

CAIRNS Final Report

An Embryonic Cross-sectoral, Cross-domain National Networked Information Service for Scotland?

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0. Overview and Executive Summary

The name CAIRNS is used to refer to two related things:

- An embryonic Scottish national networked information service or Scottish Portal that continues to develop and offers the potential of integrated access to all publicly available research materials, learning and teaching resources, and public information services in Scotland, whether digital or non-digital; it includes SLAINTE¹, and will add NGfL Scotland², BUBL³, Glasgow Digital Library⁴ in early 2001, while work with SCRAN⁵ continues. This is receiving ongoing support within the SCONE project⁶ until December 2001 and then by the CDLR until 2004;
- The eLib-funded and SCURL⁷-backed research project which created the service and ended in December 2000, having not only met all of its major objectives, but also won support in Scotland as the possible hub of a future cross-sectoral and cross-domain national networked information service.

This document is the final report of CAIRNS, the research project. It:

- Charts the development of the project itself, and of the embryonic service;
- Describes problems encountered during the project and lessons learned that are likely to be of value to other groups aiming to set up similar services;
- Provides details of the project evaluation programme and its results;
- Maps out future needs in respect of funding for additional research, development, and maintenance work and why this work would be of value to Scottish citizens and organisations aiming to compete successfully in the Information Age;
- Indicates the extent to which growth of the service is possible in the absence of additional funding and where additional funding is needed;
- Provides information on project finances;
- Encompasses essential background information, such as the Cataloguing Standards and Interoperability reports.

0.1 Activities and progress

The CAIRNS project ended on December 31st 2000, having met all of its major aims and most of its more peripheral aims. It also spawned three related funded research projects (SCONE, SEED⁸, and HILT⁹), and at least one important related initiative (CoSMiC¹⁰), that between them will help improve service within the clump¹¹ in ways that are beyond the scope of the project and will contribute to the aim of building a national networked information service for Scotland. Full details on CAIRNS activities and progress may be found in the report itself, which includes, in particular, an initial section covering all project deliverables and related objectives in logical order, together with associated outcomes. The following table summarises the key achievements of the CAIRNS Project:

¹ See <http://www.slainte.org.uk/>

² National Grid for Learning Scotland. See <http://www.ngflscotland.gov.uk/>

³ See <http://bubl.ac.uk/>

⁴ See <http://gdl.cdlr.strath.ac.uk/>

⁵ Scottish Cultural Resources Access Network. See <http://www.scran.ac.uk/>

⁶ <http://scone.cdlr.strath.ac.uk/>

⁷ Scottish Confederation of University and Research Libraries. See <http://scurl.ac.uk/>

⁸ <http://seed.cdlr.strath.ac.uk/>

⁹ High Level Thesaurus. See <http://hilt.cdlr.strath.ac.uk/>

¹⁰ Confederation of Scottish Mini-Clumps. See <http://scone.strath.ac.uk/dissemination/events.html>

¹¹ Roughly speaking, a clump is a group of distributed catalogues made cross-searchable via the Z39.50 standard and other means of ensuring interoperability between the catalogues.

Project deliverable or objective	Outcome:
Creation of a geographically distributed but centrally co-ordinated cross-searchable virtual union catalogue for Scottish HE based on the international Z39.50 standard potentially encompassing 25 servers at 16 sites utilising systems from 7 different suppliers.	Working system in place with the 20 servers at 13 sites using 4 suppliers of 5 packages available in the event. 3 other servers expected early 2001 (Glasgow Digital Library, BUBL, NGfL Scotland,). 3 others, including public libraries, expected.
Integration of service with all subjects database of Conspectus-based collection strengths to enable the dynamic generation of smaller groups of cross-searchable catalogues appropriate to particular subject interests or geographical areas.	Database successfully integrated and working 'dynamic clumper' service in place.
Investigation of local client-based, local server-based, and central server-based service access routes.	Explored. Main member interest server-based. Dynamic clumper needs central server.
Explore cross-sectoral issues with public libraries.	Explored in various ways (see full report).
Explore cross-domain issues.	Explored with SCRAN, epixtech, Elias
Ensure service extendible beyond initial membership.	Ensured. Promoted through CoSMiC.
Maximise level of interoperability possible across the member sites of the distributed catalogue.	Ensured, includes broadcast searches with variable attributes and circulation data.
Improving user access to information, regardless of location, adding value to current systems.	Improved access through cross-searchable one stop shop service and single interface.
Exploit SCURL's current organisational structure and associated inter-institutional agreements.	Current structure helped manage project and get agreement on design, cataloguing standards, distributed serials (projected service), access agreements update and so on.
Work with users to ensure that CAIRNS interoperability is achieved within the context of an effective and efficient service to users.	Achieved through building results of user evaluations into development plans.
Progress various peripheral issues as time allows: Inter-Library Loans, Authorisation and authentication, distributed serials, surrogate Explain Service, current contents to serials service.	ILL awareness day held and ILL librarians asked to evaluate, distributed serials pilot planned post project, minimal progress on remaining three issues – see main report.
Test results and analyses.	Done. See main report.
Establishing requirements for future development.	Done. See main report.
Providing a model for other similar distributed services based on Z39.50, including guidelines to consider when setting up similar systems.	Model system in place, also work with CoSMiC, papers, presentations, guidelines in this report and in planned future work.
From CAIRNS experience, make recommendations to SCURL on any adjustments to SCURL functions and inter-institutional co-operative processes.	Recommendations made and accepted on CAIRNS future, cataloguing standards, distributed serials and other issues.
Contribute to the draft UK interoperability profile.	Contributions made on several occasions
Propose metadata scheme for the description of targets and collections.	Made contributions to RSLP/UKOLN schema discussions, implemented schema via SCONE.
Provide appropriate user and system documentation.	Done where appropriate. Some via online help. See report for more details.
Annual reports and final report to eLib as specified.	Completed with the sending of this report.

0.2 Summary of lessons learned

Project staff and participants learned a great deal about building and managing a distributed service of this kind. A full account of these is provided in the body of the report and will be of value to others setting up similar services elsewhere, whether it be regional organisations of other groupings in Scotland wishing to run mini-clumps or others wishing to set up clumps similar to CAIRNS in regions of the UK or, indeed, in areas beyond the UK. Particularly significant lessons learned include:

- Members of a clump need to remember to 'Think globally before acting locally', and to be encouraged and trained to do so by the organisation responsible for the clump.

- Agreed cataloguing and indexing standards and associated training and monitoring are essential to full interoperability, although a useful functioning system can, given the right conditions, be put in place despite problems in these key areas. Agreed cataloguing and indexing standards must be the long term aim, however.
- It is possible – and, in the absence of significant resources for support and development, probably wise - to build a working system based on ‘off the shelf’ products. Specially developed software can give additional flexibility, but it makes the system difficult to maintain and development of it difficult to sustain unless significant resources are available to offer salaries and contracts that will enable the service to attract and hold on to the necessary programming expertise.
- As expected, integration of the distributed catalogue service with a collection description database proves to be the most flexible approach to creating sub-groups of catalogues for cross-searching for particular purposes – e.g. searching for a particular subject strength, location in a particular region, or on the basis of comparing other user criteria with the collection descriptions data (e.g. user wants electronic as opposed to hard-copy materials). In the context of the SCONE project, it is also viewed as important to co-ordinate collaborative collection development efforts via the same database, thus linking collection management with user navigation in the distributed service.
- Even within companies selling products based on Z39.50, there is a dearth of information available about the standard, how individual aspects of it affect interoperability, and even how it is implemented within the company’s software. Establishing and maintaining good communications with the right staff in such companies is a must, as is mutual support and information and training sharing within the clump itself.
- Human interaction between clump members at a number of levels is as essential to interoperability as things like Z39.50 itself and cataloguing standards. This, in turn, will only work efficiently if the group is relatively small. In CAIRNS, this is seen as implying the need to work both with bodies serving particular sectors, regions, and other groupings, such as SCURL, ALF¹², and particular domains, such as the Scottish Library and Information Council (SLIC)¹³ or SMC or SCA, but also an organisation like CoSMiC that will enable inter-sectoral, inter-domain, and other levels of co-ordination to take place.
- Firewalls are a problem in respect of Public Library Z servers.

Many of these have implications for the enterprises such as the DNER, and also for individual organisations either in, or aiming to join, a clump like CAIRNS. The full report contains additional information on these and other similar implications.

0.3 Final evaluation results

Formative (informing ongoing development and decision-making in the project) as well as summative (providing evidence of effects and longer term impacts) evaluation of the project was carried out and the full report of the project evaluators¹⁴ is included as Appendix A. Although it included a number of qualifications and recommendations which will be noted and acted on as CAIRNS is taken forward under SCONE and the Centre for Digital Library Research (CDLR)¹⁵, its main conclusion was positive:

“The CAIRNS Project made important progress towards establishing a comprehensive union catalogue for Scottish HE. The Project demonstrated the feasibility of this ambition - in organisational and technical terms. Where the Project encountered technical or other difficulties, these were identified quickly and appropriate recommendations were made. The Project adopted a mature and intelligent approach to its objectives, abandoning some goals that were found inappropriate and exceeding expectations in other areas. Key objectives were met. It is important that this work is carried forward towards implementation of a robust and comprehensive service.”

0.4 Future development

The CAIRNS Project Business Plan or ‘exit strategy’ was discussed at the SCURL meeting of the 22nd June 2000. In summary, it proposed:

¹² Ayrshire Libraries Forum. See <http://www.slainte.org.uk/alf/alfohome.htm>

¹³ <http://www.slainte.org.uk/Slic/slichome.htm>

¹⁴ Dr F Henderson, A McLean, Robert Clark Centre for Technological Education, Glasgow University

¹⁵ See <http://cdlr.strath.ac.uk/>

- Continuation of the basic service under SCONE then the CDLR until at least 2004.
- SCURL support for applications for project funding to support further developments¹⁶ aimed at creating a cross-sectoral and cross-domain national networked information service¹⁷ for Scotland based on CAIRNS and SCONE.

The meeting unanimously agreed with the central proposal that CAIRNS should continue and that it should develop in a Scotland-wide (as opposed to just HE) context. A small group (with CAIRNS representation) was set up to outline the SCURL's own HE vision within this context and to enter into discussion with other appropriate Scottish bodies such as SLIC to take the developmental aspect of the plan forward. The full Business Plan is included as Appendix B. SCURL has also agreed that both the CAIRNS Liaison Group and the CIGS¹⁸-coordinated CAIRNS Cataloguing Issues Working Group should continue to meet to assist in the ongoing development and maintenance of CAIRNS and CAIRNS-related standards.

- End of Main Report Section 0 (Executive Summary) -

¹⁶ Much work is required if the embryonic service is to develop into the envisaged portal to a Scottish Networked Information Service that is cross-sectoral and cross-domain. Some of this will be done within the SCONE, SEED and HILT projects (indirectly in the case of SEED and HILT), but a great deal of further work - and the associated funding that is a pre-requisite - is needed beyond this. This work is sketched out in the CAIRNS Exit Strategy (see Appendix B). Also, a particular non-development problem that needs attention relates to an apparent limit on the number of simultaneous users which appears to be set at 5 in this system. Since the software is in use in big libraries for user access to the library catalogue, this is assumed to be fixable. It is only a problem when class use is envisaged, the limit has never been hit in normal everyday use.

¹⁷ Original reference to a 'National Electronic Library', changed to cover cross-domain ambitions.

¹⁸ Cataloguing and Indexing Group in Scotland. See: <http://www.slainte.org.uk/cigs/cigshome.htm>

1. Activities and Progress

Note: The report on progress for the period following that covered in the Annual Report for the year 2000 is included as Appendix C, the section below covers achievements overall

1.1 CAIRNS Bid: Deliverables and Objectives

The CAIRNS bid – see <http://bubl.ac.uk/org/scurl/docs/cairns1.htm> - specified a set of deliverables:

- A working system comprising the elements outlined elsewhere in the bid;
- A user-adaptive system as outlined elsewhere in the bid;
- A dynamic clumping service based on a development of the RCO¹⁹ service;
- Progress on ILL, authorisation and authentication services, a distributed serials service, a current contents to serials service, and an Explain Service;
- Test results and analyses;
- Contributions to the draft UK interoperability profile;
- Proposal for a metadata scheme for the description of targets and collections;
- Installation documentation;
- System operation documentation for local systems and the clumper;
- User documentation;
- Regular reports to eLib at intervals specified by eLib;
- Final report.

It also specified an associated set of objectives:

- Work with the various sites and associated suppliers to achieve the highest level of interoperability possible between the various SCURL servers, operating both on the total clump and the various sub-clumps;
- Work with users to ensure that this interoperability is achieved within the context of an effective and efficient service to users;
- Develop a dynamic clumping service based on a development of the SCURL conspectus-based Research Collections Online service;
- Investigate and compare various clumping models - local client-based, local server-based, central-server based, including their interaction with the dynamic clumping service (Note: some suppliers in the bid already have functionality in their origins that will facilitate clumping);
- Compare the level of interoperability achieved within SCURL with the draft UK interoperability profile and propose amendments if required;
- Contribute to Information Strategy deliberations in SCURL institutions through liaison with the CATRIONA II project;

¹⁹ The original Research Collections Online Service showed users who searched or browsed the Conspectus subject headings on the web-site which libraries were strong in which subjects. Users then had to search each individual catalogue separately. The dynamic clumper was to extend this to allow cross-searches of sub-clumps of services strong in a particular area using Z39.50, to offer this through a common user interface, and to provide extended help information.

- Define and if possible develop an enhanced system for inter-exchange of metadata describing targets (for example a surrogate Explain Service);
- Make recommendations to suppliers regarding developments to enhance the interoperability and clumps-related functionality of their Z39.50 products;
- Begin to investigate other elements of interest, including Inter Library Loans, access control, and a distributed SCURL serials catalogue;
- Compile a set of guidelines and questions to consider to aid others intending to form similar clumps in the future;
- Make recommendations to SCURL as regards any adjustments to SCURL functions and inter-institutional co-operative processes suggested as a result of experience gained from the project.

The table below lists all of these deliverables and objectives in logical juxtaposition and reports on progress in each showing, we believe, that CAIRNS met all of its major aims and most of its more peripheral aims.

1.2 Deliverables, Objectives and Project Outcomes

1	A working system comprising the various elements outlined in the bid:
Deliverable	Set up a SCURL clump, comprising 25 servers at 16 Scottish sites (13 Universities, NLS, QMC, ED Public), incorporating software from a range of suppliers (Geac, Ameritech, VTLS, MDIS, SP, Ovid, III), and offering a comprehensive union catalogue for Scottish HE without the cost and effort of setting up and maintaining a central database.
Outcome	The CAIRNS clump now includes all of the Scottish University sites that it had been planned to include within the CAIRNS clump within the timescale of the CAIRNS Project. It had been anticipated that Saint Andrews, Heriot Watt and Paisley University Library would have observer status within the project and would not provide a Z target. The inclusion of Saint Andrews and Heriot Watt as CAIRNS targets is an achievement beyond the scope of the project proposal. Paisley will also become a CAIRNS target when technical problems at the supplier end are overcome. Heriot Watt has been integrated into the clump but has asked to be removed pending a system upgrade. It was originally anticipated that the CAIRNS clump would consist of 25 servers at 16 Scottish sites. This high number was arrived at because a number of sites had two Z servers, one for the library system and one for another database. However, during the project a number of these databases (for example OVID and Silverplatter) have fallen into disuse at a number of CAIRNS sites and so a number of the original Z servers are no longer available to CAIRNS. There is, however, a working system in place with the 20 servers at 13 sites using 4 suppliers of 5 packages available in the event. 3 other servers expected early 2001 (Glasgow Digital Library, BUBL (both added in January 2001), NGfL Scotland (expected later in the year)). The CATRIONA II database was to be included, but was superseded by the Strathclyde University Digital Information Office database and timescales were such that this won't be included in CAIRNS for a few months yet. East Dunbartonshire Public Library have had their Z server for sometime but it is not accessible and so far attempts to change this situation have failed. A replacement public library system was found to allow the project to retain the public library element but access has so far been impossible because, we believe, the site is behind a firewall. [Note: Over the lifetime of the project, the number of targets available has fluctuated greatly due to factor such as system upgrades. This fact is reflected in various project reports where the list of targets is not always the same list, although the basic core is always the same.]
Deliverable	Ensure that it is configurable as a number of more specialised fixed and/or dynamically generated) sub-clumps(geographical, material type (electronic resources on BUBL Z39.50, CATRIONA II, SLAINTE); subject-based (based on RCO), distributed SALSER).

Outcome	Both dynamically generated and fixed mini-clumps are in place. The original RCO collections database has been successfully integrated into the service and a working dynamic clumping service as described below is in place.
Deliverable	Investigate all of the following as access routes to the service <ul style="list-style-type: none"> • local client-based (GEOPAC, WINPAC); • local server-based (GEOWEB, III WEBPAC, Ameritech WEBPAC); • central server-based (EUROPAGATE, GEOWEB)
Outcome	In software terms, all three routes were investigated but the focus has mainly been on central gateway software because the dynamic clumper currently needs to be based on a single central database and project resources did not permit the development of interfaces between this and local server-based clients (although this has not been ruled out as a possible future development). CAIRNS has investigated a number of server-based Z client packages during its lifetime: GEOWEB, Europagate, ZAP, Innopac, epixtech and LibriVision. Innopac is a local server based client at Glasgow University and epixtech was originally a local server based client at Strathclyde that was subsequently used as the central gateway. Europagate was used as the central gateway prior to epixtech and GEOWEB was the first central gateway. ZAP and LibriVision have been of interest because of their ability to handle both MARC and GRS-1 records and therefore to potentially incorporate the SCRAN service (and now ZETOC) into the clump. Local client based approaches have not been of great interest to the clump participants in the event, but work has been done using EndNote, Reference Manager, Z-Navigator and Bookwhere.
Deliverable	Address cross-sectoral issues by including of East Dunbartonshire Public (strong local history collection) in the clump and inviting the major Glasgow (Mitchell) and Edinburgh public libraries (members of SCURL) to take up observer status within CAIRNS.
Outcome	All three included but so far none has an accessible Z server. However, discussions are in hand with two public libraries that do have Z servers and cross sectoral issues are being addressed in a number of different ways. The problem with Public Library servers and firewalls is described briefly elsewhere.
Deliverable	Address cross-domain issues.
Outcome	Work has been ongoing with SCRAN and suppliers of packages that will either handle GRS-1 records at some level or offer the possibility of such an extension. This has involved ZAP, LibriVision, and, more recently, epixtech.
Deliverable	Ensure the clump is extendable beyond initial membership.
Outcome	The Glasgow Digital Library database and St Andrews University were beyond the initial membership and have now been added. More notably, work is ongoing to include SCRAN, NGfL (Scotland) and, in time, the various members of the various regional and other organisations represented within the CAIRNS-inspired CoSMiC. Adding a service to the clump is a relatively simple matter provided that the service meet certain basic criteria (see Appendix H).
Deliverable	Associated Objective: <ul style="list-style-type: none"> • Work with the various sites and associated suppliers to achieve the highest level of interoperability possible between the various SCURL servers, operating both on the total clump and the various sub-clumps.
Outcome	This has been ongoing activity over the whole period of the project, although it is only evidenced by the overall running of the service. We are successfully cross-searching 20 servers from five different software packages (Innopac, Endeavor, epixtech Horizon and Dynix, Sirsi) at both clump and sub-clump level. We are able to optimise cross-compatible retrieval by sending different attribute sets to different services for the same search. We can successfully display accurate holdings and circulation information for all epixtech sites (the majority of CAIRNS sites) and have successfully returned circulation information from other suppliers sites (not in the current interface at the moment but expected to be returned in future). All of this has involved significant levels of working with both sites and their suppliers over the duration of the project. Technically we can do more to improve the level of interoperability but lack of project resources (staff time) and administrative factors (members and vendors can't supply necessary information) limit our current ability to do this. However, the service is (demonstrably) consistently returning good and useful results to users.

Deliverable	Associated Objective: <ul style="list-style-type: none"> Investigate and compare various clumping models - local client-based, local server-based, central-server based, dynamic clumping service interacting with all three.
Outcome	There has been no real interest in CAIRNS in local client-based interfaces, except as special purpose tools (e.g. Endnote, Reference Manager) and no significant work has been done on this front (although Glasgow University did a work for their own users on Endnote and Reference Manager). The main work has focused on web-server based clients and a lot of work has been done on using a number of these for basic cross-searching (see above). To date, the more specialised dynamic clumping work has only been done with the epixtech software, previously used as a local server-based client, but now used as the central gateway. No work has been done as yet on interfacing other local server-based packages with the dynamic clumper. This should be possible, however, and will be investigated further post-project with any CAIRNS members interested in doing this.
2	A user-adaptive system as outlined elsewhere in this bid:
Deliverable	Improving the extent to which users are able to search for and retrieve appropriate information on available resources, regardless of their location.
Outcome	The system allows libraries to be cross-searched in ways not previously possible and to do so via a common user interface. It provides extensive online help information and is integrated with a database describing Scottish collections. The integration of access to this database with CAIRNS via the dynamic clumping mechanism also facilitates user navigation and information landscape compilation.
Deliverable	Provide an added-value service to the HE community both within Scotland and across the UK.
Outcome	This has been provided. Value has been added in the ways described above. Also, for users outside Scotland, the provision of a single entry point to a significant range of Scottish services is an additional added value service.
Deliverable	Exploiting SCURL's current organisational structure and associated inter-institutional agreements.
Outcome	SCURL's current structure helped manage the project, through involvement from both the SCURL IT Group, SCURL Collections and Services Group, and SCURL itself. This structure was crucial in obtaining agreement on interface design, cataloguing standards, distributed serials (projected service), an access agreements update and the CAIRNS exit strategy.
Deliverable	Associated Objective: Work with users to ensure that CAIRNS interoperability is achieved within the context of an effective and efficient service to users.
Outcome	This was done by involving users of various kinds in three interface evaluations and building the results into technical development plans. See Section 3 on Evaluation for further details. It is demonstrated in the working embryonic service and in the largely positive reaction from users to the new service.
Deliverable	Associated Objective: Develop a dynamic clumping service to provide a mechanism to alter user screens according to user inputs.
Outcome	Successfully achieved – see 3 below (next item).
3	A dynamic clumping service based on a development of the RCO service;
Deliverable	Associated Objective: Develop a dynamic clumping service based on a development of the SCURL conspectus-based Research Collections Online service.
Outcome	This has been successfully developed and can be seen working. It currently enables subject strength based and geographical sub-clumps to be generated dynamically (i.e. not pre-fixed) by mapping user input or subject menu choices with the collections database and has the capability of being extended beyond the current functionality in various ways through improved data content – user profile based landscapes, dynamically clumped gateways for cross-sectoral regional organisations like ALF and the Glasgow Digital Library, material type clumps (e.g. electronic services only), and so on.
4	Progress on various subsidiary issues as time allows:
Deliverable	Inter-Library Loans issues.

Outcome	An awareness day was held for ILL librarians and discussions took place on ILL potential of CAIRNS. CAIRNS is known to be used by ILL librarians who were involved in the evaluations. The GAELS project used CAIRNS as the basis of its Glasgow-Strathclyde document delivery service.
Deliverable	Authorisation and authentication services.
Outcome	These issues were only discussed in the context of CAIRNS in that they never became an issue, mainly because the local Z39.50 CD servers we intended using to address them in a practical way were phased out by the member institutions before the tests could be started. However, the discussions have continued and may lead to experimental work with library suppliers software packages in the future, particularly if funding can be found to expand this aspect of the service.
Deliverable	A distributed serials service.
Outcome	Some initial work was carried out and it will be possible to set up a pilot soon. SCURL has agreed that sites will build serials only indices at system replacement time so that a fully distributed serials service will be possible at some future stage.
Deliverable	A current contents to serials service.
Outcome	It was not possible to investigate this due to lack of priority and project time.
Deliverable	A surrogate Explain Service.
Outcome	CAIRNS abandoned the development of a CAIRNS surrogate Explain Service in favour of the provision of the equivalent information about the CAIRNS targets through other means. For example, by registering the CAIRNS sites on the UKOLN Directory of Z39.50 targets in the UK ²⁰ , and by providing information in the CAIRNS help pages. Another reason why CAIRNS has not put further resources into the development of a surrogate Explain Service is because it was considered to be unlikely that any vendors would implement the origin support for Explain in the foreseeable future and that therefore users would be unable to access this information. The major achievement in this area is the much enhanced collections database at the heart of the dynamic clumper. This provides some of the information that a surrogate Explain Service would supply.
Deliverable	Associated Objective: <ul style="list-style-type: none"> • Begin to investigate other elements of interest, including Inter Library Loans, access control, and a distributed SCURL serials catalogue.
Outcome	See above.
Deliverable	Associated Objective: <ul style="list-style-type: none"> • Define and if possible develop an enhanced system for inter-exchange of metadata describing targets (for example a surrogate Explain Service).
Outcome	See above.
5	Test results and analyses;
Deliverable	Testing the feasibility of integrating the various services in the clump to form a functional and user-adaptive whole.
Outcome	The embryonic CAIRNS service shows that this has been done and the various pieces of online information describe the level of the achievement. More progress could be made with more resources.
Deliverable	Testing and extending the limits of interoperability.
Outcome	A significant amount has been achieved in this respect and interoperability levels have been maximised to the extent possible given resource levels within the project, and other factors such as the difficulty in obtaining hard information from suppliers. A full report on interoperability within the clump and on the phased approach taken within CAIRNS to the ongoing attempt to move towards full interoperability is provide in Appendix F.
Deliverable	Establishing requirements for future development of the initial service.
Outcome	This has been done in various ways, partly through the SCONE, SEED and HILT projects, partly through the CAIRNS Exit Strategy, partly by other means. See Section 4 of this report for details.
Deliverable	Providing a model for other clumps elsewhere.

²⁰ UKOLN directory of Z39.50 targets in the UK. See <http://www.ukoln.ac.uk/dlis/zdir/>

Outcome	A model working clump and dynamic clumper has been set up, demonstrated, and written about. It will continue to be maintained until at least 2004 and articles and presentations will continue to describe and demonstrate it. The CDLR will continue to offer advice where it is sought to help other regional clumps set up. Moreover, CAIRNS has helped start CoSMiC which, amongst other things, will offer Scottish regional, sectoral and domain-specific organisations advice, support and facilities to help build intersecting networks of Scottish regional, sectoral, and domain-specific mini-clumps.
Deliverable	Associated Objectives: <ul style="list-style-type: none"> • Compile a set of guidelines and questions to consider to aid others intending to form similar clumps in the future.
Outcome	Included in various parts of this report (see section 2 and appendices D, F, G and H). Also, the CDLR continues to offer advice and give information of this kind to organisations via articles, leaflets, and presentations. A single set of guidelines encompassing all aspects in one document has not yet been compiled but is being considered as a possible early CoSMiC initiative
Deliverable	Associated Objective: <ul style="list-style-type: none"> • Make recommendations to SCURL as regards any adjustments to SCURL functions and inter-institutional co-operative processes suggested as a result of experience gained from the project.
Outcome	Particular successes in this area have been: <ul style="list-style-type: none"> • Agreement to build serials only indices at system replacement; • Cataloguing standards group set up; • Inter-access agreements improved and updated; • Business plan agreed; • Approval of CAIRNS recommendations on cataloguing and indexing standards; • Continuation of CAIRNS Cataloguing Issues Working Group to continue to support CAIRNS, the service; • Continuation of CAIRNS Liaison Group to continue to support CAIRNS, the service; • SCURL agreement to join CoSMiC.
6	Contributions to the draft UK interoperability profile.
Deliverable	Associated Objectives: <ul style="list-style-type: none"> • Compare the level of interoperability achieved within SCURL with the draft UK interoperability profile and propose amendments if required. • Make recommendations to suppliers regarding developments to enhance the interoperability and clumps-related functionality of their Z39.50 products.
Outcome	CAIRNS has made a study of interoperability levels within the clump. Further details can be found in Appendices E (Cataloguing and indexing guidelines) and F (interoperability report). In the process, the project has made contribution both to the original UK Interoperability profile and to the Bath profile. Recommendations to suppliers have been made throughout the project.
7	Proposal for a metadata scheme for the description of targets and collections.
Deliverable	Proposal for a metadata scheme for the description of targets and collections.
Outcome	CAIRNS and SCONE made numerous contributions to the RSLP/UKOLN collection level description schema ²¹ . In addition, SCONE has implemented the collections level description schema for operation within the CAIRNS service when it is taken over by SCONE in January 2001.
8	Installation documentation.
Deliverable	Installation documentation.
Outcome	This deliverable is no longer appropriate, because CAIRNS epixtech gateway is developed from an off-the-shelf software package, and the vendor provides installation documentation. Support documentation is provided for maintaining the DreamWeaver and ColdFusion templates and Access database which drive the dynamic clumper. Advice will be given to other clumps on request.
9	System operation documentation for local systems and the clumper.

²¹ RSLP collection description project. See <http://www.ukoln.ac.uk/metadata/rspl/>

Deliverable	System operation documentation for local systems and the clumper.
Outcome	This information is provided within the help in the CAIRNS gateway - click on ZSERVERS in the HELP section of the service. Additional documentation has also be provided detailing the use of the SQL database of RSLP collection level descriptions in the development of the target selection stage of the CAIRNS gateway (see Appendix H below).
10	User documentation.
Deliverable	User documentation.
Outcome	User help has been provided within the CAIRNS gateway.
11	Contribute to Information Strategy deliberations in SCURL institutions.
Deliverable	Associated Objectives: <ul style="list-style-type: none"> Contribute to Information Strategy deliberations in SCURL institutions through liaison with the CATRIONA II project.
Outcome	This somewhat peripheral deliverable became impossible to progress. The CATRIONA II recommendations were in time acted upon at Strathclyde University and a Digital Information Office set up but this was only beginning to engage with such questions (at Strathclyde and within the Glasgow Digital Library project) towards the end of 2000 when CAIRNS ended. It was therefore impossible to meet this deliverable.
12	Regular reports to eLib at intervals specified by eLib.
Deliverable	Complete and send annual reports.
Outcome	Completed .
13	Final report.
Deliverable	Complete and send final report.
Outcome	Completed with the sending of this report.

1.3 Additional Outcomes

CAIRNS spawned three related funded research projects (SCONE²², SEED²³, and HILT²⁴), and at least one important related initiative (CoSMiC²⁵), that between them will help improve service within the clump²⁶ in ways that are beyond the scope of the project and will contribute to the aim of building a national networked information service for Scotland:

SCONE (Scottish Collections Network Extension project) is an RSLP-funded project which aims to aid researchers by extending existing collaborative collection management work carried out within the framework of the SCURL into new areas and investigating effective models for building and sustaining a co-ordinated Scotland-wide distributed national resource. This would be conveniently accessible to researchers via the CAIRNS distributed catalogue, the Research Collections Online based dynamic clumping service, and SCURL inter-access policies.

SEED, funded by the Scottish Executive Education Department, is part of an ongoing programme of cooperative initiatives undertaken by the SCURL. The project aims to aid researchers by adding existing subject descriptions of research collections to the Research Collections Online (RCO) database, establishing a means to keep the data current, *and extending this data to include collections held in public libraries and elsewhere in Scotland.*

HILT (High-Level Thesaurus project) is a one year project jointly funded by JISC and the RSLP. It can be viewed as an extension of the SCONE and CAIRNS projects in terms of the mapping and use of the Conspectus subject scheme (see other project details). The purpose of the project is to study and report on the problem of cross-searching and browsing by subject across a range of communities, services, and service or resource types (Libraries, Museums, Archives, the DNR, clumps, the DNER, the RDN, bibliographic databases, numeric data, and others) - to research the problem, analyse and

²² <http://scone.cdlr.strath.ac.uk/>

²³ <http://seed.cdlr.strath.ac.uk/>

²⁴ <http://hilt.cdlr.strath.ac.uk/>

²⁵ Confederation of Scottish Mini-Clumps – see <http://scone.strath.ac.uk/dissemination/events.html>

²⁶ Roughly speaking, a clump is a group of distributed catalogues made cross-searchable via the Z39.50 standard and other means of ensuring interoperability between the catalogues

document its exact nature in detail, determine whether it can be solved and, if so, how, and attempt to reach a consensus on the issue across the various communities, services and initiatives identified by the project as stakeholders.

CoSMiC, the Confederation of Scottish Mini Clumps, is a SLIC-based organisation that will seek to promote co-operative activity between similar cross-sectoral regional organisations across Scotland. One aim will be to investigate the use of the CAIRNS system to generate virtual gateways to the distributed catalogues of these organisations. Another will be to look at the potential for using the national approach to collaborative collection management being promoted within SCONE to perform the same co-ordinating function at a regional level. Once the CoSMiC web site is up, it will be at <http://cosmic.cdlr.strath.ac.uk/>. Members include SESLIN (South East Scotland Library Information Network), UHI (University of the Highlands and Islands), ALF, TAFLIN (Tayside and Fife Library Information Network), Glasgow Digital Library, Grampian Information. SCURL have also indicated an intention to join.

The CAIRNS dynamic clumper is so designed as to be able – in time - to dynamically generate any combination of targets that users might want to search – all SCURL collections, all Stirling or Edinburgh Collections, all Public Libraries or FE collections, all electronic collections, all museums or archives, all ALF collections and so on. The SCONE work will be able to echo this infrastructure to allow individual libraries or museums or archives or services to co-operate with each other as regards collaborative collection management and shared preservation (probably) in whatever combinations suit their purposes – so Napier might elect to work within this framework with the SESLIN group of libraries and the SCURL group and (say) the electronic services group and so on, Paisley within SCURL, ALF, and electronic services etc. CoSMiC is designed to echo this ‘mix and match’ approach at an organisational (i.e. people) level.

SCURL agreed to continue the work of both the CAIRNS Liaison Group (a mix of systems librarians, reference librarians, and cataloguers from SCURL institutions) and the CIGS and CAIRNS Cataloguing and Indexing Standards group beyond the end of the project.

1.4 Particular successes

Particular successes include:

- Creation of a working distributed catalogue service based on off-the-shelf software.
- Integration of the SCURL Conspectus-based collection strengths database (RCO) into the clump as a basis for the dynamic clumping service.
- Creation of a working services to dynamically generate cross-searchable sub-clumps of the total clump based on region and on subject strength coverage.
- A high profile service increasingly well known in Scotland.
- Acceptance by SCURL of the CAIRNS Exit Strategy proposal.
- Funding for three projects that allow further development of the service (e.g. SCONE) or a resolution of associated issues (e.g. HILT).
- The creation of CoSMiC to reflect the structure and possibilities of the dynamic clumper at an organisational level.
- Plans for network-based co-operative collection management work to keep the collections database up to date (SCONE project).
- Successful use of CAIRNS in practical contexts such as is described in the Napier Re-classification project case study (see Appendix G).
- Greatly improved understanding in SCURL libraries - and to a lesser extent, Scottish libraries as a whole - of both the potential of these technologies, the problems they entail, and the best approaches to dealing with these problems.
- Through working with SCONE, practical instantiation of RSLP/UKOLN Collection Level Description model and schema, and an understanding of its strengths and weaknesses (mainly the former - it has proved very resilient to date).
- Consulted extensively by SLIC on interoperability and access issues in their role as advisors to the 'Organising Information' strand of the Scottish Executive's Digital Scotland initiative.

- End of Main Report Section 1 (Activities and Progress) -

2. Summary of lessons learned²⁷ (incorporating learning from the process of implementation)

Project staff and participants learned a great deal about building and managing a distributed service of this kind – lessons likely to be of value to others setting up similar services elsewhere, whether it be regional organisations or other groupings in Scotland wishing to run mini-clumps or others wishing to set up clumps similar to CAIRNS in regions of the UK or, indeed, in areas beyond the UK:

General

2.1 Members of a clump need to remember to 'Think globally before acting locally', and to be encouraged and trained to do so by the organisation responsible for the clump.

Three points are worth making here:

- In a clump, local changes can affect users of the clump everywhere. Unless such changes can be picked up by the system automatically, which is unlikely at the current state of development, it is vital that members inform each other, and the organisation running the clump, of any changes made, ahead of the change if possible. More important than this, however, is the need to *take the clump into consideration before making a local change* and to attempt to meet both the local need and the global need when the change is agreed and effected.
- Many organisations on hearing this said (or reading it written) are likely to ask why they should take other institutions and their users into account when making such changes, commenting that they are, after all, only funded to support their own users. There is a simple answer to this question. If it is true that even the biggest institutions can no longer meet all of the needs of their own users themselves, then it follows that their own users need to be able to cross-search the home institution's database with the databases of other institutions - which means, in turn, that any local change that causes a deterioration in the cross-searching service is detrimental, not just to users from other institutions, but also to the users of the host institution itself. In other words, thinking globally before acting local *is* in the interests of their own users.
- Funding bodies may wish to consider whether the unwillingness of some organisations to embrace changes for the good of the whole clump on the (incorrect) basis that such change will not benefit their own users ought to be 'factored in' to funding models.

2.2 Agreed cataloguing and indexing standards and associated training and monitoring are essential to full interoperability, although a useful functioning system can, given the right conditions, be put in place despite problems in these key areas. Agreed cataloguing and indexing standards must be the long term aim, however.

Scottish interest in distributed systems goes back many years. There was some debate in SCURL circles over whether or not the first version of SALSER should be based on the WAIS software technology, interest in a Z39.50-based distributed approach to cataloguing electronic materials (CATRIONA Project 1994-95), and it was also possible to base early CAIRNS investigations into the indexing practices of member's sites on an early Briefing Paper by Fred Guy of the National Library of Scotland charting SCURL practices in this area. Partly as a result of this background, but also because of the keen interest that CIGS took in CAIRNS, combined with the growing understanding within the project of the importance of cross-compatibility of cataloguing and indexing practices to full interoperability, CAIRNS took steps at a relatively early stage to work with SCURL and CIGS to create a CAIRNS Cataloguing Issues Working Group with cataloguers from all institutions. This group investigated and charted variations in practices, agreed preferred approaches and made short term and long term recommendations that would improve the situations they discovered. These recommendations were presented to, and accepted by, SCURL, and the short term recommendations were acted on by CAIRNS. They are included within this document as Appendix D. The discussions at the group meetings were lively and interesting and produced much useful detail on problems and practices in Scotland in these areas. The papers of the group could be made available to other similar groups interested in pursuing this aspect of the

²⁷ As agreed with the eLib office, these two mandatory areas of the Report (2 and 6) have been merged

interoperability problem. Both they, and studies within the project itself, produced a number of interesting insights:

- It was discovered that organisations are not always fully aware of what their actual, as opposed to stated, practices are in respect of mapping records to indices. In at least one institution, the stated policy was found to be out of date because cataloguers had - for very good reasons - made changes without notifying these changes to others beyond cataloguing. Moreover, the set up of such mappings in library systems can often be complex and, in some cases, misleading to the untrained eye. Again, at least one organisation's stated policy was at variance with what was actually set up on the indexing sections of the library system software.
- It was discovered that different suppliers can mean different things when they talk about 'phrase searching'. At least two variant practices have been noted. Some systems seem to create phrase search indices based on concatenating the sub-fields in a tag and indexing the result, while others appear to index the sub-fields as separate units. This has a significant impact on title keyword searching, as a keyword phrase formed by the last words of a title and the first words of its subtitle will succeed in the former environment, and inevitably fail in the latter.
- Cataloguing and indexing is an area where the warning to 'Think globally before acting locally' is particularly important, for at least two reasons. On the one hand, in a distributed system, a change to cataloguing or indexing practices can affect everyone in the clump and should therefore be taken with the global as well as the local picture in mind. On the other, it is important, at least at the current state of development, that changes to practices be notified to other libraries and to a central system like CAIRNS so that necessary adjustments can be made.

2.3 It is possible – and, in the absence of significant resources for support and development, probably wise - to build a working system based on 'off the shelf' products. Specially developed software can give additional flexibility, but it makes the system difficult to maintain and development of it difficult to sustain unless significant resources are available to offer salaries and contracts that will enable the service to attract and hold on to the necessary programming expertise. Where a fully 'off-the-shelf' solution is impossible, 'standard' packages such as a SQL compliant RDBMS and products like ColdFusion are the next best thing.

CAIRNS began with this assumption and found in the process of developing the current CAIRNS product that it had been right. A brief summary will give a flavour of this 'process of affirmation':

- CAIRNS began with an off-the-shelf gateway product from Geac called Geoweb. It quickly determined, however, that the product had what, at the time, were insurmountable limitations in the CAIRNS context (note that these limitations no longer apply, this was an early version of the software). To get similar results from the various sites, it is necessary, in current circumstances, to send different attribute sets to different sites for the same search. This was impossible in the early version of Geoweb.
- The project accordingly moved to a 'kit-based' approach utilising the Europagate software and attempted to attract a programmer who could take the project forward. In this, we were successful, but only for a short time. The person employed soon moved on to more lucrative and attractive conditions elsewhere and we then had to attempt to find a replacement. This took close on four months and we had only four applicants. None were entirely suitable, in that all needed training. One was chosen but left after four months. We then had to begin the process all over again. Again we had only four candidates. Two were suitable but one had another post before the interviews came round. The remaining person was suitable but only wanted to work part-time. We agreed to this, offered the job, then the person was offered better terms by their existing employer and declined our offer. A year had passed and virtually no development had taken place.
- We reverted to off-the-shelf products. This time, the Ameritech (now epixtech) Webpac product became available. We knew this could deal with the earlier problems we'd encountered because we'd been looking at it under our local server-based clients programme. We were then able to use another off-the-shelf product by the same company to implement the dynamic clumper and integrate the two together. By this time, we had come full circle, back to our starting assumption that an 'off-the-shelf' approach was best - especially since it gave a

stable upgrade path and reduced dependency on a scarce resource (programmers with skills and interests in the Z39.50 area).

- That having been said, we have recently determined that a more scalable approach to dynamic clumping was necessary and opted for a database-driven approach based on MS Access providing dynamic content to the user interface via ColdFusion templates, but that too will be replaced if a fully off-the-shelf alternative can be found. It may also be necessary if cross-searching collection description databases using Z39.50 becomes an issue.

2.4 As expected, integration of the distributed catalogue service with a collection description database proves to be the most flexible approach to creating sub-groups of catalogues for cross-searching for particular purposes – e.g. searching for a particular subject strength, in a particular region, or on the basis of comparing other user data with the collection descriptions data (e.g. user wants electronic as opposed to hard-copy materials). In the context of the SCONE project, it is also viewed as important to co-ordinate collaborative collection development efforts via the same database, thus linking collection management with user navigation in the distributed service.

The aim in CAIRNS was always to test the mechanism proposed for the dynamic clumper rather than the efficacy of the data in the database which drove it. In respect of the mechanism, we are confident that it works in that it provides the most efficient way to create information landscapes appropriate to particular purposes when the services in the clump may well be appropriate to a number of landscapes (e.g. Paisley University may be part of the HE mini-clump, part of the ALF mini-clump, and part of particular subject mini-clumps). In respect of the data, this question is being dealt with within the SCONE project where the aim is to link user navigation in CAIRNS to collaborative collection management and user interface control through allowing staff updates of the collections database at the heart of the dynamic clumper (see <http://scone.cdlr.strath.ac.uk/> and the user evaluation section note in section 3 below for further details).

2.5 Even within companies selling products based on Z39.50, there is a dearth of information available about the standard, how individual aspects of it affect interoperability, and even how it is implemented within the company's software. Establishing and maintaining good communications with the right staff in such companies is a must, as is mutual support and information and training sharing within the clump itself.

Over the period of the project, CAIRNS participants have been found it difficult to obtain good information on company Z39.50 products from company staff and has in many case been given what turned out in the event to be misinformation about products and their Z39.50-related characteristics. This will only improve if clumps like CAIRNS take ongoing concerted attempts to pressure companies to improve the situation. Much of the progress that has been made has often relied on trial and error. As experience within the clump grows, an understanding of which questions to ask companies and how to interpret the (and whether to believe them) will also grow and it may be sensible at an early stage for clumps to make and co-ordinate self-help based efforts in this area.

2.6 Human interaction between clump members at a number of levels is as essential to interoperability as things like Z39.50 itself and cataloguing standards. This, in turn, will only work efficiently if the group is relatively small. In CAIRNS, this is seen as implying the need to work both with bodies serving particular sectors, regions, and other groupings, such as SCURL, ALF, and particular domains, such as SLIC or SMC or SCA, but also an organisation like CoSMiC that will enable inter-sectoral, inter-domain, and other levels of co-ordination to take place.

At the current state of development at least, and possibly even beyond that, it is the CAIRNS experience that good levels of interoperability within the clump require good communications at the human level. This is true both in respect of creating an interoperable system in the first place and in maintaining it. It may be the case in the future that everyone is applying the same cataloguing and indexing standards, and using systems that index in similar ways, implement Z39.50 in an identical fashion, communicate information about what information is where in a record, and so on, but until that is true human interaction is needed to ensure that interoperable

systems are created and maintained. Even in the longer term this seems likely to be true in some areas, and is, in any case, likely to be required for other elements of the co-operative process, such as collaborative collecting and control of portal landscapes. The belief in Scotland is that we are just about the optimum size at the national or macro level but still require further devolution to sectoral, regional or domain level to ensure good human interaction in this respect. CoSMiC is thus designed to allow these levels of interaction, echoing both the variable landscaping possibilities of the dynamic clumper, the requirements of a flexible approach to collaborative collection management, and political, financial, and geographical realities. We believe that a combined regional, sectoral and domain-based approach at these various levels is also the best way of ensuring that the system develops and is maintained along lines appropriate for, and hospitable to, the various user groups likely to use the clump.

2.7 Firewalls.

Early attempts to bring Public Libraries into the clump have hit the problem that Z servers will not operate as part of the clump if they are behind firewalls, compounded by the fact that there is a reluctance in associated systems support departments take a more flexible attitude on firewalls where Z servers are concerned - a fact likely to be a significant problem for enterprises such as the People's Network.

2.8 Company pricing policies on Z servers.

The project believes that there is an issue in relation to company pricing policies on Z server software in at least two respects:

- Some companies charge extra for the software, some bundle it in to the total price. There is also a significant variation in terms of levels of pricing amongst those who do charge. User groups and clumps and others should push for a company approach to this that would encourage take up and ensure better support and development.
- The position with regard to the need to run multiple Z servers to access multiple databases at the same site needs to be looked at. Often, companies do not have a policy at all. When they do, it can require additional Z servers to be purchased to offer access to multiple databases. This may not always be the best approach at individual sites and is potentially prohibitively expensive.

2.9 Dealing with Local Publications

The CAIRNS approach of incorporating a link between collaborative collecting and user navigation may be the best - if not the only - way of dealing with local publications in a geographical area; its possible relevance to SLIC's National strategy for Scottish materials (available in PDF format at <http://www.slainte.org.uk/slicpubs/scotmatestrat.pdf>) is a case in point. The nature of this material is such that only local librarians may be able to collect it before it disappears, and that areas of interest overlap between geographical areas. A distributed approach, co-ordinated nationally, at both a human collaborative collecting level (via CoSMiC and the proposed SCONE Portal) and a technical level (via the CAIRNS dynamic clumper) may be the best approach. It may also be applicable elsewhere in the UK.

Lessons for the DNER

All of the various point above are relevant here. Particular points making in addition are:

- If the CAIRNS experience is illustrative, then a simple statement of standards and guidelines is not enough to ensure initial and ongoing interoperability. Interaction at a human level is also important - interaction incorporating, amongst other things, training, awareness raising, self-help in respect of Z39.50 expertise, cataloguing expertise and so on.
- In the experience of CAIRNS, there are difficulties in using ordinary language (albeit professional) to describe emerging services, especially where new concepts arise and no recognised terms exist. We should try and get maximum consistency between the terms we are necessarily having to invent to describe the working parts of the service. In CAIRNS, there seems to be general agreement on something like 'dynamic clumper' (and therefore 'dynamic clumping',

'dynamically-clumped', etc.) and 'broadcast searcher' (and therefore 'broadcast search', 'broadcast searching', etc.) but there a range of difficulties like this in this new distributed environment and some kind standardisation based on requirements and work with actual users seems advisable .

Lessons for Other Institutions and Organisations

Again, the various points made above are relevant here. However, the follow list may be helpful:

- It is important that institutions be aware of the precise nature of what they are doing in respect of clump-related questions (e.g. index mapping, changes to cataloguing and indexing practices, changes to addresses and ports and database names, Z server set ups). This requires in-depth research by cataloguers and systems librarians and good communications within and outwith the organisation.
- Z servers often do not reload automatically after system shutdowns or crashes. Institutions offering Z servers must therefore check up regularly on the status of their Z server(s), aim for 24/7 uptime if possible, and always notify others of changes in set ups or software versions.
- Firewalls are a problem for Z servers - investigate the position in your organisation now.
- It is important that institutions work both with their own staff and with other members of the clump to promote and foster a 'Think globally before you act locally' culture through awareness raising, training and change monitoring mechanisms.
- If your own users need to resources catalogued elsewhere then THEY need to be able to cross search YOUR database with OTHER DATABASES - THAT is why you should spend money on interoperability. It does not just benefit other organisations and their users, it benefits your users too.
- Factors affecting interoperability - and, therefore, service to users - within a clump, are subject to constant change. Becoming a member of a clump is therefore an ongoing responsibility to maintain vigilance, communication mechanisms, standards, and 'clump awareness'.

- End of Main Report Section 2 (Lessons learned) -

3. Final evaluation results

3.1 Report of the External Evaluators

Formative (informing ongoing development and decision-making in the project) as well as summative (providing evidence of effects and longer term impacts) evaluation of the project was carried out and the full report of the project's external evaluators²⁸ is included as Appendix A. Although this included a number of qualifications and recommendations which will be noted and acted on as CAIRNS is taken forward under SCONE and the CDLR, its main conclusion was positive:

“The CAIRNS Project made important progress towards establishing a comprehensive union catalogue for Scottish HE. The Project demonstrated the feasibility of this ambition - in organisational and technical terms. Where the Project encountered technical or other difficulties, these were identified quickly and appropriate recommendations were made. The Project adopted a mature and intelligent approach to its objectives, abandoning some goals that were found inappropriate and exceeding expectations in other areas. Key objectives were met. It is important that this work is carried forward towards implementation of a robust and comprehensive service.”

3.2 User Evaluations Summary

CAIRNS user evaluation policy was outlined in the CAIRNS Project Evaluation Plan, written during the first few months of the project. The evaluation plan allowed for two major programmes of formative evaluation to take place after completion of the two main technical goals of the project. Each of the formative evaluation programmes was to consist of questionnaires and focus groups of users and was to be reported on, and this information fed into the future technical development of the project in a cumulative way. In accordance with the evaluation plan, the first evaluation programme took place in March 1999, after the establishment of author, title and subject (ATS) searches through the CAIRNS service. The second programme of evaluation took place in May 2000 after the extension of the CAIRNS service to include ISBN and ISSN searches, and to include 'dynamic clumping' (a service to guide the user to CAIRNS targets that meet his search requirements, and to assist the user to locate CAIRNS targets in the geographical region or subject area of interest to the user).

The CAIRNS Project was extended to December 2000 to allow for completion of the technical goals of the project, following difficulties experienced in attracting and retaining technical project staff. The extension to the project allowed further technical development of the service to take place, together with a third user evaluation of the CAIRNS service, consisting of questionnaires circulated to approximately thirty librarians²⁹, academics and students associated with the library targets of the CAIRNS project. Users involved in the third user evaluation (October 2000) were asked questions about the appearance and functionality of the CAIRNS query screen, results screen and help information. Users were also asked about the usefulness of the CAIRNS service to their work and they were also asked to suggest improvements to the CAIRNS service. Since the effect of feeding back the results of evaluations into the CAIRNS service design were cumulative, this report focuses mainly on the last of the evaluations which focused on something close to the product as it was by the end of the project phase of its lifetime.

Findings of the October 2000 CAIRNS user evaluation

1. Appearance of the CAIRNS service

In response to comments made in the May 2000 evaluation, the appearance of the CAIRNS screens had been simplified to reduce the need for users to scroll down screens, and information about the service was removed to help screens. As a direct result to changes made, feedback regarding the appearance of the CAIRNS service was more positive than in previous evaluations. Feedback was particularly

28 Dr F Henderson, A McLean, Robert Clark Centre for Technological Education, Glasgow University

29 It being recognised that students and academics were not the only 'users' of CAIRNS

positive from users that had participated in the other two CAIRNS formative evaluations, who were asked to compare the new appearance of the service with its earlier appearance.

It had not been possible to change the across-screen display of the list of records resulting from CAIRNS searches; the display is under the control of the epixtech broadcast searcher software. Evaluation results in May 2000 indicated that users found this display difficult to read, and comments made in this evaluation indicated that this remains a problem for users.

2. CAIRNS help information

In response to the CAIRNS evaluation in May, further information was provided for users about the CAIRNS searches, and this was appreciated by users. At the time of the evaluation, certain background information was not yet available to users through the CAIRNS help screens and users commented that provision of additional information would help them to properly understand the results of searches made on CAIRNS. Users commented that the provision of access to help information through a help button on each screen, was an improvement to the service.

3. CAIRNS simple and advanced search screens

In response to comments made in the May 2000 user evaluation, the CAIRNS 'simple search' screen was created, in addition to the 'advanced search' option. The provision of a simple search, requiring minimal key strokes was generally felt by users to be an improvement on the earlier, more complicated, CAIRNS standard search. This needs further, better informed, user evaluation at a later date. The search looks simple but users do not see the underlying problems. It is also unlikely to scale in a bigger system. However, users suggested the following improvements to the CAIRNS search pages:

Targets available for searching

A window at the top of the screen displays one of the targets available for searching, and when the arrow at the side of the window is selected, CAIRNS provides a list of all of the targets available to that search. CAIRNS users misunderstood the information provided in this window, and a significant number of users thought that only the first target displayed in the window was searched, and were confused when CAIRNS results included targets other than the first target displayed in the window. Users indicated that the presentation of the list of targets available to searches on CAIRNS should be improved.

Search provided to each target

It has not been possible to optimise the simple search of each target to the same index, because different indices are provided by different targets. This caused some confusion with the results provided by CAIRNS and users suggested that the results pages should indicate where non-standard results have been provided by particular targets. It was acknowledged that CAIRNS help information provides information about non-standard results, but it was felt that this information should also be provided on the results pages. Users indicated that it would be helpful to be able to move directly from the simple search to the advanced search page, rather than having to first select the help page.

4. Reliability of CAIRNS search results and usefulness of the service

Users involved in the evaluation of CAIRNS indicated that it would be helpful for more information to be provided on the search results pages of CAIRNS about non-standard searches. It was understood that it would be difficult to solve, even in the longer-term, certain underlying causes (including local cataloguing and indexing practice) of problems with CAIRNS results. However, the overwhelming response from users was that the CAIRNS service ability to provide almost instantaneous searches to multiple Scottish resources was useful, and would become more and more useful in the future. In particular, ILL Librarians reported an increase in the use and usefulness of CAIRNS to their work, as a result of recent changes to charges by the British Library ILL service (see also Napier Case Study in Appendix G of this report).

5. Speed of CAIRNS searches

User feedback on the speed of the provision of results to searches carried out on CAIRNS varied from 'almost instantaneous' to 'I had to wait for more than two minutes before a result was presented'. At this time, the cause of the difference in response time to searches on CAIRNS is unclear, but this is an area that requires further investigation. The project staff are often surprised at 'almost instantaneous' responses to cross searches of a number of sites.

6. CAIRNS 'mini clump' search screens

CAIRNS 'mini clumps' are CAIRNS search screens customised to the needs of a particular group of users. Evaluation questionnaires indicated that the provision of customised screens for particular user needs was useful, and saved time in terms of keystrokes. However, users indicated that, a new CAIRNS user would be unlikely to find the CAIRNS mini-clump search screens. Users suggested that it should be made more easy to locate the CAIRNS customised screens.

7. CAIRNS 'dynamic clumping' service

Participants in earlier CAIRNS user evaluations reported that the dynamic clumping screens were very much easier to navigate through, and that the appearance was much improved. In a repeat of findings from earlier evaluation work, users indicated that they approved in principle of a service to assist them in navigating to search targets which meet their interests. However, users reiterated earlier findings that the subject strength information upon which the CAIRNS dynamic clumping service is based is unreliable, and they would not recommend its use (but see Note 1 below).

8. Targets included on CAIRNS

Following the pattern of responses from earlier feedback from CAIRNS users, participants in this evaluation commented that, to supplement a service searching Scottish library databases, it would be useful if users could access the databases of the Mitchell Library and Edinburgh Central Library (relevant to the work of the SEED project). A secondary addition to the CAIRNS service would be to focus on the subject interests of users and provide customised search access to appropriate subject specialist databases outside Scotland.

Conclusion

The CAIRNS user evaluation of October 2000 indicated that considerable improvements had been made since the May 2000 user evaluation to the appearance and usability of the CAIRNS user interface and help information provided. Users indicated areas of possible improvement to the CAIRNS service, in particular in the area of presentation of information on non-standard results and the presentation of lists of records returned by CAIRNS. However, the most important response of users was their overwhelming support of the service and their interest in continuing to use the service in their day to day work, in its current state.

Note 1: Subject Strength Information and Dynamic Clumping

This 'user' comment is based on the opinion of librarians who are seen as a significant proportion of the CAIRNS user group. It is a prevalent view amongst SCURL members. The project recognised from the beginning that it was the dynamic clumping *mechanism* and the basic idea that was the focus of its efforts and these, as can be seen above, attracted positive comment. Two things should be noted:

1. The doubts expressed within SCURL on this matter appear to be uniformly based on a recognition that, despite the use of the Conspectus methodology, the results in the initial database were based largely on professional judgement, and that it was not clear that the judgements were being made on a compatible and consistent basis. SCONE has studied this in some detail (as far as that is possible). The SCONE view is:
 - a. That the attitude is based on the almost universal view that "we did it properly but other libraries didn't do it as well or as rigorously as we did"

- b. That, in the last analysis, any measurement of collection strength is likely to be based on a subjective judgement. Thus:
 - i. Most libraries are not in a position to take advantage of more automatic methods of measuring collection strength based on counting numbers of items and sampling for particular publications because of the difficulty of mapping their databases to 'control' databases like OCLC's Worldcat and the cost of rectifying this situation (although it will be interesting to see the results of the recently funded CURL-RSLP collaboration in this area; the SCONE Project Director is a consultant on this project).
 - ii. It is arguable that even such exercises are merely automated aids to assessments that, in the last analysis, are nevertheless based on 'subjective' professional judgements. Questions here are: How do we ensure no subjective bias in the choice of sampling texts? If we are to measure at least the three levels covered in Scotland – teaching, research and comprehensive – how can assessment of 'teaching' as opposed to 'research' be based on anything other than 'subjective', albeit professionally informed, judgements? When we are talking numbers, how do we know – other than subjectively – whether 100 items in one collection are equivalent to 100 in another? And would the results differ if mapped to the differing user requirements in the institutions concerned?
 - iii. A recent exercise to update the Conspectus data has not been producing much in the way of changed entries compared with the original exercise despite these often-expressed reservations about 'subjectivity' and 'inconsistency'.
- 2. The problem – if it is a problem – is being addressed by the SCONE project which will allow all library collection managers to update their entries in the database. The view taken increasingly in SCONE is that the idea of 'collection strength' is at best a little clumsy, and an unhelpful way of guiding users to the resources they need - that a better answer lies in the SCONE proposal to build a staff collection management portal with facilities to enable staff updates of the database and staff control of the associated user navigation methods, and to associate this with both online and offline communication mechanisms to enable staff to develop a shared view of what users need. The hope is that this will ensure:
 - a. A close association between the user navigation tool and collaborative collecting in Scotland and therefore better guidance for users.
 - b. Cross-compatibility and consistency in respect of collection descriptions.
 - c. Ultimately, feedback mechanisms to measure usefulness to users that will improve the navigational data and inform collaborative collecting.

SCONE is also now adding named collections to the database based on the RSLP/UKOLN model. Moreover, in the last analysis, the dynamic clumping mechanism is seen as a means of creating portal type views on a whole range of bases: all HE libraries, all astrophysics collections, all public libraries, all Ayrshire libraries, all museums, all services for secondary school pupils, and so on. This development is envisaged, but not explicitly funded in SCONE.

- End of Main Report Section 3 (Final Evaluation Results) -

4. Future development

CAIRNS did not occur in isolation. It is a natural extension of an ongoing SCURL programme and vision that has incorporated a range of initiatives over many years. These include (but are not necessarily limited to) the CATRIONA (1) project, SALSER, the Conspectus exercise, the SPIS programme, RCO, the Datasets Initiative, SEED, SCONE, and CAIRNS itself. In a sense, its future development has been underway since the funding of the SCONE and SEED projects and, indeed, its development will continue under the SCONE project until December 2001. Another related project, HILT, will have outcomes that will inform another part of its development - the question of the subject scheme employed in the dynamic clumper and how it relates to local subject schemes. In essence, therefore, a certain amount of development is already ongoing and seeking funding for further development as described in the CAIRNS Business Plan is expected to take place during 2001 as SCONE develops. Getting cross-sectoral and perhaps even cross-domain support for this is seen as crucial and much work has been taking place over the last six months with this end in view. In the main, this has focused on the following areas:

- The SCURL group charged with developing a future HE vision for SCURL in the context of a Scotland-wide approach to the development of CAIRNS (see below).
- The CoSMiC group set up by CAIRNS and the various regional library organisations in Scotland to discuss regional mini-clumps managed via CAIRNS and a range of other co-operative issues.
- Advice to SLIC on 'interoperability and access' issues relating to its submission to the 'Organising Information' aspect of the Scottish Executive's Digital Scotland initiative.
- A recent agreement between SLIC and the CDLR at Strathclyde University to work together in the context of the SLAINTE and CAIRNS/SCONE initiatives to build a Scottish Portal.

These efforts arose out of the CAIRNS Project Business Plan or 'exit strategy', presented to SCURL at its meeting of the 22nd June 2000. In summary, this proposed:

- Continuation of the basic CAIRNS service under SCONE then the CDLR until at least 2004.
- SCURL support for applications for project funding to support further developments aimed at creating a cross-sectoral and cross-domain national networked information service³⁰ for Scotland - a Scottish Portal - based on CAIRNS and SCONE.

The meeting unanimously agreed with the central proposal that CAIRNS should continue and that it should develop in a Scotland-wide (as opposed to just HE or HE and Research) context. A small group was set up to outline the SCURL's own HE vision within this context and to enter into discussion with other appropriate Scottish bodies such as SLIC [12] to take the developmental aspect of the plan forward. The full Business Plan is included as Appendix B. Very briefly, it proposed the following in terms of development:

that SCURL seek project funding - ideally in conjunction with SLIC and non-library communities with related interests such as the archives and museums communities - with a view to:

- *Implementing a full Scotland-wide, digital and non-digital, cross-sectoral and cross domain, user configurable and adaptive resource discovery portal, together with an associated organisational collections management support service and gateway*
- *Implementing short-term and long-term mechanisms for dealing with metadata based interoperability problems (including retroconversion requirements)*
- *Tackling access and authentication issues and the requirements of integrating the new extended user and staff support services and associated interfaces both with local systems, opacs and web-sites, and cross-sectoral and cross domain regional groupings such as ALF, GLASGOW DIGITAL*

³⁰ Original reference to a 'National Electronic Library', changed to cover cross-domain ambitions

LIBRARY and others (includes interface with hybrid library, user requirements, service evaluation studies)

The expressed aim being to pursue the vision of

- A Scottish distributed union catalogue;
- That is cross-sectoral and cross-domain, including libraries, museums, archives and others (users don't just want books or articles on, say, industrial development in Glasgow, they want pictures, videos, sound clips, archives of scholars and companies, anything relevant);
- Covers both hard-copy and electronic resources, including services like NGfL, SCRAN, SuffI;
- Integrates intelligently with any future UK union catalogues or catalogues, or EU union catalogue or catalogues, and with major external catalogues generally;
- Has dynamic clumper based navigation based on a collection descriptions database covering all important collections in Scotland;
- Has associated Collaborative Collection Management policies based on - and co-ordinated through - the same database;
- Offers, in addition, automatically generated user-selected information landscapes (or 'resource constellations') based on subject strengths, task to be performed, user group and level, geographical region, organisational affiliation, digital vs. non-digital, and other user-selected criteria;
- Is moving in a planned way towards full interoperability both in terms of metadata and conformance with the Bath Profile;
- Has in place inter-organisational support mechanisms, such as a cataloguing standards group, a Confederation of Scottish Mini-Clumps (CoSMiC) and (possibly) and inter-library loans and document delivery system.

The vision has developed somewhat since then in various areas, but still remains essentially the same in respect of core proposals. As indicated previously, these are outlined in greater - but not full - detail in the Exit Strategy in Appendix B below. In the meantime, research bids have been submitted when the opportunity arose to approach some of the development needs in a piecemeal fashion. At least four such bids will be assessed in the next few months. A bid to support the main proposal is being discussed with a number of interested parties but awaits identification of a suitable source of funding.

A note on the scalability of the CAIRNS service

The database of collection level descriptions allows additional Z targets to be registered as collections of metadata, with related records for the collections described by the target, including their subject strengths, geographical location, and conditions of access to the materials. A separate data table holds technical information about the target Z servers; this table is linked to the collections database, so that appropriate parameters can be passed to the broadcast searcher for each collection selected in the dynamic clumper. There is no technical limit to the number of targets which can be added to the service.

Hierarchical relationships between collection records allow a scalable degree of control over granularity issues. A single target's metadata may describe more than one institutionally-based collection (Napier's target gives access to the combined catalogue of Napier University and West Lothian College libraries), or many special collections of rare books (the Edward Clark Collection at Napier), private libraries or subject-specific research collections (departmental libraries in the ancient Universities). Separate collection records contain data appropriate to a specific level of granularity; this data, such as electronic location of an online catalogue, is inherited by the records for child

collections. There is no technical limit to the depth of analytic description of coverage of the target metadata.

ColdFusion templates contain SQL statements programmed to link collection descriptions at any level of granularity with the appropriate Z server. Various types of relationship between collection records are allowable according to the RSLP/UKOLN Collection Level Description model. The dynamic clumper can therefore be configured for any desired level of granularity supported by the underlying data. The precision with which collections can be selected for searching is directly controlled by the granularity of the collection descriptions.

The searching of collection descriptions themselves, as opposed to broadcast searching their corresponding Z servers, becomes an issue as the number of servers and granularity of description grows. Dynamic clumping is fully scalable, being dependent entirely on the precision of collection records, but simple alphabetical browsing of collection titles, institutions and locations will become increasingly ineffective as lists get longer.

The scalability of the broadcast searcher component of the service depends on a number of factors. The epixtech Z client documentation indicates that the number of targets supported is open-ended, but the project was unable to test more than 25 in practice. The broadcast searcher requires adequate bandwidth for its Internet connection to provide users with an acceptable response time. Potentially, it must be able to handle a complex search sent to all available targets. The addition of desirable enhancements to the basic service, such as de-duplication of search results, will create scaling problems for the processing power required.

- End of Main Report Section 4 (Future Development) -

5. Project finances

CAIRNS PROJECT

<u>DESCRIPTION</u>	<u>CEI/JISC</u>	<u>EXPENDITURE</u>	<u>BALANCE</u>
	<u>FUNDING</u>		
	<u>ALLOWANCE</u>		
<u>SALARIES</u>			
Project Officer		82,983.95	
Clerical Assistant		13,353.90	
SUB TOTAL GLASGOW SALARIES 97/00	99,596.00	96,337.85	3,258.15
Technical Officer		33,395.58	
Contract Spending - GD		18,000.00	
SUB TOTAL STRATHCLYDE SALARIES 97/00	55,404.00	51,395.58	4,008.42
SUB TOTAL CAIRNS SALARIES 97/00	155,000.00	147,733.43	
TRAVEL			
SUB TOTAL GLASGOW TRAVEL 97/00		11,050.56	
SUB TOTAL STRATHCLYDE TRAVEL 97/00		3,501.68	
SUBTOTAL CAIRNS TRAVEL 97/00		14,552.24	
CONSUMABLES			
SUB TOTAL GLASGOW CONSUMABLES 97/00		5,276.45	
SUB TOTAL STRATHCLYDE CONSUMABLES 97/00		1,210.58	
SUB TOTAL CAIRNS CONSUMABLES 97/00		6,487.03*	

EVALUATION			
USER EVALUATION		1530.99	
EXTERNAL EVALUATION		4631.50	
SUB TOTAL CAIRNS EVALUATION 97/00		6,162.49	
SUB TOTAL NON-WAGE RECURRENT 97/00	34,000.00	27,201.76	6,798.24
EQUIPMENT			
SUB TOTAL GLASGOW & STRATH EQUIP 97/00	16,000.00	15,453.02	546.98
GRAND TOTAL G&S 97/00	205,000.00	190,388.21	14,611.79

* Note that this figure does not include the cost of production of the final report

End of Main Report Section 5 (Finances) -

- End of Main Report -

The CAIRNS Project External Evaluation Report

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Introduction

This report documents the evaluation of the CAIRNS Project, including evaluation episodes generated internally by the Project staff and externally by the evaluation team in the Robert Clark Centre for Technological Education. The role of the external evaluation and this document is to give an overview of the success of the Project, its process, and its impact, before drawing overall conclusions. Findings will be reported in the four sections that follow.

Section 1 – The Project

- outlines the Project, the needs of the funding body and its external evaluators.

Section 2 – The Process

- considers the process evaluation of the Project –examining its structure and the success of its management. It reports on the formative and summative evaluation conducted throughout the Project; and briefly considers forecasting and planning at this stage of the Project's life.

Section 3 – Impact

- reports on the CAIRNS dissemination effort. It also examines the extent to which the Project's objectives were met.

Section 4 – Conclusions

- summary conclusions of findings reported in Sections 2 and 3.

Section 1 – The Project

1.1 Introduction

To best understand the CAIRNS Project and its evaluation, it is critical to consider the underlying goals of the initiative which sponsored the research, the Electronic Libraries Programme (eLib), and this is done in Section 1.2.

The eLib Programme gave detailed evaluation guidance and recommendations to the projects it funded in a document prepared by the Tavistock Institute in London. This guidance is considered in detail in Section 1.3.

The CAIRNS Project itself is described in Section 1.4, including its aims, objectives and structure.

1.2 The Electronic Libraries Programme

Every evaluation of any programme should be mindful of the needs of the stakeholders (Patton, 1990). Hence the objectives of the CAIRNS Project's funder, the Electronic Libraries (eLib) Programme, are important to the design and reporting of the evaluation of the Project. The eLib Programme aims to encourage and increase the use of network services and electronic media in UK Higher Education and so improve access to information, increase library performance, and improve the quality of teaching and research. To facilitate this, eLib predicts and supports the formation of new communities within the library and academic sectors, and this is an implicit objective of the eLib Programme. Central to the eLib initiative is learning by doing, rather than a narrow focus on product outcome. The eLib Programme has appreciated that the pace of change in the electronic library has forced the need to learn as it evolves, and intends these lessons should assist future Projects and the community in general.

1.3 The Tavistock Guidelines

The role of the Tavistock Institute's guidelines are to assist and focus evaluations conducted by projects in the eLib initiatives. The guidelines suggested that evaluation should consider the needs of the Project's stakeholders and that its results should be made available to the stakeholders. These results should assist the direction of the and should contain an element of *process evaluation*, that is, consider the development, implementation and, if appropriate, the maintenance of the Project and its Service - not only the outcome of its objectives. Finally, they suggested that the evaluation should contribute in some way to the dissemination, which would contribute to the uptake of the Project's knowledge and outcomes. This last point can be seen as fulfilled in most projects simply by the participation of user-stakeholders in the 'formative' and 'summative' evaluation process. By taking part in that process, stakeholders are learning about the Service and this in turn should feed into their future practice, implicitly or explicitly.

The CAIRNS Project Management Team evaluated the progress of their Project and its achievements using the three key elements of an operational approach to evaluation, as defined by the Tavistock Guidelines. These are:

1. The evaluation of Steering or Advisory Groups
2. Structured, systematic feedback
3. Forecasting and planning

This evaluation report on the CAIRNS Project, reviews the success the Project using this same approach, and it is therefore worthwhile considering the approach and its recommended methods in more detail.

1. The evaluation of Steering or Advisory Groups

The Tavistock Institute recommended that the Project steering or advisory group should consist of members who have influence, knowledge, strong professional networks, and the ability to take decisions of short and long-term influence on the Project and its outcomes. Further, they propose that this group should demonstrate a broad base of membership i.e. be representative of the key stakeholder groups in both management and beneficiary sectors. They suggest such a group should show memberships from senior management in the institutions, senior academics, intermediate and end-users (e.g. library staff, teaching staff who can represent student interest), publishers, and 'others relevant to their programme area and local circumstances' (p.7 – Kelleher et al, 1996).

The Guidelines also suggested that the tasks the steering group embraces should be clearly identified, and proposed 4 main goals of the Steering Group against which can be examined for evaluation purposes.

1. Providing general steerage for the Project, including its redirection if necessary.
2. Giving general advice on matters pertaining to the interface between the Project and its institutional and wider environment
3. Providing ongoing formative feedback, on the basis of Project reports and evaluation data.
4. Acting as a mechanism to disseminate Project learning.

2. Structured, systematic feedback

The Tavistock's description of this component in the operational approach is essentially 'conventional' evaluation i.e. the design of formative and summative studies, methods of data collection, interpretation and reporting of the findings, and acting on the results.

3. Forecasting and planning

The Tavistock's Guidelines suggest that in some cases viability should be considered under the forecasting and planning banner, including assessments of direct effects and market potential. This

falls out with this evaluation report's agreed specification. A brief description of the future of the CAIRNS Service will be included under this heading.

Section 1.4 – The CAIRNS Project

The following subsections examine the aims of the CAIRNS Project, its objectives, structure and consortium membership.

1.4.1 The Aims of the CAIRNS Project

The central aim of the CAIRNS Project was to integrate the catalogues and information services of the SCURL members, not only with each other, but also with other resources elsewhere:

CAIRNS aims to integrate the 25 Z39.50-compliant catalogues or information services of CAIRNS sites across Scotland into a functional and user-adaptive test-bed service.

[\(http://cairms.lib.gla.ac.uk/\)](http://cairms.lib.gla.ac.uk/)

The aims of the CAIRNS Project were broadly to provide:

- A comprehensive union catalogue for Scottish HE without the cost and effort of setting up and maintaining a central database.
- A set of smaller specific subsets of this catalogue appropriate to particular purposes (e.g. a particular subject of interest)
- A means of integrating access to different types of resources (e.g. simultaneous searches for hard copy and electronic resources).
- A means of integrating access to these with access to other clumps elsewhere.

1.4.2 The Objectives of the CAIRNS Project

The CAIRNS Project had 11 explicit objectives at its outset, and these are listed below.

1. Work with the various sites and associated suppliers to achieve the highest level of interoperability possible between the various SCURL servers, operating both on the total clump and the various sub-clumps;
2. Work with users to ensure that this interoperability is achieved within the context of an effective and efficient service to users;
3. Develop a dynamic clumping service based on a development of the SCURL conspectus-based Research Collections Online service;
4. Investigate and compare various clumping models - local client-based, local server-based, central-server based, dynamic clumping service interacting with all three (Note: some suppliers in the bid already have functionality in their origins that will facilitate clumping);

5. Compare the level of interoperability achieved within SCURL with the draft UK interoperability profile and propose amendments if required;
6. Contribute to Information Strategy deliberations in SCURL institutions through liaison with the CATRIONA II Project;
7. Define and if possible develop an enhanced system for inter-exchange of metadata describing targets (for example a surrogate Explain Service).
8. Make recommendations to suppliers regarding developments to enhance the interoperability and clumps-related functionality of their Z39.50 products;
9. Begin to investigate other elements of interest, including Inter Library Loans, access control, and a distributed SCURL serials catalogue;
10. Compile a set of guidelines and questions to consider to aid others intending to form similar clumps in the future;
11. Make recommendations to SCURL as regards any adjustments to SCURL functions and inter-institutional co-operative processes suggested as a result of experience gained from the Project.

(See <http://bubl.ac.uk/org/scurl/docs/cairns1.htm>)

Section 3.2 of this report uses the available evidence to consider the extent to which these objectives were met.

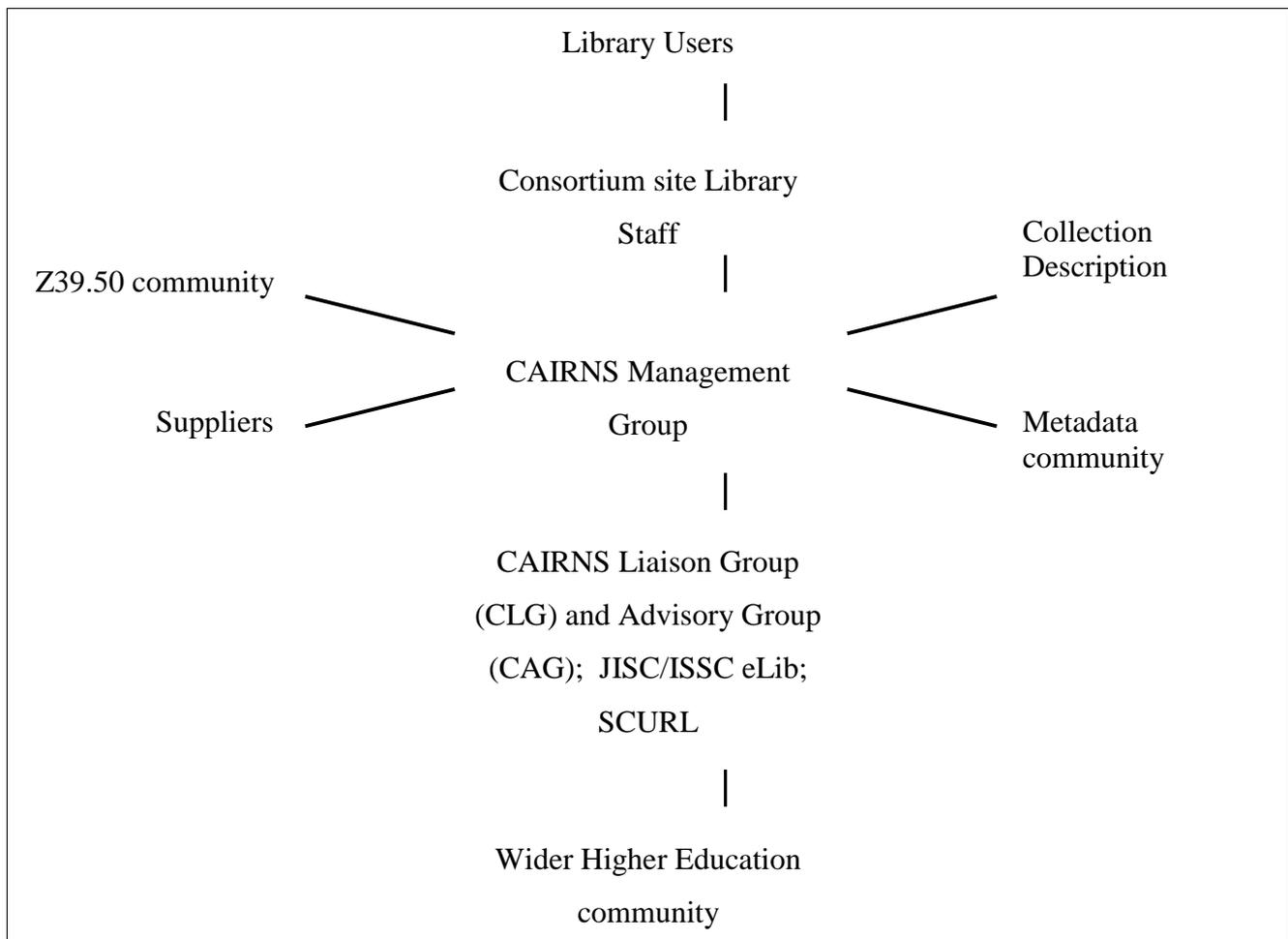
1.4.3 The structure of the CAIRNS Project

The CAIRNS Project included 3 groups with differing responsibilities:

- The CAIRNS Management Group (CMG) – the steering group of the Project
- The CAIRNS Liaison Group (CLG) – the representatives of the institutions participating in the Project
- The CAIRNS Advisory Group (CAG) – formed to represent stakeholders from the wider community and eLib

The originally anticipated place of each group in the community is described in Illustration 1.

Illustration 1 – The structure of the CAIRNS Project



All these groups and organisations were able to feedback to each other and to the dedicated CAIRNS Groups, which in turn informed the CAIRNS Management Group.

1.4.4 Consortium Membership

CAIRNS is a consortium comprising 16 Scottish sites including East Dunbartonshire Public Library and the National Library of Scotland. The University members of the CAIRNS Project are: Glasgow (Lead site), Strathclyde (Secondary Lead Site), Aberdeen, Abertay Dundee, Dundee, Edinburgh, Glasgow Caledonian, Heriot-Watt, Napier, Paisley, Queen Margaret College, Robert Gordon, St. Andrews and Stirling, essentially constituting all the Scottish Universities in existence at the time of the Project's beginning.

Section 2 – The process

The process evaluation of CAIRNS will be conducted by:

- examining the effectiveness and functioning of the steering and/or advisory groups

- documenting, reviewing and, where appropriate, conducting further analysis of the evaluations conducted during the Project
- looking to the future of the Service

In short, the operational approach advocated by the Tavistock Institute will be used as the structure for this section.

2.1 Steering or Advisory Groups

Illustration 1 demonstrates the CAIRNS Management Group (CMG) was central to the Project's structure and feedback cycle. It also shows the CMG was supported by the CAIRNS Liaison Group (CLG) and the CAIRNS Advisory Group (CAG). All three groups are therefore considered when discussing the evaluation of the Steering or Advisory Groups, as they each serve important functions in dissemination, feedback, and decision-making.

2.1.1 The CAIRNS Management Group

The CAIRNS Management Group (CMG) was small, and consisted only of the Project Team members, specifically the two Project Directors, Project Officer, Technical Support Officer and a Clerical Assistance. It was responsible for the continual administrative management of the Project, and endeavoured to meet several times a month. It reported to eLib, but gained general guidance from the CAIRNS Advisory Group, SCURL and SCURL IT. It also liaised with other consortium members when necessary through the CAIRNS Liaison Group.

2.1.2 The CAIRNS Advisory Group

The CAIRNS Advisory Group (CAG) represented the interests of the wider Higher Education community across the UK. Its membership was as follows:

- A representative from the committee for Electronic Information and eLib
- A representative from Public Libraries
- Two Scottish academics/users
- Chief Librarians/Directors from 3 Scottish Universities
- Librarian of the National Library of Scotland
- A Welsh research institute librarian/user
- A metadata expert
- A Z39.50 expert
- CAIRNS Project Directors
- Other Project Staff as required

The membership of the CAG was diverse, both professionally and geographically, and representative of the management and beneficiary/user sectors. In terms of membership base, it can be seen as meeting the criteria suggested by the Tavistock guidelines.

2.1.3 The CAIRNS Liaison Group

The CAIRNS Liaison Group (CLG) contained a representative from all the participating sites, and occasionally additional members such as cataloguers. Its intention was to provide a mechanism for liaising with and providing feedback to interested parties and stakeholders such as the CAIRNS sites and suppliers of the CAIRNS systems. It had no managerial responsibilities, unlike the CAG. It also served as a dissemination mechanism and a testing bed for the CAIRNS Service. Its members were mostly systems librarians, and numbered approximately 20 representatives. The membership appeared appropriate to the goals of the group, and hence can be seen to fulfil the Tavistock's requirements.

2.1.4 The objectives and success of the groups

However, it is important to consider the functioning of these groups, and not just their consistency. Hence the groups' performances are considered according to the 4 objectives for Steering and/or Advisory Groups identified by the Tavistock Institute. These are listed below, and the relevance to each group is highlighted.

1. Providing general steerage for the Project, including its redirection if necessary: **CMG & CAG**
2. Giving general advice on matters pertaining to the interface between the Project and its institutional and wider environment: **CAG**
3. Providing ongoing formative feedback, on the basis of Project reports and evaluation data: **CMG & CLG**
4. Acting as a mechanism to disseminate Project learning: **CMG & CLG**

In order to evaluate this, the following sections give an example of how the Groups fulfilled the demands of each of these 4 points.

1. Providing general steerage for the Project, including its redirection if necessary: CMG & CAG

The CAG and CMG worked together to steer and redirect the Project where necessary. An example of the CAG's advice is seen in the minutes of the CAG on 16 July 1998, where the CMG are advised to contact SEREN and IRIS regarding technical and other developmental issues.

The CAIRNS Project had not budgeted for an external evaluation, but by July 1998 it was clear that eLib expected one. The issue was raised at the CAG meeting on 16 July 1998, and advice asked for. The CAG proposed the CAIRNS Project should cultivate links with other relevant projects to facilitate the possibility of mutual evaluation. In this way, the CAG advised, the external evaluation of the CAIRNS Project could be conducted without a specific budget.

2. *Giving general advice on matters pertaining to the interface between the Project and its institutional and wider environment: CAG*

The CAG's role in advising the Project appears to have been an influential and important one. For example, the Annual Report (1998/99) states that the CAG 'has provided the CAIRNS Management Group with advice and guidance on Project management issues. The Group have provided positive feedback and helpful advice on work carried out by the Project.' (CAIRNS Annual Report: 1 August 1998 to 31 July 1999: 10).

3. *Providing ongoing formative feedback, on the basis of Project reports and evaluation data: CMG & CLG*

The CLG was heavily involved in the collection of formative data, as the Group's members participated in the formative evaluation of the CAIRNS Service in October 1999, December 1999, and January 2000. As a result of these studies, the CMG and CLG discussed and agreed the decision to switch from Europagate to epixtech

The CMG were responsible for reporting the results of these evaluations to the members of the CAG and CLG, and did so via the publication of evaluation reports and the Annual Reports.

4. *Acting as a mechanism to disseminate Project learning: CMG, & CLG*

The CMG conducted Project awareness sessions for the CLG members and their colleagues (see pages 11 to 14 of the Annual Report, 1998-1999). The CLG members were 'gateways' to their institution, and as representatives of their institutions, were expected to feed relevant information back to their colleagues. The CMG did most of the dissemination of the Project throughout the UK, and their achievements are discussed in the *Dissemination* section later.

2.2 Structured, systematic feedback

This section refers to the 'conventional' evaluation, specifically formative and summative studies, data collection, interpretation and reporting of the findings, acting on the results. It includes information on including evaluation generated internally by CAIRNS Project staff and externally by the evaluation team in the Robert Clark Centre of Technological Education. This section considers:

- User Evaluations – Spring 1999 & Spring 2000
- Reactive Evaluation Episodes – December 1999 & January 2000
- Comparative studies – October & December 1999
- External comparative evaluation – December 1999
- Final summative evaluation of the product
- Influence of the evaluations

2.2.1 User Evaluations – Spring 1999 and Spring 2000

2.2.1.1 Spring 1999

The first formal exploratory evaluation took place in the Spring of 1999 and involved 20 users representative of a range of target groups including undergraduates, postgraduates, serial librarians, academics, subject librarians, and inter-library loan librarians. The sample came from Glasgow (8 users), Napier (4 users) and Stirling (8 users) Universities, one institution from each of the traditional, new and modern university sectors. The users all completed a questionnaire that had four sections:

- Questions about the individual
- Search tasks using the OPAC system
- An introduction to and list of search tasks on the CAIRNS Service
- Post-task questionnaire

In addition, the users took part in a post-task focus group.

The users were invited to complete the questionnaire in their own time or to complete it in a scheduled lab immediately before the focus group. In both studies, the Glasgow University users tended to complete it in their own time, while the participants in Napier and Stirling almost all used it in the scheduled session.

The evaluation generated a considerable amount of qualitative data. In summary, the study found that the CAIRNS Service was fast and easy to use, immediately relevant, and of great value to teaching and research - should access issues be resolved. However, they found the service unreliable in two ways and reported that this would prevent them recommending it to others. These problems were summarised in the evaluation report as:

... the tendency to return error messages in place of records and in terms of the lack of consistency between results received from CAIRNS and the results received from individual OPACS.

*(Evaluation of the Basic Author Title Subject Service
available through the central CAIRNS gateway H. Gillis, September 1999, p2)*

The users asked for improved bibliographic information, specifically more detail about call numbers, status, location and presentation of records in MARC. Also important to the users was the availability of help, especially when a search failed. Further, the users wanted the error messages when searches failed to be less frequent and less technical. The attempts at addressing and resolving these issues are discussed in Section 2.2.6.

2.2.1.2 Spring 2000

At the end of the first study, the participants were asked if they would be involved in a similar study a year later. The study was repeated in the Spring of 2000, with almost entirely the same sample. The second group swelled to 24 users, presenting better coverage across the three institutions of the seven target user groups listed in the Spring 1999 study. In addition, new target groups were included, specifically sublibrarians Graduate Trainees, and cataloguers. Glasgow University supplied 10 users, Napier University supplied 7 users, as did Stirling University.

The tasks across the two studies differed, although the method was similar. The participants all performed specified searches using both their local OPACs and COPAC, and the CAIRNS Service. Their tasks were listed in a questionnaire, which also included questions on the usefulness of the CAIRNS Service and whether the users believed that the CAIRNS Service was meeting its objectives. This questionnaire was designed with the assistance of the external evaluators, and is not comparable to the Spring 1999 study. The Spring 2000 evaluation also differed from the Spring 1999 evaluation in the software underlying the service, as the CAIRNS Service had been switched from Europagate to epixtech.

The results across the two evaluations were broadly the same. Both found that the One-Stop-Search Service was appreciated, and reportedly much-needed amongst the target groups. However, although deemed faster than other services, it was found to be less accurate and more difficult to use than others, and there were some issues raised about its interface, but none which were reported by all or even half the users. Where individual's feedback inconsistently and about different issues, personal preferences can be responsible. In such cases, action cannot be expected to be taken unless the problem is agreed by the stakeholders as being a broader issue, and one which may have been overlooked by other participants.

It should be noted that some of the issues and feedback surrounding the interface and the search issues in the CAIRNS evaluation occurred as a factor of different populations, and may not be easily solved. For example, when asked about the presentation of results, an undergraduate student reported that they had 'found some confusing indications' (Undergraduate student – Stirling: CAIRNS Project User Trial Summary – 2000: p12.). In contrast, in response to the same prompt a serials librarian from the same institution said that it was 'clear and concise' (CAIRNS Project User Trial Summary – 2000: p12.)

All participants in the Spring 2000 phase found the One-Stop-Search Service was easy or very easy to search, although this dropped to 58% when using the CAIRNS Select Collections Service. However, the added online help, included as a result of the Spring 1999 evaluation discussed above, was successful with approximately 85% of respondents finding it helpful or very helpful, 10% finding it neither helpful nor unhelpful, and only 5% (two respondents)

finding it very unhelpful. The Spring 1999 study also reported a need for more information about collections, and so the usefulness of the inclusion of this information was probed in the Spring 2000 study. It was found that the majority of the sample (69% of respondents) found this information was helpful or very helpful.

Finally, the sample was asked 'How well does the CAIRNS service meet the objective of the Project?' Six prompts were devised by the Project Officer to represent the key objectives of the Service from the user-as-stakeholder viewpoint. Not all individuals answered all questions, so the results are shown in percentages. Further, to demonstrate general trends, the scales of 'Very Good' and 'Good' are collapsed into a single positive response, while 'Bad' and 'Very Bad' are collapsed into a single negative response. The responses are considered in Table 1.

Table 1 – User-rated CAIRNS Objectives

Service Provision	Positive	Negative	Not Sure
CAIRNS provides a mechanism to allow one-stop-searching to a Scottish virtual union catalogue (n=23)	82%	9%	9%
CAIRNS provides a mechanism which enables users to identify databases which meet their subject interests, prior to searching the clump (n=16)	50%	0%	50%
CAIRNS provides user help to support the searches (n=21)	67%	5%	29%
CAIRNS provides information on local cataloguing and indexing guidelines to explain results (n=14)	71%	14%	14%
CAIRNS provides information on access and inter-library loans rights (n=21)	57%	19%	24%
CAIRNS provides an interface design which is intuitive and simple to use (n=21)	62%	14%	24%

Users in the evaluation rated the Service very positively overall. Most positive answers were for the one-stop-search, although it was not without its critics. Of most concern is the finding that 50% of the sample were unsure that 'CAIRNS provides a mechanism which enables users to identify databases which meet their subject interests, prior to searching the clump'. The most negative answers (i.e. the respondents felt the objective was not fulfilled) was the issue of access and inter-library loans rights, perhaps not surprising as this is a political concern which is yet to be resolved by SCURL, and is beyond the remit or capabilities of the CAIRNS Project.

A disappointing finding was that 38% of the sample is either unsure or certain that CAIRNS does not provide an interface design that is intuitive and simple to use. There are several recommendations

about improving the general appearance of CAIRNS, including minimising information on the CAIRNS pages such as the header and the results presentation; renaming the one-stop-search button; creating a single 'help' button etc.. Many of these issues have been addressed and evaluated once again, although this occurred too recently to be included in this report and will be described in the final Project report by the CAIRNS team.

2.2.2 Reactive Evaluation Episodes

In December 1999 and January 2000, the CAIRNS Liaison Group were invited to use the CAIRNS Service to assess the informal finding that the CAIRNS service was troubled by multiple users. Specifically, it was emerging that CAIRNS refused access or slowed down in multiple use.

Thirteen CLG members attempted to log on to the Service from Strathclyde University Library on December 14 1999. The users all completed a questionnaire which was based on seven search tasks. The results suggest that the access to the Service weakened during the trial. The search failed at Aberdeen University (*CAIRNS Liaison Group user trial to test the operation of the CAIRNS Project Ameritech gateway* Strathclyde University Library, 14th December 1999).

The exercise was repeated using an identical search-task questionnaire across different sites simultaneously at 2pm on Tuesday 25 January 2000. However, by Task 4 seven users (41% of the sample) were unable to proceed, and a further 5 users (29% of the sample) found the search problematic. By Task 5 the 'Far from the Madding Crowd' search, 11 users (65% of the sample) were unable to proceed due to the problems they were encountering. Indeed, Task 7 'Search for 'statistics' by subject keyword' was completed successfully by only 2 of the 17 users (equivalent to only 12% of the sample), while one other user attempted the task but found it problematical.

Clearly there was a considerable problem with the Service under multiple user conditions, with the second remote trial being more unsuccessful than the first. The problem was not found to be only with multiple use at a single site, and indeed seemed even worse if people logged on from their home sites around the country. The Project Officer documented the problems and error messages in detail, and submitted this to the CAIRNS Liaison Group members, which included the members of the CMG. She stated that:

Between now and December 2000, the CAIRNS Management Group will look more closely at the issue of providing a service which can support multiple users and will report its progress to the CLG.

(Evaluation CLG on Ameritech-DecJan summary.doc: p2).

The problem was discussed addressed by the CAIRNS Management Group in March 2000, and is documented in their minutes as described in Section 2.2.6.

2.2.3 Comparative studies

The evaluation of the CAIRNS Service by the CLG on the 14 December 1999 not only addressed the multiple user issue as described in Section 2.2.2, but also examined another similar gateway developed by the RIDINGS Project. To facilitate this, a second trial ran with 11 members of the CLG to compare the RIDINGS Project gateway with the CAIRNS Service, and involved a different seven-task questionnaire with a short post-comparison questionnaire at the end. This trial was unsuccessful, as by the second of this trial's 7 tasks 9 participants (69% of the sample) were having problems accessing records. By Task 5, a search for 'Far from the Madding Crowd' at Sheffield and Sheffield Hallam Universities, it is stated in the evaluation data report that '8 gave up' the search (*CAIRNS Liaison Group user trial to test the operation of the RIDING Project gateway* Strathclyde University Library, 14th December 1999: p3).

A post-session questionnaire was administered and found only two responses to the question 'Do you prefer the content of records presented by CAIRNS or by RIDING?' Both were in favour of CAIRNS. However, the question was perhaps irrelevant given the problems the users were having with the RIDING gateway. Most were not getting as far as the records and their content, and could not compare the two. This comparative study is therefore inconclusive.

An earlier comparative study had also been conducted in October 1999 to compare the OPAC, M25 Europagate and the CAIRNS Ameritech gateways, and the CAIRNS dynamic clumper. As would be done later, the CAIRNS Liaison Group was targeted as a useful and representative sample, and a lengthy task-driven questionnaire was developed by the Project staff and administered to the Group. The Group members were asked to complete the questionnaire and its task in their own time.

The results were presented in a document addressing the issues arising from the extensive data collected during this evaluation (see *Review, by the CAIRNS Liaison Group, of the searching, reporting and interface provided by the CAIRNS service gateways (the M25 link Europagate gateway; the Ameritech gateway and the CAIRNS dynamic clumper)*). A number of findings and actions were listed within this document, including issues such as access rights, cataloguing/ indexing differences between the sites, terminology, presentation etc. One key issue identified was the occurrence of problems the day before the CLG meeting, when several users attempted to log on to the Ameritech (CAIRNS) Service to complete the questionnaire. The actual problems they encountered were not specified, and are described simply as '...problems logging on to the site...' (*Review, by the CAIRNS Liaison Group, of the searching, reporting and interface provided by the CAIRNS service gateways (the M25 link Europagate gateway; the Ameritech gateway and the CAIRNS dynamic clumper)*: p9).

2.2.4 External comparative evaluation

An external evaluator examined the CAIRNS Service on 6 December 1999 with 10 undergraduate students. They were asked to compare the Europagate interface, the Ameritech/epixtech interface, and the CAIRNS dynamic clumper.

It was found that all the students found a simple search on the Ameritech system was easy or very easy. The dynamic clumping search was found to be difficult by one student, and two noted that they didn't understand the term 'dynamic clumping search.' The majority of responses to the question of what they would suggest to improve the service were similar to the Spring 2000 study, in that they wanted a less cluttered and better presented web page. The two findings (December 1999 and Spring 2000) triangulate well, and suggest that some effort should be made to enhance the interface.

The students also found the Europagate search to be easy or very easy, and their comments about improvement to the site were less critical and more about issues such as colour than the density and difficulty of using the interface. A question over reliability/coverage is raised but not explored or explained by the finding that 60% of the students only sometimes found what they were searching for during the session. One student always did, and three reported they often did.

The students in this study did not seem to have any problems with multiple-use, despite what happened a week later in the CLG comparative study. To understand this, the evaluator entered discussion with members of the CMG who indicate that the CAIRNS Service never crashed for all users simultaneously, just slowed down considerably for some individuals. They speculated that the more relaxed speed of novices, and possible staggered logging on over a period of several minutes, may have been enough to prevent the problems occurring.

2.2.5 Final summative evaluation of the product

It had been intended that a 'summative' evaluation case study would be designed and administered by the evaluation consultant in collaboration with the CAIRNS Project team, and with consideration of the Process Evaluation results. This was to compliment the user evaluations already conducted by the Project Officer in Spring 1999 and repeated in Spring 2000, and an external evaluation by a member of the external evaluation team in December 1999. The summative evaluation was designed to facilitate the observation of a group of users working with the Service. However, due to a technical problem with the epixtech software, it was discovered that a multiple user evaluation was not possible. This problem had been identified earlier (see Section 2.2.2), but the Project team had believed it had been resolved. As a result of this multiple user failure, it was agreed that the summative evaluation should not go ahead.

2.2.6 Influence of the evaluations

As was discussed in the User Evaluation Results section earlier, there were issues uncovered in the evaluations that required attention. The resolution of these issues is considered in detail here.

The switch from Europagate to epixtech occurred as a result of several factors, prominent amongst which were the evaluation results from the CLG trial in October 1999. That study demonstrated that, compared to epixtech, Europagate had a greater number of problems within it, mainly involving

searching and reporting, which would be difficult to solve. Epixtech was found to be providing better results than Europagate. The decision was taken by the CMG in consultation with the CLG to move to epixtech. Further, the CAIRNS Project staff had existing experience and expertise in epixtech, which was an important consideration when no technical staff could be recruited through a local skill shortage.

The Spring 1999 user evaluation uncovered several issues and suggestions, and the following improvements were made to the CAIRNS Service as a direct result.

- Detailed holdings information is now included for each record, with the exception of 6 sites
- Online help is now available
- Record display has been improved by adding 3 choices – a brief record, a detailed bibliographical record, and MARC records.
- Improvements to reliability by transferring to the epixtech gateway, and an improvement in error messages, specifically making them more user friendly and less technical.

The user evaluations by the CAIRNS Liaison Group in December 1999 and January 2000 uncovered an issue with multiple users. The minutes of the CAIRNS Management Group meeting at Strathclyde University on Thursday 9 March 2000 show the Group discussed this issue and possible solutions, and actions were allocated to group members. The four suggestions for action by the Technical Officer were:

- Logging on, and active involvement from epixtech if we can get it.
- Investigate configuration of the web cache – is this a problem?
- Investigate the possibility of NT4 memory leakage – and improvements which might be gained from patches and overnight rebooting.
- Contact Horizon – L about the problem.

(Minutes of CMG (21) 6/3/00: p2)

Unfortunately, this failed to resolve the problem, and it later emerged that the issue was almost certainly with the epixtech software, as the following extract of an email from the Project Officer suggests:

... Tuesday test of CAIRNS with multiple users (9) proved problematic. CAIRNS is simply not allowing multiple users to log on. A number of possible causes of the problem have been identified and epixtech have been contacted ...

(Email from the Project Officer to the evaluation consultant, 8/11/2000)

2.3 Forecasting and planning

As the CAIRNS Project comes to an end, the need for forecasting and planning becomes relevant only to the exit strategy. This is in place and is viable, with Strathclyde University taking on the mantle of service provider until 2003. SCURL will continue to examine the access issues in future, which the Development Officer will facilitate.

Section 3 – Impact

This section documents the impact evaluation of the CAIRNS Project, specifically the dissemination effort and the fulfilment of the Project's individual objectives, before drawing conclusions about the overall success of their objectives.

3.1 Dissemination

The dissemination effort is considered in two ways in this subsection. The 'conventional' dissemination, presentations, papers, workshops etc., is described and discussed. Then the telephone dissemination evaluation is considered, followed by the COSMiC group and its evolution, before finally the formation of new communities through the efforts of CAIRNS is reviewed.

3.1.1 Conventional dissemination

Conventional dissemination has been a feature of the CAIRNS Project throughout its lifetime. The CMG attended meetings and conferences, they also did presentations, wrote papers and conducted Project awareness sessions for the CLG members and their colleagues. Their dissemination endeavours are listed at <http://cairns.lib.gla.ac.uk/dissemination.html>.

3.1.2 Telephone Dissemination Evaluation

At the beginning of 2000 an evaluation of the dissemination of the CAIRNS Project was conducted using telephone interviews with system librarians throughout the UK. A total of 185 interviews were conducted. In order to find the system librarians throughout the UK, University-related telephone books were searched. In the Scottish sample, most of the system librarians were already involved with CAIRNS so could be contacted directly. The interviews used a script developed by the Project Office and an external evaluator. The results were encouraging, and are shown on Table 2.

Table 2 – Summary of CAIRNS Awareness by Country

Country	Yes	No
Scotland	88%	12%
England	60%	40%
Wales	57%	43%
Ireland	50%	50%

Total	63%	37%
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In Scotland, a substantial part of the target group (88% of respondents) had heard about the Service from a member of the CAIRNS Liaison Group. Over the entire sample, the majority of those who had heard about the CAIRNS Project (31% of respondents) were involved in an eLib clump Project and had heard of it through that network, while 12% found out from Lis-Link, 11% through a clump workshop or its advertising, and 10% through professional literature/ mailing lists. The remaining 26% heard from a variety of sources, including colleagues, through eLib literature, the hybrid library projects etc. Some respondents (8%) couldn't remember where they had found out about CAIRNS.

The function of the dissemination evaluation was two-fold. Not only did it generate information about the dissemination effort, but also informed those who had not heard of CAIRNS about the Service. The 37% of the sample (69 respondents) who had not heard about CAIRNS had done so after the telephone interview. Those who were previously unaware were all read the following script:

Well, CAIRNS is an eLib Phase III clump project investigating the establishment of distributed searching across dynamically generated clumps of libraries in Scotland. It started on 1st June 1998 and is integrating the 25 Z39.50 compliant catalogues or information services of CAIRNS sites across Scotland into a functional and user-adaptive test-bed service.

(Script for surveying system managers on knowledge of CAIRNS January 2000)

3.1.3 COSMiC

It had been intended to establish the Friends of CAIRNS Group to assist dissemination to interested parties in the wider HE community. However, this function has instead been fulfilled by the Confederation of Scottish Mini Clumps (COSMiC), an organisation formed to discuss matters of common interest between CAIRNS and Scottish regional co-operative organisations. The group is chaired by one of either CAIRNS Project Directors, and meets biannually. Discussion also takes place on a mailbase (<http://www.mailbase.ac.uk/lists/cosmic/>).

3.1.4 Formation of new communities

In the introduction, it was suggested that the formation of new communities within the library and academic sectors is an implicit objective of the eLib Programme. The existence of COSMiC and the creation of the CAIRNS Cataloguing and Indexing Working Group are just two new communities in the sector which owe much of their creation to the CAIRNS Project. The CAIRNS Project also brought cataloguers from across Scotland physically together for the first time since the late 1980's.

3.2 Fulfilment of Objectives

In the original proposal for the CAIRNS Project

(<http://bubl.ac.uk/org/scurl/docs/cairns1.htm#1background>), 11 objectives of the Project were

identified. Drawing on interviews with the Project Directors and the review of appropriate documents, the extent to which these objectives have been met is discussed below.

Objective 1 – Work with various sites and associated suppliers to achieve the highest level of interoperability possible between the various SCURL servers, operating both on the total clump and the various sub-clumps.

CAIRNS undertook a comprehensive and well informed assessment of available software solutions. The Project Director reported that they had looked at various products and suppliers (III, Ameritech, VTLS, MDIS, SISRSI, Silver Platter and OVID) in great detail. They also considered the needs and capabilities of 16 sites, although the actual numbers involved in the later stages fluctuated. At the time of writing (December 2000) the Project had approximately 14 sites active.

Objective 2 – Work with users to ensure that this interoperability is achieved within the context of an effective and efficient service to users

The Project demonstrated interoperability between the various SCURL servers. The Project did not set out to implement a robust, reliable, service for large numbers of users. There were technical problems associated with multiple use. During the Project, some problems were identified relating to the consistency of search results and the interface (see, for example, section 2.2.1). As described earlier in Section 2.2 the Project conducted user evaluations, and acted on the results where this was possible. Problems identified in the course of the Project were addressed but it seems that evaluation of the improved service is not complete and it would be appropriate to continue with user evaluation as work proceeds.

Objective 3 – Develop a dynamic clumping service based on a development of the SCURL conspectus – based Research Collections Online service.

A dynamic clumping facility is in place and has been evaluated by users. (see Section 2.2)

Objective 4 – Investigate and compare various clumping models – local client-based, local server-based, central-server based, dynamic clumping service interacting with all three.

The Project Director reported that the Project found it difficult to make progress with this objective because they had to predict what would be used e.g. CD-ROMs, web, LAN etc. They had expected that the dynamic clumper would interact with them all, but it emerged that all sites were using web based services. The Project was therefore unable to test clumping models which included non-web

based resources. Since the development and testing of such models would not have served the needs of the sites in the Project, it would be inappropriate to see this as a weakness.

The Project Director reported that some local web – based gateways had been set up to test the service. What appears clear from the knowledge gathered within the CAIRNS Project so far is that all three models appear theoretically possible, although there may be some problems in implementation.

Objective 5 – Compare the level of interoperability achieved within SCURL with the draft UK interoperability profile and proposed amendments if required.

A comparison has taken place with the UK interoperability profile.

Objective 6 – Contribute to Information Strategy deliberations in SCURL institutions through liaison with the CATRIONA II Project.

The CATRIONA II Project only overlapped with CAIRNS for a few months it was in fact very peripheral. This was due to the time delay of 18 months between the end of CATRIONA II and its continuance at Strathclyde University. This objective therefore became inappropriate.

Objective 7 – Define and if possible develop an enhanced system for inter-exchange of metadata describing targets (for example, a surrogate Explain Service).

The Project contributed to the RSLP collection level description schema.

It was not considered appropriate to develop an enhanced system for inter-exchange of metadata. The inter-exchange of metadata was supposed to happen across various clumps, and contribute data about targets to the UKCON database.

The possibility of developing an enhanced system for inter-exchange of metadata describing targets was regarded by the Project Director as naive. At the time of formulating this objective the Project understood that the interchange of metadata would constitute a transfer of files. A surrogate Explain Service was not established because it became clear that it was not possible to develop a practical and reasonable model of how this service would function.

Objective 8 – Make recommendations to suppliers regarding developments to enhance the interoperability and clumps-related functionality of their Z39.50 products.

The CAIRNS Project worked closely with suppliers, and at the time of writing is continuing work with epixtech over the software problems within their product that seems to make multiple usage unstable.

The Project has also disseminated recommendations developed by CAIRNS CMG staff to suppliers as required³¹. Email evidence of discussions between suppliers and CAIRNS was supplied to the external evaluation team on request.

Objective 9 – Begin to investigate other elements of interest, including Inter Library Loans, access control, and a distributed SCURL catalogue

The Project Director reported that they have begun to investigate these other elements, but as the wording of the objectives suggests, this would always be exploratory only. Evidence cited for the beginnings of this investigation included:

- The awareness day for ILL librarians (24 September 1999).
- The examination of RSS, associated with the product epixtech web pack that they currently use.
- Consideration of access issues is ongoing, and is now firmly on the SCURL agenda.

The current barrier to a distributed SCURL catalogue is the need for a serial-only index. However, the Project has identified four sites that are possible, and the Project Director is still keen to progress this.

Objective 10 – Compile a set of guidelines and questions to consider others intending to form similar clumps in the future.

The Project Director noted that a ‘guidelines’ document on cataloguing has been produced. In addition, a report on interoperability problems has been written. Project staff regard them as useful guidelines for best practice in cataloguing area. A complete set of guidelines will be in summary in final report, which was not available at the time of writing (December 2000). The cataloguing and indexing recommendations are available on the CAIRNS website (<http://cairns.lib.gla.ac.uk/docs/index.html>).

Objective 11 - Make recommendations to SCURL as regards any adjustments to SCURL functions and inter-institutional co-operative processes suggested as a result of experience gained from the Project.

The Project has made recommendations to SCURL. Successes in this area include the setting up of the cataloguing standards group and the agreement to build serials-only indices at system replacement. One recommendation central to the success of the CAIRNS service in future was that SCURL update their documentation on inter-access agreements.

³¹ These recommendations are still in press at the time of writing

Section 4 – Conclusions

The CAIRNS Project made important progress towards establishing a comprehensive union catalogue for Scottish HE. The Project demonstrated the feasibility of this ambition - in organisational and technical terms. Where the Project encountered technical or other difficulties, these were identified quickly and appropriate recommendations were made. The Project adopted a mature and intelligent approach to its objectives, abandoning some goals that were found inappropriate and exceeding expectations in other areas. Key objectives were met. It is important that this work is carried forward towards implementation of a robust and comprehensive service. The remainder of this section summarises findings from the evaluation process, from process evaluation and then by comparison with Project objectives. Recommendations are incorporated and the section concludes with a recommendation about the future of this work.

Conclusions from process evaluation (section 2 of this report)

The CAIRNS Management Group, Liaison Group and Advisory Group served important functions in dissemination, feedback, and decision-making. Each group was appropriately constituted in terms of membership and function. A variety of approaches to internal and external evaluation were adopted and the Project itself was responsive to evaluation outcomes. Evaluation was hampered by technical difficulties with multiple use but when evaluation was able to proceed, the outcome was positive overall. On the whole, Project staff made appropriate recommendations and took appropriate action in response to evaluation results. At the conclusion of the Project, forecasting and planning is in place and is viable. Evaluation with users indicated that the service (at that stage) was not always perceived as intuitive and simple to use. As progress is made towards establishing a comprehensive union catalogue for Scottish HE, these issues should receive further attention.

Conclusions from comparison with Project objectives (section 3 of this report)

The CAIRNS Project undertook a comprehensive and well-informed assessment of available software solutions and worked closely with suppliers on technical problems associated with multiple usage. Cost, effectiveness and user acceptability figured in CAIRNS design and evaluation activities. A dynamic clumping facility is in place and has been evaluated by users. The Project implemented and tested clumping models for web-based catalogues. An investigation into other elements of interest was initiated, including Inter Library Loans, access control, and a distributed SCURL catalogue. Guidelines for the formation of similar clumps in the future and on cataloguing have been produced and a report on interoperability problems has been written. Recommendations were made to SCURL throughout the Project.

Overall, users responded positively to the service during trials but some issues were highlighted and action was taken where possible. As work on establishing a comprehensive service proceeds, it seems appropriate to ensure that the service can cope with multiple users. Other factors to be considered in future should include the consistency of search results, the ergonomics of the interface and the usefulness of help facilities and error messages.

- End of Appendix A -

Appendix B: CAIRNS Exit Strategy

CAIRNS Exit Strategy: Towards a 'National Electronic Library' for Scotland

Summary

CAIRNS has shown that a distributed catalogue incorporating both hardcopy and digital resources, returning holdings information and circulation information when appropriate, and automatically generating limited information landscapes from collection description data (dynamic clumping), is a feasible proposition, and has created a useful but limited service. It will be maintained at this level with minimal development for at least four years at no additional cost to the community, first within SCONE, then when this has ended (December 2001) by Strathclyde University's Centre for Digital Library Research (till at least 2004).

However, significant *project* funding is required if we are to pursue the idea of Scotland's developing 'National Electronic Library'³² first given concrete expression at the SCURL C&S group meeting by Ann Matheson and further supported at the subsequent SCURL meeting. This vision has been implicit in SCURL-backed projects such as RCO, CAIRNS, SCONE, SPIS and SEED for many years and is the logical next step in the development process. It is a vision shared, in essence, by SLIC, and one that is particularly relevant to current developments in Scotland and the world, the Digital Scotland initiative being a case in point. Unless Digital Scotland has at its heart the kind of 'National Electronic Library' developing within the CAIRNS, SCONE and SEED projects, the very significant levels of public funding likely to be injected into the creation of content in the years ahead as a result of Digital Scotland will be under-utilised because:

- Scotland's citizens will be unable to reliably discover the materials they require
- There will be no facilities available to collection managers to ensure that collections are developed to meet user needs and that duplication of effort and expenditure is minimised

With this in mind, it is suggested that SCURL:

- Continue to support attempts to seek project funding to address key development issues such as those identified below, if possible in conjunction with SLIC and any other appropriate organisations sharing a similar vision and agenda.
- In particular, set up discussions with SLIC with a view to agreeing a joint approach to funding bodies for the development of a 'National Electronic Library' based on the further development of the CAIRNS, SCONE and SEED approach and using the co-ordinated set of proposals outlined below as a starting point for agreeing a specific joint proposal. These aim to develop a distributed cross-sectoral and cross-domain collaborative system that would underpin and support both the development and subsequent maintenance of the Scottish National Collection and user adaptive access to the resources it contains, whether digital or non-digital (please note that, at present, the proposals are well-developed sketches rather than full detail bids). In short, they move us in the direction of a 'National Electronic Library'. At the moment, the sketches, whilst intended to be cross-sectoral, are written from an HE point of view. Discussions with SLIC would partly focus on exact requirements and the involvement of non-HE sector partners amongst other things³³.
- Aim to ensure that the SCURL Development Officer, once appointed, make obtaining commercial sponsorship or other types of funding for the support and, if necessary, the development of the gateway to this collection a key priority

³² A term used in the Nordic countries to refer to CAIRNS-like developments. It usually denotes a system that covers both hard-copy and digital resources, but where resource discovery and location is mediated electronically

³³ These projects encompass a wider set of issues than the 'Access to networked electronic resources for Scottish education' proposal put forward by Gordon Dunsire which addresses a discrete set of issues relating only to electronic resources and could be funded separately - in which case the structure and costs of the projects proposed below would be changed to take account of this].

Strategy in Detail

1. CAIRNS is part of an ongoing SCURL programme and vision that has incorporated a range of initiatives that include (but are not necessarily limited to) SALSER, the Conspectus exercise, the SPIS programme, RCO, the Datasets Initiative, SEED, SCONE, and CAIRNS itself.
2. The vision behind such initiatives has developed and grown over the years but its essence has always been a co-operative approach aimed at making resources go further for the benefit of users and the enhancement of access in a distributed environment. In recent years, particularly in the context of projects like CAIRNS, SEED, SCONE and SPIS, the vision - discussed at various times in and with SCURL C&S, SCURL IT, and SCURL itself - has been one which entails:
 - ❖ Sharing resources across SCURL and providing for user access, partly through a distributed union catalogue based on Z39.50 and MARC and partly through SCURL inter-access policies [CAIRNS]
 - ❖ Managing and preserving collections collaboratively in SCURL and co-ordinating this effort through the use of the RCO collection descriptions database [RCO and SCONE]
 - ❖ Linking user navigation and direction within the shared collections to the Collaborative Collection Management programme by providing a mechanism ('dynamic clumping') that generates appropriate 'user landscapes' within the distributed catalogue based on user input [RCO, CAIRNS and SCONE]
 - ❖ Looking beyond SCURL to identify services and collections likely to be of value to SCURL members and looking to incorporate these within both the distributed catalogue and the RCO database and Collaborative Collection Management programme [work with NGfL, SCRAN, SLAINTE, BUBL, Glasgow Digital Library in CAIRNS, SCONE and SEED]
3. CAIRNS has shown that a distributed catalogue incorporating both hardcopy and digital resources, and returning holdings information and circulation information when appropriate, is a feasible proposition, and has created a useful but limited service. It will be maintained at this level with minimal development for at least four years at no additional cost to SCURL, first within SCONE, then when this has ended (December 2001) by Strathclyde University's Centre for Digital Library Research, who are willing to maintain it into 2004 because of its relevance to CDLR research interests. The CDLR will also continue to seek project funding to develop the service, or aspects of it, further, regardless of the success or failure of the proposals detailed in this document.
4. Ideally, however, further development should now be undertaken, both to develop the SCURL vision in full and to address an array of problems and issues identified by CAIRNS as requiring action, particularly in respect of the application of metadata standards, retrospective conversion, and interoperability. It is therefore proposed that SCURL seek project funding - ideally in conjunction with SLIC and non-library communities with related interests such as the archives and museums communities - with a view to:
 - ❖ Implementing a full Scotland-wide, digital and non-digital, cross-sectoral and cross domain, user configurable and adaptive resource discovery portal, together with an associated organisational collections management support service and gateway
 - ❖ Implementing short-term and long-term mechanisms for dealing with metadata based interoperability problems (including retroconversion requirements)
 - ❖ Tackling access and authentication issues and the requirements of integrating the new extended user and staff support services and associated interfaces both with local systems, opacs and web-sites, and cross-sectoral and cross domain regional groupings such as the Ayrshire Libraries Forum, the Glasgow Digital Library and others (includes interface with hybrid library, user requirements, service evaluation studies)
5. Three inter-related projects are proposed, based at and led by three SCURL sites, but involving all other SCURL members wishing to be involved. Each project would address a different area, but would, of necessity, work with the other two in order to deliver a single inter-related solution and service. Each would work with at least one public library, one FE library, a museum, and an archive service. All would work with the National Library of Scotland and library system suppliers

and with NGfL and SCRAN. The projects would have single steering group but separate project teams that meet regularly. The three areas are:

- ❖ Resource discovery portal and collections management gateway
- ❖ Retroconversion and metadata interoperability and standards
- ❖ Local interfaces, access, authentication, user requirements, and project evaluation

Together, they would not only bring into being a set of integrated support services that would fully implement the SCURL vision described above (which includes, as previously indicated, the recognition that many resources and services relevant to SCURL exist outwith SCURL) but also deliver the basis of a Scotland-wide solution covering the same areas, offering ultimately:

- ❖ A Scottish distributed union catalogue
 - ❖ That is cross-sectoral and cross-domain, including libraries, museums, archives and others (users don't just want books or articles on, say, industrial development in Glasgow, they want pictures, videos, sound clips, archives of scholars and companies, anything relevant)
 - ❖ Covers both hard-copy and electronic resources, including services like NGfL, SCRAN, Sufi
 - ❖ Integrates intelligently with any future UK union catalogues or catalogues, or EU union catalogue or catalogues, and with major external catalogues generally.
 - ❖ Has dynamic clumper based navigation based on a collection descriptions database covering all important collections in Scotland
 - ❖ Has associated Collaborative Collection Management policies based on - and co-ordinated through - the same database
 - ❖ Offers, in addition, automatically generated user-selected information landscapes (or 'resource constellations') based on subject strengths, task to be performed, user group and level, geographical region, organisational affiliation, digital vs. non-digital, and other user-selected criteria.
 - ❖ Is moving in a planned way towards full interoperability both in terms of metadata and conformance with the Bath Profile
 - ❖ Has in place inter-organisational support mechanisms, such as a cataloguing standards group, a Confederation of Scottish Mini-Clumps (CoSMiC) and (possibly) and inter-library loans and document delivery system
6. This is, we believe, the kind of service described in sections 6.3.2, 6.3.4, 6.3.5 and 6.3.6 of the recently published Digital Scotland Task Force report and envisaged (implied?) in SLIC's *Enabling Seamless Access*. It is true that a Scotland-wide service of the kind proposed goes a little beyond the direct needs of SCURL. However, there are a number of good reasons for doing this:
- ❖ It would cost just as much to do the SCURL part alone, the basic structures, mechanisms, organisational requirements, standards, and technical solutions being more or less identical
 - ❖ It would attract wider support and improve the possibility of shared funding. For example, it is clear from discussions between CAIRNS and SLIC that the SLIC vision is not appreciably different from the SCURL vision here
 - ❖ A Scotland-wide service and portal offers a better chance in the longer term of obtaining either continuing central funding or sponsorship for the service
 - ❖ If a non-SCURL service is set up separately (as it might be if we do not create a wider service ourselves) it would be in competition for users and funding. It might also aim to be a Scotland-wide service itself
 - ❖ If a non-SCURL service were set up in the public library sector, say, there might in the long term be a need for further development to integrate the two
 - ❖ The CAIRNS dynamic clumping mechanism offers a means of creating an 'information landscape' or 'resource constellation' that could, for example, consist only of SCURL-related collections (or, indeed, digital only collections or public library only collections, and so on)

7. A more detailed description of each of the three proposed projects is included below as appendices A, B, and C. The cost of each is currently estimated at around £45,000 a year, although exact costs may vary if and when full bids are prepared. This represents a cost of £135,000 a year. The recommended length of the proposed projects is three years each, a total cost of £405,000, but significant progress could be made on all fronts over two years, at a total cost of £270,000. An alternative would be to tailor one year projects initially, then follow up with further proposals in years two and three, but this is a less than ideal approach. This is a major enterprise and will require significant time, effort and funding to complete successfully. Most of the costs involved are personnel costs. It should be noted that the three projects would have higher individual costs if any one was funded on its own. We believe that the approach proposed offers the best value in respect of costs, organisational experience, and organisational perspective (an ancient, a modern and a new university are all involved).
8. In order to secure the future of the proposed full service after the end of the projects, it is suggested that one of the tasks of the SCURL Development Director might be to work with the host institutions of the projects to secure long term funding based on top-slicing, sponsorship, advertising, revenue-earning added-value services, or a mixture of all four.
9. Because of ongoing metadata based interoperability problems, it is recommended that the Cataloguing Standards Group set up under CAIRNS with SCURL' s approval be continued beyond the end of the project.

Annexe A: The Resource Discovery Portal and Collection Management Gateway

Note: Proposed by the Centre for Digital Library Research at Strathclyde University with NU and GU as supporting partners

The purpose of this project is to build on the simple, and relatively small and unsophisticated, CAIRNS gateway and dynamic clumper, and to utilise and develop the extended RCO database and collaborative collection management interface being created by SCONE and SEED, with a view to creating and integrating both:

- ❖ A full function Scotland-wide, digital and non-digital, cross-sectoral and cross domain, user configurable and adaptive resource discovery portal
- ❖ An associated organisational collections management support service and gateway

This will entail:

1. Tackling a range of non-metadata related problems identified by CAIRNS as barriers to full interoperability:
 - ❖ Working with and lobbying software suppliers to enable the full implementation of the Bath Profile in relevant sites within Scotland
 - ❖ Documenting a range of bugs and non-standard responses in installed Z servers and pressing suppliers for fixes
 - ❖ Working with the supplier of the current gateway software (epixtech) to enable the handling of non MARC record formats, particularly GRS-1 and Dublin Core
2. Tackling a range of issues identified within CAIRNS, SCONE and elsewhere as important to the development of the proposed Scotland-wide portal:
 - ❖ Scoping the requirements of a task-oriented interface for the portal in the wider Scottish environment
 - ❖ Mapping of the RCO subject strengths database to local subject schemes and encompassing the outcomes of the HILT (High Level Thesaurus) project being discussed with RSLP and JISC
 - ❖ Working with the access issues project (Annexe C) to identify a means of recording user categories and educational levels
 - ❖ Scoping the metadata requirements of the extended and extensible dynamic clumper envisaged for the portal
 - ❖ Creating a metadata registry with a view to keeping track of the range of metadata formats in use in Scotland (portal support mechanism)

- ❖ Conducting a preliminary examination - with the metadata unit and the access project - of granularity issues
3. Designing, developing and implementing a Scotland-wide, user configurable and adaptive, cross-sectoral and cross-domain, digital and non-digital resource discovery portal with the following features:
 - ❖ Able ultimately to elegantly and intelligently encompass and cross-search all Z39.50 compatible catalogues and metadata repositories in Scotland, regardless of sector, domain, function, metadata format, or other distinction
 - ❖ Able to automatically generate, on the basis of mapping user input to the extended RCO collection descriptions database and other related databases, subsets of this total group of Z39.50 services to create cross-searchable 'information landscapes' or 'resource constellations' appropriate to particular purposes - task to be performed, user group and educational level, geographical region, organisational affiliation, digital or non-digital coverage, and others.
 - ❖ Has associated collaborative collection management policies based on - and co-ordinated through - the same database, with collections mapped to subject strength, user group and level, organisational relevance, geographical area, digital or non-digital etc and an ongoing co-operative maintenance and development programme encompassing appropriate collection development experts in organisations across Scotland
 - ❖ Able to intelligently and elegantly offer wider access to collections beyond Scotland, either through an extension of the RCO collections database to encompass such resources or through integration with other national and international distributed or physical union catalogues (UK, Europe, the 'Nimble North' countries etc)
 - ❖ Offers user authentication and access control where appropriate
 - ❖ Offers user-instigated inter-library loans and other document delivery facilities
 - ❖ Offers inclusion of the Z39.50 compatible repository of web index data detailed under item 4 below, cross-searching of this with other Z39.50 databases, and 'icon click' access to a search engine covering the wider Scottish web
 4. Designing, developing and implementing a quality controlled, metadata based internet search gateway covering Scottish resources not encompassed in Z39.50 databases. This would index and search all Scottish web-sites but give higher ranking to kitemarked sites following agreed metadata standards described on the web-site, thereby encouraging producers of quality materials to utilise standards based metadata. The service would also create vital links to the more organised and structured portal service in two ways:
 - ❖ By creating a Z39.50 compatible database from the web-related metadata and incorporating the service into the portal system described at 3 above
 - ❖ By offering 'icon-click' access to the portal system described above on every screen
 5. Extending the SCONE facility which allows collection managers to collaborate in the building and describing of their collections to enable it to encompass the staff and organisational requirements of the new much-extended distributed resource discovery service
 6. Producing publicity and training materials for the portal, the web search facility, and the collaborative collection management gateway
 7. Offering a pro-active liaison and advice service for new collections of value to the Scottish National Collection
 8. Working to ensure integration with the DNER
 9. Working with the metadata unit and services or organisations such as NGfL (Scotland), SUFI, Glasgow Digital Library and SLAINTE on a collaborative collection management policy of co-operative collecting and cataloguing of digital resources
 10. Working with the access project on the interface of local and regional systems with the portal service and collaborative collection management gateway
 11. Investigating alternative software packages for the portal and related services

12. Extension of the SLAINTE directory of people, organisation and expertise, and the integration of this into the portal

Annexe B: The Retroconversion and Metadata Interoperability and Standards Unit

Note: Proposed by Napier University with SU and GU as supporting partners

The aim of this project is to set up a unit that will:

1. Establish minimum standards for bibliographic record creation across a distributed national catalogue.
2. Design and implement mechanisms for dealing with metadata based interoperability problems (including retro-conversion requirements) identified by the CAIRNS project, dealing with these problems using a number of different strategies:
 - ❖ Dealing with digital resources separately, as follows:
 - ◆ Set up a server or set of servers containing only metadata for networked and interoperable electronic information resources.
 - ◆ Connect servers to CAIRNS.
 - ◆ Ask SCURL and associated libraries to 'donate' existing metadata.
 - ◆ Set up service so that local access to the mini-clump is transparent to users.
 - ◆ Local libraries have choice of duplicating metadata, or using the mini-clump as an extension to their own collections.
 - ◆ No compulsion to donate or use service.
 - ◆ Identify guidelines for 'analytic' cataloguing of multi-component resources such as web-sites, and ensure appropriate bibliographic linkages between metadata records.
 - ◆ Identify requirements for a minimum metadata content necessary to ensure interoperability of standards CAIRNS indexes.
 - ◆ Identify requirements for standard headings for authors, subjects to ensure interoperability.
 - ◆ Investigate common authentication approaches (RPA).
 - ◆ Amend donated metadata to fit interoperability standards (AAAF, HILT type subject scheme).
 - ◆ Create system for cataloguers to search mini-clump, copy records if necessary, donate any new records created.
 - ◆ Integrate with extended RCO collections database to develop, implement and maintain joint policies and work-share agreements for the development of the Scotland-wide digital collection
 - ❖ Aiming to ensure the hardcopy problem ceases to get worse, as follows:
 - ◆ Liaise with the CAIRNS Cataloguing Standards Group to help maintain and promote guidelines on ensuring and gradually implementing a guaranteed level of interoperability between metadata for non-electronic resources.
 - ❖ Aiming to set up mechanisms for dealing with problems in legacy metadata, including the absence of such data (retroconversion), as follows:

- ◆ Establish the feasibility of utilising the database of the National Library of Scotland as a basis for gradually eliminating known and anticipated interoperability problems caused by poor, limited, or absent catalogue data or records in the existing Scottish catalogues that are the constituents of a Scottish national catalogue (Taking into account a range of issues including copyright considerations, costs if any, staff time required in the libraries and looking at the feasibility of the proposal in the widest sense).
 - ◆ Set up and test a pilot service, refine it, implement a full service
 - ◆ Set up a web-based training programme to enable the use of the service by any library in Scotland
3. Work with local libraries to formulate plans for the long-term elimination of metadata interoperability problems.
 4. Establish minimum standards for non-bibliographic (archives, museums and galleries, electronic materials, and directories) record creation across a (cross-sectoral and cross-domain) distributed national catalogue.
 5. Work with the CAIRNS and CIGS Cataloguing Standards Group to formulate a long-term plan for implementing a full-function distributed serials catalogue
 6. Monitor the development of, and disseminate information on, international metadata standards developments; ensure that Scottish interests are represented to groups dealing with the development of such standards

Annexe C Local interfaces, access, authentication, user requirements, and project evaluation

Note: Proposed by Glasgow University with SU and NU as supporting partners

The purpose of this project is to focus on user, staff, system-based, organisational, and policy related access issues, on evaluation, and on local and regional interface development. It will entail the following major elements:

1. Conducting a survey that will identify user groups and educational levels in Scotland with a view to establishing suitable terminologies to support user profiling on the central portal and in local and regional systems, identifying user needs in respect of local, regional and national access to resources, and informing authentication and authorisation investigations
2. Investigating, designing and developing a model interface between local and regional systems interfaces and both the user portal and the collaborative collection management gateway and metadata unit interface, looking at the hybrid library in a university, FE college and public library setting, the needs of regional organisations such as ALF and Glasgow Digital Library, and other related issues [overlap here with MERLIN2 and also the GDL interface]
3. Conducting a comprehensive and definitive investigation of inter-library loan and other document delivery needs in Scotland with a view to making recommendations on the most economic method of meeting these; making associated recommendations as to the design and functionality of related direct user access facilities on the portal and local and regional interfaces
4. Investigating and making recommendations on needs and mechanisms for user authorisation and authentication in the context of the portal and of local and regional services.
5. Looking at, and making recommendations on, inter-access agreements across Scotland
6. Organising and managing user evaluations of various portal facilities as they develop, including the proposed task-oriented interface, user configurable and adaptive features based on the extended dynamic clumping mechanism, and the interfaces between the central portal and local and regional systems.
7. Organising and managing staff evaluations of the portal, the collaborative collection management gateway, and the services provided by the metadata unit.

- End of Appendix B -

Appendix C: Report on progress subsequent to 2000 Annual Report

Work done in the five-month period following the 1999-2000 Annual Report entailed the following main threads:

1. Development Work on the Interface

The CAIRNS 'front end' was extensively redesigned based on the cumulative results of the various user evaluations, but particularly those relating to the May and October 2000 evaluations. Work done included:

- The 'de-cluttering' of the various screens by relegating HELP to subordinate screens available through button clicks (a major re-working)
- The creation of a very simple 'cross search all services via a single index with a single search term' facility as requested by users. This was achieved by adding an all-targets keyword search to the dynamic clumper, and passing it as a standard Z39.50 General keyword search to the broadcast searcher. The default settings for this search in the epixtech Z client produced useable results for most targets, failing only where the target did not have this search available. Redirecting the search type to Title keyword was found to be an acceptable solution in these cases.
- Providing improved granularity in respect of location information of collections within the dynamic clumping services. Collections can now be selected by the town of their location, as well as on a regional basis.
- Creation of a log for monitoring which web pages in the dynamic clumper are being accessed by users.
- Provision of an online user evaluation form

2. Addition of New Targets

Seven new targets were researched, planned, added and tested : five National Library of Scotland databases, the BUBL LINK database and the Glasgow Digital Library database (work began during project but some of it finalised in January 2001).

3. Final User Evaluation

A final user evaluation was carried out in October 2000. A report on this forms section 3 of this report.

4. Final Dissemination Activities

This was a major element of work in the last part of the project. Much of this work is evident from the report on dissemination in Appendix E below (which, of course, involved significant preparation or meeting organising work in some instances). This includes three presentations, including the final 'CAIRNS in the Community' event, and two articles. However, the following additional activities are also worthy of note:

- New CAIRNS poster and flyer created with current advice on the requirements of joining CAIRNS. Disseminated at various events.
- Significant discussions with CoSMiC member organisations regarding future co-operation, much of which raised a variety of CAIRNS-related issues and generally heightened the profile of the project.

5. Reworking of Technical Infrastructure

The underlying technical infrastructure of parts of the system - particularly the dynamic clumper - was reworked using 'ColdFusion' and an SQL database. This was done for a number of reasons:

- To simplify the addition of targets
- To make the system more robust
- To make the system more scalable

- To give it a more coherent structure
- To implement the RSLP/UKOLN Collection Level Description model and schema in the database supporting the dynamic clumper
- To prepare for the projected hand over to the SCONE project at the close of CAIRNS

6. Project Closedown Activities

These included the following main activities:

- Preparing for, arranging, conducting, reporting on the final meeting of the CAIRNS Liaison Group
- Preparing for, arranging, conducting, reporting on the final meeting of the CAIRNS Advisory Group
- Asking and obtaining the agreement of SCURL on the continuance of the CAIRNS Liaison Group
- Asking and obtaining the agreement of SCURL on the continuance of the CIGS and CAIRNS Cataloguing Issues Working Group
- Liaison with the external evaluators
- Reworking and completing the main project web-site
- Discussing, preparing, submitting, publishing, disseminating final report
- Handing over the project, the project systems, and project documentation to the SCONE project and training project staff

- End of Appendix C -

Appendix D: CAIRNS Cataloguing and Indexing recommendations

SCURL and CAIRNS: Issue Number 3

Cataloguing and Indexing recommendations

Executive summary

Introduction

Differences in cataloguing and indexing practice on the SCURL servers affects the results presented by CAIRNS. To investigate the action which could be taken by the SCURL libraries to improve CAIRNS search results, the CAIRNS Cataloguing and Indexing Working Group (CCIWG) was established in June 1999, with the approval of SCURL. Membership of the CCIWG consists of the senior cataloguer of each of the CAIRNS consortium sites, and of Edinburgh City Libraries and Information Services.

The CAIRNS Management Group recommends the adoption of a common standard for cataloguing and indexing in Scotland, to be achieved through SCURL's approval of the CAIRNS cataloguing and indexing recommendations. This would enhance the interoperability of data in Scottish libraries, and would help support the aim of SCURL to encourage greater collaboration between libraries in Scotland.

CAIRNS currently offers browse and keyword searches to author, title, subject and standard publisher number indices and, for this reason, the recommendations made by CAIRNS focus on searches to these indices.

Issues affecting the effectiveness of CAIRNS searches, and solutions proposed for solving these problems

A number of mechanical and procedural changes to local practices have been identified, which would allow for improvements to search results provided by CAIRNS, within the timescale of the Project. Implementation of CAIRNS shorter term recommendations would direct CAIRNS searches to the most appropriate index for each site, to provide the best result, given current indexing and cataloguing practice, for an author, title and subject keyword or phrase search.

To properly meet the requirements of Scottish library users, more fundamental changes are required to cataloguing and indexing practice. These changes have also been outlined in the recommendations document, and include the retrospective standardisation of indexing and cataloguing practice, with reference to the Bath Profile³⁴.

To attract resources to allow the implementation of these standards would require long term planning and further collaboration between the Scottish Libraries. For this reason, CAIRNS would ask SCURL to support the continued work on cataloguing and indexing standards, as follows:

- To support the implementation of the cataloguing recommendations of the CAIRNS Project.
- To support twice-yearly meetings of senior cataloguing staff of the CAIRNS consortium sites, and senior cataloguers of major public libraries in Scotland.
- Establishment of an email list to allow cataloguers in Scotland to raise and to resolve cataloguing issues.
- To support the production of further cataloguing and indexing recommendations by the CCIWG.

³⁴ The Bath Profile is an ISO Internationally Registered Profile (IRP) of the Z39.50 Information Retrieval Protocol, intended as a basis for effective interoperability between library and cross-domain applications. Conformance to this Profile's specifications will improve international or extranational search and retrieval among library catalogues, union catalogues, and other electronic resource discovery services worldwide.

- Support of forthcoming activities and project bids, which would help to achieve the aims of the document.
- Inclusion of the cataloguing and indexing recommendations in any future SHEFC/ SCURL plan for cataloguing /indexing retro-conversion.
- Inclusion of the cataloguing and indexing recommendations in any future acquisition of a library system by SCURL or CAIRNS consortium libraries.

If SCURL agrees to support the cataloguing and indexing recommendations and the ongoing work of the CCIWG, CAIRNS will undertake the implementation of the shorter-term recommendations, within the lifetime of the CAIRNS Project. CAIRNS will also undertake to make further recommendations regarding the implementation of the longer term cataloguing and indexing recommendations.

Helena Gillis

CAIRNS Project Co-ordinator

26th May 2000

CAIRNS Project recommendations for a cataloguing and indexing strategy for Scottish libraries

28th June 2000

Shorter term solutions

Shorter-term recommendations are work-arounds, which CAIRNS can put in place, and mechanical and procedural changes to local practices, which can be achieved within the timescale of the CAIRNS project.

1. Author

Compliance with current cataloguing policy

- CAIRNS libraries should ensure compliance with their current stated cataloguing policy.

Format issue

- CAIRNS and libraries should ensure that the author indices at each site conform to the information provided in the CAIRNS help.

User help

- CAIRNS should provide on-screen examples of how a name should be entered to allow searching on CAIRNS.
- CAIRNS should provide help to users on the variant forms of surnames
- CAIRNS should provide help screens to specify the 'types' of names (for example: authors, editors, corporate names, etc.) included in the index to which author searches are directed for each target on CAIRNS.

2. Title

Compliance with current cataloguing policy

- CAIRNS libraries should ensure compliance with their current stated cataloguing policy.

Format issue

- CAIRNS and libraries should ensure that the title indices at each site conform to the information provided in the CAIRNS help.

User help

- CAIRNS should provide a help screen to describe what is mapped to the title index at each CAIRNS consortium site.
- CAIRNS and CAIRNS libraries should provide help to explain the impact of stop words, synonyms, etc. on CAIRNS searches.

3. Subject

Compliance with current cataloguing policy

- CAIRNS libraries should ensure compliance with their current stated cataloguing policy.

Format issue

- CAIRNS and libraries should ensure that the subject indices at each site conform to the information provided in the CAIRNS help.

User help

- CAIRNS and the CAIRNS libraries should provide help information on how the variation in the subject index (subject authority list or subject scheme) of each target affects results presented to the user.

4. ISBN and ISSN numbers

Compliance with current cataloguing policy

- CAIRNS libraries should ensure compliance with their current stated cataloguing policy.

Format issue

- CAIRNS and libraries should ensure that the ISBN indices at each site conform to the information provided in the CAIRNS help.
- ISBN numbers should be, where possible, recorded in normalised form (without spaces or punctuation, and with upper case X) by CAIRNS libraries in sub field A of UKMARC field 021 or in subfield A of USMARC field 020. If impossible, ISBN numbers should be recorded at the beginning of the ISBN field to allow the first ten characters to be indexed.
- CAIRNS libraries should provide an index from which ISBN numbers can be searched.
- Each CAIRNS library should ensure that they follow the accepted local policy of recording binding information in the record.

Multiple ISBNs

- CAIRNS libraries should distinguish between distinct items, where multiple ISBNs are recorded.
- To allow users to distinguish between multiple ISBNs in a record, repeats of subfields A and C of UKMARC field 021 and repeats of subfield A of USMARC field 020 should be displayed by CAIRNS.
- CAIRNS libraries should ensure that multi-item qualification information is recorded in the ISBN field in addition to the ten-digit number.
- Each CAIRNS library should ensure that multi-issue information is incorporated in the record, following the standards required by MARC and AACR2.

Invalid ISBNs

- CAIRNS and CAIRNS libraries should agree on the circumstances in which invalid ISBNs should be recorded.
- Whenever possible, CAIRNS libraries should record invalid ISBNs in the UKMARC ISBN subfield z or in the USMARC subfield z. For libraries with computer systems which either cannot record more than one ISBN number (for example East Dunbartonshire's system), or cannot return invalid ISBNs (for example Edinburgh City Libraries system) the hardback or 'main' ISBN should be recorded for the item.
- CAIRNS and CAIRNS libraries should provide help for users searching on invalid ISBNs, to draw their attention to the fact that they might be searching for an invalid ISBN and to assist them with their search.

Duplicate ISBNs

- Record displays of duplicate items should continue as users may wish to know the existence of all available items which meet their search criteria.

User help

- CAIRNS, CAIRNS libraries and other local sites should provide help information to explain why and when ISBN searches might result in inaccurate results.

Record display

- CAIRNS to include the 001 field within the record display until mapping issues are sorted out, because the 001 field includes ISBN numbers.

5. Serials

User help

- User help should encourage a user to re-direct his search to the appropriate indices, if they receive a negative response.

6. Record display

Information to be returned to the user

- CAIRNS to provide the option of access to a brief, full and MARC record for each item returned to the user.
- CAIRNS to optimise the content of full and brief records.
- CAIRNS to provide the location and status information for each holding, where possible.

User help

- CAIRNS to provide help on the information contained within CAIRNS brief and full records. CAIRNS should also describe the additional information available from the MARC record.

7. Bath Profile

Before further work is done in connection with the Bath Profile, it is necessary for the International Profile to include UKMARC.

8. Focus for further work on cataloguing and indexing issues in Scotland

- The CCIG should meet at six monthly intervals.
- A Scottish Cataloguing and Indexing Issues Group email list should be established, to allow issues and proposed local changes in cataloguing and indexing practices to be discussed.
- Further discussion of the content of holdings is required, including specific issues associated with serials, multi-part items and electronic materials.

Longer term solutions

Longer term solutions include recommendations for the standardisation of indexing and cataloguing practice which would require the collaboration of Scottish libraries to attract resources over an extended period to allow the implementation of these standards.

1. Author

Format issue

- A future service should agree the content of a standard author index and each library should provide such an index.
- In a future service, each CAIRNS library should provide a separate author keyword index in conformance with the Bath Profile.

SCAN function

- A future service should investigate the implementation of the SCAN function in conjunction with suppliers.

Authority file

- A future service should carry out a feasibility study into the technical and professional implications of providing a centrally located, Scottish authority file for names, compliant with AACR2.

Research into user interrogation of the data

- A future service should seek to carry out research on user approaches to searches for names.

2. Title

Format issue

- In a future service, each library should provide the following two indices:

1/ A title alpha index

(The title alpha index would follow the AACR2 definitions and rules on title entries, with the addition of subtitles. It would consist of the title proper; subtitles; alternative titles; added titles; related titles; uniform titles; series titles).

2/ A title keyword index, directed to the same data as the title alpha index.

- A future service should research the use of notes fields carrying title keyword type information.

3. Subject

Format issue

- In a future service each library should provide a separate subject keyword index.

Authority file

- A future service should adopt a single scheme or authority list.

4. ISBN and ISSN numbers

Format issue

- Keyword searching at the National Library of Scotland and at Edinburgh will ensure that a 10-character ISBN number can be found. However, this is unacceptable as a long-term solution as it is non-compliant with the Bath Profile. A future service should find an alternative, longer-term solution to this problem.
- A future service should index ISSN numbers separately from ISBN numbers.
- A future service should convert SBN numbers to ISBN numbers.
- CAIRNS libraries should ensure the retrospective conversion to uppercase X for ISBN and ISSN numbers.
- A future service should apply retro-conversion to normalise ISBN numbers, for example to remove hyphens and spaces.
- A future service should ensure that binding qualifiers and multi-item qualifiers are the only qualifiers included in the record.

Multiple ISBNs

- A future service should supply, in the appropriate ISBN sub-fields, any missing ISBN numbers and multi-item and binding qualifiers required for display purposes.

Invalid ISBNs

- Invalid ISBNs meeting the criteria agreed by the CAIRNS Cataloguing and Indexing Working Group should be included in the ISBN index.

Duplicate ISBNs

De-duplication should be made available to the user as a non-default option.

5. Serials

A future service should adopt a standard definition of serials and their cataloguing requirements.

6. Keyword searching

Each library should provide:

- a separate subject keyword index
- a separate title keyword index
- a separate author keyword index

-a general keyword index

7. Record display

- A future service should carry out research into the information which should be displayed within a brief and full record. All information available from a CAIRNS search should be included in the full record display.
- Libraries should ask suppliers to develop Zservers to allow holdings level information, including location and status, to be returned in searches, where such facilities are not currently available.

Terminology used in this document:

Term:	How this term is used:
Record	The bibliographic record
Item	Components of the thing that has been catalogued
Holdings	Copies of items catalogued in the record
ISBN	International Standard Book Number (unique identifier for individual publications)
ISSN	International Standard Serial Number (unique identifier for serial publications)
UKMARC	United Kingdom Machine Readable Cataloguing
USMARC	United States Machine Readable Cataloguing
AACR2	Anglo-American Cataloguing Rules, second edition

- End of Appendix D -

Appendix E: Dissemination of Project Outcomes

Introduction

The lists below are a summary of dissemination activities carried out by the project. The success of these is clear from the comments in the external evaluation report on this topic. Another key area of activity in this area was the creation of the Confederation of Scottish Mini-Clumps (COSMIC) which made CAIRNS well known to regional and other organisations in Scotland and, hence, to the institutions and organisations making up the membership of these organisations. A number of posters and 'flyers' have also been produced and disseminated.

Presentations

Dennis Nicholson. A Scottish Portal? Presentation to SLIC. February 12th, Dundee

Building Digital (and non-digital) Scotland (Dennis Nicholson, SLAMIT AGM, Strathclyde University, 15th February 2001

Three presentations (Dennis.Nicholson, Gordon Dunsire, Helena Gillis), December 13th 2000, 'CAIRNS in the Community', Edinburgh

Presentation (Dennis.Nicholson, Gordon Dunsire), November 16th 2000. 'Components of a National Electronic Library for Scotland', Edinburgh, Information for Scotland

Presentation (Dennis.Nicholson, Gordon Dunsire), November 10th 2000. 'Components of a National Electronic Library for Scotland', RGU, Aberdeen

Launch of the online version of the catalogue of the Scottish Poetry Library, Edinburgh, for National Poetry Day 2000. Demonstration, by Gordon Dunsire, of access to the catalogue via CAIRNS via SLAINTE, to Rosemary McKenna, MP, and to other invited guests.

"Providing a Virtual Union Catalogue for Scotland: achievements and the future of CAIRNS, the Scottish eLib phase 3 'clump' project" given by Helena Gillis at the MDA (Museum and Documentation Association) Conference 2000 'Clicks and Mortar: building cultural spaces for the 21st century' at the University of Newcastle, 6th September 2000.

COSMIC (COntederation of Scottish MIni Clumps) Seminar (Dennis Nicholson), to outline the work of CAIRNS and SCONE and to discuss ways in which these projects can work with regional groups, including the Ayrshire Libraries Forum, Grampian Information and the University of the Highlands and Islands. 30th June 2000

CAIRNS, SCONE, SEED, SPIS and CoSMiC. A presentation by Dennis Nicholson at the SCONE Awareness Day for Scottish RSLP projects, University of Strathclyde, 30 June 2000.

Presentation by Dennis Nicholson on the CAIRNS distributed catalogue to SEDIC in Madrid June 2000

30th June 2000 Workshop on "Cataloguing electronic resources: case studies from SLAINTE and CAIRNS" given by Gordon Dunsire at the Libraries of the digital age seminar, 25-28 May 2000, Dubrovnik, Croatia.

Presentation and discussion on the topic "The Virtual Library in Scotland: plans and experiences" given by Gordon Dunsire to 50 staff and students of the National Library of Croatia and University of Zagreb, 23 May 2000, Zagreb, Croatia.

"Access and interoperability issues in networked cataloguing", a presentation given by Gordon Dunsire at the Libraries in the Digital Age seminar, 25-28 May 2000, Dubrovnik, Croatia. The same

presentation was given to 20 members of staff and students at the National Library of Croatia and University of Zagreb, 22 May 2000, Zagreb, Croatia.

Dennis Nicholson. SCONE and SHERAL: Co-ordinating collaborative collecting across Scotland. A presentation to SHERAL, Robert Gordon University, 19 May 2000.

Presentation to Ayrshire Libraries Forum on CAIRNS, SCONE and COSMIC. May 2000

Dennis Nicholson gave a presentation entitled "Building and organising digital (and non-digital) libraries" to EURASLIC 2000, the eighth biennial meeting of the European Association of Aquatic Science Libraries and Information Centres (EURASLIC). The presentation focussed on CAIRNS and dynamic clumping and the link with SCONE and collaborative collection management. The meeting was held in Aberdeen from the 3-5 May 2000.

"CAIRNS in Scotland: a false-drop in the ocean of 'stuff'?": a presentation by Gordon Dunsire to the SCURL (Scottish Confederation of University and Research Librarians) at the one day seminar, entitled 'Hybrid Libraries and Clumps: What's in it for me', presented by the eLib phase 3 projects, at the Gilmorehill Centre at Glasgow University on the 17th April 2000.

Cataloguing issues affecting interoperability in the CAIRNS Project, a presentation to the SCURL IT Advisory Group on 14th April 2000, by Gordon Dunsire; URL: <http://catriona.napier.ac.uk/resource/lib/scurlcatiss.pps>

13th April 2000, presentation on CAIRNS to CAUL (Council of Australian University Librarians) by Helena Gillis at Glasgow University Library.

Library Resource Sharing and Discovery: Catalogues for the 21st century. Two one-day workshops presented by the eLib Clump Projects, 3rd March 2000 in London and 11th April 2000 in Glasgow. A report on the one day conference held in London can be found in Issue 23 of ARIADNE. Presentation on cataloguing electronic resources for maximum interoperability, given by Gordon Dunsire at the 11th Annual Conference of CODI, Tampa, Fla., March 1-3 2000. The presentation includes a discussion of the CAIRNS Project and the work of the CAIRNS Cataloguing Issues Group. Attended by 40 Dynix system administrators and cataloguers. The presentation slides can be found at URL: <http://catriona.napier.ac.uk/resource/lib/gdcodi00.pps>

7 March 2000, presentation by Dennis Nicholson entitled 'CDLR Projects and a Virtual Union Catalogue for (Digital) Scotland' at the IBM Digital Library Solutions day at Strathclyde University Library.

Seminar on Cataloguing issues affecting interoperability, held by the Cataloguing and Indexing Group in Scotland on February 22, 2000. This included two presentations by Dennis Nicholson and Gordon Dunsire, and discussion on the CAIRNS Project and its relationship to other actual and proposed projects, and work done by the CAIRNS Cataloguing Issues Group. The event was attended by 35 cataloguers from public, special and academic libraries and information centres.

Cataloguing and Indexing Group in Scotland Workshop on Cataloguing for WebPACs on February 11, 2000. This included presentations by Gordon Dunsire and Paul Cunnea, drawing attention to the larger, interoperative environment in which cataloguing now takes place, as exemplified by CAIRNS. There was discussion on the advantages of centralised authority files, shared cataloguing, and the adoption of common schema for Z39.50 indexes and metadata mapping. The use of technical data, being gathered by CAIRNS for Z39.50 interfacing and applicable to local 'mini-clumps' set up using WebPAC technologies, was also discussed.

Presentation (Helena Gillis), entitled "How to guide the user to relevant information within a clump, with particular focus on an early version of the CAIRNS dynamic clumping service", at the Hylife Project Conference, Integrate, Co-operate, Innovate: eLib Phase 3 in context, November 24-25, 1999.

24 September 1999 - Presentation (Helena Gillis) on CAIRNS and Inter-Library Loans, to a one day event organised by the Forum for InterLending in association with the Inter-Library Services of the National Library of Scotland, at the National Library of Scotland.

July 1999, presentation by Helena Gillis and Keith Gilbert on CAIRNS to the Aristotle University of Thessoloniki, at Strathclyde University Library.

27 May 1999 - CAIRNS presentation (Helena Gillis) on Electronic Collaboration, to the SLA (Scottish Library Association), at the Branches and Groups Day in Peebles.

22 April 1999 - Joint MALIBU and CAIRNS presentation (Helena Gillis) to SCURL (Scottish Confederation of University Research Libraries) on clumps and hybrid library projects.

“CAIRNS Project Awareness Session on Inter-Library Loans Issues”, was held on 1st April 1999 at Glasgow University Library. The session included presentations by Sue Stevens, SEREN Consortium Manager; David Kenvyn;

Mark Denham and Helena Gillis. Exhibition at the “Internet Librarian & Libtech Conference ‘99” (29-31 March), Olympia. ELib phase III projects had a joint stand which was staffed by representatives from each of the projects. Helena Gillis represented CAIRNS. This included exhibition of project flyers and posters and demonstrations of project gateways.

“Library Resource Sharing and Discovery: Catalogues for the future”, 22 March 1999, British Library. A workshop presented by the eLib Clumps Projects, including a demonstration of CAIRNS and the RCO by Dennis Nicholson entitled ‘It’s Out There Somewhere: RCO and Locating Material by Subject’ and a presentation by Helena Gillis entitled ‘Not Just A Protocol: Managerial and Organisational Aspects of Clumping’.

“CAIRNS Project Awareness Session on Cataloguing Issues”, was held on 3rd March 1999 at Glasgow University Library. The session was presented by Gordon Dunsire and was attended by the CAIRNS Liaison Group and by Cataloguers from Scottish Libraries. Presentation on CAIRNS (Dennis Nicholson) to Strathclyde University Library staff, 25 February 1999.

Presentation, entitled “An investigation into content issues facing regional and subject clumps” (Helena Gillis and Katharine Hogg of the Music Libraries Online Project) at the “Integrate, Co-operate, Innovate” Conference, co-ordinated by eLib’s Hylife Project, at the Open University Conference Centre, London, 15 and 16 December 1998. Paper of the same title published in “The New Review of Information and Library Research”, Volume 4, 1998, pages 85-91

“Z39.50 in Theory and Practice”, presentation (Graeme Stewart) to representatives of West of Scotland Further Education colleges at the College of Building and Printing, Glasgow, on December 12 1998 available at <http://piedra.lib.strath.ac.uk/~graeme/z3950/> .

CAIRNS Presentation (Helena Gillis) at the SCONUL (Standing Conference of National and University Libraries) in York, 1-2 December 1998.

Poster presentation at the Scottish Cultural Resources Exhibition / Information for Scotland 5 Conference, at the Scottish Exhibition and Conference Centre (SECC) in Glasgow, 11-12 November 1998.

References to CAIRNS at presentations on CATRIONA II and on the CATRIONA II website.

Z39.50 web presentation (Graeme Stewart) at a meeting of the CAIRNS Liaison Group and Systems Librarians from the CAIRNS Consortium Sites, at the University of Glasgow, 30 September 1998, available at <http://piedra.lib.strath.ac.uk/docs/presentation/fe/index.html>

Articles, press releases, etc.

Article entitled “Components of a National Electronic Library for Scotland”, by Dennis Nicholson, published in Scottish Libraries: the journal of the Scottish Library Association, November 2000.

Article entitled: “Behind the screens with.....CAIRNS”, by Gordon Dunsire, published in: Scottish

Libraries: the journal of the Scottish Library Association, v. 14, no. 3, issue 81, p. 12.

Nicholson, D. Researching and Developing Virtual Scotland - A Perspective from the Centre for Digital Library Research. *The Electronic Library*. 18(1) February 2000. p.51-62 . ISSN 0264-0473

“Clumping towards an UK National Catalogue?” (Dennis Nicholson) ARIADNE Issue 22, 1 December 1999.

Book chapter in *The New Review of Information and Library Research*, Volume 5, 1999, pages 99-105, by Helena Gillis, entitled “How to guide the user to relevant information within a clump, with particular focus on an early version of the CAIRNS dynamic clumping service”. The abstract can be seen on the Hylife Project website.

Chapter in the proceedings of the 85th annual conference of the Scottish Library Association, 1999, page 64, by Helena Gillis, entitled ‘The CAIRNS Project: An example of collaboration within an electronic environment’

Book chapter on BUBL, CATRIONA and CAIRNS (Dennis Nicholson), published in “The Amazing Internet Challenge”, by ALA Editions, Chicago, 1999.

Book chapter in *The New Review of Information and Library Research*, Volume 4, 1998, entitled “An investigation into content Issues facing regional and subject clumps: The CAIRNS and Music Libraries Online Projects, by Helena Gillis and Katharine Hogg of the Music Libraries Online Project.

Article “CAIRNS that go clump in the night” (Dennis Nicholson) *Library Technology*, November 1998

- End of Appendix E -

Appendix F: Technical evaluation of the interoperability available

General Comments

CAIRNS has taken a pragmatic approach to questions relating to interoperability. The assumption is that factors such as institutional independence, sectoral and domain boundaries, and political considerations make a distributed approach to co-operation necessary, and that whilst, in the long term, fully interoperable systems will require fully compatible metadata, rigorous implementation of the Z39.50 standard, adherence to the Bath profile or any future replacement profile, and systems that allow automatic adjustment to change such as Explain, we are only likely to reach this desired future situation if we aim to maximise operational interoperability in the short term so that the benefits of a distributed approach can be demonstrated and the wisdom of taking steps towards the longer term goal of full interoperability seen. This means, for example:

- Sending different attribute sets to different targets for the same search in order to maximise appropriate retrieval in circumstances where a more 'purist' approach would offer less useful results.
- In some cases, cross-searching different indices at different sites - for example in circumstances where some sites have subject indices, but others offer a general keyword search as the best subject approach.
- Accepting that things such as differences in local practice, for example the location in a record of particular piece of information or changes to target details, will require manual adjustments and, hence, human vigilance in the short term, and that this implies good 'interoperability' at a human level, something which, in turn, requires relatively small communities such as Scotland and sub-communities of the Scottish community (sectors, domains, regions, and so on), co-ordinated via an organisation such as CoSMiC.

The report below should be seen in that light, remembering, however, that the fully interoperable system nevertheless remains the long term goal. Note that, in every case, where this type of 'imperfect' approach has been adopted, an attempt has been made to explain the situation to the user via help screens.

Searches

CAIRNS offers the following search choices:

- Author
- Author keyword
- Title
- Title keyword
- Subject
- Subject keyword
- ISBN
- ISSN

These were selected in the early stages of the project after preliminary investigations into which Z39.50 searches were supported by the vendor systems used by CAIRNS members at the time. Precise definitions of how the searches would operate in terms of search term truncation, phrase searching, Boolean searching and cross-index searching were left for subsequent analysis.

As a result of user evaluation tests and feedback, a General keyword search was added to the interface during the latter stages of the project.

The General keyword search is available as part of the 'simple' search facility, which automatically includes all targets in the search. It is the only search type included in this facility.

The eight original searches are now available as part of the ‘advanced’ search facility and ‘dynamic clumper’. These facilities allow a choice of one of the searches to be made against all targets or a subset of targets selected by the user according to subject strength or physical location.

Targets

The following Z39.50 targets were actually or potentially available for inclusion in the CAIRNS service during the project.

Table F1: CAIRNS target Z29.50 servers		
Target	System	Target identifier¹
Aberdeen University. Library catalogue	Dynix	AbeU
Bibliography of Scottish Literature in Translation (BOSLIT) ^{2,6}	Voyager	BSLI
Bibliography of the Scots Language (BOSLAN) ^{2,6}	Voyager	BSLA
BUBL LINK ²	Horizon	BUBL
Dundee University. Library catalogue	Dynix	DunU
East Dunbartonshire Libraries catalogue ³	Dynix	EDun
Edinburgh City Libraries. Central Library catalogue ^{3,4}		EdCL
Edinburgh University Library. Catalogue	Voyager	EdiU
Glasgow Caledonian University. Library catalogue	Dynix	GCal
Glasgow City Libraries. The Mitchell Library catalogue ^{3,4}		Mitc
Glasgow Digital Library ²	Horizon	GDLi
Glasgow University. Library catalogue	Innopac	GlaU
Heriot-Watt University. Library catalogue ⁴	Advance	HeWa
Napier University Learning Information Services catalogue ⁷	Dynix	Napi
National Library of Scotland catalogue ⁶	Voyager	NaLS
National Library of Scotland manuscripts catalogue ^{2,6}	Voyager	NLSM
Queen Margaret University College. Library catalogue	Unicorn	QMar
Scottish Bibliographies Online (SBO) ^{2,6}	Voyager	SBOon
SCRAN catalogue ⁵	Aquarelle	SCRA
SLAINTE catalogue ⁸	Dynix	SLAI
St Andrews University. Library catalogue	Innopac	StAn
Stirling University Information Services. Library catalogue	Dynix	StiU
Strathclyde University. Library catalogue	Horizon	Stra
The Robert Gordon University. Library catalogue ³		RoGo
Union Catalogue of Art Books in Libraries in Scotland (UCABLIS) ^{2,6}	Voyager	UCAB
University of Abertay Dundee. Information Services catalogue	Dynix	AbDu
University of Paisley. Library catalogue ⁵	Talis	PaiU

Notes	
1	These target identifiers are used in the underlying system control records.
2	Added in Jan 2001.
3	Z server not yet available.
4	Observer status as member of SCURL.
5	Z server available but not yet connected to CAIRNS.
6	National Library of Scotland databases using a Z server with separate port numbers.
7	Includes the catalogue of West Lothian College.
8	Includes the catalogue of the Scottish Poetry Library.

MODELS Library Interoperability Profile Family

The MODELS Library Interoperability Profile Family, at <http://www.ukoln.ac.uk/dlis/models/clumps/technical/zprofile/zprofile.htm> (MLIP) was the only relevant interoperability profile available at the start of the project. Although it has been superseded by

the Bath Profile during the lifetime of the project, it has formed the basis of much of the project's focus on interoperability issues.

During the first year of the project, institutions were asked to provide mappings from their metadata structure to local indexes which matched the basic author, subject, title and control number searches of the MLIP. The mappings and areas of non-conformance to the profile, in terms of UKMARC and USMARC tags and subfields, are noted in the following tables. All CAIRNS catalogues use MARC as their Z server metadata schema.

Target	MARC format
AbeU	US ²
AbDu	UK
DunU	UK ²
GCal	US
GlaU	UK
HeWa	UK
Napi	UK
QMar	UK
RoGo	UK
StAn	UK
StiU	UK
Stra	US

1	Data for other CAIRNS targets was not available due to ongoing system procurement or Z server procurement.
2	Metadata stored in non-MARC format, but mapped to MARC tags for output.

MLIP mapping		
UKMARC: 100, 110, 111, 700, 710, 711, 800, 810, 811		
USMARC: 100, 110, 111, 400, 410, 411, 700, 710, 711, 800, 810, 811		
Target	MLIP tags not used	Tags additional to MLIP
AbeU		
AbDu	800, 810, 811	
DunU		709
GCal	400, 410, 411, 800, 810, 811	
GlaU	800, 810, 811	
HeWa	100, 110, 111, 711, 800, 810, 811	
Napi	111, 711, 811	600, 610
QMar	800, 810, 811	
RoGo	800, 810, 811	
StAn		400, 410, 411
StiU	800, 810, 811	
Stra	400, 410, 411, 800, 810, 811	130, 730

MLIP mapping		
UKMARC: 100, 110, 111, 700, 710, 711, 800, 810, 811		
USMARC: 100, 110, 111, 400, 410, 411, 700, 710, 711, 800, 810, 811		
Target	MLIP tags not used	Tags additional to MLIP
AbeU	N/a	N/a
AbDu	800, 810, 811	
DunU	N/a	N/a

Gcal	N/a	N/a
GlaU ¹	N/a	N/a
HeWa	100, 110, 111, 711, 800, 810, 811	
Napi	N/a	N/a
QMar	800, 810, 811	
RoGo	N/a	N/a
StAn ¹	N/a	N/a
StiU	800, 810, 811	
Stra	400, 410, 411, 800, 810, 811	130, 730

Table F5: MARC tag mapping for CAIRNS targets compared to MLIP for search type: Title browse

MLIP mapping		
UKMARC: 240, 243, 245, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 740, 745, 800t, 810t, 811t		
USMARC: 130, 21X-24X, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 730, 740, 800t, 810t, 811t, 830, 840		
Target	MLIP tags not used	Tags additional to MLIP
AbeU	400t, 410t, 411t, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t	400l, 410l, 600l, 610l
AbDu	490, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t	248, 780, 785, 840
DunU	243, 440, 490, 600t, 611t, 800t, 810t, 811t	700v, 710v, 711v
GCal	130, 21X-23X, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t, 830, 840	780, 785
GlaU	600t, 610t, 611t, 710t, 711t, 800t, 810t, 811t	248, 840
HeWa	240, 243, 490, 600t, 610t, 611t, 700t, 710t, 711t, 740, 745, 800t, 810t, 811t	
Napi	243, 440, 490, 611t, 711t, 811t	640, 645
QMar	740, 800t, 810t, 811t	248, 840
RoGo	490, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t	248, 840
StAn	243, 490, 600t, 610t, 611t	248, 400t, 410t, 840
StiU	440, 490, 800t, 810t, 811t	248h
Stra	130, 21X-23X, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 730, 800t, 810t, 811t, 830, 840	222

Table F6: MARC tag mapping for CAIRNS targets compared to MLIP for search type: Title keyword

MLIP mapping		
UKMARC: 240, 243, 245, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 740, 745, 800t, 810t, 811t		
USMARC: 130, 21X-24X, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 730, 740, 800t, 810t, 811t, 830, 840		
Target	MLIP tags not used	Tags additional to MLIP
AbeU	400t, 410t, 411t, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t	400l, 410l, 600l, 610l
AbDu	490, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t	248, 780, 785, 840
DunU	243, 440, 490, 600t, 611t, 800t, 810t, 811t	700v, 710v, 711v
GCal	130, 21X-23X, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 700t, 710t, 711t, 800t, 810t, 811t, 830, 840	780, 785
GlaU ¹	N/a	N/a
HeWa	240, 243, 490, 600t, 610t, 611t, 700t, 710t, 711t, 740, 745, 800t, 810t, 811t	
Napi	243, 440, 490, 611t, 711t, 811t	248, 505, 640, 645
QMar	740, 800t, 810t, 811t	248, 500, 505, 840
RoGo	N/a	N/a
StAn ¹	N/a	N/a
StiU	440, 490, 800t, 810t, 811t	248h
Stra	130, 400t, 410t, 411t, 440, 490, 600t, 610t, 611t, 730, 800t,	500, 505, 520, 590, 770, 772, 775,

810t, 811t, 830, 840	776, 780, 785, 787
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Table F7: MARC tag mapping for CAIRNS targets compared to MLIP for search type: Subject browse		
MLIP mapping		
UKMARC: 600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695		
USMARC: 600, 610, 611, 630, 650, 651, 653, 654, 655, 656, 657, 69X		
Target	MLIP tags not used	Tags additional to MLIP
AbeU	N/a	N/a
AbDu	600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695	659
DunU	650, 651, 653, 655, 660, 661, 668, 695	640, 645
GCal	N/a	N/a
GlaU	653, 655, 660, 661, 668, 695	640, 645, 870, 871, 872, 873, 874, 875, 876
HeWa	N/a	N/a
Napi	600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695	089
QMar	653, 655, 660, 661, 668, 695	645
RoGo	653, 655, 660, 661, 668, 695	640, 645
StAn	653, 660, 661, 668, 695	640, 645, 755
StiU	653, 655, 660, 661, 668, 695	245, 505, 745
Stra	651, 653, 654, 655, 656, 657	

Table F8: MARC tag mapping for CAIRNS targets compared to MLIP for search type: Subject keyword		
MLIP mapping		
UKMARC: 600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695		
USMARC: 600, 610, 611, 630, 650, 651, 653, 654, 655, 656, 657, 69X		
Target	MLIP tags not used	Tags additional to MLIP
AbeU	N/a	N/a
AbDu	600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695	659
DunU	650, 651, 653, 655, 660, 661, 668, 695	640, 645
GCal ¹	N/a	N/a
GlaU ¹	N/a	N/a
HeWa	N/a	N/a
Napi	600, 610, 611, 650, 651, 653, 655, 660, 661, 668, 695	089
QMar	653, 655, 660, 661, 668, 695	645
RoGo	N/a	N/a
StAn ¹	N/a	N/a
StiU	653, 655, 660, 661, 668, 695	245, 505, 745
Stra	651, 653, 654, 655, 656, 657	

Table F9: MARC tag mapping for CAIRNS targets compared to MLIP for search type: ISBN		
MLIP mapping		
UKMARC: 021		
USMARC: 020		
Target	MLIP tags not used	Tags additional to MLIP
AbeU		
AbDu		
DunU	021	001
GCal		
GlaU ²		022
HeWa		

Napi ²		001, 022
QMar		
RoGo		
StAn		001
StiU		001
Stra		021

Table F10: MARC tag mapping for CAIRNS targets compared to MLIP for search type: ISSN

MLIP mapping		
UKMARC: 022		
USMARC: 022, 4XXx, 7XXx		
Target	MLIP tags not used	Tags additional to MLIP
AbeU		950
AbDu		
DunU		
GCal	022	020
GlaU ²		021
HeWa		
Napi ²		001, 021
QMar		
RoGo		
StAn		
StiU	022	001
Stra	4XXx, 7XXx	

Notes

1	General keyword index used.
2	Combined ISBN and ISSN index used.

These mappings were used to raise interoperability issues with the CAIRNS Cataloguing Issues Working Group.

It should be noted that some mapping details have changed since the information was gathered and last updated. This is generally true for all information presented in this section: server settings, index mappings, and index content have been amended at the target end as a result of changes in local needs or vendor systems, data migration exercises, and not least because of a desire to improve interoperability within the CAIRNS service.

Bath Profile

The Bath Profile Z39.50 specification was released half-way through the CAIRNS project. It is currently in release 1.1, which is the version considered for this report.

The following table gives the bib-1 attribute sets recommended by the Bath Profile which are the nearest equivalents to the established CAIRNS searches.

Table F11: CAIRNS searches and nearest equivalent Bath Profile attribute sets			
Search	CAIRNS identifier	Bath Profile identifier	Bib-1 attribute set
Author-name browse	A	5.A.1.4. Author Search - Exact Match	(1003, 3, 1, 1, 100, 3) ¹
Author-name keyword	AK	5.A.1.2. Author Search - Keyword	(1003, 3, 3, 2, 100, 1)
Title browse	T	5.A.1.8. Title Search - First Characters in Field	(4, 3, 1, 1, 1, 1)
Title keyword	TK	5.A.0.2. Title Search - Keyword	(4, 3, 3, 2, 100, 1)
Subject browse	S	5.A.1.12. Subject Search - First Characters in Field	(21, 3, 1, 1, 1, 1)
Subject keyword	SK	5.A.0.3. Subject Search - Keyword	(21, 3, 3, 2, 100, 1)

ISBN	ISBNA	5.A.1.14. Standard Identifier Search	(1007, 3, 1, 1, 100, 1) ²
ISSN	ISSNK	5.A.1.14. Standard Identifier Search	(1007, 3, 1, 1, 100, 1) ³
General keyword	GK	5.A.0.4. Any Search - Keyword	(1016, 3, 3, 2, 100, 1)

Notes	
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- | | |
|----------|---|
| 1 | CAIRNS truncation attribute is set to 1 (right truncation) rather than 100 (do not truncate). |
| 2 | Specific ISBN search (use attribute 7) not defined by Bath Profile release 1.1. |
| 3 | Specific ISSN search (use attribute 8) not defined by Bath Profile release 1.1. |

The attribute sets used for CAIRNS searches are based on the default sets supplied with the epitech Horizon Z client. These sets have been amended by trial-and-error to produce meaningful search results against each Z target. The Z client attributes were adjusted to improve the match of the CAIRNS results sets compared against those obtained by searches carried out with local interfaces. There was insufficient time within the project to make detailed comparisons taking into account factors such as punctuation stripping, auto-truncation and phrase searching in the the local interface. It is likely that further investigation of the CAIRNS bib-1 attribute sets will provide improvement in the accuracy of search results.

The following tables give the bib-1 attribute sets used by the CAIRNS Z client for searching the targets.

Table F12: Bib-1 attribute sets for CAIRNS searches for target: AbDu, AbeU, DunU, GCal, GlaU, GDLi, HeWa, Napi, Omar, SLAI, StAn, StiU, Stra

Search identifier	Bib-1 attribute set ¹
A	(1003, , , 1, 1,)
AK	(1003, , , 2, 100,)
T	(4, , , 1, 1,)
TK	(4, , , 2, 100,)
S	(21, , , 1, 1,)
SK	(21, 3, , 2, 100,)
ISBNA	(7, , , 1, ,)
ISSNK	(8, , , 1, 100,)
GK	(1016, 3, , 2, 100,)

Table F13: Bib-1 attribute sets for CAIRNS searches for target: BSLA, BSLI, EdiU, NaLS, NLSM, SBOn, UCAB²

Search identifier	Bib-1 attribute set ¹
A	(1003, , , 1, 1,)
AK	(1003, , , 2, 100,)
T	(4, , , 1, 1,)
TK	(4, , , 2, 100,)
S	(21, , , 1, 1,)
SK	(21, 3, , 2, 100,)
ISBNA	(7, , , 1, 1,)
ISSNK	(8, , , 1, 1,)
GK	(1035, 3, , 2, 100,)

Table F14: Bib-1 attribute sets for CAIRNS searches for target: BUBL

Search identifier	Bib-1 attribute set ¹
A	(1003, , , 1, 1,)
AK	(1003, , , 2, 100,)
T	(4, , , 1, 1,)
TK	(33, , , 2, 100,)

S	(21, , , 1, 1,)
SK	(121, 3, , 2, 100,)
ISBNA	(7, , , 1, ,)
ISSNK	(8, , , 1, 100,)
GK	(1035, 3, , 2, 100,)

Notes	
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1	Values for attributes not specified by Z client with the result that the target automatically adopts a default value
2	All Endeavour Voyager targets.

Current conformance of the CAIRNS Z client and targets to the Bath Profile is poor. Improvement in conformance is likely to require reconfiguration of the client and the targets. The current lack of detailed specification information from the system vendors makes this a difficult task, and there is no suitable set of search test data that could be used to investigate stated levels of conformance. As will be seen from the use of the system, however, a reasonable degree of interoperability has been achieved and this is seen as enhancing the chances of future work that will improve conformance and interoperability in general as explained in the introductory section of this Appendix.

Search redirection

Not all CAIRNS targets support every search attribute set sent by the Z client. There are two principal causes of a 'search failed' error message presented by the client. The target may not contain an index appropriate to the use attribute sent, or the target may not be able to handle certain combinations of use, position and truncation attributes. Lack of target system documentation has prevented the project investigating this issue in detail.

The CAIRNS Z client allows each standard CAIRNS search to be redirected to another standard search for each target. CAIRNS uses this facility to redirect searches not supported by a target. This is an important consideration for the end-user, for a number of reasons:

- The Z client takes a significant amount of time to determine that a target does not support a search attribute set before generating the 'search failed' message, and the search results are not displayed until all targets have delivered a results set or error message; redirection reduces the average time taken to complete a broadcast search.
- Results from the redirected search may often be useful to the end-user, even if they are not as precise.
- Reduction of the number of error messages improves end-user confidence in the system.

The following table gives the redirection map for the CAIRNS targets.

Target	CAIRNS search	Redirected to
AbDu	AK	A
AbeU	SK	TK
AbeU	AK	A
DunU	AK	A
DunU	SK	S
EdiU	S	SK
EdiU	T	TK
GCal	SK	GK
GCal	S	GK
GCal	AK	A
GlaU	AK	A
HeWa	SK	TK
NaLS	T	TK
NaLS	AK	A
Napi	SK	TK
Napi	AK	A
Napi	S	TK

QMar	A	AK
QMar	T	TK
QMar	S	SK
StAn	AK	A
StAn	SK	S
StAn	TK	T
StiU	AK	A
StiU	SK	S
Stra	AK	A
Stra	SK	S

It is likely that some of these redirection mappings could be eliminated as a result of changing elements of the bib-1 attribute sets sent to the targets.

Result set display

The CAIRNS Z client does not de-duplicate result sets. Instead, they are displayed initially as the number of records found against each target. The result set for each target can then be selected for browsing. The initial browse display is a list of brief bibliographic records consisting of title, author and date of publication. The end-user can then select a record for a full display or a MARC display.

The client contains configuration files for mapping record syntaxes to the brief and full bibliographic record displays, and for holdings display.

There are currently two bibliographic record configuration files, one for USMARC/MARC21 and the other for UKMARC. Local, non-standard tags can be included in the configuration. This is not appropriate for most local tags in CAIRNS because tag contents may be irrelevant outside of a local context, or misleading and ambiguous if the same tag has been used for different purposes in two separate targets. However, the SLAINTE target contains directory records for most Scottish libraries, including CAIRNS members, which is held locally in a non-MARC format, but which is mapped to non-standard UKMARC fields for Z server output. The UKMARC configuration file allows these directory information records to be displayed within the SLAINTE result sets.

Display configuration files can, in principal, be customised for each CAIRNS target to take account of deviations from adherence to stated standards. Such deviations may include the use of a standard field for non-standard content, or the use of a non-standard, local field for standard content. The current CAIRNS use of monolithic configuration files causes mis-matches between displayed field labels and contents when such deviations occur.

The CAIRNS client can also display holdings level records. Very little work was carried out by the project to create appropriate configuration files because of the wide variation in record syntaxes for item description. However, the default configuration file supplied by epixtech works well with epixtech Dynix and Horizon targets, which form the majority of CAIRNS targets where holdings information is relevant.

Semantic interoperability

The CAIRNS Cataloguing Issues Working Group met several times to consider policies, practices and standards that might affect the usefulness of a service based on CAIRNS. The group produced the MARC tag mappings for comparison with the UK Library Interoperability Profile, and a set of guidelines recommending short and long term methods of improving the semantic interoperability of CAIRNS targets.

Quantitative indications of semantic interoperability are difficult to determine. The group considered the variability of content in each of the five semantic types of CAIRNS search: author, ISBN, ISSN, subject, and title. It was generally agreed that these could be ranked, in order of increasing variability: ISBN, ISSN, author, title, subject.

There is a distinct differential between subject semantic variance and the other four. The use of the Anglo-American Cataloguing Rules, 2nd edition is widespread in CAIRNS libraries, and much of the

variance in ISBN, ISSN, author and title semantics noted is due to conformance to different levels of the rules and adoption of allowable options. There was no similar consensus in the use of subject standards. Library of Congress Subject Headings was the most common scheme used, but was used in only half of the libraries which supplied information, as shown in the following table.

Table F16: Subject heading schemes used by CAIRNS targets		
Target	Scheme	Notes
BUBL	LCSH	Applied to new records and some older records.
DunU	Local	
EdiU	MeSH	Applied to most records in the Erskine Medical Library collection.
EdiU	LCSH	Applied to most records.
GCal	LCSH	Applied to some older records.
GCal	Local	Applied to some new records.
GlaU	LCSH	Applied to new records.
Napi	Local	Based on DDC schedules
PaiU	Local	
QMar	LCSH	
QMar	MeSH	Present in some imported records.
RoGo	Local	
StAn	LCSH	
StiU	MeSH	Applied to some records.
StiU	Local	Applied to some records.
StiU	LCSH	Applied to some records.
Stra	Local	Applied to older records in Jordanhill campus collection.
Stra	LCSH	Applied to new records.

There was considerable variation in the classification schemes used. Although CAIRNS does not offer a classification number search, the number is often used by libraries to derive subject headings. The Dewey Decimal Classification was the most common scheme used, but in various editions within and between libraries.

- End of Appendix F -

Appendix G: Napier University Case Study: Using CAIRNS in a Re-classification Project

Background

Napier University Learning Information Services (NULIS) includes three campus learning centres created from the libraries of the former Lothian College of Nursing. Stock in these centres is classified and shelfmarked using the National Library of Medicine (NLM) scheme, while Dewey Decimal Classification (DDC) is used in other centres. The University plans to close one of the NLM centres; stock will be integrated with that in a DDC centre, so reclassification of the NLM stock was required. This had to be achieved as quickly and cheaply as possible.

As a first step, DDC numbers already applied to copies held at other centres were identified and used. Next, DDC numbers available on imported MARC records for the NLM stock, but not yet used, were identified. This left some 2700 items with no internal source of DDC numbers. A list of ISBNs associated with these items was readily generated from the catalogue

Professional staff suggested that CAIRNS could be used to identify DDC numbers in MARC records held by other Scottish university libraries, particularly those which had undertaken similar reclassification projects resulting from mergers with nursing and midwifery colleges. CAIRNS was asked if there were any ways of isolating specified catalogues for one-stop searching; this was an ideal test for the concept of a 'mini-clump', and CAIRNS agreed to set up an interface which would present only the specified Z targets for searching.

NULIS wanted to use paraprofessional staff to carry out the work of searching, identifying relevant MARC records, and determining whether any associated DDC numbers were suitable for the reclassification by checking edition numbers. They suggested that the 'decision-making' elements of this work could be simplified if staff could first search only for ISBNs for the items. A second stage could then search only for titles for items not found in the first stage. Again, the specification of particular searches was part of the mini-clump concept, and CAIRNS was able to produce a suitable interface.

In fact, two mini-clumps were set up. Both had the same specified targets: Napier itself, in case previous internal searches had mistakenly failed; the National Library of Scotland (NLS), the largest single catalogue in CAIRNS; Dundee University (DUL) and Glasgow Caledonian University (GCal), both of which had already undertaken similar reclassification projects. One mini-clump only allowed ISBN searches; the other only title alphabetic searches.

Methodology

Paraprofessional staff were given an hour's training in using CAIRNS in general, and the mini-clumps in particular.

A list of ISBNs to be searched was generated as a machine-readable text file. Staff opened the text file in one window, a MARC editing window for Napier's Dynix catalogue, and the CAIRNS ISBN mini-clump in another. ISBNs were copied and pasted from the text file to the mini-clump search term input. Positive hits from the targets were searched in a specified order: Napier first, followed by Glasgow Caledonian, then Dundee, and finally the National Library. If a suitable DDC number was found, it was entered directly into the local Napier record, and the next ISBN number copied into the mini-clump.

After all ISBNs had been processed, a text file of titles of items not found was generated, and the procedure repeated using the CAIRNS Title mini-clump.

Results

Search	NULIS	GCal	DUL	NLS	Not found	Total
ISBN	150	444	78	61	426	1159
Title	35	567	50	40	851	1543
Total	185	1011	128	101	1277	2702

Paraprofessional staff reported that the mini-clumps gave a fast "within seconds" response time for each search. Delays occurred when CAIRNS itself was off-line, due to development work, or if one of the specified targets was down; the latter did not only result in 'no hits' for that target, but also delayed positive responses from the other targets as the CAIRNS Z client traversed a complete 'attempting connection' cycle.

Little supervision of the paraprofessional staff was required because the mini-clumps and project procedures allowed a linear workflow with simple decision points.

Professional staff were pleased that well over half of the items were reclassified without using their limited time resources. Professional staff contributed to the manual reclassification of the remaining items.

The systems librarian said "Without access to a service like CAIRNS, we could still have carried out the project, but it would have taken a considerably longer time."

- End of Appendix G -

Appendix H: User and System documentation produced by CAIRNS

User Help Documentation

This is all available online - see <http://cairns.lib.strath.ac.uk/>

System Documentation

In the main, 'off-the-shelf' products have been used and it is unwise for CAIRNS to attempt to cover and re-write a supplier's system documentation. Information that is required in addition to supplier documentation is provided below. Basic registration of new targets requirements are also covered in the CAIRNS leaflet created towards the end of the project.

Registration of new targets

The CAIRNS service consists of two separate functioning systems linked together. New targets must be properly registered in each system before they can be incorporated into the service.

The 'dynamic clumper' offers a set of web pages allowing the end-user to select one or more targets in various ways, choose one of the available search types, and enter a search term.

The 'broadcast searcher' carries out a Z39.50 search using those parameters, and displays the results to the end-user as a set of web pages.

Essential information required to make the target operational

Dynamic clumper

The dynamic clumper uses a SQL database and ColdFusion software to generate appropriate content for its web pages. A new target must be registered within the SQL database, which is based on the Research Support Libraries Programme schema for collection level descriptions.

Registration requires:

A record in the **Collection** table describing the target catalogue as a collection (of metadata).

Mandatory fields are:

Title: the name of the target catalogue or finding aid. This must usually be created from the name of the collection of resources being described, following the style of existing entries.

Type, using a controlled vocabulary from the schema: the word 'catalogue' must be included to allow the software to select the record for display as a target.

A record in the **Collection** table for at least one of the collections of resources described by the target catalogue:

Title: the name of the collection of resources. This may be derived from the name of the holding institution, following the style of existing entries, or may be supplied by the holding institution.

Type: as defined by the schema.

A record in the **RelIsDescribedBy** table, consisting of the ID keys of the Collection records.

A record in the **Zserver** table, holding technical parameters for the broadcast searcher:

CollectionID: the ID key of the target metadata Collection record.

IsActive: set to true if the target is up and running.

RootCode: a four-letter mnemonic code for the target, used to identify the target in the broadcast searcher.

WPDbNumber: a number used to identify the target in the broadcast searcher.

A record in the **CollectionMeta** table, containing information about cataloguing practices affecting interoperability:

MetadataSchemaID: the ID key of the metadata schema used for the target Z server record syntax.

Two records in the **MiniclumpCollection** table, defining collections assigned to stored dynamic clumps or 'mini-clumps'. One record contains the ID key of the target metadata Collection record and the ID key of the CAIRNS 'Scottish collections (simple)' mini-clump (which contains all targets). The other record contains the ID key of the target metadata Collection record and the ID key of the CAIRNS 'Scottish collections (advanced)' mini-clump (which contains all targets).

The target host institution should supply the **title** of one or more of the collections described by the metadata of the target, if available. All other essential information is created during set-up.

Broadcast searcher

The broadcast searcher uses epixtech's Horizon WebPAC Z client.

Registration requires:

A configuration file for the target. The filename is created from the **Zserver RootCode** already defined in the dynamic clumper, an underscore character, a three-letter mnemonic code for the target system, and a filename extension of cfm (e.g. for Napier University's dynix system, it would be napi_dyn.cfm). The file contains:

- The bib-1 attribute sets for standard CAIRNS searches, optimised for the target.
- The IP address, socket number and database name of the target Z server.
- The name of the field display configuration file for the result set; currently for UKMARC or USMARC/MARC21 only.
- The redirection map for CAIRNS searches not supported by the target.
- Other parameters affecting the search and display configurations.

An entry in the broadcast search node configuration file, webpac.cfg. The entry is currently only used to register the target and its associated cfm file, so the existing entries can be used as a guide. The node name for the target is the **Zserver RootCode** already defined in the dynamic clumper. The node name must be added to the parent menu called 'broadcast search'.

The target host institution should supply the **IP address, socket number, database name** and result set **record syntax** of the target Z server.

Desirable information

Additional information from the host institution can improve interoperability, the precision and recall of searching, and the completeness of the result set records.

Target Z server configuration and conformance to the CAIRNS default and Bath Profile bib-1 attribute sets will help CAIRNS to refine the Z client configuration files in the broadcast searcher.

Field mappings to target indexes can be used to amend the Z client field display configuration files to reduce ambiguity and improve the completeness of the result set display in the broadcast searcher.

Notes of metadata standards used by the target catalogue can be used for help and support pages in the dynamic clumper.

Additional information about the collections of resources described by the target catalogue, including subject strength, coverage and location, can be used to complete the Collection records in the dynamic clumper. The Collection records are used for generating dynamic clumps based on subject, location and other criteria.

Appendix I: Glossary of Acronyms

ALF	Ayrshire Libraries Forum
CDLR	Centre for Digital Library Research
CIGS	Cataloguing and Indexing Group in Scotland
DNER	Distributed National Electronic Resource [project]
FE	Further Education [sector]
HE	Higher Education [sector]
HILT	High Level Thesaurus [project]
NGfL	National Grid for Learning
RSLP	Research Support Libraries Programme
SALSER	Scottish Academic Serials
SCA	Scottish Council on Archives
SCONE	Scottish Collections Network Extension [project]
SCURL	Scottish Confederation of University and Research Libraries
SESLIN	South East Scotland Library Information Network
SLIC	Scottish Library and Information Council
SMC	Scottish Museums Council
TAFLIN	Tayside and Fife Library Information Network
UHI	University of the Highlands and Islands
UKOLN	UK Office for Library Networking

- End of Appendix I -

- End of Report -