Digital Repository Programme Support Project and Repository Research Team, Final Report

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Project Partners: UKOLN (University of Bath) and CETIS (Universities of Bolton, Heriot Watt and Strathclyde.)
Executive Summary

The Digital Repositories Programme Support Project (DRPSP) and the Repository Research Team (RRT) were two phases of a project that supported the JISC's repository related programmes from 2005 to 2009. The project comprised staff from two JISC services (now Innovation Support Centres): two from UKOLN and 0.5 FTE (rising to 1 for the final year) at CETIS; it was initially managed by Rachel Heery of UKOLN, and in its final year by Lorna Campbell and Phil Barker of CETIS.

In its original DRPSP phase the project focussed primarily on support for individual projects in the JISC programme, provided by team members engaging with projects through several thematic clusters. This allowed the team to become familiar with project activities, giving them a detailed overview of the programme as a whole and enabling them to provide advice to projects about relevant related work. During this period, DRSP ran a number of support workshops aimed at increasing the sector's understanding of issues such as describing and managing complex/aggregate objects, using UML, writing scenarios and use cases and developing service usage models for the eFramework. The team also played a significant role in incubating a number of high profile technical developments, most notably the Scholarly Works Application Profile (SWAP) and the Simple Web-service Offering Repository Deposit (SWORD) protocol.

When the duration of the project was extended to support the 2007-2009 Repository and Preservation Programme, its remit was also changed to focus on providing JISC with strategic support by contributing to the understanding of what the programme achieved and what barriers had been faced; contributing to and reporting on relevant interoperability initiatives; exploring relevant new developments in understanding and promoting the interoperability of repositories. This was in part due to the changing requirements of the JISC and the projects funded, and in part due to the establishing of the Repository Support Project, which took over the remit for direct project support and institutional advocacy. To reflect the change in emphasis the project name was changed to the Repository Research Team (RRT).

During this phase the project undertook work aimed at modelling and understanding the repository environment. For example, the project investigated the use of metaphors drawn from the biological science of ecology to represent repository and service interaction; considering the strengths and limitations of different approaches to articulating or modelling relationships between repositories and other services and factors in the information environment. The RRT also supported the planned synthesis and evaluation of the Repository and Preservation Programme by innovative use of a blogging platform which they used to post information about relevant evidence found by trawling project outputs. These posts were tagged by evaluation or synthesis theme, effectively creating a public annotated index of project outputs.

Despite the challenges of managing such a long running cross service support project we believe that funding dedicated staff in existing services and innovation support centres and bringing them together to form a coherent project is generally a good model for programme support. This enables the support team to leverage the resources and expertise of the host service or centre. In addition the services and innovation support centres are also in a good position to synthesise issues arising from the programme, relate them to broader strategic issues and feed them back to JISC.
Background

The Digital Repositories Programme Support Project (DRPSP) was initiated in August 2005 to support JISC work in the area of repositories at the time when JISC was initiating the Digital Repositories Programme (DRP)\(^1\). The 2005-7 DRP comprised approximately 40 projects funded to a total of £3M with the aim of

"bringing together people and practices from across various domains (research, learning, information services, institutional policy, management and administration, records management, and so on) to ensure the maximum degree of coordination in the development of digital repositories, in terms of their technical and social (including business) aspects."

The scope of the project was quite wide and included supporting programme-level objectives by facilitating exchange of knowledge between the projects in the programme and beyond, and contributing to other national and international repository-related initiatives.

Subsequently the JISC funded the Repository and Preservation Programme\(^2\), a £14M programme of 91 projects which ran from 1 April 2006 to 31 Mar 2009 to support its vision of "a network of digital resources and services to significantly improve content use and curation". This programme included the creation of a Repositories Support Project (RSP) to provide technical and other support to projects in the programme. Between August 2007 - July 2008 a second JISC Digital Repositories Programme\(^3\) was funded, comprising 23 projects and several supporting studies; this programme focussed on "repository interoperability and using repositories to curate and share research data".

As a result of the changing priorities of the JISC Repositories Programmes and the creation of the RSP, the project's scope was changed to be more directed to providing a research facility in support of the programme as whole and the programme management in particular. To reflect this the project was recast as the JISC Repositories Research Team (RRT).

Aims and Objectives

Initially, the aims for the DRPSP were:

- helping projects find and exploit synergies across the programme and beyond
- gathering scenarios and use cases from projects
- liaising with other national and international repositories activities, including liaison with the e-Framework
- synthesizing project and programme outcomes
- engaging with interoperability standards activity and repository architectures

The aims of the RRT were to support the JISC by:

- contributing to the understanding of what the programmes achieved and what barriers had been faced;
- contributing to and reporting on relevant interoperability initiatives;
- exploring relevant new developments in understanding and promoting the interoperability of repositories.

It is important to note that the aims and objectives of the project evolved throughout the duration of both the DRPSP and RRT phases and reflected the changing nature and priorities of the repository programmes and projects.

\(^1\) [http://www.jisc.ac.uk/whatwedo/programmes/digitalrepositories2005.aspx](http://www.jisc.ac.uk/whatwedo/programmes/digitalrepositories2005.aspx)

\(^2\) [http://www.jisc.ac.uk/programme_rep_pres.aspx](http://www.jisc.ac.uk/programme_rep_pres.aspx)

\(^3\) [http://www.jisc.ac.uk/whatwedo/programmes/digitalrepositories2007.aspx](http://www.jisc.ac.uk/whatwedo/programmes/digitalrepositories2007.aspx)
Methodology

The project team and management

The team was originally composed of 2.5 FTE project officers, with 2 FTE based at UKOLN, and 0.5 based at CETIS (this was later increased to 1 FTE in the final year of the project). An additional 0.5 FTE was funded at UKOLN to manage the project and to provide representation on relevant committees and steering groups; CETIS also provided a small amount of management input from core funding. Funding staff at two JISC innovation support centres (previously JISC services) allowed the expertise of each to feed into the project's activities, with UKOLN focusing on digital information management in general and library and information services and CETIS focusing on teaching and learning issues.

The project team was highly distributed with staff employed by the Universities of Bath, Strathclyde and Heriot-Watt and located in Bath, Manchester, Sheffield, Glasgow and Edinburgh. There was also significant input from JISC staff located in London, Manchester and Bristol. A number of methods were used in order to coordinate the work of such a distributed team, these included monthly team conference calls, approximately quarterly face-to-face meetings, a JiscMail list for the team and the management and a private wiki. It is significant that JISC staff were regular participants in all these activities, increasing the level of coordination of the team's activities with the emerging requirements of the programme managers.

Engagement with projects and the wider world

The original DRPSP support remit involved considerable engagement by the project team with individual projects. The projects were divided into thematic clusters and each member of the team was allocated a cluster. Each team member visited the lead sites of their project clusters and participated in cluster meetings. This allowed the team to become familiar with project activities, giving them a detailed overview of the programme as a whole and enabling them to provide advice to projects on relevant related work. Workshops were organised to allow the projects to learn about and share experience of topics that were relevant to the wider programme aims, for example how to contribute to wider interoperability efforts such as the eFramework. Once the JISC Repositories Support Project was established this level of direct engagement with the projects was dropped as this remit passed from DRPSP / RRT to RSP. Assigning projects to fixed thematic clusters was also seen as less useful than allowing more dynamic associations of projects around emerging themes. Despite this the team remained in close contact with individual projects. For example, projects contributed to the team's research activities in modelling "repository ecologies" and in preparing for programme synthesis and evaluation work. DRPSP / RRT also took care to liaise with other JISC-funded initiatives supporting repositories such as the CETIS Metadata and Digital Repository SIG, the eFramework and the Repository Support Project. The team's location within UKOLN and CETIS, who had involvement in these initiatives beyond the activity of DRPSP/RRT project, helped to facilitate this liaison.

The team initially set up a public wiki and email list hoping that projects would contribute directly; but in practice projects rarely engaged with the wiki. However it did prove to be a useful public web presence for the team, providing access to completed and ongoing work by the team and other closely related projects that took forward work incubated by the team e.g. the SWORD Project. The public email list4 was highly successful in attracting members and contributions from JISC repository projects, practitioners, developers and other interested parties from the UK and internationally. By the end of the project the list had 1100 members and traffic was around 50-100 messages per month, sometimes more.

The project team were particularly successful in disseminating programme and project outputs through formal scholarly channels such as peer reviewed journals and international conferences including the Open Repositories Conference, OAI5, ECDL and DC- 2006 and 2008.

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4 jisc-repositories@jiscmail.ac.uk, http://www.jiscmail.ac.uk/JISC-REPOSITORIES
Engaging with and supporting JISC

As mentioned above, JISC programme managers and in some instances JISC consultants, regularly joined team meetings, allowing them to be fully informed of the team's progress and to contribute to its future direction. Members of DRPSP / RRT also sat on a number of JISC advisory groups, most notably the Repository and Preservation Advisory Group, to feed into the JISC planning process.

DRPSP / RRT undertook a large amount of supporting work for the JISC programmes and other repository related initiatives. The nature of this work was varied, involving community consultation, desk study and analysis; and the outputs included reports, roadmaps, workshops, training events, incubation for new specifications (e.g. requirements gathering and the development of straw-man proposals to meet these requirements) and syntheses of programme outputs etc. A number of the most significant examples are listed in the Outputs and Results section, below.

One piece of supporting work, the analysis of outputs of the 2007-2009 JISC Digital Repositories Programme for synthesis and analysis, used a method sufficiently novel to be worth describing in more detail. The objective of this workpackage was to identify evidence produced by projects that would be relevant to a planned thematic evaluation and synthesis of the programme. The actual evaluation and synthesis were to be undertaken by consultants who had not been appointed at the time that RRT started this work, although the relevant themes had already been identified by JISC programme managers. The team began by asking programme managers to identify those projects they supervised that were most relevant to each of the themes. The team then "trawled" through the outputs of these projects and when they found relevant evidence they posted a note on a blog that had been set up for this purpose\(^5\), and "tagged" the blog post against the relevant theme. This resulted in a blog that effectively acted as an annotated index of project outputs tagged against themes. Initially access to the blog was limited to team members and relevant JISC programme managers, but once the approach was shown to be effective, access restrictions were lifted and project managers were invited to comment on entries about their project. The blog platform provided useful functionality for this activity: it allowed the distributed team to work together on a collection of documents, it provided an over-view and oversight of this work by the RRT project managers and the JISC programme managers, it provided a starting point and invaluable programme summary for the consultants commissioned to carry through the evaluation and synthesis, and it allowed the annotated index to be viewed publically.

Outputs and Results

The main outputs of the project are detailed below, grouped under the following headings:

- **Incubating technical developments**, i.e. putting up straw man suggestions for specifications to meet certain identified user requirements and engaging in other community efforts doing similar. Generally the straw man suggestions were taken on by others to be worked up into fully fledged specifications.

- **Extracting models**, i.e. using information garnered from contact with the many projects in the JISC repository-related programmes to form or evaluate either general models of the repository and related domains or specific models some aspect of a repository's function. Many of these were undertaken in order to inform the eFramework.

- **Training events** to enhance the capability of the sector to engage with current issues.

- **Informing JISC decisions**, i.e. reports and advice to JISC programme managers and others.

\(^5\) [http://rrtsynthesis.wordpress.com/](http://rrtsynthesis.wordpress.com/)
Incubating Technical developments

Deposit API (precursor to SWORD)

A discussion session on repository service-orientation for the eFramework at the 2005 CETIS Conference identified “deposit” as the most important repository function for which there was no single, obvious standard for implementing as a web service. DRPSP / RRT carried out some introductory research, held a series of meetings and gathered use cases and feedback from the repository development community to help incubate work on a common API for repository deposit. This working group ultimately gave rise to the SWORD project and subsequent developed a highly significant profile of the Atom Publishing Protocol as a deposit API.

Date: November 2005 onwards.

Further information:
Deposit API: http://www.ukoln.ac.uk/repositories/digirep/index/Dropit_API
SWORD APP: http://www.swordapp.org/

SWAP and Dublin Core Community

At the request of the JISC programme manager DRPSP / RRT and Eduserv began work on the development of a Dublin Core application profile for eprints/ scholarly works. Through a working and feedback group drawn from the repositories community the Scholarly Works Application Profile was developed. The ongoing community uptake and implementation of the application profile is now a separate JISC funded project based at UKOLN which is engaged with the Dublin Core Scholarly Communications Community.

Dates: 2006 - 2007

Further information:
SWAP: http://www.ukoln.ac.uk/repositories/digirep/index/Eprints_Application_Profile

Common Repositories Interfaces Group (CRIG)

DRPSP / RRT was involved in establishing JISC’s CRIG and maintained an active engagement with the development community through CRIG’s work.

Dates: 2007 - 2008

Further information
CRIG wiki: http://www.ukoln.ac.uk/repositories/digirep/index/CRIG

OAI-ORE involvement

On behalf of JISC the UKOLN based members of DRPSP / RRT participated in the OAI-ORE liaison committee and technical group during the development of the specification. UKOLN has now taken on future engagement with the completed specification.

Dates: 2007 - 2008

Further information:
ORE Specification and use guides: http://www.openarchives.org/ore/1.0/toc.html

Extracting models

Repository Ecology

DRPSP / RRT undertook a major initiative to investigate models of repository and service interaction and consider the strengths and limitations of different approaches to articulating or modelling their relationships. This involved an examination of the usefulness drawing on the biological study of
ecology as a metaphor to provide new ways to represent the complex multi-faceted environments in which repositories exist and interact.

Dates: 2007 - 2009

Further information:
Presentations: http://www.slideshare.net/RJohnRobertson/tag/ecology

Evaluating OAIS

The OAIS model was evaluated to appraise its potential usefulness as a reference model for different types of repositories. The report describes the OAIS model and concludes that it is flexible enough to be applicable to repositories other than the archival systems for which it was originally developed.

DRPSP / RRT were also involved in contributing to the DCC/ DPC response as part of the five year review of the OAIS standard. The paper summarising the input gathered from the feedback groups the team participated in led to a revision of the standard. DRPSP / RRT also produced an article commenting on the suitability of OAIS as a more general repository model.

Dates: 2006 & 2008

Further information:
OAIS evaluation report: http://www.ukoln.ac.uk/repositories/publications/oais-evaluation-200607/

Scenarios and Use cases

DRPSP / RRT organised training in writing use cases and scenarios for projects on behalf of the Digital Repositories Programme. The projects produced a series of related outputs which can be found on the DRPSP / RRT wiki.

Dates: 2006 – 7

Further information:
Use cases http://www.ukoln.ac.uk/repositories/digirep/index/All_the_Scenarios_and_Use_Cases_Submitted
Training materials: http://www.ukoln.ac.uk/repositories/digirep/index/Useful_Resources

e-Framework for Learning and Research Service Factorisation Meeting

This meeting, held in London in early 2006, brought together representatives from the e-Framework Working Group and from the e-science, e-admin and e-learning communities. The aim of the event was to provide a forum to discuss the development of e-Framework services, to update the service descriptions and definitions and to decide who would be looking after which services. The meeting aimed to help stakeholders gain a shared understanding of e-Framework terminology and discuss how service areas would be developed.

Dates: 2006

Further information:
Presentations: http://www.elframework.org/Members/sam/brick-factoring/
Report of event: http://www.elearning.ac.uk/news_folder/brickmeeting

SUMS workshop

DRPSP / RRT organised a workshop for a number of repository projects to explain the relevance of the e-Framework and to promote the development of Service Usage Models relating to repositories.

Date: 2008
Training events

UML
A training workshop on using UML to support the production of use cases and scenarios was organised by DRPSP / RRT in Dec. 2005.

Date: 2005

Further information:
Training resources: http://www.ukoln.ac.uk/repositories/digirep/index/Useful_Resources

Complex Objects Event
DRPSP / RRT organised a two day training event about metadata and packaging formats for complex objects. The first day focused on MPEG21-DIDL, the second day had a broader purview and presented and discussed a number of standards including MPEG21-DIDL, METS, IMS-CP, RAMLET, and Dublin Core.

Date: 2007

Further information
Programme (day 1): http://www.ukoln.ac.uk/events/mpeg-21-didl/programme/
Programme (day 2): http://www.ukoln.ac.uk/events/content-packaging/programme/
Presentations: http://www.ukoln.ac.uk/repositories/digirep/index/Content_Packaging_Standards#Content_Packaging_Event

Workflows – Business Process Modelling Notation
DRPSP / RRT hosted a one day workshop on BPMN facilitated by Balbir Barn.

Date: 2007

Further information:
Programme: http://www.ukoln.ac.uk/events/workflow-2007/

Informing JISC Decisions

Review of Registry Services
DRPSP / RRT undertook a review of JISC funded repository related services including OpenDOAR, ROAR, IEMSR and IRS.

Date: 2008

Synthesis and Evaluation Support Work
DRPSP / RRT have supported the synthesis and evaluation of a number of JISC’s repositories and preservation programmes. By analysing, abstracting and indexing highlights of the 2007 - 2009 Digital Repositories Programme, RRT has created a searchable resource capturing key outputs of this development programme.

Date: 2008 - 2009

Further information:
Synthesis Blog: http://rrtsynthesis.wordpress.com/

Outcomes
One important feature of the project was the fairly loose remit, i.e. supporting the repository programmes and investigating relevant issues that arose from the programmes and elsewhere. This provided a team of dedicated staff with the opportunity to see connections across the programme.
which weren't obvious to project managers and which programme managers did not have time to identify. As a result more connections were made between projects and there was better awareness within projects of what was happening around them (e.g. initiatives like the eFramework) and how they might contribute to those initiatives. Where there was a mismatch between the expertise of those engaged in the programme and that required to contribute to wider initiatives, the project built capacity within the community through workshops, through encouraging direct engagement with specific initiatives and indirectly through forums such as the JISC-Repositories email list. The team was also able to disseminate information about the achievements of the programme and represent the programme in conferences and scholarly meetings thus increasing awareness of the programme within other areas of UK HE and internationally.

The information and expertise accrued by the team engaging with the projects and reflecting on the issues which arose was reflected in advice provided on the JISC's strategic direction through contributions to the synthesis and evaluation of previous projects and the roadmap for future work. The ecology work by the project has the potential to be applied other areas of the JISC concern, such as the lifecycle of Open Educational Resources.

The flexibility of workplan allowed the team to engage in the initial development of several specifications, notably SWAP and SWORD, which are internationally significant for repository interoperability. The knowledge of JISC and community requirements built up by the team was important in ensuring the initiatives such as SWORD and SWAP reflected these requirements; the team's knowledge of the expertise within the JISC community and beyond was important in the successful development of these specifications; and the links forged by the team with the wider technical and international community were important making sure that these developments were not isolated but rather were adopted outside of the JISC repository community.

**Conclusions**

Appropriate programme support is very important, and there is lot to be learned from RRT model. Having dedicated personnel allowed for engagement with the projects funded through the repository programmes and the wider community, e.g. through scholarly communication, and thus the team had the ability to make connections not apparent to others. The provision of dedicated personnel with loosely defined objectives allowed the team to react to new requirements as they arose, which was especially important in the project's role as incubator for new specifications and an initiator for other work, for example the work involved in SWAP, SWORD, Repository Ecology, and Programme-level Synthesis and Evaluation support.

DRPSP / RRT was a relatively long-lived project that spanned a number of programmes and whose remit changed considerably throughout its lifetime. The project was fortunate to employ a number of dedicated and motivated staff who rose to the challenge and who, despite the challenges, viewed their time with the DRPSP / RRT project as being extremely positive and productive both professionally and personally.
Appendix A. Papers and Presentations

The following is a complete list of the papers and presentations arising from the project.

Papers

http://www.ariadne.ac.uk/issue47/jisc-conf-rpt/

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/DRPSP-researchinformation-ja-draft.pdf

http://www.ariadne.ac.uk/issue49/dc-2006-rpt/

http://www.dlib.org/dlib/february06/02inbrief.html#ALLINSON

http://www.elearning.ac.uk/news_folder/news_item.2006-02-20.6686786629

http://www.ariadne.ac.uk/issue50/allinson-et-al/

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/aliss-application-profile.pdf

http://www.ariadne.ac.uk/issue51/open-repos-rpt/


http://www.ariadne.ac.uk/issue47/jisc-repositories-rpt/


http://www.ariadne.ac.uk/issue57/mahey-rvw/

Mahey, Mahendra (2008). ‘Open Repositories 2008’, *Ariadne* At the Event, Issue 56,  
http://www.ariadne.ac.uk/issue56/or-08-rpt/

http://www.ariadne.ac.uk/issue57/robertson-et-al/


http://ie-repository.jisc.ac.uk/379/

http://ie-repository.jisc.ac.uk/380/

http://www.ariadne.ac.uk/issue59/handshake-rpt/

http://www.ariadne.ac.uk/issue60/or-09-rpt/

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/Signed-metadata-dublin-core.pdf

Presentations and Posters
http://www.ukoln.ac.uk/ukoln/staff/j.allinson/Repositories_summary.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/repositories_ref_models_MDRSIG.pdf


http://www.ukoln.ac.uk/ukoln/staff/j.allinson/eprints-ap-openscholarship.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/Prints-special-session.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/Open-scholarship-DRPSP-poster.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/dcap-ja-progmeet-2006-10-25.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/nowal-repositories-exchange-2006-11-03.pdf

http://www.dcc.ac.uk/events/dcc-2006/posters/DCC%20poster%20PP22.pdf

http://www.ukoln.ac.uk/ukoln/staff/j.allinson/eprints-ap-slainte-2006-12-04.pdf


http://www.ukoln.ac.uk/ukoln/staff/j.allinson/OAI-ORE-2007-02-09.pdf


http://indico.cern.ch/getFile.py/access?sessionId=31&resId=0&materialId=1&confId=5710


http://www.ukoln.ac.uk/ukoln/staff/j.allinson/or2007-deposit.pdf


http://www.ukoln.ac.uk/repositories/digirep/images/0/08/Introduction_content_packaging_workshop.ppt


http://edina.ac.uk/projects/grade/ppt/data_repositories.ppt

http://www.ukoln.ac.uk/repositories/digirep/images/5/59/Analysis_scenarios_use_cases-2007-01-25_brief.ppt


Mahey, Mahendra (2007). ‘Tutorial 4 – Object models and object representation – Content Packaging Standards for complex objects (Some)’. Tutorial at CERN workshop on Innovations in Scholarly Communication (OAI5), 18-20 April 2007,  
http://indico.cern.ch/getFile.py/access?sessionId=31&resId=0&materiaId=2&confId=5710

http://www.jisc.ac.uk/media/documents/events/2007/06/rapporteurdatastrand.pdf

http://www.jisc-collections.ac.uk/media/documents/jisc_collections/metadata_jibs_mmahey_12_09_2007.ppt


Introduction

http://jif08.jiscinvolve.org/files/2008/07/jisc_innovation_forum_2008_research_data_theme_notes_intr o.doc

Session 1 – Legal and policy issues, JISC Innovation Forum
http://jif08.jiscinvolve.org/files/2008/07/jisc_innovation_forum_2008_research_data_theme_notes_ses sion1_legal_policy.doc

Session 2 – Capacity and skills issues
http://jif08.jiscinvolve.org/files/2008/07/jisc_innovation_forum_2008_research_data_theme_notes_ses sion2_capacity_skills.doc

Session 3 – Technical and infrastructure issues
http://jif08.jiscinvolve.org/files/2008/07/jisc_innovation_forum_2008_research_data_theme_notes_ses sion3_technical_infrastructure-1.doc


http://strathprints.strath.ac.uk/5979/

http://strathprints.strath.ac.uk/5989/

http://strathprints.strath.ac.uk/5990/

http://strathprints.strath.ac.uk/5991/

http://strathprints.strath.ac.uk/5992/

http://www.swordapp.org/SWORD2-LSE.ppt/view

http://www.slideshare.net/adrianstevenson/lightweight-deposit-using-sword


https://or09.library.gatech.edu/workshops.php

http://www.slideshare.net/adrianstevenson/the-cutting-edge-of-sword
http://www.slideshare.net/adrianstevenson/sword-an-overview