevelopment occurring for Kinetica, the range of services offered will be expanded and, in addition, the Public Library Portal, Information Australia, will be included within the range of core interfaces. Response time will be improved as will the flexibility of use of the service.

Easy to use: The new interface will be developed using the design principles identified from international research and best practice, in addition to the new expectations of users for a “Google” type interface. A first step towards specifications came from the report of the Kinetica Expert Advisory Group on Reference and End User Access, additional input has been taken from the Expert Advisory Group on Enhancements.

There will be two interfaces for Kinetica – a simple search based on a Google approach with Boolean functionality and an “expert” or guided search offering the ability to select indexes for searching from drop down boxes. The KineticaWeb interface launched in March 2004 road tested a new approach to enabling easy searching of subsets, such as theses, newspapers and Australian resources. Feedback from this has been very positive and has contributed to planning for the development of the new interfaces.

Better results: Searchers expectations have changed with the development of web search engines, in particular Google. Not only do users expect to be able search with very simple terms, they

also expect that the system will assist through fuzzy logic for any misspellings. The new search interface will provide this functionality, for example misspelling Australia could result in a link to related terms such as “try: AUSTRALIA(984407) or AUSTRAL(3290)”.

A display based on FRBR (Functional Requirements for the Bibliographic Record) principles will be piloted in 2004. A recent study (Rajapatirana) found that the NBD can support the creation of FRBR displays and potentially even data structured according to the FRBR entity model. A pilot using the LC algorithm, with revisions to adopt the OCLC work-set matching logic, will be developed into an FRBR tool and interface. This implementation will also build on the work of RLG with the RedLightGreen service and OCLCs Fictionfinder project.

Records will also be available in a greater array of formats. In addition to html and text, Endnote and Procite formats will be available. Records will also no longer be restricted to supply on a one by one basis. Sets of records will be able to be chosen and supplied as a single file.

Available through small and large devices: Compatibility with tool used by searchers is important for the new Kinetica service. Hand held devices, such as palm pilots and personal digital assistants are increasing the choice of information seekers. While it is early days for these devices, the Kinetica interface will be searchable through hand held devices enabling users in a wide range of situations, from clinicians in hospitals to students in lectures, to search easily. Design for access via these devices is a core part of the National Library’s web service development.

Improved accessibility: Compatibility with adaptive technologies and compliance with the W3C level A guidelines is essential for the service. Testing will be undertaken to ensure that the service is fully accessible. This testing is a standard part of the Library’s IT environment and will be undertaken using a range of approaches.

Delivery of full access: For users in the twenty first century there is an expectation that they will be able to “get” as well as “find” resources. Building a “get” service into Kinetica is essential to the delivery of a relevant service to end users as well as libraries. The Expert Advisory Group on Kinetica Document Delivery is undertaking a survey and analysing the appropriate delivery models, such as links to direct ordering as well as to entries on the IRLS directory and other possible supply chains. This development will also build on the findings of the ILL Benchmarking Study. It is critical that libraries continue to be able to record their collections in the NBD including those that are not available for interlibrary loan. The public library portal has demonstrated how complex interlending workflows are and how requesting by end users could fit into a librarys workflow using Kinetica Document Delivery. The search interface for phase 1 will reflect the outcomes of consultation with Australian libraries, and offer the ability to directly order material.

Improved functionality: An SDI service will be available offering all users the ability to select a regular update of information on resources added to the NBD in any subject area, format or by particular authors. Users will also be able to request updates based on material held in Australian libraries. Libraries will be able to order regular record listings that can be used for acquisition and reference. Libraries will be able to offer their users the ability to have SDIs as well, providing up to date information on new publications of interest.

Databases available through KineticaWeb will also be increased. Users will be able to search the existing databases on a pay per search or annual licence as occurs now. They will also be able

to search the catalogues of the Library of Congress and British Library without charge. The interface will offer an easy ability to select and search multiple databases.

2. Z39.50 gateway

The new service will provide a Z39.50 service through a gateway proxy service. This will provide external Z39.50 targets which can be used by your local system –whether it be a cataloguing client, or a search service such as an OPAC or portal. The Zgateway will enable a connection to be made to databases and pass on details of the user, enabling reports to be generated using individual logons for better access and better information service. Users will be able to have their cataloguing software, for example, link directly through to other databases, rather than having to use KineticaWeb. This will enable significant efficiencies in cataloguing workflows. It will provide more flexible services for Kinetica users.

Improved Database:

A key to the improvements in phase 1 is the implementation of a new database for Kinetica searches. Cataloguers will continue to use the Kinetica “update” database, which will remain on Amicus, however the new database will move to an XML based approach with MARCXML records. While this will not result in changes in the records users see or your searching directly, it provides the Library with much greater flexibility in areas of database design and record management. The Library can more easily build special indexes and manage character and behind the scenes data management issues.

The database will be built by the Library using a toolkit previously used to develop services such as PictureAustralia, building on tried and true technology.

Customers will see the results through much better keyword indexes, the elimination of the stopword list and new indexes. “The cat in the hat” will, for example, deliver just the records users expect to see. NonRoman language searching will be much improved with the first implementation of Unicode.

It will be one of the worlds largest XML databases, enabling continuing innovation of services to more flexibly and quickly make enhancements to meet users needs.

Improved business systems:

One of the great innovations offered in this phase is the development of support of IP authentication. This will enable libraries to provide access through computers within a range of IP addresses and eliminate the need to enter password information, providing a better level of security and enabling much easier end user access.

The developments will focus on enabling searches on the new search database to be recorded and incorporated into all reports, particular the reports for customers.

In summary phase 1 provides for innovation in the development of much better interfaces, greater functionality and uses tested technology to underpin the developments. In moving to new standards such as Unicode and XML the focus is on improvements in the efficiency and effectiveness of services, and in providing additional new functionality, such as SDIs and IP authentication.

Kinetica redevelopment: data management innovation in phase 2

The modular approach used for the Kinetica redevelopment moves to focus in this phase on the database and business systems. A “National Bibliographic Utility” will be implemented using a library

management system which will be procured from the marketplace. This utility will support record contribution and management, together with a new online cataloguing system, including contribution of records through a web interface. The diagram below highlights the modules to be redeveloped in phase 2.

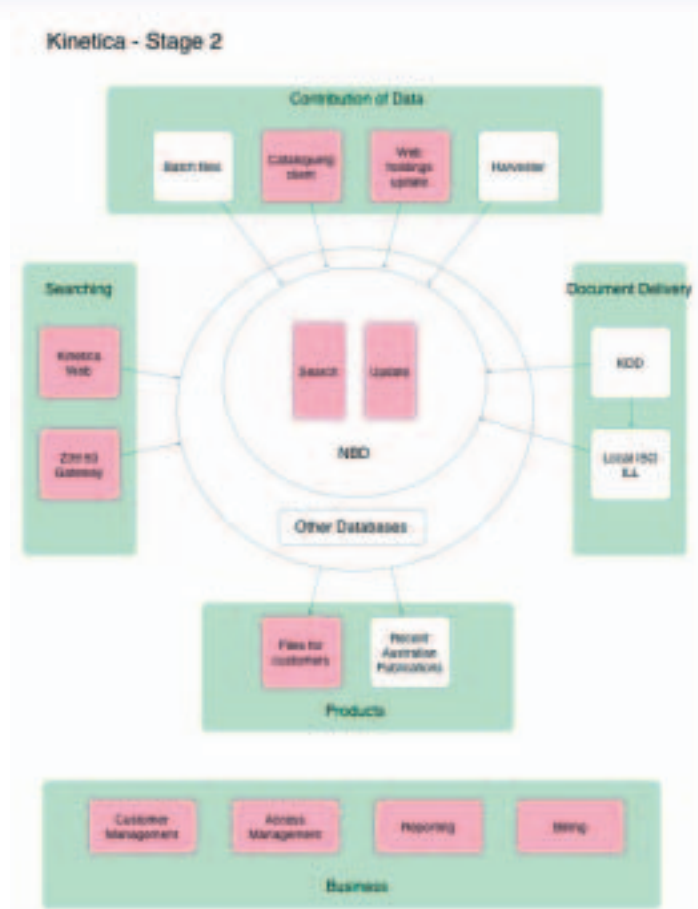


Figure 2: Phase 2 architecture

The primary areas of development and innovation for this phase are described in more detail below.

Improved Searching: The web search interface and Z39.50gateway will not undergo major redevelopment; however some additional functionality will be delivered. The major area for development is offering interfaces which would display selected sets for records from the NBD. One set would be an “Australian” view of the data offering functionality to support better access to Australian resources for libraries and end users. This will enable our documentary heritage to be more easily accessible to all users of the service. It will also be possible to establish smaller union catalogues, for example if a group of libraries formed a consortia it would be possible for an interface to be available which enabled users to just search that group of library’s holdings. Demonstrator models will be completed with discussions with Australian libraries about their needs in this area.

Improved Database:

The existing Kinetica “update” or cataloguing database, currently in Amicus, will be replaced. The Library has tendered for a new bibliographic management tool, a National Bibliographic Utility (NBU), to support better management of records. While currently in evaluation, the system will be required to provide for much better functionality to prevent duplicate records and to enable records to be updated quickly and effectively. A new approach will be fundamental to the relationship between the catalogue and search

database – updating will be in near real time and libraries will be able to provide much more rapid contribution of records through files for addition to the database. With the implementation of the new database there will also be a change in the cataloguing client. More information on this will be available at the time of the conference.

The NBU will support non-roman scripts using the Unicode standard, enabling full integration of script and roman language records. CJK will be fully incorporated into the new architecture. It should be noted that issues of the finalisation of the conversion of records from Wade Giles to Pinyin and authorities are the subject of current investigation.

Improved business systems:

The completion of the project will see the implementation of the customer data *directory* in an internationally accepted standard protocol (Lightweight Directory Access Protocol LDAP see Lunau for a description of the use of this standard). This is important as it will enable all the information held about libraries in Kinetica, Australian Libraries Gateway, the ILRS directory and other services to be integrated. Libraries will be able to update all entries by using a single update form.

Access management will also be developed. In addition to IP authentication libraries may be able to integrate their local authentication systems with Kinetica to pass on information, enabling better end user services by, for example, supporting SDIs and search profiles for individuals based on information about end users held in their local system.

Products will be developed to enable libraries to more easily select one off or regular records sets, and introduce the ability for more extensive customisation of the service.

Reporting and billing will also be developed to enable libraries to have access to a wider range of reports and information on their use of the service.

In summary phase 2 introduces a much more flexible and user focused service. The NBU will offer better record management and enable higher quality control, particularly to reduce of duplicate records. Business systems will support greater flexibility for customers.

Future directions

The redevelopment of Kinetica is a major project for both the National Library and Australian libraries. The service provides a fundamental building block for national cooperation and resource discovery. The redevelopment will enhance this role while supporting great efficiencies for Australian libraries and enabling much easier access to Australian library collections.

A major direction for the Library is to enable a wider range of users, including end users, to search the database more effectively. The Senate Environment, Communications, Information Technology and the Arts Reference Committee's report on "Libraries in the online environment" recommended:

The Committee recommends that the National Library of Australia receive additional funding to provide improved access to Kinetica for all Australian libraries and end users.

While the Library awaits the government response to the report a review of the business model for Kinetica is underway including consideration of future directions to improve end user access.

Underpinning the successful development of the service is new work of data quality. A Quality Improvement Plan has been prepared for the NBD with quite a significant number of activities to be undertaken

over the next two years. The plan will be reviewed quarterly and regular reports on achievements will be published on the Kinetica web site. Work towards improving the efficiency of cataloguing in Australia is being pursued through Kinetica Catalogue Workflows training. A high level of commitment to supporting resource sharing can only be maintained through continued work on coverage, quality and service development. The Kinetica Redevelopment depends for its success on the delivery of improved functionality and services. It also required on regular data improvement and work with Australian libraries to enable them to more fully utilise the service.

The redevelopment of Kinetica provides an example of the utilisation of new technologies and standards. These will be used to support an online library service enabling access to the nations collections, online publications and international databases. It will enable the Library to provide access to the valuable collections held across our vast continent.

Finalising the Kinetica Redevelopment Project will not signal an end to the development of the service to underpin the national information network. There are technological developments on the horizon to support even great functionality, such as being able to check with local systems whether copies are available or in use, supporting a higher level of customisation to enable libraries to offer special services and considering how new digital rights technologies, such as ONIX could support links to publications. In addition, the nature of access to the resources of Australian libraries and the development of new areas of collaboration for collection building will be able to be addressed from a different perspective.

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Keywords

National union catalogues; Kinetica; Resource sharing; Resource discovery; IT development; International cooperation

Footnotes

- 1 Barbara Tillett's paper to ACOC <http://www.nla.gov.au/lis/stdnrds/grps/acoc/tillett2004.ppt#2> outlines the FRBR model of a Work which is realised through an Expression which is embodied in a Manifestation and then exemplified by an Item. For example a novel (Work) may be in an original text, a translation or critical edition (Expression) which is in paper or html (Manifestation) and may be an autographed copy (Item). This model offers the potential to bring these related works together through implementation of a display relating works.