

**Serials Union CATalogue (SUNCAT)
SCOPING STUDY**

**FINAL REPORT TO JISC, RSLP AND
THE BRITISH LIBRARY**

BY

INFORMATION POWER LTD

0. Executive Summary	1
1. Background	3
1.1 The Feasibility Study for a National Union Catalogue	3
1.2 The Scoping Study and Implementation Plan for SUNCAT	4
1.3 Priorities for SUNCAT	5
2. Why is SUNCAT needed?	6
2.1 A single authoritative source of serials information	6
2.2 A complete picture.....	7
2.3 Upgrading of serials records in local OPACS	7
2.4 Access to high quality external serials information	8
2.5 Open standards and interconnectivity	8
2.6 Collaborative collection management and development	8
2.7 Improvements to holdings statements.....	9
2.8 Raising the profile of serials in UK libraries	9
3. Scope and boundaries of SUNCAT.....	10
3.1 Serials and journals	10
3.2 Electronic journals and other non-print formats.....	11
3.2.1 <i>Online Access to e-journals via SUNCAT</i>	11
3.2.2 <i>Visitor access to e-journals</i>	12
3.3 ISSN issues	12
3.3.1 <i>Assigning ISSNs</i>	12
3.3.2 <i>UK ISSN Centre</i>	13
3.3.3 <i>Matching by ISSN</i>	13
3.4 Contributing Libraries	14
<i>Phase 1: A quick start-up</i>	14
<i>Phase 2: Medium-term development</i>	16
3.5 The SUNCAT service model.....	17
<i>For researchers and librarians</i>	17
<i>For librarians</i>	18
3.6 Organisation and governance of SUNCAT	18
4. The technical model.....	19
4.1 Linkage to JOIN-UP, the JISC Information Environment and other serials-related services ...	19
4.1.1 <i>Overview</i>	19
4.1.2 <i>JOIN-UP: A Summary</i>	20
4.1.3 <i>SUNCAT and JOIN-UP: A Comparison of Purpose and Functionality</i>	21
4.2 SUNCAT architecture.....	22
4.2.1 <i>Bibliographic records</i>	23
<i>Source of Bibliographic Records</i>	23
<i>Adding Bibliographic Records</i>	24
<i>Structure of Bibliographic Record</i>	27
4.2.2 <i>Holdings statements</i>	27
4.2.3 <i>Other metadata</i>	28
4.3 Keeping SUNCAT up-to-date	28
4.4 Linkages to and from other serials-related services.....	28
4.5 The User Interface	29
4.5.1 <i>Access and ease of use</i>	29
4.5.2 <i>Search capabilities</i>	29
4.5.3 <i>Display and sorting of results information</i>	29
4.6 User Architecture.....	30
4.7 SUNCAT interface technologies	31
4.7.1 <i>Client-side interfaces</i>	31
4.7.2 <i>Server-side interfaces</i>	31
4.8 Specific technologies	32
4.8.1 <i>HTML/HTTP</i>	32
4.8.2 <i>XML</i>	32

4.8.3. <i>OpenURL</i>	33
4.8.4. <i>OAI Harvest</i>	33
4.8.5. <i>Z39.50</i>	33
4.8.6. <i>Proprietary systems</i>	33
5. The hosting of SUNCAT.....	34
6. Financial models for the setting up and running of SUNCAT.....	35
6.1 Revenue Sources	35
6.1.1 <i>Centralised funding</i>	35
6.1.2 <i>Funding from contributing libraries</i>	35
6.1.3 <i>Revenue from Services</i>	36
<i>Selling bibliographic records to non-contributing libraries</i>	36
<i>Income from participation in CONSER</i>	36
<i>Selling high quality bibliographic records to publishers</i>	36
<i>Sponsorship</i>	36
<i>Document delivery transaction charges</i>	37
<i>Registry Services</i>	37
7. Cost estimates.....	38
<u>Not included in public version</u>	
8. Outline implementation plan	39
Prepare tender document.....	39
Award of Contract.....	39
System Development	39
Acquisition of Bibliographic Databases	40
Database Building	40
Search Interfaces	40
Loading of Phase 1 Library data	40
Loading of Phase 2 Library data	40
Review Process	40
Appendix 1: Websites Referenced.....	41
Appendix 2: Holdings statements from Phase 1 contributing libraries and Z39.50 availability	43
Appendix 3: Extracts from Library of Congress Action Plan.....	45
Appendix 4: Sample XML Record	47
Appendix 5: Cost Estimates - Not included in public version	49
Appendix 6: Detailed Labour Costs - Not included in public version.....	49
Appendix 7: Record Processing Calculations	51
Appendix 8: Outline Implementation Plan - Not included in public version.....	52
Appendix 9: MARC21 fields which might be used in SUNCAT	53
Appendix 10: Sample CONSER record.....	54
Appendix 11: Fields of the ISSN record	56
Appendix 12: Fields in the Ulrichs Record	59

0. Executive Summary

The Serials Union Catalogue (SUNCAT) Scoping Study built upon the recommendations (for serials) in the 'Feasibility Study for a UK National Union Catalogue' produced for JISC, RSLP and BL CPP in 2001. SUNCAT, if funded, will be the UK National Union Catalogue of Serials. It will be a catalogue of high quality serials bibliographic records - obtained from high quality external sources including CONSER and ISSN - linked to the holdings of UK national and academic libraries, specialised libraries (e.g. learned societies) and major public libraries. It will be designed and developed to support open standards and interconnect with other serials-related projects and services within the JISC environment, as well as commercially-based services. Because the existence of high quality bibliographical records is a pre-requisite for all linking initiatives, an important element of the work of the SUNCAT team will be to encourage contributing libraries to download SUNCAT records (at no financial cost) back into their local OPAC. The success of this endeavour will have an impact upon the longer-term development of SUNCAT.

The main purposes of the Scoping Study have been: to validate the technical model; to confirm the initial scope and boundaries of SUNCAT; and, to estimate the level of funding required. In addition, the Study Team was required to identify and consider: financial models; technical and resource implications; linkages to and from other serials-related services; and options for the development and hosting of the service.

SUNCAT is needed for many different reasons. Firstly, the UK requires a single authoritative source of serials information for UK researchers, students and the general public. Secondly, SUNCAT would provide access to high quality data relating to the serials holdings of UK libraries (whether in print or electronic format) and to the CONSER and ISSN databases. This would enable users to discover: bibliographic information about serials published world-wide; information about the individual volumes and issues of serials; information about access to serials; and (directly or indirectly) to information about the individual articles published in serials. Access to serials is a key issue and all libraries contributing to SUNCAT should be strongly encouraged to allow free access to their printed serial holdings. Moreover, as SUNCAT grows in size and stature, it will become an important tool for collection management and development in the UK and it will raise the profile of serials by providing a national focus and possibly by being the body that represents the UK in the international standards and bibliographic arenas.

The SUNCAT database will comprise three separate - but linked - databases. The first contains high quality bibliographic records and links to further information, which will be centrally maintained. The second contains the SUNCAT holdings data, which will be primarily centrally maintained, and the third contains the SUNCAT library preferences that may be maintained centrally or by the local library. In addition SUNCAT users will have access to the full CONSER and ISSN databases.

The Scoping Study has identified two phases for the implementation of SUNCAT. Phase 1 will be a quick start-up phase, aimed at establishing a critical mass of titles in SUNCAT. In this phase, *current and 'dead' journals* (for print and e-journals from contributing libraries), and *serials with ISSNs* should be targeted for inclusion in the database. Three national libraries plus 17 other academic libraries have been identified as appropriate for Phase 1 loading. The contributing libraries have been selected according to the number of serials titles they receive (i.e. national and large academic research libraries), their coverage of both scientific, technical and medical titles and titles in the social sciences, arts and humanities,

and to ensure good geographical coverage from the start. Significant special collections of serials are also held in Phase 1 contributing libraries.

In order to speed up the loading process and therefore the critical mass of material available, SUNCAT should implement as much automatic matching and processing as possible. SUNCAT will rely heavily on the ISSN database as an authority file, so it is important that the British Library (in their role as the UK ISSN Centre) and the ISSN Agency in Paris establish how a 'fast track' allocation of ISSNs for SUNCAT could be developed. Manual processing and re-cataloguing should be reduced to the minimum during Phases 1 and 2. A basic assumption has been made that SUNCAT will be contracted out and therefore full commercial costs need to be calculated which were not included in the Feasibility Study. 78% of the cost estimates are labour, plus overhead, compared to 18% for hardware, software and bibliographic records. The major part of the labour cost is divided between the initial effort in setting up the overall matching and loading processes and the continuing bespoke work required to acquire the records from each individual library. The number of bibliographic records and holdings loaded therefore does not have a significant effect on the overall costs, whereas the number of contributing libraries being added does.

The nature of serials is complex as they frequently change their title, merge with other titles, cease completely, or change publisher and therefore ISSN; electronic journals have added a further layer of complexity. There is also no standard definition of a *journal* and a *serial* that is universally adopted by individual libraries and national bodies. Because of the frequent changes to serials bibliographic information, library holdings and thus their holdings statements, are unstable, and this is one of the reasons that the standard of holdings statements for serials in UK library OPACs is rather poor and probably inaccurate. For SUNCAT to succeed, standards for holdings statements will have to be established and rigorously applied at the summary level.

Phase 2 covers the medium and longer term development of SUNCAT. In this phase, priority should be given to selecting specialised libraries, such as those in learned societies and academic libraries that hold specialised subject collections, with the aim of increasing the sectoral range of contributing libraries and, in particular, increasing the number of unique serial titles in the database. As Phase 2 progresses, SUNCAT should aim to include all types of serials, not just those with an ISSN. This will clearly have an impact upon other existing UK union catalogues and this will need to be addressed by the Steering Committee.

The Scoping Study has identified a number of revenue sources for SUNCAT, but these will not cover the set-up and running costs of SUNCAT. As SUNCAT will be going out to tender, cost information from the consultants' report has been excluded from this public version as 'commercial in confidence'

The final sections of the Scoping Study report provide an outline implementation plan. A separate outline specification of requirements for SUNCAT has also been prepared.

This public version of the report contains minor revisions to the text submitted by Information Power Ltd. The revisions were made by members of the SUNCAT Steering Group.

1. Background

1.1 The Feasibility Study for a National Union Catalogue

In 2000/02, RSLP, JISC CEI and the British Library jointly funded a “Feasibility Study for a National Union Catalogue (UKNUC)”. The British Library was interested in the potential of a UK union catalogue – in particular for serials – as part of the national infrastructure for identifying resources held on a distributed basis, and because of the escalating cost of journal provision and the need for information to guide it and other libraries on difficult decisions on serials subscriptions. RSLP, in its consultation exercise that informed the Programme (in early 1999), had discovered that access to serials was a widespread problem for UK HE academics. There were obvious collection management issues relating to resource sharing which RSLP was keen to address. JISC’s interest had originally been related to the relative merits of distributed and centralised approaches to the provision of union catalogues, primarily from the monographs perspective.

The UKNUC study recommended that the serials element of the union catalogue should:

- Encompass the records and holdings from the BL, the National Libraries of Scotland and Wales, large research universities and some smaller, specialised institutions
- Be a centralised catalogue of high quality bibliographic records
- Use customised software to import serial records from local catalogues, match them with existing high quality records from external sources (e.g. CONSER), upgrade records where appropriate, and load them into SUNCAT with standardised holdings information
- Be able, where appropriate, to copy back upgraded records to local catalogues
- Be so designed to facilitate linkages and enable the development of added-value services

Consultation with the user community on the findings of the UKNUC Study report (in February 2001) demonstrated that there was strong support for the development of a serials union catalogue, but insufficient support to pursue a union catalogue for monographs. It was subsequently agreed that the funders of the UKNUC study would jointly contribute to funding a scoping study and specification of a serials union catalogue (SUNCAT).

The funders believe that a serials union catalogue would be an important building block in the infrastructure to support research in the UK, and relevant to the work of the Research Support Libraries Group (RSLG) set up in 2001 to advise the HE Funding Bodies, the British Library and the National Libraries of Scotland and Wales on strategies for promoting collaboration in and integration of the development and provision of library collections, their long-term management, and services to support research. RSLG's core concern is how to ensure that researchers working in the UK can have easy access to the full range of world-class information resources they need wherever this may be located. Access is a key issue, and libraries contributing to SUNCAT should be strongly encouraged to allow free access to their printed serial holdings.

A presentation was made to RSLG on the UKNUC and SUNCAT scoping studies in November 2001. RSLG asked to receive the findings of the SUNCAT study when complete to allow further discussion of issues.

1.2 The Scoping Study and Implementation Plan for SUNCAT

At the end of November 2001, RSLP, JISC/DNER and the BL commissioned Information Power Ltd (subsequently referred to as the Study Team) to perform a Scoping Study for SUNCAT. It also commissioned EDINA, one of the JISC-designated National Data Centres, to work with the Study Team to provide input on specific technical aspects and to ensure consistency with activities in development for the JISC Information Environment. The Study Team was charged with building upon the findings of the UKNUC Study, to bring it to the point where the funders could go out to tender. The Study Team, therefore, did not repeat work carried out by the Feasibility Study but sought to build on that work. In some cases it was necessary to undertake more detailed research in order to validate the concepts and assumptions. This report should therefore be read in conjunction with Feasibility Study report and Serials Work Package.

The Study Team comprised the following:

Dr Hazel Woodward – Cranfield University
Helen Henderson - Consultant
Chris Leamy - Consultant
Prof Jack Meadows - Consultant
Pamela Graddon - Consultant
Prof Jonathan Bowen – South Bank University

The SUNCAT Steering Committee comprises:

Prof Derek Law (Chair) – University of Strathclyde
Andrew Green – National Library of Wales
Dr Clive Field – British Library
Geoff Smith – British Library
Dr David Baker – University of East Anglia
Peter Burnett - University of Oxford
Ronald Milne - Research Support Libraries Programme
Catherine Grout - JISC

The purpose of the study is to:

- Validate the technical model
- Confirm the scope and initial boundaries of SUNCAT in terms of data contents, institutional involvement and functionality
- Identify and consider financial models for setting up and running SUNCAT
- Identify the technical and resource implications for likely key data contributors and confirm their willingness to contribute
- Identify linkages to and from other serials-related services
- Identify options for developing and hosting the service
- Identify the organisational and governance arrangements for its management and sustainability
- Estimate the level of funding required

The deliverables – presented in this report – are required to be:

- A report to the funding bodies and potential data contributors
- An outline implementation plan for the service
- A specification of requirements

1.3 Priorities for SUNCAT

At the initial and subsequent meetings of the Study Team and the Steering Committee the priorities for SUNCAT were decided as being:

- To allow the academic community to locate information about serials holdings wherever they are
- To create a data pool for UK academic libraries to copy back the high quality records into their own catalogues
- To create a high quality, central database of records for serials
- To ensure from the outset that SUNCAT is managed and developed in such a way as to rapidly include the wide range of journal titles held in UK libraries
- To ensure that SUNCAT is inclusive – both geographically and by subject discipline – by adding the holdings of relevant UK libraries from all sectors and guarding against the domination of STM (scientific, technical and medical) journals within the database
- To include records of electronic journals (both electronic versions of print format journals and free electronic journals) in the database as far as these are recorded and easily available from the contributing libraries
- To identify a strategy for a quick start-up for SUNCAT to provide early benefits to the community
- To create and develop the system in such a way that the work load for contributing libraries is kept to a minimum
- To create the system in such a way that it sits comfortably in the JISC environment and forms a core enabling service for JISC JOIN-UP projects
- To create the system in such a way as to be hospitable to new technologies, to support open standards, and to interconnect to added-value serials-related services

2. Why is SUNCAT needed?

2.1 A single authoritative source of serials information

Data from the UKNUC Feasibility Study and subsequent community consultation and research by the SUNCAT Study Team demonstrate that researchers and librarians require access to high quality information about the serials holdings of UK libraries and that, ideally, they would like to access this information from an authoritative source. Since the demise of the printed publication “British Union Catalogue of Periodicals” (BUCOP), researchers and librarians have not had access to one single union catalogue of serials held by UK libraries. Granted, there is a plethora of smaller, often regionally-based, union catalogues available - for example, COPAC, SALSER, CALIM, ULS - but none of these have overcome the significant problems of providing authoritative, high quality bibliographic and holdings records for the serials held by their member libraries. This is because of the fundamental problem that the serials bibliographic and holdings records of individual academic libraries in the UK are inconsistent and generally of a low standard.

Researchers report that serials represent an extremely important research resource, but currently a significant amount of time can be wasted attempting to locate specific titles or obtain articles. Moreover, as more and more serials are available in electronic format it is essential that the metadata associated with serials is of the highest quality in order that both SUNCAT and local OPACs can interconnect to other value-added serials-related services and, additionally, facilitate linking between records in separate databases (for example, the CrossRef initiative which facilitates linking between the serials databases of over 80 major journal publishers). This and other initiatives will provide valuable and time-saving services to researchers, librarians and the general public alike.

The SUNCAT database will include information about the serials holdings of a large number of UK libraries in all sectors – national, academic, government, special and public libraries. It will also include *all* the holdings of all contributing libraries (not just selected special collections) in order to facilitate collaborative collection management and development and encourage resource sharing. (See Section 2.6.) In the early phases of developing SUNCAT (see Section 3.4), contributing libraries will be selected to provide good geographical coverage and as wide a subject spread as possible. This will inevitably mean that the national libraries and major research libraries will be included in Phase 1 in order to provide a critical mass of titles upon which to build. The SUNCAT Steering Committee should ensure careful selection of the Phase 1 libraries; through this the Study Team believes that a critical mass of both scientific, technical and medical (STM) and social science, arts and humanities journal titles will be entered into the SUNCAT database, as well as significant numbers of less widely available journal titles which are held in the specialised collections of the national and large research libraries.

The serial holdings of libraries selected to be included in Phase 2 – for example, learned society libraries, Research Councils and large public libraries – will contribute to the rapid build up of more specialised and less widely held titles. Phase 2 will also see the start of ‘serials’ records being included in SUNCAT on a large scale, as the long-term aim of SUNCAT is to be a *serials* union catalogue. This means that it will include journals, annual publications, technical and government reports, monographic serials and newspapers. However, what is defined as a ‘journal’ or a ‘serial’ both within individual libraries and by the International ISSN Centre varies quite widely, and this will impact upon the task of populating of the SUNCAT database. (See Section 3.1.) The ISSN is regarded as the key to accurate matching. The Study Team therefore believe that in the early stages of SUNCAT

journals (which have a higher rate of ISSN allocation) and other serials with ISSNs should be the first items to be included in the database. (See also Section 3.3.)

2.2 A complete picture

Researchers and librarians are interested in a number of pieces of information about serials:

- Information about journals published world wide
- Information about the individual issues of a journal
- Information about location and access to journals
- Information about the individual articles published in a journal (directly or indirectly)
- Information about access to articles

SUNCAT will enable users to discover *all* of this information. Information about journals will be contained within the bibliographic records in the SUNCAT database, and information about individual issues of journals will be contained in the libraries' holdings statements within the database.

Information about how to access materials held in libraries must also be available via SUNCAT. For example, for printed material, users require to know the access policies of the individual contributing libraries. A comparable statement would be needed for access to electronic copy. (See Section 3.2)

Provision of information about articles is outside of the scope of SUNCAT; rather, it is intended that SUNCAT form part of the larger information infrastructure being created by the JISC, in particular through the facilities being forged in the JOIN-UP projects. Links can be provided to external services such as electronic access and document supply options, whether from libraries, publisher's websites, aggregator databases or abstracting and indexing (A&I) services. (See Section 4.1.)

Access to serials is a key issue and all libraries contributing to SUNCAT should be strongly encouraged to allow free access to their printed serial holdings. Currently, national and academic libraries will allow researchers from other institutions at least reference access to their serial collections; however, users will need to know the opening hours of individual academic libraries. The access policies of specialised libraries might be more problematical and, indeed, they may not permit physical access to their collections by non-members or they may levy a fee (typically between £5 and £25 per day). If physical access is not permitted, the user will require to know the arrangements for interlibrary loan or document delivery.

In order for users to obtain access via SUNCAT to the electronic journals they are authorized to use, SUNCAT will need to utilise authorisation and authentication software to link users to the 'appropriate copy' of a journal (i.e. a link to the vendor that the user's institution has paid to provide that journal).

2.3 Upgrading of serials records in local OPACS

For serials, the standard of bibliographic and holdings data in UK library OPACs is currently, with a few honourable exceptions, very poor. If individual libraries take advantage of the facility built into SUNCAT to download high quality bibliographic records into their own OPACs, then SUNCAT provides the opportunity to remedy this situation. Over time, local records could, in the light of technical developments, be upgraded on a large scale. This will mean that, as the SUNCAT database records are updated, the system will need to send back information to contributing libraries so that local records are also updated.

One particular advantage for individual libraries of using SUNCAT to obtain serials records will be the freeing up of the time cataloguers currently spend on creating bibliographic records for current serials. This should enable library directors to put in place a programme of bibliographic records updating for older and more specialised serials which can in turn be contributed to SUNCAT. As we look to the future, the existence of high quality records in local OPACs will not only enable individual libraries to interconnect to other external information sources and services, it will also allow SUNCAT to move to a more cost-effective, less resource-intensive, distributed service.

2.4 Access to high quality external serials information

In order to achieve a database of high quality records it will be necessary for SUNCAT to have access to external sources of high quality serials records of MARC 21 standard. The Study Team is recommending a different approach from the Feasibility Study in focussing on automated procedures for the creation of bibliographic records rather than original cataloguing. This will be less labour intensive and will create more higher quality records at a faster rate. If, as recommended by the Study Team, SUNCAT obtains national site licences from CONSER, ISSN and possibly Ulrich's, then these databases with their wealth of information about serials worldwide, will be available – free at the point of use – to all UK HE libraries.

2.5 Open standards and interconnectivity

If SUNCAT is designed and developed according to the specification recommended by the Study Team, it will provide a system which supports open standards, thus providing not only an enabling service for JISC services and JOIN-UP projects but also interconnectivity with other external serials-related services such as A&I services, document delivery services and publishers' websites. (See Section 4.4)

2.6 Collaborative collection management and development

As SUNCAT grows in size and stature, it will become an important tool for collection management and development. It will enable collection managers in individual libraries to identify, for example, those serial titles for which their library holds the only copy in the UK or those titles for which they hold the only copy within a particular geographical region. It will also flag up titles that are extensively subscribed to by large numbers of libraries and, for example, provide data for regional co-operatives to take de-selection decisions in the knowledge that at least one copy of an expensive title is held within their group of libraries.

There is little doubt that there is extensive duplication of serial holdings in UK libraries. Where printed serials are concerned, it could be argued that as researchers require quick and easy access to these serials, such duplication is justified. However, as many serials (particularly those from major commercial and learned society publishers) are now available electronically, evidence of wide-spread duplication provided by SUNCAT might encourage libraries to consider regional or subject-based site-licensing initiatives. SUNCAT might even provide evidence to support national site-licensing negotiations with some of the larger publishers, along the lines of the Canadian or Finnish national initiatives.

It will be important for SUNCAT to incorporate searching options that will allow for a range of different types of queries, including those relating to collection management. For example, librarians may wish to interrogate the database to discover journal holdings within their region, as well as nationally, or they may wish to discover titles which are held uniquely within a particular group of libraries.

2.7 Improvements to holdings statements

Some way of resolving an article-level request, in SICI format (Z39.56), against each statement of holdings for each major library, is urgently required. Of high priority, therefore, is improvement in the quality of the holdings statement that provides information on whether a particular article is held in the volumes of journals within each library.

2.8 Raising the profile of serials in UK libraries

Evidence from the Study Team's interviews shows that currently access to serials, and serials cataloguing are not a high priority in many UK libraries. SUNCAT has the potential to change this situation by raising awareness of the benefits of having high quality records in local OPACs, such as the ability to link to external serials related services, and to make the resources that now constitute a high proportion of their budget much more widely available and accessible. While the importance of serials to the research community is well documented, it should be noted that serials (particularly recommended titles and specific articles) are becoming an increasingly important information resource for undergraduates. Moreover, the existence of SUNCAT may well stimulate demand for serials from the general public. SUNCAT can also raise the profile of serials in the UK by providing a national focus, and possibly by being the organisation that represents the UK in the international standards and bibliographic arenas.

3. Scope and boundaries of SUNCAT

The aim of SUNCAT is to provide access to the bibliographic and holdings records of significant serials collections held by UK libraries from all geographical regions. This means that contributing libraries will need to be selected using the following criteria: the size of their collections and the number of current subscriptions (the major national and research libraries); the specialised nature of their collections (smaller, specialised libraries such as learned societies); and, their geographical location. This will ensure the depth and breadth of SUNCAT holdings.

Before entering into a detailed discussion of which libraries are in scope (see Section 3.4) it is necessary to define what is meant by the term 'serial' and the term 'journal' in the context of SUNCAT.

3.1 Serials and journals

For the purposes of this report, the Study Team accepts the following definition of a serial:

“A publication in any medium in successive parts bearing numerical or chronological designations and intended to be continued indefinitely.”
[Anglo-American Cataloguing Rules]

Thus the term serial encompasses a wide range of materials, including: journals; technical and government reports; annual publications; monographic serials; and newspapers. However, it should be noted that the AACR definition will be changing shortly to widen the definition to include loose-leaf publications and websites that do not currently meet the seriality criteria. This will have an impact on the scope of records that will be in the bibliographic databases used as a base resource for SUNCAT.

Journals are an important and significant sub-group of serial publications and they are heavily used by the research community. Page, Campbell and Meadows [Page, G., Campbell, R. and Meadows, J., *Journal publishing*, Cambridge University Press, 1997] define learned (or scholarly) journals as:

....."serials which contain a significant proportion of articles (often called 'papers' in scientific journals) based on original scholarship....."

In practice, defining 'what is a serial' and 'what is a journal' is not an exact science, and it is clear from interview data obtained by the Study Team that individual libraries have their own definition for serials and journals. Monographic series, annual publications, grey literature, official publications, etc., are normally regarded as serials (and may be allocated an ISSN) but not as journals. Presence, or not, of an ISSN in the bibliographic record is not a defining criterion. (See Section 3.3 for further discussion of ISSNs.) Moreover, definitions adopted by individual libraries can be influenced by a number of factors such as the budget head paying for the subscription or the requirements of the local financial / management reporting systems.

Library serials collections may comprise current and "dead" serial titles. Both terms describe the publication status of the title (i.e. whether it is currently published or not). In addition, current serials may be held on "current subscription", or they may be "closed". These terms describe the status within the local library -- a serial may be current, but not necessarily held currently (e.g. the subscription may have been cancelled for financial reasons). Interview data

from potential contributing libraries indicates that, of the total number of serials held by libraries, some 25% - 30% of that number represents *current journal subscriptions*.

Because of the important role of journals in supporting research and in order to manage the size and scope of the database, the Study Team believes that in the early stages of building the SUNCAT database, the focus should be on collecting information about the *journal holdings* – and, where necessary, the *current journals* - of contributing libraries. However, because ISSNs will be used for matching records within SUNCAT, it will be a relatively simple exercise to also collect bibliographic and holdings records for other types of serials if an ISSN is present in the contributing library's database. (See Section 3.3.3.)

3.2 Electronic journals and other non-print formats

Academic libraries in the UK acquire their current journals in two main formats, print and electronic, with microform and CD for archive versions. Until recently, printed journals were the dominant format, but, due partly to the success of the JISC National Electronic Site Licence Initiative (NESLI) in negotiating cost-effective e-journal deals with major scholarly publishers, as well other JISC deals for full text databases which provide access to e-journals, many academic libraries now provide their users with access to many thousands of subscription based e-journals. There is also an increasing number of academically significant free e-journals. It is therefore vitally important that the SUNCAT database incorporates e-journals.

The use of electronic journals for reference linking (cross references between journals from different publishers and the A&I databases) has highlighted the importance of high quality and accurate bibliographic and holdings records in library OPACs. This applies to both print and electronic journals, to ensure that appropriate resources are identified and available.

3.2.1 Online Access to e-journals via SUNCAT

Online access to e-journals for UK researchers requires sophisticated access management (the term now being employed to cover such issues as certification, authorisation and authentication). Currently JISC licences for electronic resources require suppliers to use ATHENS – the de-facto standard for access management of online services in the UK. ATHENS currently manages over 1.7 million user accounts from over 600 organisations. However, not all e-journals subscribed to by UK libraries are acquired via JISC deals.

While this issue sits outside the direct scope of SUNCAT, it will have a major impact upon the use of e-journals via SUNCAT. In the early stages of SUNCAT, hyperlinks within the e-journal bibliographical records will be those provided within the record acquired from the bibliographic source, directed to the publishers' websites. This hyperlink may, however, not be appropriate or up-to-date for the SUNCAT user. In the later phases of SUNCAT is to be hoped that a national access management scheme will be in place - to allow hyperlinks within SUNCAT to be resolved to the appropriate link, thus allowing researchers to gain access to the online journal articles they are authorised to use.

In the wider JISC environment, there is clearly a pressing need for some very secure computer certification scheme to allow national and international data sharing and co-operation among researchers across SuperJANET and the Internet. Effectively, in library terms, we are talking about the next stage to follow ATHENS in managing access to electronic resources. It should be noted that there is progress in this area. The Russell Group of IT Directors (RUGIT) is holding a joint seminar on this topic in May 2002, involving JISC, UCISA and SCONUL. Furthermore, JISC is supporting a UK expert to work with a team in the US on their Shibboleth Internet 2 project to create a viable national certification scheme.

Digital certificates are actively being looked at as a longer term solution. However, the Study Team recognises that this section will quickly be dated, and that SUNCAT will have to be compliant with one or more external resolvers.

3.2.2 Visitor access to e-journals

Where a researcher is not authorised to access the online version of an e-journal via the SUNCAT database, the other option might be for him/her to visit the subscribing library. However, whether they are permitted access once on the library premises (as a 'walk-in user') is entirely dependent upon the licence that the subscribing library has signed. E-journal licences are of crucial importance in relation to access to e-journals.

The most widely used e-journal standard licences, for example, the NESLI Model Licence and the John Cox Standard Licence, have a clause in them allowing for 'walk-in users'. So, for example, in the UK where libraries have purchased e-journals via NESLI, those e-journals could be made available to visiting researchers. It is difficult, however, to estimate how many e-journals are acquired via NESLI or other licences containing this clause. The Study Team conducted an online survey on lis-e-journals which revealed that NESLI does have a reasonably high level of market penetration. Of the responding libraries, NESLI e-journals represented, on average, 54% of their e-journals collection. RSLG is also conducting research in the area of 'walk-in user' clauses in licences and have recently posted a query on the liblicense list – asking for information on those publishers who do not allow for 'walk-in users'. Survey results are not yet available.

3.3 ISSN issues

In order to create a database of high quality records, SUNCAT will require an authoritative identifier for serial titles. This has to be the ISSN despite some misgivings about the current system of ISSN allocation. The external manifestation of the work of the ISSN Centres is the International ISSN Database which is available for purchase either on CD-ROM or via the Web. The Web version allows only record by record searching, so ideally the ISSN database should be loaded locally with better search software.

3.3.1 Assigning ISSNs

The system of allocating and assigning ISSNs to serials is managed by the International ISSN Centre in Paris and it works in close collaboration with a number of National Centres worldwide.

Responsibility for assigning an ISSN to a title is given to the country which is the first named place of publication. If that country does not have an ISSN Centre, it is the responsibility of the International Centre. Major international serial publishers are the responsibility of a particular Centre, for example, the UK Centre is responsible for all Butterworth titles, the US Centre is responsible for all Wiley titles. International bodies, such as the United Nations, are the responsibility of the International Centre.

The International ISSN Centre is also concerned about 'what is a serial?'. They too recognize that there will always be grey areas around the fringes of serials – conference proceedings, monographic series, working paper series, loose-leaf publications, websites and other integrating resources – where the decision on whether to allocate an ISSN is taken on a case-by-case basis. The definition of a serial under AACR rules is changing, and the ISSN Centres are having to look at an increase in volume. Also, because of the international scope of the ISSN database, some national Centres, including the UK, are reluctant to assign ISSNs to titles regarded as ephemeral in nature (such as advertising or trade literature) or those deemed to be of local interest (e.g. in-house journals, local newspapers or magazines).

ISSNs should be assigned to each version of a serial – so the electronic version of a printed serial requires its own ISSN. However, ISSN assignment to e-serials is very patchy, partly because of the problem of finding them in the first place (as yet there is no UK legal deposit) and partly due to resource limitations. It is understood that ISSNs for different versions and variants are cross-referenced within the ISSN database record

3.3.2 UK ISSN Centre

The UK ISSN Centre should play a pivotal role in ensuring the success of SUNCAT. Conversely, the success of SUNCAT could be undermined by the absence of up-to-date issue of ISSNs for publications originating in the UK. However, the UK Centre is clearly under-resourced. This is emphasised by David Baron who is in charge of the UK Centre based at the British Library. In response to the Study Team's enquiries he stated:

“We are able to cope with the demand for ISSNs for new titles, and a little backlog work, but we already have backlogs of requests from the Document Supply Centre (DSC) and from other National Centres for assignment of ISSNs to existing titles. Any increase in requests as a result of SUNCAT would have to be matched with an increase in the resourcing of the Centre. The situation in most other National Centres is the same, if not worse – if a request has to be sent to another Centre, it can take months or years to get a reply, if at all. The ISSN Centre still operates a paper-based system. This means that the only record of pre-publication assignments, and of records which have not yet completed the keyboarding process to enter them in to the International ISSN Database (and there is a substantial backlog of these at the moment) is via the card files in the UK Centre. This means that many serials will in fact have an ISSN, but the information is not available to anyone who does not have physical access to the card files.”

The operational staffing complement of the UK ISSN Centre is 2.5 full time equivalents and two full time clerical members of staff. The manager of the UK Centre spends about 30% of his time on ISSN work. According to David Baron: “This resourcing is just about sufficient to keep up with current requests as they come into the centre and occasionally nibble away at the backlog”.

The backlog of work within the UK Centre is difficult to quantify. Requests from publishers and requests from the Document Supply Centre (DSC) are dealt with quickly – within a few days. The backlog of other materials waiting to be processed are (i) requests for ISSNs and record amendments from other ISSN Centres, and (ii) requests for non-current serial ISSNs from DSC. Work on the backlog is hampered by the lack of an automated system.

3.3.3 Matching by ISSN

An additional issue relating to ISSNs that will impact upon SUNCAT is that of matching by ISSN, based on the ISSN printed on the serial. There is variation here that needs to be resolved through cross-referencing within the ISSN database. Some publishers continue to print the ISSN of a former title, or a different edition on the serial; or an ISSN may simply be typeset incorrectly. A more significant number of publishers fail to request a new ISSN for the e-version of a serial. One third of the serial titles bought by UK libraries do not have an assigned ISSN. The cross-referencing within the ISSN database is crucial.

Data collected from potential contributing libraries by the Study Team indicates that:

- The number of *current* journal bibliographic records with ISSNs is estimated to be between 50% and 90%.
- The number of ISSNs for *all* (current and dead) serial records is estimated to be between 18% and 35%

Within the SUNCAT database there is clearly a need to provide an alternative identifier for bibliographic records where no ISSN has been allocated. The Study Team considered the possibility of allocating 'pseudo' ISSNs to titles that had not yet been allocated an ISSN. However, further reflection suggests that this would not be a sensible way forward and that a better strategy would be to work closely with the UK ISSN Centre and the International ISSN Centre to improve the allocation of ISSNs. SUNCAT records will, of course, be allocated an accession number, but these should not be visible externally.

Study Team discussions with Guisepe Vitiello and Françoise Pelle at the International ISSN Centre indicate that they already work in close collaboration with a number of union catalogues – including NOSP, Latindex and ABES-SUDOC – and that they are very willing to work with SUNCAT. It should be possible for SUNCAT to facilitate the 'fast track' allocation of ISSNs and this should be further explored, based on the initial indications of support from the International ISSN Centre.

The details of how the matching will be done against the databases is given in Section 4.2.

3.4 Contributing Libraries

The UKNUC Feasibility Study recommended that the SUNCAT database should comprise records and holdings from the British Library, the National Libraries of Scotland and Wales, large research universities and some smaller, specialised institutions. The Study Team recommends that the scope of SUNCAT is broadened considerably to include information about the serials holdings of a much larger number of UK libraries in all sectors – academic, government, special and public – across all geographical regions. The longer-term aim of SUNCAT should be to become a complete UK serials union catalogue. Given the huge potential scope of SUNCAT, work on building the SUNCAT database will have to be approached in a number of Phases.

It will be important for contributing libraries to be aware of the implications of contributing to SUNCAT. The system will be designed to be as automated as possible and to keep the workload for contributing libraries to a minimum. Nevertheless, libraries will be expected to:

- In Phase 1, provide the SUNCAT team with an automated file of all journals (current and dead, if possible) together with all serials with an ISSN
- Have a designated person to liaise with the SUNCAT team as and when queries arise
- Set up a local automated system to receive upgraded bibliographic records from SUNCAT, and load them into their local OPAC
- Set up a system to receive record updates for existing records and new titles from SUNCAT
- Assist in notifying the UK ISSN Centre of any titles not yet allocated an ISSN
- In Phase 2, send a further automated file of all serials to the SUNCAT team

Phase 1: A quick start-up

The Steering Committee has indicated that a quick start-up of SUNCAT is required. In order to create a critical start-up mass of titles within the database, the Study Team recommends that the focus in Phase 1 is on bibliographic and holding records for current *journals* (currently held or closed), 'dead' *journals* and other *serial* records having ISSNs, that a number of large, automated libraries be selected to build up this critical mass of titles and that these should be the three national libraries plus 17 other academic libraries. Some of these contributing libraries have indicated that it would be easier in Phase 1 to contribute current journals records only. However, where collection of current and 'dead' records is straightforward, all records should be input to SUNCAT.

Fourteen of the Phase 1 academic libraries have been identified as having large research collections of serials (based on the number of serials they subscribe to - according to SCOUNL/LISU statistics). By selecting libraries according to the number of serials titles they receive – rather than their total serials spend – the Study Team believe that some libraries with large arts/ humanities/ social science collections (which have lower average prices than STM journals) will be represented. These libraries also house some quite extensive collections of serials in highly specialised subject areas and these collections will make a significant contribution to extending the subject coverage of SUNCAT, which will be built upon in Phase 2 by adding the holdings of smaller specialised collections.

Other academic libraries have been selected to promote better geographical coverage in Phase 1.

The following have been identified for potential inclusion in Phase 1:

The British Library
The National Library of Scotland
The National Library of Wales

Imperial College of Science, Technology and Medicine
London School of Economics and Political Science
The Queens University of Belfast
University of Birmingham
University of Bristol
University of Cambridge
University College London
University of Durham
University of Edinburgh
University of Glasgow
University of Leeds
University of Manchester
University of Nottingham
University of Oxford
University of Southampton
University of Wales, Cardiff
University of Warwick

It is anticipated that the Steering Committee will play an important role in selecting contributing libraries and monitoring priority.

It is recommended that the University of Oxford and the National Library of Wales be selected as SUNCAT's beta sites due to the existing high quality of their serials bibliographic records. (The National Library of Wales is the only UK member of CONSER.)

It is estimated that the libraries identified for participation in Phase 1 subscribe to (or provide access to, in the case of the legal deposit libraries) some 500,000 *current journals*, and *serials with ISSNs*. This figure rises to approximately 1,500,000 if all the *current and 'dead' journal* records from contributing libraries are counted.

The number of unique bibliographic records covered by this participation in SUNCAT would be around 60,000 current journals - due to the large overlap in subscribed titles. The number of unique bibliographic records for current and 'dead' journals is estimated at 250,000 (based on data from Ulrich's and ISSN) with an average holding of 5 per title. The ISSN database gives figures of 648,000 for 'periodicals', 95,000 for monographic series and 24,000 for newspapers with an estimated 33% of the titles classified as 'dead'.

Systems staff and technical service staff (cataloguers, union list managers) have been interviewed in depth by the Study Team to establish size of collections, bibliographic and holding record formats and structures, downloading capabilities, uploading capabilities etc. Unsurprisingly, record quality (of both bibliographic records and holdings statements) varies considerably between these libraries – indeed the University of Oxford is the only university library that uses MARC 21 for cataloguing serials.

Library Directors have also been contacted and the Study Team found that the majority expressed considerable support and enthusiasm for SUNCAT. The two major areas of concern for Library Directors are (i) resource issues including the possible increased workload for their staff, and (ii) whether the free download of high quality records from SUNCAT for their own OPACs would be of interest to them.

Phase 2: Medium-term development

Following the quick start-up phase, SUNCAT should aim both to increase the number of contributing libraries and to increase the number of unique journal titles in the database. Priority will be given to selecting specialised libraries, such as those in learned societies and academic libraries that hold specialised subject collections of serials (for example, Leicester University, which has a special collection on transport history).

Hyperlinks for e-journals within SUNCAT should be considered in Phase 2. However, this will be dependent on progress in the development of authentication technology. (See Section 3.2.1.)

The Study Team did consider whether it should recommend that *just* the bibliographic and holdings records of the journals in the special collections (if indeed it is possible for the library to identify them separately) should be added to SUNCAT, or whether *all* journal bibliographic and holdings records should be added. However, the effort of setting up the mechanisms for loading and the effort from the contributing library is the same for one or all titles. Given that an expressed aim of SUNCAT is to be a UK union catalogue and that users may wish to check on the location of journals within their own geographical region, it would be cost-effective to add all records.

Further information about specialised libraries and their journals holdings was collected by interviewing the following organisations:

The Geological Society
The Linnean Society
The Natural History Museum (NHM)
The Royal Astronomical Society
The Royal Society

In addition, a questionnaire was completed by a number of librarians from other learned societies in the humanities – thus providing a view of SUNCAT from a non-science viewpoint. Overall, there was a general willingness among interviewees and respondents to participate in SUNCAT.

Most learned society libraries tend to have relatively small collections of serials, typically between 200 and 800 current subscriptions, and between 1,000 and 4,000 total holdings including dead titles. Only a small number of specialised organisations, such as the NHM, have large collections (the NHM has 11,000 titles). A good proportion of titles from these libraries are highly discipline specific and are unlikely to be widely available in the UK. Thus, their inclusion in the SUNCAT database will significantly expand the number of unique titles

and greatly facilitate the identification and location of less widely held journals to the benefit of UK academic researchers.

Some smaller learned societies still operate manual serial systems but the majority have moved, or are moving, to stand-alone, automated serial systems (e.g. CALM2000PLUS; C2; Heritage). Libraries with manual systems will be unable to participate in SUNCAT.

By the end of Phase 2 SUNCAT should be an important and heavily used resource for researchers and librarians; it is anticipated that it could become the first port of call for information about serials held within UK libraries. It will already include all types of serials, and represent a very wide range of contributing libraries of all sizes and from all sectors, and will have good geographical coverage. By this stage, the Study Team envisages that the cost of SUNCAT will have reached a steady state. Therefore, it is recommended that post-Phase 2 costs are reviewed by the Steering Committee. In addition, SUNCAT should already have had discussions with some existing Union Catalogues. For example, SUNCAT would provide much of the functionality presently provided by other Union Catalogues.

The SUNCAT Management Team also has the potential to improve awareness of the benefits of having high quality records in local OPACs, as it will be providing links to external serials related services. SUNCAT should also be raising the profile of serials in the UK by providing a national focus, and possibly by being the organisation that represents the UK in the international standards and bibliographic arena. The value of providing links to the JISC Information Environment, and hence to external serials related services, should also be evident

3.5 The SUNCAT service model

The Study Team proposes that SUNCAT should offer the following services to users.

For researchers and librarians

A single, authoritative source of high quality bibliographical information about serials in UK libraries

The facility to discover the location and holdings of serials held in UK libraries

Search facilities for discovering:

- The existence of a journal in UK libraries
- The history of a journal (title and publisher changes)
- Whether an electronic version of a title exists
- What journals are published in various subject areas
- The ISSN of a particular title
- Which journals have no UK holdings
- What titles are held in a local region
- Which A&I services cover particular titles
- Physical access arrangements for individual libraries
- Up-to-date information on new serials
- Changes in titles, publishers, etc., in advance of bibliographic sources record updates

The facility to interchange information with:

- contributing library OPACs
- JISC services and JOIN-UP projects, and hence to external sources of serials-related information such as:
 - publisher websites

- the electronic version of the titles
- A&I and aggregator services covering article information
- other serials bibliographic services such as the CONSER, ISSN and Ulrich's database

For librarians

- Provide local holdings data from a large number of libraries to facilitate national collection development
- The ability to up-grade local bibliographic records quickly and easily
- An authoritative source of information on ISSNs that is free at the point of use
- The option to inform the UK National ISSN Centre about titles where no ISSN has been allocated

3.6 Organisation and governance of SUNCAT

It will be necessary for the Steering Committee to put in place various structures to oversee the implementation and development of SUNCAT and to ensure that the views of key stakeholders are represented.

4. The technical model

As stated in earlier Sections, SUNCAT must be designed and developed within the broader framework of the JISC services and the wider information economy for UK libraries. To do this, SUNCAT should be a system that supports open standards. More about that is set out in Section 4.4 below. There is specific requirement that SUNCAT provides an enabling service for JISC-sponsored services, and the JOIN-UP projects. More about this, and the route to other serials related services, such as A&I services and document delivery services, be these from within the sector or provided commercially, is set out in Section 4.1, below.

4.1 Linkage to JOIN-UP, the JISC Information Environment and other serials-related services

4.1.1 Overview

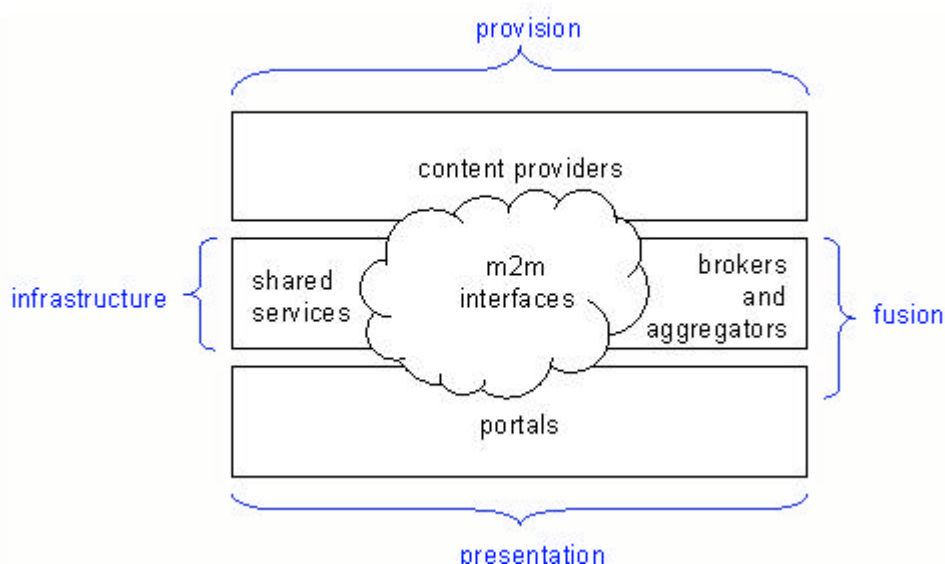
The vision for SUNCAT is that it will sit within the wider architecture of the JISC sponsored services, especially those being created by JOIN-UP, the JISC information infrastructure for journal articles. It is clearly important to link serials information within SUNCAT to external serials-related resources, such as A&I databases, document delivery services, publishers' web sites and other aggregator services: this linkage is likely to be provided by JOIN-UP.

Through JOIN-UP, users of SUNCAT will be provided with authorised offers of access to other JISC and commercial services, such as:

- Bibliographic A&I services, such as provided by the JISC Data Centres and others
- Full text A&I services (e.g. ProQuest)
- Publishers' websites containing full text journal articles (e.g. Science Direct)
- Commercial aggregator services (e.g. Ingenta, OCLC, RLG, Swets, EBSCO)
- Document delivery services (e.g. British Library, EASY, Infotrieve)

JOIN-UP is a cluster of four projects funded by the Joint Information Systems Committee (JISC) with the intention of providing, as services, that part of the information infrastructure to do with journal articles and the like (<http://edina.ac.uk/projects/joinup/>). The Information Environment (IE) is the name given to that Infrastructure, or Information Architecture, which is being sponsored by the JISC for UK further and higher education. This corresponds to what was formerly referred to as the Distributed National Electronic Resource (DNER).

The 'information architecture' for this is summarised in the following representation, taken from the JISC:



Within this context libraries are regarded as content providers (of journal issues and their content) and SUNCAT plays the role of an aggregator of the catalogues that list the serials held. Although SUNCAT will have its own web presence, it should be capable, through the use of open standards, of being used by a variety of other JISC sponsored portals.

The information architecture depicted above, is based upon work funded in an earlier JISC funding programme, the eLib Programme, itself an outcome from the Follett Implementation Group (FIGIT) in the 1990s. This programme funded a series of workshops that examined what was required to assist moves towards distributed electronic library services. These have been referred to as the MODELS 'demand-side' verbs and have been a major heuristic: discover, request, locate & deliver/access. Within that context, SUNCAT is a 'locate' facility. It is therefore important to appreciate the relationship between SUNCAT and JOIN-UP, particularly the ZBLSA locate broker, with which there is potential for overlap of functionality.

4.1.2 JOIN-UP: A Summary

JOIN-UP is a three-year work activity funded by the JISC to create the infrastructure for services focusing on journal articles. It comprises four related projects and began at the start of 2001. It is anticipated that the JOIN-UP projects will be capable of supporting a number of test services during the latter part of 2002. JOIN-UP involves the JISC Data Centres (EDINA & MIMAS), the British Library and several university libraries, together with the Resource Discovery Network Centre (RDNC) and UKOLN as associates. A working relationship is being established with the EASY project, which was commissioned by the JISC/PA to test an economic model for electronic document delivery. JOIN-UP is a practical implementation of the MODELS verbs, joining-up the stages whereby staff and students in UK further and higher education can discover, locate, request and access the articles they need for research, learning or teaching.

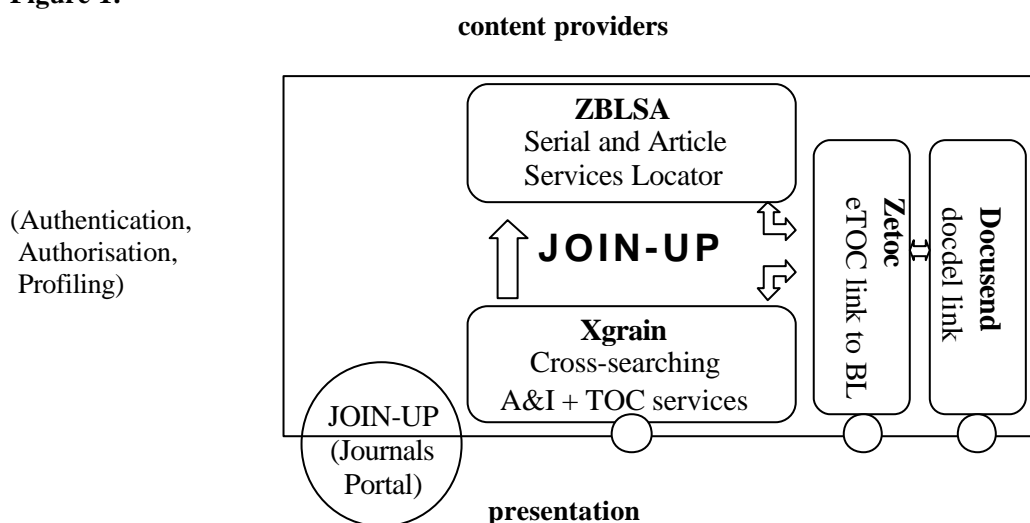
Of the four projects engaged in the JOIN-UP programmes activity, two projects were initially envisaged as end-to-end solutions, both addressing the functional equivalents of 'request' and 'deliver', as well as having interest in 'discover' and 'locate':

- zetoc, an alerting service for the journal articles listed in the British Library's Electronic Table of Contents
- Docusend, a university-library-based, one-stop document delivery service.

Two projects were conceived to be functional realisations of the 'discover' and 'locate' verbs:

- Xgrain, a broker that cross-searches A&I and TOC databases plus an 'easy-use' portal for students
- ZBLSA, a broker to locate services on articles, allowing portals to focus on presentation & user interface issues.

The four JOIN-UP projects which, in JISC terminology, provide a mixture of aggregator and shared services for journals and journal articles, are shown in Figure 1:

Figure 1:

Three of the JOIN-UP projects aim to support a portal each (shown here as three small circles) for the purpose of presentation to end users. Importantly, each also aims to support the variety of portals envisaged within the JISC Information Environment: subject portals; Data Centre portals, institutional (local library) portals, etc. JOIN-UP will also support a shared Journals Portal which is intended to make use of 'shared services' for authentication, authorisation and institutional profiling.

Note that ZBLSA, in the absence of SUNCAT, had an initial remit to search for and present services on serials and well as articles: this is discussed below.

4.1.3 SUNCAT and JOIN-UP: A Comparison of Purpose and Functionality

The purpose of SUNCAT, as the UK national union catalogue of serials, is to provide authoritative information on 'what libraries hold what serials', and to be an authoritative source of bibliographic records. Thus, within the context of JOIN-UP, SUNCAT combines a locate facility (for physical holdings) with an identification and catalogue record facility. Accordingly, it seems sensible to make detailed comparison here of SUNCAT with ZBLSA, as this provides a generic locate broker service within JOIN-UP: to Docuend, Xgrain and zetoc.

The purpose of ZBLSA, as the broker for locating services on journal articles for JISC-sponsored portals, is to find offers of services on full-text material in printed or electronic form, whether on the basis of 'prior rights' or 'pay as you go'. Its scope and technology have been defined, with a view to its deployment for field-testing in 2002.

Note. As a locate broker, ZBLSA has both client-side & server-side interfaces; it also has both functional (b2b, ie business to business)) and technical (m2m - machine to machine) aspects:

- Functionally, ZBLSA is a b2b facility, both for the other JOIN-UP facilities and for the full range of JISC portals. It is designed to be business-neutral, carrying out rights evaluation, not full-blown authentication/authorisation.
- Technically, ZBLSA is primarily an m2m facility, designed to be 'lightweight', carrying out messaging, not transaction management. ZBLSA supports the Open URL for client-side messaging, and both Z39.50 & HTTP for server-side search/retrieval. The technical specifications of client-side and server-side interfaces have both been published. Attention is also being given to the potential that may lie in the more recent Open Archives (OAI) protocol. (Further reference is made to these interface technologies in a later section – 4.8)

ZBLSA is the equivalent of the Serials Services Database that was designed as part of a work-package (WP4) in the CASA project, funded under the EU Telematics Programme, 4th Framework, and led by the University of Bologna, and involving the ISSN International Centre and EDINA as partners.

There is clearly both a difference and an overlap in purpose between SUNCAT and ZBLSA. SUNCAT is to build a catalogue of holdings based on high quality records. The 'offers of service' collated by ZBLSA, although they would include library services such as institutional OPACs and union catalogues (e.g. COPAC, SALSER, and the Z39.50 'clumps'), use the 'best efforts' pragmatic approach taken in SALSER, the 'virtual' union catalogue of serials in Scotland (<http://edina.ac.uk/salser>); this means that the results that it presents to users are only as good as each library has to offer.

A pair of symmetrical questions is addressed here:

- (i) how might ZBLSA (and the other JOIN-UP services) use SUNCAT?
- (ii) how might SUNCAT use ZBLSA?

In answer to the first question, (i) how might ZBLSA use SUNCAT, ZBLSA:

- may need to confirm the identity, including the ISSN(s) for a given serial
- could provide access to SUNCAT as an 'offer of service' to its client community
- would choose SUNCAT as first preference because of the enhanced quality if there were a critical mass of records, though it would retain the capability to search a 'local' OPAC (or serials list) and the 'remote' OPACs dynamically (via Z39.50 or http).

A major challenge for ZBLSA, is to establish a way of resolving an article-level request, in SICI format (Z39.56), against the holdings for each major library. Of high priority, therefore, is improvement in the quality of the holdings statement that provides information on whether a particular article is held in the volumes of journals within each library. See Section 4.2.2. and Appendix 2.

In answer to the second question, (ii) SUNCAT could use ZBLSA:

- to locate serials via the OPACs (or serial lists) of libraries not (yet) included within its scope.
- as a broker to allow users to link to the additional information services provided by the JOIN-UP services within the DNER:
 - rights evaluation (for 'appropriate copy'), as per ZBLSA
 - user document delivery facilities, as per Docusend, ZBLSA & zetoc

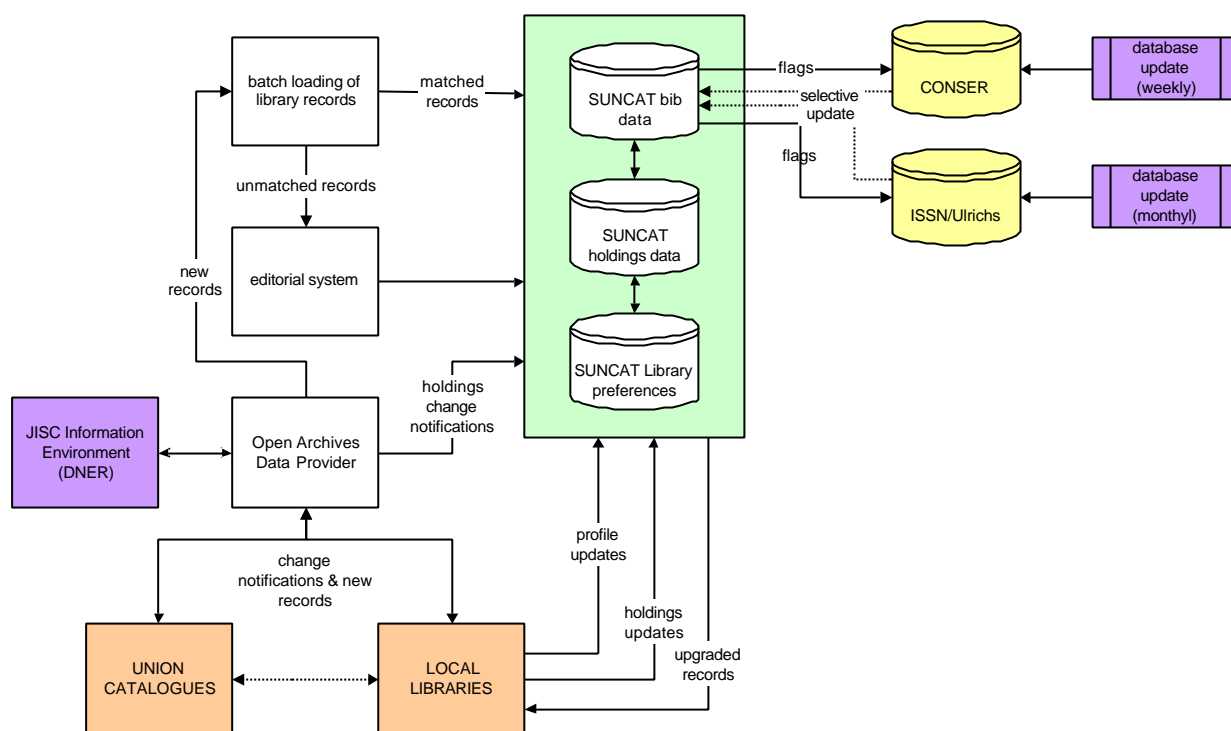
The division of labour between SUNCAT and ZBLSA as two locate facilities needs to be carefully specified and managed, to the mutual benefit of both, and of the community of users within UK further and higher education, and beyond. Much depends upon the range of services definitions finally agreed for the implementation of SUNCAT. However, it is probable that ZBLSA would be able to offer a number of 'broker' services that correspond to:

- the critical mass required for SUNCAT to make an impact (as SUNCAT grows in the number and significance of libraries covered)
- the hybrid (centralised versus distributed) character of the architecture chosen for SUNCAT
- the command over technology required by SUNCAT (e.g. operation by ZBLSA of Z39.50 and the variety of protocols across http)

4.2 SUNCAT architecture

Figure 2 shows the SUNCAT architecture for Phases 1 to 2 as recommended by the Study Team.

Figure 2



4.2.1 Bibliographic records

Source of Bibliographic Records

In order to achieve a database of high quality records it will be necessary for the SUNCAT Team to have access to external sources of high quality records of MARC 21 standard.

A review was conducted of the bibliographic records available from:

- Commercial sources: e.g. Ulrich's
- Public sector sources: e.g. ISSN; CONSER
- UK libraries: e.g. Oxford University
- UK union catalogues: e.g. COPAC
- UK library cooperatives: e.g. TALIS
- Other union catalogues: e.g. Picarta

Three potential suppliers were identified by the Study Team: CONSER; ISSN; and Ulrich. A request for an outline quotation was sent to these three suppliers. The conclusion of the Study Team, based on quality and cost of bibliographic records, was that a combination of CONSER and ISSN would cover much of the requirements of SUNCAT. In addition, those libraries with high quality serials bibliographic records such as the University of Oxford and the National Library of Wales (the only UK CONSER member) could be used as base records.

The levels of CONSER records are characterised briefly as follows:

- **Full** level records contain a full complement of elements that are applicable to the serial and all elements contained are fully authoritative
- **Core** level records contain those elements essential to the description and access of the serial and all elements contained are fully authoritative

- **Minimal** level records contain the essential (i.e., core) elements for description but subject elements may not be present and one or more headings may not be authoritative

All bibliographic records entered into the SUNCAT database will be in the MARC 21 format. The CONSER core bibliographic record, with appropriate local amendments or additions, might perhaps serve as the SUNCAT recommended standard. Recommended elements of the MARC 21 serials record are shown in Appendix 9.

There are inevitably some drawbacks with all these suppliers. CONSER is weak when it comes to European and UK serials titles, but it is, nevertheless, a tremendously valuable resource. The International ISSN Database is not as rich in subject information as the CONSER database, although some ISSN Centres do add UDC or DDC numbers. Ulrich's, since its acquisition by Cambridge Information Group, has indicated that it will be upgrading the databases. The main advantage of having access to Ulrich's is that it is particularly rich in historical data. The license cost for the whole database, for use by all UK HE & FE libraries, is currently \$280,000. However, it is possible that this could be negotiated down.

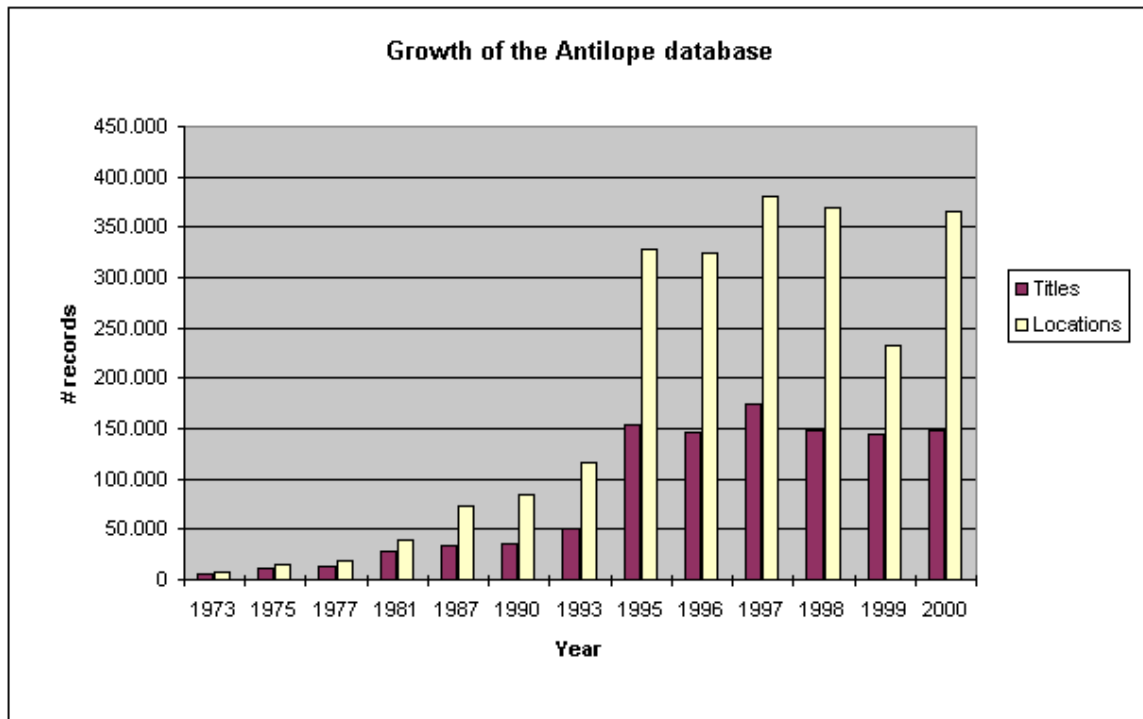
Adding Bibliographic Records

As each new contributing library is brought on board by SUNCAT, bibliographic records will be batch loaded into SUNCAT and matched against the externally sourced records.

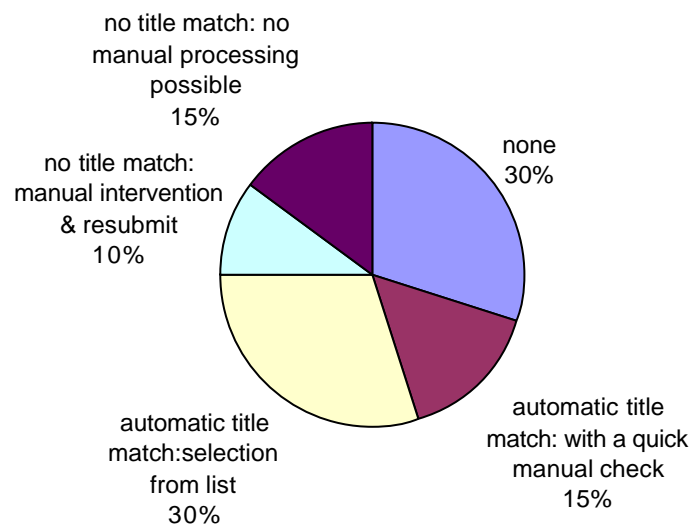
Items matched by ISSN will be added to the SUNCAT database. If a bibliographic record already exists in the database, only the holding statement will be added. (See Section 4.2.2, Holding statements.) Incoming records which do not have an ISSN will be matched algorithmically by title keywords against the CONSER, ISSN and possibly Ulrich's databases. If matched, they too will be added to the SUNCAT database. Although the scoping study did not do any detailed sampling or testing of record matching, experience of previous similar projects suggests that matching on the MARC 022 field, the 008 position 21 and whether the holdings statement is open or closed, should be sufficient to identify current versus 'dead' records. However, further investigation is required.

Unmatched records will have to undergo a manual check. It is recognised by the Study Team that this will be a very labour-intensive process and consequently be the most costly part of the process. If the manual check discovers a simple error and a match can then be made, that record will be added to the database. Records which are still unmatched at this stage will be added to the database but flagged as unverified. Priority is being given to records that can be matched, so these unverified records will be made up of material that is unique to SUNCAT, or records where the bibliographic information is insufficient to match against an existing record. However, experience with Antilope, the Belgian Union Catalogue of Serials, shows how rapidly the number of titles levels off, and therefore the likelihood of matching is higher.

Figure 3, below, shows how matching and de-duplication of bibliographical records will take place within SUNCAT.



Type of Manual Processing Required



This section has deliberately focused upon the up-grading and incorporation of *new* records into the SUNCAT database. The up-dating of bibliographic records is dealt with in Section 4.3.

Structure of Bibliographic Record

There is a debate about the structure of MARC bibliographic records in relation to their holdings statements and multiple media manifestation. The debate is whether there should be a different bibliographic record for the electronic version and for the print version, or whether a single bibliographic record should contain multiple manifestations. For example, in the CrossRef database, a very high proportion of the titles have the same ISSN for the print and electronic versions. It should be noted that current CONSER practice is to create one record per print title, which means that, unless there is a significant difference between the print and electronic versions of a journal, both formats will be included in a single record. Recent CONSER working groups have discussed the option of moving to separate records for print and digital version and for appearances in aggregator databases. Since varying from CONSER practice will mean the need to amend downloaded CONSER records, the Study Team recommends that CONSER practice be followed.

4.2.2 Holdings statements

The nature of serials is complex as they are constantly changing their title, publisher and therefore ISSN. Furthermore, libraries cancel or change the titles to which they subscribe. Together, these factors create an environment where holdings and the holdings statements are highly unstable, and they are part of the reason that the standard of holdings statements for serials in UK library OPACs is extremely poor, sparse and probably inaccurate. Some examples of holdings statements from contributing libraries are shown in Appendix 2. It is clear that there is no standard amongst these.

Most union catalogues struggle to provide standardised holding information. CONSER, for example, has found that the MARC record structure is unsatisfactory because holdings information is only held in one field and gives no indication of the date ranges for individual library holdings. They have overcome this problem by creating a separate record (Local Data Records) to enable individual CONSER members to records details of holdings.

There are standards for holdings statements developed by OCLC LDR (Local Data Records) and Library of Congress MFHR (MARC Format Holdings Records), but the Study Team considers that these are unnecessarily complex for SUNCAT. ANSI/NISO Z39.71 – 1999 Holdings Statements for Bibliographic Items (ISSN: 1041-5653) is the basis of what the Study team recommends, using only Level 3. Because of the sparsity of existing holdings information in UK libraries, it is not practical to attempt to develop detailed holdings statements in the initial phases of SUNCAT. The summary holdings statement just gives a start date and end date (which may be open) e.g. Vol. 31, no. 1 (Jan. 1963) -. The detailed holdings statement will give breaks in the holdings and missing issues, and often the actual location of the title in the library. The detailed holdings statement can be stored and would be used only once the user had decided that they wished to access this title at a particular library.

The Study Team considers that SUNCAT has a unique opportunity to contribute to standards in this area, since the Library of Congress has an Action Plan for bibliographic control of web resources, which is currently addressing precisely these issues and needs input. In this Action Plan, for example, Action 3.4 is to “Enhance MARC21 to support display of hierarchical relationships among records for a work, its expression and its manifestations....”. Details of the Action Plan are in Appendix 3.

However, it is important that the bibliographic record in SUNCAT can point to multiple holdings statements from multiple libraries. As an example, an XML record describing this holding is shown in Appendix 4.

4.2.3 Other metadata

There are clearly other important pieces of information relating to both the contributing libraries and the serial titles in the SUNCAT database, which will need to be recorded and linked to the bibliographic and holdings records in order to give users as much information as possible about the item they are searching for and how they might acquire it.

Information about contributing libraries (preferences):

- Access policies and opening hours. (Some learned society libraries, for example, may not permit non-members to use the library, or may levy visitors' fees)
- Policies on interlibrary loan and document delivery

Information about the users' library (profiling)

- Authentication and authorisation information

Further information about the journals from sources such as Ulrich's, ISSN and PCC/PURL

- Title history – former and later titles and mergers
- Which A&I services cover a particular journal title
- Which aggregator services provides coverage of particular e-journals

4.3 Keeping SUNCAT up-to-date

A problem for any centralised union catalogue is keeping its data up-to-date, without placing too great a burden on its contributing libraries. For SUNCAT, there are a range of up-dating issues which need to be addressed:

- CONSER, ISSN and Ulrich all update the records in their databases at regular intervals; CONSER is weekly and ISSN and Ulrich's are monthly. These updates include changes to titles, ISSNs, publishers, etc. Updates from these external databases will need to be applied to SUNCAT records
- Contributing libraries add new bibliographic and holdings records for new titles – this is happening more frequently at present as libraries add records for electronic versions of serials they acquire. They also delete appropriate records if a title is withdrawn, and, on occasions, they update their bibliographic and holdings records for existing titles. All these changes need to be captured by SUNCAT.
- If contributing libraries have elected to receive up-graded records from SUNCAT, any changes to bibliographic records for specific titles held by the contributing library need to be communicated back to that library

The whole issue of updating the holdings records in union catalogues *in a standard, automated way* has not been satisfactorily resolved by any of the major organisations working in this area (see Library of Congress Action Plan in Appendix 3). Z39.50, which has been widely implemented in libraries, was not designed for updating union catalogues.

4.4 Linkages to and from other serials-related services

The final element of serials information which SUNCAT should tackle is that of article level information and access to the articles themselves. This is outside the scope of SUNCAT, but Section 4.1 covers this topic within the JISC framework.

4.5 The User Interface

The Study Team have reviewed many different union catalogues around the world and a team of researchers carried out detailed analysis of a selected number of these. The following summarises the recommendations.

4.5.1 Access and ease of use

- Work with a wide variety of browsers
- Accessible for disabled users
- Help pages, FAQs, Common Search Problems, easy log-off
- Fast loading, low graphics
- Adherence to W3C coding standards – including easy to use, professional, well-designed interface and screen sized pages avoiding vertical scrolling
- Utilisation of Cascading Style Sheet – CCS – formatting
- Support for OpenURL/Z39.50 based searches originating from local library based systems

4.5.2 Search capabilities

- Searching by designated fields (e.g. by ISSN, author, title, subject, publisher or professional organisation and notes - singularly and in combination).
- Option to search for an exact title match, or title keywords match, in the order entered.
- Boolean searching in any combination of up to three (3) author, title, subject and combined (all indexed fields) indexes with logical operators AND, OR, NOT.
- Support other operators available, e.g. near, with and adjacent.
- Support for embedded wildcard characters
- Support for left hand or right hand truncation of keywords
- Option to refine searches
- Maintenance of users' search history
- Ability to set a search time-out for complex searches
- Stop words, case or punctuation should not be the concern of the user
- Ability to specify medium wanted (e.g. print only, electronic only)

4.5.3 Display and sorting of results information

- Results list and full record display easily navigable
- Option to select number of (short entry) records display on one screen
- Combined entries for titles available as print or electronic but the ability to show and link if both available and medium
- Option to save sets of selected records
- Offer a comprehensive record display with full metadata and holdings statements, with indications of each holdings library's access policy and document delivery services.
- Ability to see both title sought and current name of title but not all intervening titles unless users asks to see whole chain.
- Individual records to be displayed or printed in either labelled or MARC format (for librarians)
- Allow user options for sorting titles found (e.g. alphabetically, by relevance to search, descending/ascending year of first publication)
- Order holdings statement with users' own library displayed first
- Allow user to see the holdings of libraries in a selected region

- Allow user to check up-to-date holdings and availability at particular library, for example via ZBLSA, without re-entering data.
- Where a library has indicated a preference SUNCAT switches user to local library's OpenURL resolver or to OPAC with details of title selected.
- Allow for load shedding by sorting statement so that libraries are not always listed in the same order (the BL may be an exception)

4.6 User Architecture

Figure 4

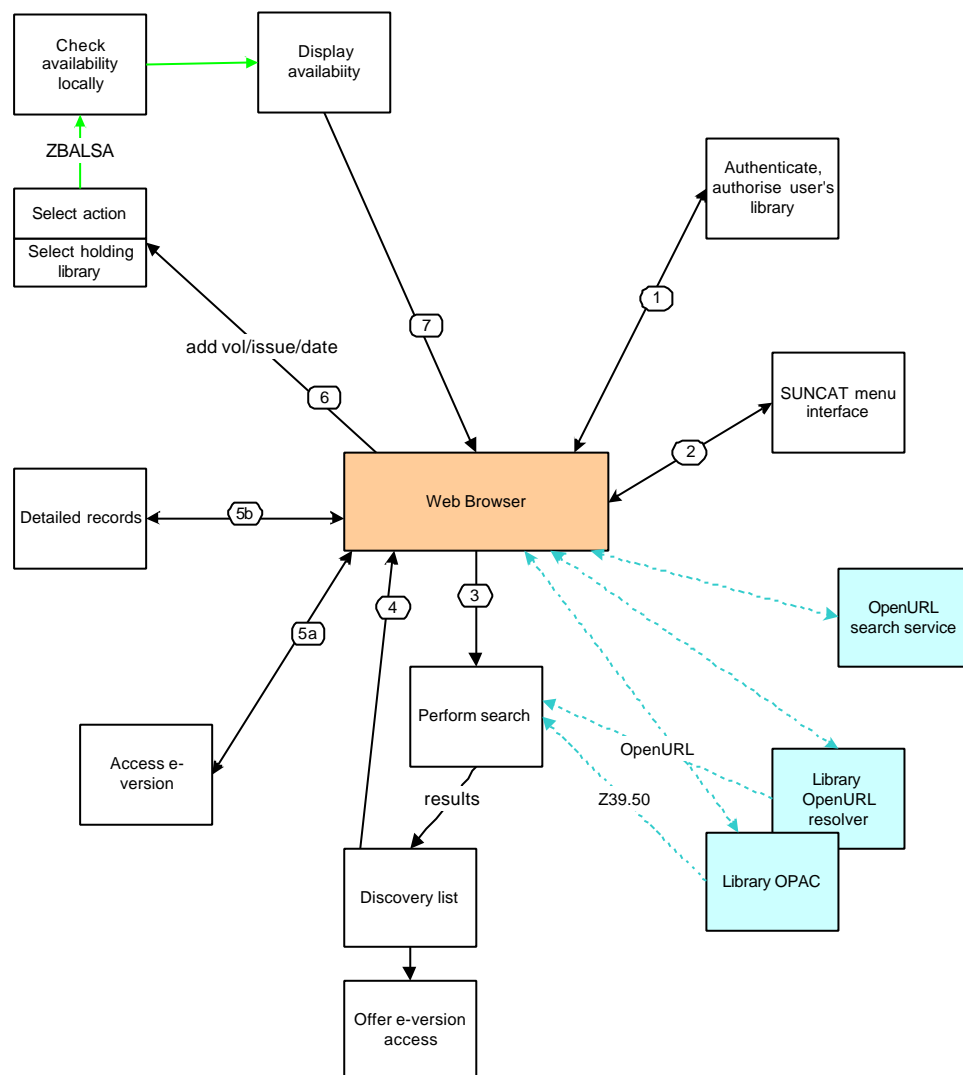


Figure 4, above, illustrates how a user might interact with SUNCAT. This is partly based on research carried out by the Study Team end user researchers, both with and without an information retrieval background.

Access might be direct (or via an external interface) or via the user's library's OPAC or OpenURL resolver used as a result of searching an OpenURL enabled search service.

The steps for the end user involved are:

1. recognise any library the user might be related to

2. offer the SUNCAT search menu which offers a range of search options
3. once the search is performed the results are processed to reflect the user's preference, library preferences, and the availability of e-journal access to the user
4. the user can select from the list
5. (a) direct access to the e-version or (b) see the detailed record and summary holdings information
6. once a holding library is selected, the user adds volume/issue/date information and availability can be checked

4.7 SUNCAT interface technologies

The purpose of SUNCAT is to provide services to its wide client base, and integrate with other JISC services as well as the wider library and information world. For this, SUNCAT must support well-defined interfaces, and deploy suitable technology to implement them. Interface definition is required on two levels: on the client-side, where SUNCAT receives and responds to user requests; and on the server-side where SUNCAT interacts with participating libraries.

A variety of technologies are used to support JISC services and will be relevant to ensure proper integration of SUNCAT. These interface technologies include Z39.50, HTTP, OpenURL, XML, and the OAI Harvest protocol, and are discussed below.

SUNCAT has two levels of interface to consider - client-side and server-side.

4.7.1 Client-side interfaces

Given the different types of SUNCAT user (e.g. library cataloguers, interlibrary loan librarians, scholars, UK citizens) it is likely that a variety of end-user services will be developed for SUNCAT. It could be argued, in fact, that client interfaces are not a central responsibility of the SUNCAT project, and should mainly be developed by others serving distinct user interests. (In practice, it will be necessary to develop at least a minimal SUNCAT client, if only for development and demonstration purposes.) In modelling terms, however, it makes more sense to develop an open interface to support client services than incorporate an integrated client interface within SUNCAT.

To support its external client services, SUNCAT should offer one or more machine-to-machine interfaces, to receive client requests, and convey results. While Z39.50 could be used for this purpose and may be chosen for applications that require that specific functionality, it is likely that many developers would opt for simpler mechanisms, such as OpenURL and XML. What is first required, however, is agreement on the services that SUNCAT should actually provide. Service definition must come before technical realisation.

4.7.2 Server-side interfaces

On the server-side, SUNCAT acquires catalogue data from contributing libraries, integrates these with its master database of catalogue records, and returns upgraded records. In broad terms, this can be described as follows:

- Data selection. Once the initial task of downloading a participating library's complete serials catalogue has been completed (which may be regarded as a one-off exercise), the routine task of updating SUNCAT with new and amended records will follow. Details of the data selection task will vary from library to library according to the library automation system in use and local policy

- Data transmission. This may be accomplished very simply by physical or other means that involves manual intervention. For a procedure intended to continue indefinitely, however, an automated process is preferable
- Upgraded record export. Again, a variety of mechanisms are available. The final choice may well be determined by a practical evaluation of what a participating library can most easily handle

Z39.50 is the obvious technology for implementing these server-side functions. On paper, it has all the necessary properties and features. There may be occasions where particular difficulties arise, for example, where library policy precludes use of Z39.50, or where the necessary configuration changes are thought disruptive to existing services. It should be possible to resolve such problems if appropriate Z39.50 expertise is available; in practice, this may have to be provided as an ongoing part of SUNCAT support.

Alternatively, libraries could develop suitable scripts on their library automation systems to be run as overnight jobs, to select new and updated records and transmit the results to a reserved location accessible to SUNCAT. The main difficulty here is the effort required to implement the task anew on each of the proprietary library systems in use. It would be possible for a library to support a 'virtual' open archive, and allow new records to be retrieved by SUNCAT by means of the OAI Harvest protocol. Such a novel solution would require practical assessment and justification before attempting any wide-scale deployment. However, it might provide a useful supplementary route where Z39.50 technology is not an option.

4.8 Specific technologies

Some of the technologies that may be relevant to SUNCAT are summarised below.

4.8.1 HTML/HTTP

This is the familiar combination of technologies that form the foundation of the web. HTTP provides the underlying protocol that enables web browsers and servers to communicate. HTML defines the data format used to convey information between server and browser. Its main strength is its use as a display format: it enables web service designers to create visually rich content which most web browsers are capable of rendering acceptably on screen. Details of these and related standards can be found at <http://www.w3.org/>.

4.8.2 XML

While HTML continues to serve well as a display technology, it has limitations as a vehicle for conveying complex data objects. The desire to extend web applications beyond the point where HTML is effective led to the development of XML (Extensible Markup Language). Unlike HTML, XML has strict rules of syntax conformance, and the capacity to convey data objects of arbitrary complexity.

A further limitation of HTML becomes apparent in m2m communication (in contrast to machine to browser communication). While it is possible to write code that allows for automatic processing of HTML objects, it is rather hard work, and never fully reliable. This is where XML is particularly useful. It is always possible to parse a conformant XML object. Knowledge of the particular specification which defines an XML object enables the receiving system to apply the appropriate semantic interpretation to the object received. Hence, XML is the technology of choice for machine processing of information retrieved from a web server. For more details see <http://www.w3.org/TR/REC-xml>.

4.8.3. OpenURL

The OpenURL provides a method to use HTML to convey a service request for a single bibliographic object. An OpenURL comprises a standard URL (which identifies the target web server) with a payload of additional information that contains a bibliographic descriptor of the object of interest. The response to an OpenURL request varies according to the specific application; it may take the form of a standard HTTP page, suitable for display on a browser, or a unit of XML intended for machine processing. The OpenURL has become widely accepted among researchers and vendors as the unit of currency for conveying bibliographic service requests to web servers. The original OpenURL proposal is currently proceeding through the NISO fast-track standardisation process; see http://www.niso.org/committees/committee_ax.html.

4.8.4. OAI Harvest

The Open Archives Initiative Protocol for Metadata Harvesting is another recent development that was devised to support the emerging generation of open archive systems. The open archive provides a facility for 'self-publication' (where 'self' may not always be an individual), by the act of depositing an information object along with some descriptive metadata. In order to publish the content of the archive, the archive supports the Harvest protocol that enables external services to retrieve metadata descriptions of the information objects held. In the present context, information objects (i.e., local catalogue records) and their corresponding metadata descriptions are one and the same thing. The protocol supports some simple facilities that allow metadata records to be retrieved selectively, but in typical use, an external service would request all records created after a specified date. OAI Harvest is implemented using XML. See <http://www.openarchives.org/OAI/openarchivesprotocol.htm>.

4.8.5. Z39.50

Z39.50 is a technology familiar to library systems librarians. It was originally developed in the 1980s as a general-purpose client-server protocol for interrogating record-based data repositories, and is still undergoing development. It has been adopted widely in the library community and is supported in virtually every library automation system in use in the UK (though, in practice, is often not enabled for use). Its advantages as a technology for SUNCAT are its ubiquity and acceptability. Its disadvantages are its perceived complexity (e.g. the difficulty of configuration), the variability in operation of different vendors' products, and the inconsistent practice in handling the various attribute sets. As a central mechanism for implementing a distributed model for SUNCAT, the feasibility study found Z39.50 an unsuitable technology. In the rather different role of a mechanism that enables SUNCAT to retrieve subsets of the catalogues of participating libraries, however, Z39.50 could be effective.

While Z39.50 was developed as a client-server protocol, the client software is rarely used on desktop machines; most use of Z39.50 is as a machine-to-machine interface. See <http://lcweb.loc.gov/z3950/agency/document.html> for further information.

4.8.6. Proprietary systems

There has been much experience in the task of building union catalogues elsewhere, notably in the USA, and proprietary systems exist that may have resolved many of the issues identified for SUNCAT. Unfortunately, there is little hard information available about the properties of these products that can be judged independently. For this reason and in general, it is recommended that in any deployment, proprietary or not, use is made of Open Standards, such as the five listed above.

5. The hosting of SUNCAT

Research conducted by the Study Team on existing union catalogues has shown that the technological requirement and infrastructure for SUNCAT are not complex and are widely available. It would be easy to start from scratch and reinvent systems for SUNCAT, but this would be time consuming and expensive. Within the UK, the existing JISC Data Centres would all be capable of meeting the technological requirements. Outside of the JISC environment there are a number of either not for profit or commercial organisations who would be equally capable. These would include co-operatives like Talis or OCLC, library systems vendors like Fretwell-Downing Informatics or Endeavor, and knowledge management companies like divine. There is even specific software available for running union catalogues, for example Muse Global.

Any of these organisations may wish to form groupings to run SUNCAT. This project will be of sufficient size that the formal EU tendering procedures will have to be observed and other companies will identify themselves as part of the process.

In order to make the many policy decisions that will arise during the project, a manager and a bibliographic expert should be available to oversee the SUNCAT project. It is assumed that all other staff are within the contracting organisation.

6. Financial models for the setting up and running of SUNCAT

6.1 Revenue Sources

Services within JISC must be provided free at the point of use to users within UK further and higher education institutions. Therefore, the Study Team has identified only three main sources of revenue for SUNCAT:

- centralised funding from government/ funding bodies
- funding from contributing libraries
- revenue from services

6.1.1 Centralised funding

Centralised funding is the only way that SUNCAT will be set up in its initial stages, although in the longer term the possibilities of trading between SUNCAT and the contributing libraries in terms of resources or bibliographic records might be a possibility. For example, cataloguing staff from contributing libraries might be made available as consultants to SUNCAT, or high quality bibliographic records for new journals might be exchanged by contributing libraries for special services. Interview data from Library Directors from potential contributing libraries highlighted their concern about the possible resource implications and additional workloads for their staff in contributing to SUNCAT. Other revenue streams, such as the selling of services discussed below, could not be implemented until the later stages of SUNCAT.

It is possible that the Steering Committee might wish to investigate other large funding agencies who specialise in funding projects in either specialised subject areas or areas of significant international importance. Examples might include the National Heritage Lottery Fund, Research Councils, AHRB or the Mellon Foundation.

6.1.2 Funding from contributing libraries

Our interviews with the Library Directors highlighted as one of their main concerns the impact the additional work of contributing to SUNCAT in addition to existing Union Catalogues might have on their staff and other resources. It is important to SUNCAT that a critical mass of libraries and their holdings is built up as quickly as possible, therefore barriers to entry, such as charging for the records, should not be levied initially. However, the Study Team has already identified an important strategic role for SUNCAT in highlighting the importance of access to serials and serials cataloguing.

Library Directors, concerned at increased usage of their physical and electronic collections because of SUNCAT, need to be aware that increased use of libraries by external researchers might raise the amount of RSLP access-type funding received by these institutions, and might impact positively on institutions' success in future research assessment exercises and thus on future library budgets.. The only potential revenue from contributing libraries might be to charge them if they wished to download high quality bibliographic records from SUNCAT into their local OPACs. However, as this is the only 'perk' offered by SUNCAT, the Study Team is firmly of the opinion that records should be downloadable free of charge, with no volume constraints. It is also important that libraries have the higher quality records in order to provide higher quality serials related services, and incidentally to facilitate future updating of SUNCAT.

6.1.3 Revenue from Services

The Study Team has identified a range of services that could be provided, which should help to fund SUNCAT.

Selling bibliographic records to non-contributing libraries

It is anticipated that that any UK academic library that wishes to upgrade its serials records will be invited to contribute to SUNCAT, therefore the potential market for purchasing SUNCAT bibliographic records would be commercial libraries who might not wish to have their holdings listed e.g. pharmaceutical companies, non-UK libraries and even, possibly, other bibliographic utilities. The serials records created by SUNCAT will be the result of a combining multiple existing sources of information with some original editing and cataloguing. It is anticipated that these records will be of a higher quality than any generally available. Demand is likely to be in batches as libraries commit to upgrading their catalogues; updated records will be in a continuous stream. The average number of new serials produced in a year (based on the number of new ISSNs issued) is 38,000 and it is estimated that of these under a thousand are added to UK library catalogues.

The price charged by SUNCAT for records must reflect the market price, which ranges from 30p to £5.20 from OCLC, and \$2 to \$7 charged by Ulrich's. It should also not unfairly undercut the other bibliographic record suppliers.

Income from participation in CONSER

OCLC has indicated that SUNCAT can be a cataloguing member of CONSER and would receive a £5.20 credit for every new original, new workform created record or upgrade to CONSER standard which was contributed to the CONSER database. This credit could be used against other services, such as the uploading charge of £0.10 per record to CONSER.

Selling high quality bibliographic records to publishers

CrossRef (a reference linking initiative supported by over 80 journal publishers world-wide) has identified the linking problems caused by low-grade bibliographic information being supplied by publishers and is trying to initially solve this by buying MARC21 records and matching them against the existing database. This will continue to be a problem, and SUNCAT could sell such services to CrossRef, as well as to individual publishers wishing to upgrade their own bibliographic records.

ONIX, an XML data exchange standard for the book trade, is developing a complementary standard for serials which will be used by publishers to communicate metadata to subscription agents and libraries, if they are able to use it. However, the ONIX standard only covers the structure, and high quality bibliographic metadata will be needed to make the records valuable. (For more information on ONIX see www.editeur.org)

Sponsorship

The Steering Committee may wish to seek a sponsor or sponsors for SUNCAT in the same way as Amazon have sponsored the British Library's OPAC. Likely candidates would be companies who are selling products and services to libraries and to academics.

Specific parts of the catalogue might be sponsored with, for example, publishers paying for their titles to be highlighted, or aggregators and document delivery services paying for specific highlighted links. It is becoming more common for users to accept that free services have to have sponsorship or advertising in order to defray costs.

Document delivery transaction charges

A charge or commission is now standard for directing users to other services, and document delivery is an example of what could be implemented for SUNCAT.

Registry Services

Most registry (or numbering) services, for example ISBN, Duns, and the new ISTC, charge for the registration of an identifier and the appropriate metadata. In order to have efficient linking, more identifiers are being created, with three new ISO identifier work programmes this year alone. There are openings for organisations to become the registry for these, and also potential for taking over existing registries, as there are huge economies of scale. SUNCAT is effectively “registering” the holdings of libraries and has an infrastructure that is appropriate. With the UK ISSN registry under-resourced, perhaps there is potential for this to be run in conjunction with SUNCAT. There is also the possibility of a new identifier for libraries, which will need a European registry and which would fit in well with a national resource managing library material.

7. Cost estimates

As a tender will be issued for the development of SUNCAT, this section is regarded as 'commercial in confidence' and is not available in the public version of the report.

8. Outline implementation plan

The implementation plan assumes that the tendering process is completed within six months.

Prepare tender document

Decisions will need to be made immediately about the contracting procedures. There are options for a one-stage process, where there will be an immediate requirement for a detailed tender document containing: the detailed statement of requirements, firm budgets, timescales; contractors' financial and organisational capabilities; payment terms, reporting, quality control and other details. Alternatively, there can be a two-stage process where a request for expressions of interest can contain general information with an outline specification of requirements, and potential contractors can supply information. This means that the subsequent detailed documents can then take into consideration the capabilities of the potential contractors. It is also possible in the two-stage process to have discussions with the potential contractors before preparing the final tender document. The two-stage process gives the opportunity to:

- identify key issues, which may not have come out of the Feasibility or Scoping Studies
- understand differences of approach which it might be necessary to highlight in the specification of requirements
- quantify the range of pricing and financial approaches that contractors are prepared to accept
- review the possibility of multiple contractor relationships or partnerships
- refine the list of potential contractors allowed to bid, reducing detailed evaluation time
- ask for ideas on revenue generation

A detailed implementation plan and functional specification should be prepared at this stage that can be based on input from the expressions of interest and discussions. This will be done at the same time as the Phase 1 contributing libraries are contacted. A review process would be built into the contract after three years.

Award of Contract

Once the contract is awarded the functional specification will need to be validated and reviewed by the contracting organisation in the light of their existing systems and capabilities. In addition a new specification is usually prepared for project management and quality control purposes which is appended to the contract. Any procurement by the contracting organisation would be started at this point.

System Development

It is assumed that proprietary and open software would be used and therefore system development can be fast tracked. Data can be collected from the beta test libraries to help with the system development.

Acquisition of Bibliographic Databases

The ISSN and CONSER database would need to be acquired and mounted locally, with the appropriate search software set up.

Database Building

The beta sites' data will have been analysed for standard and non-standard qualities. It can also be used for workflow testing and preparation of workflow instructions. The initial loading of bibliographic data from the beta test site libraries will validate the processes and the functional specification for the databases.

Search Interfaces

In parallel with the database building, work can be carried out on search and retrieval interfaces, using both the beta test sites and other groups that should include end users and librarians.

Loading of Phase 1 Library data

There are 18 libraries remaining in Phase 1 (excluding the beta test libraries). There will be between 4,000 and 120,000 current journal records from these libraries. The loading target is one new library added per month. This should speed up as more and more libraries are added, with the number of unique records levelling off at 250,000 with average holdings per record around 5.

Loading of Phase 2 Library data

Phase 2 will focus on adding the collections of current journals from a larger number of libraries, particularly specialised libraries. It is estimated that there will be a maximum of 11,000 records from each library, but the number of unique records will begin to grow again in this phase.

Review Process

SUNCAT should be reviewed after three years, as this was the period in which the major start-up would be achieved. This review might include examination of: (i) the efficiency of provision by the contractors; (ii) the user friendliness of the system from both the libraries and the lay user perspective; (iii) the likely future structure of SUNCAT (i.e. centralised/distributed catalogue); (iv) what the optimum steady state would be in terms of records and contributing libraries; (v) how it would be maintained and supported in the future.

Appendix 1: Websites Referenced

Final report of the 2nd TG on Journals in Aggregator Databases
<http://lcweb.loc.gov/catdir/pcc/aggtg2final.html>

MARC Holdings Records-Format-Reference
<http://www.library.cornell.edu/tsmanual/MHLD/format.ref.html>

MARC Holdings Records-Enumeration and Chronology Fields (863-865)
<http://lcweb.loc.gov/marc/holdings/echdenum.html>

CONSER Record Requirements (Library of Congress)
<http://www.loc.gov/acq/conser/recordreq.html>

Library of Congress Implementation of Amendments 2001 to AACR2
<http://lcweb.loc.gov/catdir/cpsa/amen2001.html>

Report of CONSER at Large Jan. 2002 <http://www.loc.gov/acq/conser/at-lgjan02-sum.html>

Revising AAACR2 to Accommodate Seriality: B. Seriality <http://www.nlc-bnc.ca/jsc/ser-rep2.html>

PCC Interim Report of the TG on Implementation of Integrating Resources
<http://www.loc.gov/catdir/pcc/tgintegrpt.html>

CONSER Program Membership Information (Library of Congress)
<http://www.loc.gov/acq/conser/aboutmem.html>

Interim report of the PCC Task Force on Multiple Manifestations of Electronic Resources
<http://www.loc.gov/catdir/pcc/tgmulerrpt.html>

Program for Cooperative Cataloging <http://lcweb.loc.gov/catdir/pcc/>

CONSER Working Group, Single or Separate Records: Charge
<http://wwwtest.library.ucla.edu/libraries/cataloging/sercat/conserwg/>

CONSERline no. 18 (Library of Congress) Aggregators and E-versions Task Groups' Work
<http://www.loc.gov/acq/conser/consln18.html#ejourn>

MOUSS ILL Union List of Serials Working Group
<http://www.ala.org/rusa/mouss/committees/ill/docs/union.html>

OCLC Final Report of the Ad Hoc Task Force on Union Listing
<http://www.oclc.org/oclc/union/taskforce.htm>

CONSER PURL Pilot: FAQ <http://www.loc.gov/acq/conser/purl/faq.htm>

Open Archives Initiative FAQ <http://www.openarchives.org/documents/FAQ.html>

Belgian Library Catalogues - Short introduction to Antilope
<http://lib.ua.ac.be/ANTILOPE/intro.html>

The ISSN format <http://www.ISSN.org:8080/English/pub/tools/format>

COPAC: duplicate record reduction in a union catalogue
<http://www.mcc.ac.uk/newsletters/MIDAS/9703/970308.html>

Citation de-duplication <http://ltt-www.lcs.mit.edu/ltt-www/Public/work.html>

UB Karlsruhe: KVK Karlsruhe Virtual Catalog <http://www.ubka.uni-karlsruhe.de/hylib/en/kvk.html>

Building the Infrastructure of Resource Sharing by Clifford A. Lynch
<http://www.caslin.cz:7777/caslin99/a3.htm>

The DNER Technical Architecture: scoping the information environment
<http://www.ukoln.ac.uk/distributed-systems/arch-arch.html>

ZBLSA: An EDINA Project <http://edina.ed.ac.uk/projects/joinup/zblsa/>

Appendix 2: Holdings statements from Phase 1 contributing libraries and Z39.50 availability

Problem statement

Holdings statements present a distinct problem for SUNCAT. While the use of CONSER provides a reference-quality version of the bibliographic record for a serial to which a poorer quality local record can be mapped, the holdings statements can only be drawn from the local records themselves. The problem of handling local holdings statements is threefold:

- a) The format of holdings statements is not well standardised. Many institutions have adopted a syntax for recording holdings statements purely as a local matter. In practice, the format(s) used in any specific library can be determined only by inspection.
- b) Even within one institution, the syntax of holdings statements may vary over time, or even from cataloguer to cataloguer. In addition, even where a standard format is in general use, the lack of syntax checking software makes it probable that human error will cause some statements to contain syntax errors.
- c) The extent to which a library's holdings statements accurately reflect its actual holdings is simply unknown, but is not expected to be perfect. Informal examination of a typical research library's catalogues suggests that holdings statements are often absent altogether. Unfortunately, the approach of upgrading old, variable quality records with new, high quality CONSER records will not improve the accuracy and comprehensiveness of the holdings statement component of the records (though it could eliminate syntax variations). A separate approach may be required to assist libraries in improving the accuracy and comprehensiveness of their holdings statements.

Examples of typical holdings statements are shown below.

```
1996- 1-
1963-1976 23-36
40-58, 1967-85
Notes: Library holds: March 2001- (print), Vol 1, Oct 2000-
      (electronic)
Vol.14- , 1992-
Vols.11-13, 1989-1991.
1(1992)-
6(1972/73)-
[1](1984)-3(1985)
5 NOS.1-4(1967-70)
1985-
1(1949)-5(1967)
1(1968)-7(1974/77)
Vol. 8 (1994) to date
Vol. 13 (1955) to Vol. 30 (1973)
Numbering Vol.107-111 1985-1989
Library holds: Winter 1994-
Numbering 1991
```

Dec., 1966, no. 21 ; [1966]
Vol. 31, no. 1 (Jan. 1963)-

Machine processing

Ideally, SUNCAT would develop software capable of recognising a variety of holdings statement syntaxes, and would convert each statement to some canonical form (normalisation). In practice, except for the minority of cases where rigorous rules have been observed, the variable nature of these statements will make comprehensive machine processing an unrealistic goal.

For statements which cannot be fully parsed with any great degree of confidence, or which are effectively un-interpretable, it may still be possible to extract some information. For example, a trailing hyphen may be taken to indicate a subscription which has continued to the present (or until publication ceased). In general, it should be possible to extract at least the start and finish dates from most statements. The extent to which machine processing is effective will be finally determined only by experimentation on the large number of records involved.

While it is always possible to improve the success of parsing by fine-tuning the software, this quickly becomes a game of diminishing returns. Further, given the number of erroneously encoded records (not conformant to any common syntax), and the occasional ambiguous (hence, unparseable) record, it is probable that a significant proportion of holdings statements can be resolved only by the contributing library.

Z39.50 availability

A variety of library automation systems are in use among the core group of contributing libraries, including Talis, Unicorn, ALICE, Innovative, Voyager Endeavour, and GEAC Advance. It is thought that all of these systems are equipped with effective Z39.50 capabilities, which, in theory, could provide external access to the OPAC. In practice, however, some obstacles exist in the present arrangements:

- a) In some cases, institutions have not announced details of how their Z39.50 services may be accessed. So while suitable software exists, it has not been advertised for external use.
- b) In other cases, the Z39.50 software has been activated, but has not been configured in a way suitable for handling serials. For example, specific indexes required for serials searching (such as material type) may be absent (or in one case, present but not populated).

So while, in general, Z39.50 capability is available, for some contributing libraries additional configuration may be necessary before it can become effective.

Appendix 3: Extracts from Library of Congress Action Plan

Bibliographic Control of Web Resources:
A Library of Congress Action Plan Revised July 25, 2001

These actions have been extracted as they seemed relevant to some of SUNCAT's problems.

Relevant to showing the relationship between the various manifestations of a serial.

3.4 Enhance MARC 21 to support display of hierarchical relationships among records for a work, its expressions and its manifestations (based on the IFLA Functional Requirements for Bibliographic Records (FRBR)).

Potential Collaborators: LC Network Development & MARC Standards Office; MARBI; OCLC; RLG; System vendors

Priority: Long-term/High

Related Action Items: NA

Relevant to up - dating SUNCAT automatically.

4 Develop automated tools for harvesting and maintaining metadata to improve bibliographic control of selected Web resources.

4.1 Develop specifications for addressing issues related to record supply and maintenance for aggregated resources to provide mechanisms for: detecting and reporting changes in resource content; changing records; and notifying libraries when changes are made. Communicate the specifications to the vendor community and encourage their adoption.

Potential Collaborators: PCC Standing Committee on Automation; OCLC; RLG; Vendors; Publishers; ARL; ALCTS

Priority: Near-term/High

Related Action Items: NA

4.2 Develop specifications for a maintenance tool to provide mechanisms for detecting and reporting changes in resource content and associated metadata. Communicate the specifications to the vendor community and encourage their adoption.

Potential Collaborators: PCC Standing Committee on Automation; OCLC; RLG; Vendors; Publishers; ARL; ALCTS

Priority: Near-term/High

Related Action Items: NA

4.3 Develop specifications for a metadata creation tool for authors that can support various metadata standards. Communicate the specifications to the metadata community and encourage their adoption.

Potential Collaborators: LC Network Development & MARC Standards Office; Dublin Core Metadata Initiative; ARL; NISO; ALCTS

Priority: Long-term/Medium

Related Action Items: NA

4.4 Develop specifications for a resource selection, evaluation and user feedback tool. Communicate the specifications to the vendor community and encourage their adoption.

Potential Collaborators: ARL; RUSA; ALCTS; LITA; Vendors; OCLC; RLG

Priority: Near-term/Medium

Related Action Items: 1.3

4.5 Promote OAI (Open Archives Initiative) standard for harvesting metadata.

Potential Collaborators: LC Network Development & MARC Standards Office and Metadata Policy Group; ARL; OAI; ALCTS

Priority: Near-term/High

Related Action Items: NA

Appendix 4: Sample XML Record

```

<?xml version="1.0" standalone="yes"?>
<SUNCAT_RECORD>
<marc>
<!-- contains field and field indicators as attributes -->
<!-- sub_fields as repeating children of the field -->

<field type="field no" i1="" i2="" >
<subfield type="subfield code">
</subfield></field>
</marc>
<holdings_data>
<holdings_library_ID="">
<!-- Chronological dates converted to yyyyymmdd as in SICI
specification -->
<holdings_summary_chronology start_date="" end_date="" />
<!-- Enumeration vol:issue:part as in SICI specification -->
<!-- type "print/CD-ROM/microfilm/online/etc" specified if only one
type else mixed -->
<holdings_summary_enumeration start_vol="" end_vol="" type=""/>

<holdings_detailed_chronology >
  <!-- runs have an id number so that runs can be in overall date
order -->
  <run_chronology id_no="" type="print/CD-ROM/microfilm/online/etc"
start_date="" end_date=""/>
  </holdings_detailed_chronology >
<holdings_detailed_enumeration>
  <run_enumeration id_no="" type="print/CD-
ROM/microfilm/online/etc" start_date="" end_date=""/>
  </holdings_detailed_enumeration>
</holdings>
</holdings_data>

<!-- aggregator databases coverage of title repeated even if title
has changed name ISSN -->
<!-- it might be better not to hold this data in record as data keeps
changing, data could be keep in a separate database -->
<aggregator_databases>
  <aggregator_name>
    <coverage_chronology_summary start="" end=""
embargo_period_months=""/>
    <coverage_enumeration_summary start="" end=""/>
  <!-- If coverage broken use runs as for holdings -->

</aggregator_name>
</aggregator_databases>

<!-- MARC field 510 in CONSER is not complete because of field number
limits use same format and data -->
<!-- it might be better not in record at all as data keeps changing,
data could be in a separate database-->
<!-- CONSER data for this field is not kept up to date -->

<AandI_services_list>

```

SUNCAT Final Report

```
<AandI_service>  
  <Title ></Title>  
  <ISSN></ISSN>  
</AandI_service>
```

```
</AandI_services_list>
```

```
</SUNCAT_RECORD>
```

Appendix 5: Cost Estimates

As a tender will be issued for the development of SUNCAT, this section is regarded as 'commercial in confidence' and is not available in the public version of the report.

Appendix 6: Detailed Labour Costs

As a tender will be issued for the development of SUNCAT, this section is regarded as 'commercial in confidence' and is not available in the public version of the report

Appendix 7: Record Processing Calculations

Sources		Proportions	Number of Records	%	Rate per Week	Weeks	Days	Man-Years	Type of Manual Processing	Records per hour	Minutes per record
CONSER, SSN, SUNCAT	target record has ISSN	0.3	45000	30					none		
CONSER, ISSN, SUNCAT	target record has no ISSN	0.15	22500	15	900	25	125	0.57	automatic title match: with a quick manual check	30	2
CONSER, ISSN, SUNCAT		0.3	45000	30	300	150	750	3.41	automatic title match: selection from list	10	6
		0.1	15000	10	150	100	500	2.27	no title match: manual intervention & resubmit	5	12
		0.15	22500	15	900	25	125	0.57	no title match: no manual processing possible	30	2
		1	150000			300	1500	6.82	Totals		

Appendix 8: Outline Implementation Plan

This section will be revised and updated immediately prior to the start of the tender process.

Appendix 9: MARC21 fields which might be used in SUNCAT

FIXED LENGTH FIELDS

All Leader and 006/007/008 bytes as appropriate

CONTROL FIELDS--0XX

001 Control number
003 Control number identifier
022 International Standard Serial Number
035 System control number(s)
042 Authentication code

VARIABLE FIELDS--1XX-9XX

1XX Main entry
240 Uniform title
245 Title statement (insert \$h)
246 Varying form of title
250 Edition statement
260 Publication, etc. (Imprint)
310 Current publication frequency
362 Dates of pub., vol. designation
4XX Series statement
5XX Notes
6XX Subject added entries
700-730 Name/title added entries
773 Host item entry
780/785 Preceding/Succeeding entry
7XX Other linking entries
8XX Series added entries
856 Electronic location and access

The 650 field contains LC or Medical subject headings (depending on indicator value), and it is possible to incorporate other thesauri or classifications in the free text field 653.

Appendix 10: Sample CONSER record

010 86-644466 \$z sn86-1265
 040 NSD \$c NSD \$d OCL \$d NSD \$d DLC \$d NST \$d DLC \$d NST \$d AGL \$d NST \$d NSD \$d DLC \$d NSD \$d NST \$d NLM \$d NST \$d OCL \$d NSD \$d NST \$d EYM \$d NST \$d NSD \$d NYG \$d NSD \$d CUS \$d OCL
 007 c \$b r \$d u \$e n \$f u
 016 7 9004358 \$2 DNLM
 016 7 SR0057581 \$2 DNLM
 022 0 0887-624X \$y 0360-6376
 030 JPACEC
 032 282240 \$b USPS
 042 nsdp \$a lc
 050 00 QD471 \$b .J6425
 060 00 W1 \$b JO837NAL
 070 0 QD471.J6
 072 0 X500
 082 00 547.7 \$2 19
 092 \$b
 049 ACEA
 210 0 J. polym. sci., A, Polym. chem.
 222 0 Journal of polymer science. Part A, Polymer chemistry
 245 00 Journal of polymer science. \$n Part A, \$p Polymer chemistry.
 246 10 Polymer chemistry
 260 [New York, N.Y.] : \$b Wiley, \$c [c1986-
 300 v. : \$b ill. ; \$c 26 cm.
 310 Semimonthly, \$b <1999->
 321 Monthly (semimonthly in Mar.), \$b Jan. 1991-
 362 0 Vol. 24, no. 2 (Feb. 1986)-
 500 Title from cover.
 510 2 Abstract bulletin of the Institute of Paper Chemistry \$x 0020-3033
 510 2 Chemical abstracts \$x 0009-2258
 510 2 Coal abstracts \$x 0309-4979
 510 2 Computer & control abstracts \$x 0036-8113 \$b 1986-
 510 2 Electrical & electronics abstracts \$x 0036-8105 \$b 1986-
 510 2 Engineering index annual (1968) \$x 0360-8557
 510 2 Engineering index bioengineering abstracts \$x 0736-6213
 510 2 Engineering index energy abstracts \$x 0093-8408
 510 2 Engineering index monthly (1984) \$x 0742-1974
 510 2 International aerospace abstracts \$x 0020-5842
 510 2 Physics abstracts \$x 0036-8091 \$b 1986-
 510 2 World surface coatings abstracts \$x 0043-9088
 510 2 World textile abstracts \$x 0043-9118
 530 Also available online.
 530 Available also by subscription via the World Wide Web.
 650 0 Polymers \$v Periodicals.
 650 0 Polymerization \$v Periodicals.
 650 2 Chemistry \$v periodicals.
 650 2 Polymers \$v periodicals.
 776 1 \$t Journal of polymer science. Part A, Polymer chemistry (Online) \$x 1099-0518 \$w (DLC)sn 98007469

780 00 \$t Journal of polymer science. Polymer chemistry edition \$x 0360-6376 \$w (DLC) 75644575 \$w (OCoLC)2245997

780 06 \$t Journal of polymer science. Part C, Polymer letters \$x 0887-6258 \$w (DLC) 87654288 \$w (OCoLC)13378587 \$g 1991

856 41 \$u <http://www.interscience.wiley.com/jpages/0887-624X/>

936 Vol. 29, no. 1 (Jan. 1991) surrogate LIC

Appendix 11: Fields of the ISSN record

␣ means a blank

TAG	INDICATOR		SUBFIELD	DATA ELEMENT
	1	2		
008	none	none		
			b	Publication status
			c	Start date
			d	End date
			e	Country of publication
			f	Frequency
			g	ISSN Centre code
			h	Type of publication
			i	Alphabet of original title
			j	Language of publication
			k	Medium of publication
012			&b	Internal management data (record creation date etc.)
				ISSN
	␣	␣		Serial of international or national interest
022	1	␣		Serial of purely local interest or ephemeral
			&a	Current ISSN
			&z	Cancelled ISSN
	␣	␣		<u>CODEN and other codes</u>
030			&a	CODEN
			&b	Other codes
	␣	␣		<u>Universal Decimal Classification number</u>
080			&a	UDC numbers from editions other than the reference edition
			&b	UDC numbers from the standard English reference edition
	␣	␣		<u>Dewey Decimal classification number</u>
082			&a	DDC numbers from editions other than the reference edition
			&b	DDC numbers from the standard English reference edition
	␣	␣		<u>Abbreviated key title</u>
			&a	Abbreviated key title
210			&b	Abbreviated qualifying information distinguishing otherwise identical key titles
			&c	Abbreviated qualifying information distinguishing otherwise identical abbreviated key titles
	␣	␣		<u>Key title</u>
222			&a	Key title
			&b	Added qualifying information distinguishing otherwise identical key titles
	␣	␣		<u>Title proper</u>
245			&a	Title proper or common title part of the title proper
			&s	Section, subseries, supplement designation

			&u	Section, subseries, supplement title
246				<u>Variant title(s)</u>
	↳	0		Access to portions of titles and developed forms of key title
	↳	1		Parallel titles
	↳	3		Other forms of title not specified
	↳	4		Cover title
			&a	Title
260	↳	↳		<u>Imprint</u>
			&a	Place of publication
			&b	Publisher
			&c	Date of publication different from that in field 008
510	↳	↳		<u>Coverage by abstracting and indexing publications</u>
			&t	Key title
			&x	ISSN
550	↳	↳		<u>Name of issuing body as on the piece</u>
710				<u>Name of issuing body or conference as established by national cataloguing practice</u>
	0	↳	&a	Name of issuing body (other than a conference)
	1	↳	&a	Name of conference
759	2	↳		<u>Is other language edition of</u>
			&t	Key title
			&x	ISSN
760	2	↳		<u>Is subseries of</u>
			&t	Key title
			&x	ISSN
762	2	↳		<u>Has subseries</u>
			&t	Key title
			&x	ISSN
769	2	↳		<u>Has other language edition(s)</u>
			&t	Key title
			&x	ISSN
776	2	↳		<u>Has editions in other media</u>
			&t	Key title
			&x	ISSN
779	2	↳		<u>Is inset or supplement to</u>
			&t	Key title
			&x	ISSN
780				<u>Former title</u>
	↳	0		Continues
	↳	1		Continues in part
	↳	4		Formed by the union of ... and ...
	↳	5		Absorbed
	↳	6		Absorbed in part
			&t	Key title

		&x	ISSN	
785			Successor title(s)	
	↳	0	Continued by	
	↳	1	Continued in part by	
	↳	4	Absorbed by	
	↳	5	Absorbed in part by	
	↳	6	Split into ... and ...	
	↳	7	Merged with ...	
	↳	8	To form ...	
			&t	Key title
			&x	ISSN
787	2	↳	Related title	
			&t	Key title
			&x	ISSN
789	2	↳	Has inset or supplement(s)	
			&t	Key title
			&x	ISSN
856			Electronic location and access	
	0		Access method (Email)	
	1		Access method (FTP)	
	4		Access method (HTTP)	
		0		Resource
			&u	Uniform Resource Locator (URL)

Appendix 12: Fields in the Ulrich's Record

Field Name	Field Description
Title_UID	Primary key of table
Title	Title of publication
Sub_Title	Subtitle of publication
Trans_Title	Translated title
ISSN	ISSN
Title_Assigned_to_ISSN	Used when significantly different from Title of Publication in Ulrich's database.
Publication_Year	Year first published
RC_Country_UID	Country of publication
Publication_Stop_Year	Last year of publication
Alt_Title_UID	Primary key of table
Title_UID	
Title	Alternate Title
RC_Serial_Title_Type	Type of Alternate Title
RC_Language_UID	Language of Alternate Title
Title_History_UID	Primary key of table
Title_UID	Foreign key
ISSN	ISSN associated with this (historic) title
Seq_Num	Sequence number of history entry for this title
Historic Title	Previous title of publication for this history record
History Comments	Edited narrative that puts history (ies) in context
Dewey Numbers_UID	Primary key of table
Dewey_Number	Dewey Classification System Number assigned to this title
Seq_Num	Sequence number of Dewey entry for this title
Item_UID	Primary key of table
RC_Item_Type_UID	Foreign key
Title_UID	Foreign key
RC_Media_Class_UID	Foreign key
Num_Pages	Number of pages per issue
Large_Type_Ind	Serial item is composed in large type
Large_Type_Point_Size	Point size of text typography if Large_Type_Ind is not null
LC_Cat_Num	Library of Congress Catalog Number
CODEN	CODEN (Assigned by Chemical Abstracts Service)
Subj_Link_UID	Primary key of table
Item_UID	Foreign key
Subj_Head_UID	Foreign key
RC_Subj_Class_UID	Foreign key
Serial_UID	Primary key of table
Item_UID	Foreign key
Title_UID	Foreign key
Columns per page	Number of columns per page in typographical composition
Special_Features_Index_Info	Text field for elaborative description of index information
Back_Issues_Available	Yes/No/Null field
Free_Sample_Available	Yes/No/Null field
Index_Available	Yes/No/Null field
Copyright_Registration_This_Serial	Yes/No/Null field
Free_Photocopies_wo_Permission	Yes/No/Null field
Copy_of_Article_For_Fee	Yes/No/Null field
Royalty_Free_Copy_ABS	Yes/No/Null field
Refereed_Serial_Ind	Yes/No/Null field
Advertising_Available	Yes/No/Null field
Number_of_Volumes	

Issues_per_Volume	
Latest_Volume_Number	
Latest_Volume_Year	Year of Latest_Volume_Noted
Latest_Issue_Number	
Latest_Volume_Qualifier	Text field for elaborative description of Latest Volume information
Base_Volume_Number	Number of Base Volumes per year
RC_Frequency_Type_UID	Foreign key
Volume_Number_of_Times	Number of times Base Volume is updated per year
RC_Frequency_Term_UID	Foreign key
EOV_Season	Beginning Season of volume, if applicable
EOV_to_Season	Ending Season of volume, if applicable
EOV_Month	Beginning Month of volume, if applicable
EOV_Month	Ending Month of volume
EOV_Number	Beginning issue number of volume
EOV_to_Number	Ending issue number of volume
	Code used internally (assigned by Ulrich's staff) to identify and link A&I services to the journals they cover.
Abstract_Index_Master_Code	These codes appear as abbreviations in the print products.
Complete_Record_Indicator	Is Serial a "complete record" according to Ulrich's editorial guidelines?
RC_Ad_Size_UID	Foreign key
Ad_Size_Height	Vertical measurement of full-page advertisement
Ad_Size_Width	Horizontal measurement of full-page advertisement
RC_Size_Scale_UID	Foreign key
Web_Address	URL specific to this serial title
E-Mail_Address	General E-Mail address specific to this title
Unidentified_Supplement_Available	Yes/No/Null field
	Comment regarding price of serials that applies to all prices, or that otherwise cannot be accommodated in the Price table.
Price_Comments	
Status_History_UID	Primary key of table
Serial_UID	Foreign key
Status_Year	Effective year of this status
RC_Status_UID	Foreign key
Seq_Num	Sequence number of status
Status_Notes	Textual description of when status occurred
New_Series_Indicator	New series began with this status history if field is not null
Expected_Resumption_Date	If staus is suspended, and publisher provides expected date
Special_Features_UID	Primary key of table
Serial_UID	Foreign key
RC_Special_Feature_UID	Foreign key
Special_Index_UID	Primary key of table
RC_Special_Index_UID	Foreign key
Serial_Type_UID	Primary key of table
Serial_UID	Foreign key
RC_Serial_Type_UID	Foreign key
Serial_Sub_Type_UID	Primary key of table
Serial_UID	Foreign key
RC_Serial_Sub_Type_UID	Foreign key
Review_Content_UID	Primary key of table
Serial_UID	Foreign key
RC_Review_Content_UID	Foreign key
Language_Content_UID	Primary key of table
Serial_UID	Foreign key
RC_Language_Content_UID	Foreign key
	Text field that allows for elaborative information not covered by RC table data
Language_Comments	
Content_Languages_UID	Primary key of table
Language_Content_UID	Foreign key
RC_Language_UID	Foreign key

Pub_Frequency_UID	Primary key of table
Serial_UID	Foreign key
RC_Frequency_Type_UID	Foreign key
Number of Times	Number of times per year
RC_Frequency_Term_UID	Term that corresponds to field Number of times
Frequency_Qualifier	Text that elaborates on frequency data, if necessary
Price_UID	Primary key of table
Serial_UID	Foreign key
RC_Currency_UID	Foreign key
RC_Price_Type_UID	Foreign key
RC_Price_Basis_UID	Foreign key
Serial_Co_UID	Foreign key
RC_Country_UID	Foreign key
RC_Region_UID	Foreign key
Price_Clarification	text field for explanatory information about price
Secondary_Source_Name	Source of price information, if not the publisher
RC_Subscriber_Type_UID	Type of subscriber this price is valid for
RC_Price_Eff_Desc_UID	Foreign key
Price_Effective_Month	Month price is effective
Price_Effective_Year	Year price is effective
Price_History_Date	Date this price was written to history
Ins_Date	Date this price was entered into database
Co_Name	Company name of source of information
Seq_Num	Display order of price record
Delivery_Price_UID	Primary key of table
Price_UID	Foreign key
RC_Delivery_Type_UID	Foreign key
Delivery_Cost	
Cost_Included_Ind	If delivery cost is included in price record, this field is not null
Circulation_UID	Primary key of table
Serial_UID	Foreign key
RC_Circulation_Type_UID	Foreign key
Circulation_Amount	
Circulation_Audited_Ind	Indicator if circulation is audited
Co_Type_UID	Foreign key
Advertising_Rates_UID	Primary key of table
Serial_UID	Foreign key
Advertising_Rate	Cost of advertisement
RC_Currency_UID	Currency of cost of advertisement
RC_Advertising_Unit_UID	Foreign key
Serial_Annot_UID	Primary key of table
Serial_UID	Foreign key
Annot_UID	Foreign key
Annot_UID	Primary key of table
RC_Annot_Type_UID	Foreign key
Annot_Date	Date of review
Annot	Text of description or review
RC_Annot_Source_UID	Foreign key
Serial_Personnel_UID	Primary key of table
Personnel_Job_Function_UID	Foreign key
Serial_UID	Foreign key
Personnel_Job_Function_UID	Primary key of table
Personnel_UID	Foreign key
RC_Job_Function_UID	Foreign key
Personnel_UID	Primary key of table
Address_UID	Foreign key
First_Name	
Mid_Name	

Last_Name	
RC_Name_Prefix_UID	Foreign key
RC_Name_Suffix_UID	Foreign key
Co_UID	Foreign key
Serial_Address_UID	Primary key of table
Serial_UID	Foreign key
Address_Type_UID	Foreign key
Address_Type_UID	Primary key of table
Address_UID	Foreign key
RC_Address_Type_UID	Foreign key
Address_UID	Primary key of table
Co_UID	Foreign key
Co_Name	"care of" line for this address (if any)"
SAN	Standard Address Number of address (if one is assigned)
Street1	
Street2	
Street3	
Postal_Location	Text identification of post office location, if not a city
City	
City Code	Postal Code of City
RC_State_UID	Foreign key
Zip_Code	Postal Code
RC_Country_UID	Foreign key
County	
APO	
Region	Region within a country
Serial_Comm_Access_UID	Primary key of table
Serial_UID	Foreign key
Comm_Access_UID	Foreign key
Comm_Access_UID	Primary key of table
Co_UID	Foreign key
Address_UID	Foreign key
Personnel_UID	Foreign key
RC_Comm_Access_Type_UID	Foreign key
RC_Comm_Access_Function	Foreign key
Comm_Access_Number	The actual communications access data (phone number, URL, etc.)
Comments	Textual description for comm_access, if necessary
Related_Serials_UID	Primary key of table
Serial_UID	Foreign key
RC_Relationship_Type_UID	Foreign key
Primary_Indicator	If field is not null, then this serial is the primary serial in the group.
Relationship_Num	Unique identifier of the group
Comments	In related serials, where applicable, the years covered
Serial_Co_UID	Primary key of table
Co_Type_UID	Foreign key
Serial_UID	Foreign key
Primary_Publisher_Ind	If this field is not null, then this publisher is primary for this serial
Comments	Text qualifier for this company as it relates to this serial, if necessary.
Serial_Serv_Locator_UID	Primary key of table
Serial_Co_UID	Foreign key
Serial_Locator	Third-party location data
Years_Covered	Years/volumes available from service
Co_Type_UID	Primary key of table
Co_UID	Foreign key
RC_Co_Type_UID	Foreign key
Service_Name	Internal-use identifier of service company provides
Co_UID	Primary key of table
RC_Co_Status_UID	Status of company

Name	Name of Company
Symbol	Internal-user identifier of company
Prev_Name	Previous name of company (if any)
Prev_Symbol	Previous symbol of company
Name_Upper	Name in Upper Case
RC_Country_UID	Country of Company record
Parent_Co_UID	UID of parent company of this one
Abbrev_Description	Spelled-out meaning of acronym in company name
Alt_Lang_Name	Name of Company in alternative language
RC_Child_Type_UD	Foreign key