



JISC Project Plan

Overview of Project

1. Background

This is the project plan for IEMSR phase 3, running from October 2006 until March 2009, to be led by UKOLN.

The project began in January 2004 and recently completed its second phase, with funding to the end of September 2006.

- Phase 1: January 2004 – June 2005;
- Phase 2: July 2005 – September 2006.

Phase 2 of the project had UKOLN as the sole funded partner, sub-contracting development work to the Institute for Learning and Research Technology (ILRT), University of Bristol (software development), and Oliver Greening, consultant (marketing plan). In addition the project included two non-funded associate partners to represent the DCMI and IEEE LOM communities: the British Library and CETIS. For phase 3, UKOLN will continue as sole funded partner working with the established associate partners.

During Phase 2 the Schema Registry developed software that has successfully demonstrated appropriate use cases to a number of stakeholders. The registry consists of three functional components:

- Registry Data Server - an RDF application providing a persistent data store and APIs for uploading data (application profiles) to the data store and for querying its content
- Data Creation Tool - supports the creation of RDF Data Sources (application-specific profiles) for use by the Registry Data Server
- User Website Server - allows a human user to browse and query the data (terms and application profiles) that are made available by the IEMSR Registry Data Server

The Registry is targeted at the UK education community where both Dublin Core (DC) and IEEE Learning Object Metadata (LOM) standards are used. IEMSR focuses on both DC and IEEE LOM application profiles.

2. Aims and Objectives

It is anticipated that the development of the Metadata Schema Registry will begin to deliver the following benefits:

- Single point of access for the UK FE/HE community to information about terms used in DC and IEEE LOM metadata
- Promotion of existing metadata schema solutions
- Increased interoperability between schemas as a result of re-use across applications
- Less duplication of effort amongst implementers
- Managed evolution of schemas
- Improved communication between those JISC projects and services using the DC standard and those using the IEEE LOM standard

Within the context of the JISC IE, an effective infrastructure for management of metadata is vital for cost effective delivery of services. A registry service is a basic 'middleware' component for metadata management and it is important that the major funding bodies take a lead in the development of such a service. The project will be pro-active in collaboration with other registry activities.

The intention is that the less tangible outcomes of the project will be of benefit to the community in a number of ways, such as increasing the amount of re-use of existing application profiles, sharing of expertise and experience, and enhancement of interoperability between services.

The JISC IE Metadata Schema Registry has proved to be of interest to other organisations, nationally and internationally, that are establishing schema registries as a means to enable re-use and interoperability between schemas. The project is pro-active in collaboration with these other registry activities.

Within the next period of funding the main objectives are to:

- Review, update and expand user requirements
- Refine IEMSR architecture and software design
- Release software according to plan
- Progress move to operational service environment
- Encourage use of IEMSR
- Contribute and collaborate with other JISC IE activity
- Collaborate with national and international registry activity
- Disseminate and evaluate IEMSR

3. Overall Approach

Strategy/Methodology

The work will be structured around an ongoing process of evaluation, implementation and elicitation of user requirements (a user-centred development cycle). The stakeholders identified according to the work carried out in the previous phase will be closely involved in the following phase in which user requirements are reviewed. Further stakeholders have also been loosely identified according to recent developments in the Web environment, specifically, the increase in ad hoc development characterised by the Web 2.0 phenomenon.

Important issues to be addressed

Interoperability: the potential for use of the IEMSR service within the wider community, that is, by the 'intermediate developer' has clear implications on present-day approaches to API design, which require reevaluation in this light; however, the issue of primary importance to the IEMSR remains the availability of the system by primary stakeholders and Information Environment infrastructure members. Strategies will be considered to maximise the value of the system, principally for the IE, but additionally for tertiary users. Furthermore, opportunities for collaboration with other services such as the IESR are key to ensuring that the interoperability decisions taken prove to be appropriate to the wider information environment.

Usability: Several issues have already become clear in light of preliminary user testing of the IEMSR project. These will be documented together with further issues that may arise during more in-depth testing of the system, and used to inform the current stage of development. Encouraging the use of IEMSR in general, both locally and internationally, will provide additional feedback with which to inform further development.

Applicability: Several use cases have been suggested for the IEMSR in the previous project phase. It is probable that some cannot be fully met; however, feasibility is key in bringing the prototype towards service status. In practical terms, preliminary user testing has suggested that the system may require a certain amount of adaption for certain goals to be met, particularly those related to sharing of metadata schemas/application profiles with other groups in the machine-to-human sense, simply because the IEMSR has not been designed with the requirements of distributed computer-supported collaborative work in mind.

Collaboration: Several schema registry efforts are taking place, such as the DC registry, the European Library's work, NSDL and DART. Working jointly with these registry efforts is a key requirement in ensuring that the IEMSR remains appropriate and relevant in the wider metadata ecology. Similarly, current work in ontology and schema development is relevant to the IEMSR's aims.

Scope and boundaries of work

The present development is essentially one of consolidation, both of the software with respect to the user communities recently identified, but also of the service with respect to the wider information environment. However, it is not expected that this phase will result in a service as such.

Usability is a crucial element in the uptake of IEMSR; however, IEMSR as a service is bound tightly into the requirements of client and web interfaces. It is not intended that the core development work build interfaces suitable for every stakeholder; however, it is necessary that the core service support those functions that are required for the development of such interfaces. With this in mind, a user-centred process requires prototype development of key example interfaces, preferably suitable examples taken from real-world stakeholders who consent to work with the IEMSR project on an occasional or ongoing basis.

Critical success factors

Present-day work with stakeholders such as the British Library has already demonstrated that there is room for improvement in terms of the usability of the IEMSR, relating to the apparent requirement for authoritative statement of fact; it is likely that this will prove to be a significant issue in the acceptance and reuse of the IEMSR in general terms, and this – the usability of the system as regards authority – is considered a major factor in the success of the system. Furthermore, since the IEMSR requires 'buy-in' from stakeholders such as the BL and others, it is important to ensure, not only that we are working in a manner consistent with or complementary to other registry efforts, and that we are aware of such efforts, but additionally that it is made clear to stakeholders that the IEMSR provides useful added-value in the present tense and will retain a clear upgrade path to future development.

There is a requirement for an initial release of a minimal but functional version of the IEMSR service as a “placeholder” on which to build further development; however, this must be balanced with careful management of user expectations.

Ongoing interaction with other JISC projects and wider stakeholder groups is a key factor.

4. Project Outputs

- Project Plan
- Sustainability Plan
- Website
- Final Report
- Completion Report
- Requirements Specification
- User Requirements Document
- User testing report
- IE Integration demonstrator specification involvement
- Review of conclusions/Development plan
- Periodic update releases
- Dissemination plan/papers & presentations
- Third-party developer/advocacy materials
- IEMSR Policies
- Case studies (BL, etc)

5. Project Outcomes

- More effective re-use of existing application profiles enhancing interoperability
- More effective discovery of application profiles and more persistent archiving of profiles
- Building consensus on modelling of application profiles
- Providing a focus for joint working between DCMI and IEEE LOM users within JISC. This aids communication and understanding between digital library and learning communities.
- Impact on research and learning domains, potential for impact on wider communities

6. Stakeholder Analysis

Several stakeholders have already shown an interest in involvement; these include the British Library, Claret, TASI, the current DC Eprints Application Profile development effort and Data Webs. Others have also offered material for IEMSR use, including the Japanese Junii2 application profile developed for the NII portal (Hokkaido

University) and the ERC (Electronic Resource Citation) format and mappings to Dublin Core – developed by John Kunze as part of a DCMI workgroup effort.

Stakeholders	Interest/Stake (Potential use)	Importance
Schema creators	Discovery and re-use of existing application profiles or individual terms.	High
Service/System developers	Easy access to information about existing schemas and application profiles. To include developers of JISC IE services and 'intermediate developers' of Web 2.0 applications.	High
Data curators & service providers (e.g JISC projects & services)	Access to machine-readable schemas and application profiles Publishing machine-readable schemas and application profiles used within service implementations.	High
Cataloguers	Detailed information on application profiles which can support the training of cataloguers	High
Funders	Encourage re-use of existing application profiles and terms to save duplication of effort and promote interoperability. Promotion, quality assurance and preservation of schemas and application profiles.	High
Commercial suppliers of software products and services to JISC IE	Access to machine-readable schemas and application profiles deployed within JISC IE.	Medium
Other registries	Re-use application profile models, re-use source code.	Medium

Table1: Stakeholders of the IEMSR

7. Risk Analysis

The JISC Shared Services Review states that if the IEMSR did not exist there would be no single point of access for information about application profiles and therefore effort would be duplicated; interoperability would be compromised since services would be encouraged to develop their own application profiles rather than re-use existing profiles. There would be no m2m access to metadata schemas and application profiles.

The following risk analysis applies to the project itself:

Risk	Probability	Severity	Score	Action
Staffing	3	4	12	Flexibility regarding schedule
Organisational	2	1	3	Lead partner in control
Complexity of software development	4	4	16	Review and monitor progress Undertake peer review
Complexity of developing single tools to fulfil requirements across DCAPs and IEEE LOM Aps	3	4	12	Set realistic expectations by means of scenarios, prioritise requirements, manage expectations by dissemination
Sub-contractor's availability	3	4	12	Start negotiations early
Legal	1	4	4	Ensure no IPR issues

IPR in the content of the registry (schemas, application profiles, annotations) will remain with the creators. No additional IPR issues are envisaged.

8. Standards

Name of standard or specification	Version	Notes
RDF Vocabulary Description Language	V1 (Feb 2004)	
RDF Semantics	V1 (Feb 2004)	
RDF Concepts and Abstract Syntax	V1 (Feb 2004)	
RDF/XML Syntax Specification (Revised)	V1 (Feb 2004)	
DCMI Abstract Model		http://www.dublincore.org/documents/abstract-model/
SPARQL Query Language for RDF	W3C Working draft (21 July 2005)	We expect to migrate to the current candidate specification (2006)
XHTML	V1.0	
HTTP	V1.1	
Java	>1.3	Chosen for interoperability and platform-independence

The following guidelines have informed work on the Registry:

CEN Workshop Agreement: Dublin Core Application Profile guidelines CWA14855

CEN Workshop Agreement: Guidelines for machine-processable representation of Dublin Core Application Profiles CWA15248

The scope of the IEMSR will be the two standards for resource description recommended by the JISC and application profiles associated with those standards that are deployed within the JISC and wider education community:

Dublin Core Metadata Element Set, Version 1.1: Reference Description
<http://dublincore.org/documents/dces/>

DCMI Metadata Terms
<http://dublincore.org/documents/dcmi-terms/>

Expressing Simple Dublin Core in RDF/XML. (DCMI Recommendation)
<http://dublincore.org/documents/dcmes-xml/>

Expressing Qualified DublinCore in RDF/XML. (DCMI Proposed Recommendation)
<http://dublincore.org/documents/dcq-rdf-xml/>

Guidelines for implementing Dublin Core in XML. (DCMI Recommendation)
<http://dublincore.org/documents/dc-xml-guidelines/>

IEEE Standard for Learning Object Metadata (Approved Publication of IEEE)
<http://ltsc.ieee.org/wg12/par1484-12-1.html>

Standard for XML binding for Learning Object Metadata data model (Modified Revision Project)
<http://ltsc.ieee.org/wg12/par1484-12-3.html>

Standard for Resource Description Framework (RDF) binding for Learning Object Metadata data model (New Standard Project)
<http://ltsc.ieee.org/wg12/par1484-12-4.html>

The project will strive to follow good practice regarding accessibility standards and guidelines, for example by following HTML W3C html 4.01 (<http://www.w3.org/TR/1999/REC-html401-19991224/>) and using W3C WAI guidelines to doubleA conformance (<http://www.w3.org/WAI/WCAG1AA-Conformance>).

9. Technical Development

The project will adhere to standards recommended by the JISC IE Standards framework. All software delivered by the project will be covered by an Open Source Licence and will follow the open source development model, using existing software from IEMSR Phase 2 along with appropriate third party open source code.

•Implementing separate registries

Covering two different schemas has added a layer of complexity to the project since the two standards have incompatible data models, so designing user interfaces for an integrated tool is complex. One option in future may be to split the registry into separate services for different metadata standards, whilst presenting the human user with an integrated web interface.

A solution may be to implement separate registry software instances for application profiles based on different standards (IEEE LOM and DC). This solution will be evaluated as part of WP2 and WP3, and implemented if considered feasible. The effort required to implement a METS profile registry, and the cost benefit, will be assessed.

•Release schedule

The development of an IEMSR service will be influenced by the JISC IE development teams approach to taking forward the shared service infrastructure, as well as by current thinking on moving projects to service. There is potential for the IEMSR to work with the JISC IE Testbed activity (now the subject of an open ITT), either as a partner in that activity or as a collaborator.

•Web 2.0

IEMSR m2m interfaces/APIs correspond to the needs and abilities of intermediate developers, that is, the diverse subgroup who might consume/reuse such a service as a component required following decomposition of their own users' requirements (that is for Web2.0 applications or 'mashups').

The development aspects of the project will proceed according to a user-centred development approach. Specifically, this means that the HCI aspects of the project will be considered and reevaluated according to work with appropriate user groups on an ongoing basis. The stakeholder analyses already produced provide an excellent basis for task analysis and elicitation of detailed requirements, with which any additions or alterations required on the existing prototype system may be elicited, documented, developed and tested in an iterative process. However, it is equally clear that as a service situated for machine-to-machine use, the IEMSR must also satisfy ongoing technical requirements for this purpose.

10. Intellectual Property Rights

IPR in any software delivered by the project will be assigned according to the Consortium Agreement. All software delivered by the project will be covered by an OpenSource Licence. IPR in the content of the registry (schemas, application profiles, annotations) will remain with the creators. No additional IPR issues are envisaged.

However, IPR issues exist relating to the ownership of schemas and application profiles provided to the effort. For this purpose, a agreement must be drawn up for users of the web site, as well as a disclaimer relating to the quality of the material available on the site. This tradeoff between input quantity and quality is an issue related to the discussion of authoritative provision of information in general and the collaborative aspects of IEMSR in particular, and will be investigated during this phase.

Project Resources

11. Project Partners

11.1 Lead Partner

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11.3 Peer review of technical approach

The technical approach, both architecture and software design, will be evaluated at appropriate stages throughout the project. External evaluators will be identified for this purpose.

12. Project Management

The JISC IE Metadata Schema Registry will be project managed by Emma Tonkin at UKOLN. Project administration will be carried out with the assistance of Jenny Taylor working as a Project Assistant. Project management will be based on the JISC development programme guidelines. UKOLN will be responsible for monitoring activities to ensure proper execution of the work programme to schedule and budget. Project management techniques will be of a modest level of complexity, in keeping with the scale of the work involved.

Communication: email, phone conferences, private web pages (Wiki)
Project meetings: regular meetings
Schedule: Gantt chart
Budget: interim reports

Time spent on project management: 10%

13. Programme Support

The project will continue to co-operate fully with the JISC Programme manager and will collaborate with relevant JISC projects and services as appropriate. In particular the project will explore developing an IE integration demonstrator with other components of the JISC IE by involvement with the JISC IE Testbed. The project will engage with programme activity, and will inform JISC IE Support work at UKOLN, in particular the shared services programme support within the Repositories Research Team. The project will continue to liaise with the JISC Standards Catalogue activity to ensure that the information provided by the Standards Catalogue on metadata standards/specifications is consistent with the data held/provided by IEMSR. Also IEMSR will continue to liaise with the JISC Framework activity to ensure that the IEMSR services are integrated with the Framework.

As the IEMSR will offer m2m 'infrastructure services' it would be useful for the programme manager also to encourage communication between IEMSR and appropriate JISC services who might be potential users. IEMSR phase 2 found that there was a great deal of enthusiasm from diverse stakeholders, but that there were issues due to project maturity or development stage on either side that mitigated against further work – that is, it is often true that mature projects have reached the stage at which relevant design decisions have already been made.

14. Budget

See Budget, Appendix A.

Detailed Project Planning

15. Workpackages

The project will run for 30 months between October 2006 and March 2009.

16. Evaluation Plan

Evaluation will focus on the fitness-for-purpose of the underlying service and tools, and the appropriateness of the functionality provided by the service for the purposes outlined by stakeholder analysis and the results of HCI evaluation of the task and system.

Evaluation will be in the form of usability evaluation sessions with naïve users, followed by joint sessions with key stakeholders.

Timing	Factor to Evaluate	Questions to Address	Method(s)	Measure of Success
March 2007	Compliance with accessibility standards	Accessibility evaluation	W3C tools	Successful validation
June 2007	Evaluation based on user scenarios taken from initial report	Usability evaluation	Heuristic analysis	Clear and applicable feedback

17. Quality Plan

Output					
Timing	Quality criteria	QA method(s)	Evidence of compliance	Quality responsibilities	Quality tools (if applicable)
March 2007	Compliant with current requirements	Evaluation against current requirements	Technical evaluation	UKOLN	
June 2007	Compliance with elicited user requirements	Evaluation against elicited requirements	Technical evaluation	UKOLN	

18. Dissemination Plan

The following plan is a partial list of activities currently in planning; however, dissemination is a key part of encouraging uptake and involvement with IEMSR. Appropriate dissemination activities to each of the key stakeholder groups are planned; further opportunities for dissemination are expected to result from user testing/joint work with related projects.

Timing	Dissemination Activity	Audience	Purpose	Key Message
Jan 2007	Presentation	CAP programme meeting March/April 2007.	Advantages of reuse of application profiles	
First quarter 2007	Presentation	JISC projects related to ontology use (Image Access project workshop)	Discussion of approaches to AP reuse	Benefits, practicality, functionality, collaboration
Second quarter 2007	Paper	Information professionals	Advantages, opportunities for collaboration	Interoperability and reuse

19. Exit and Sustainability Plans

Project Outputs	Action for Take-up & Embedding	Action for Exit
Software tools	Dissemination and advocacy	Make available as OSS for download from sourceforge
Registry web service	Requires ongoing maintenance	Negotiate sustainability of service
Elicited requirements, lessons learnt	Reports, articles, presentations – Dissemination and advocacy	Make available in eprint form

List any project outputs that may have potential to live on after the project ends, why, how they might be taken forward, and any issues involved in making them sustainable in the long term.

Project Outputs	Why Sustainable	Scenarios for Taking Forward	Issues to Address
Registry service	Of benefit to a range of stakeholders	Shared service	Ongoing relevance to wider information environment, technical challenges

Appendixes

Appendix A. Project Budget

Appendix A: Budget

The project runs from 1 October 2006 to 31 March 2009

	% of staff costs	Year 1 2006/07	Year 2 2007/08	Year 3 2008/09	Total
		£	£	£	£
Staff Costs:	FTE				

Staff 1 (1.5/0.5 FTE) [Note 1]		39,969	30,208	11,675	81,852
Admin (0.1 FTE)		2,936	3,646	2,516	9,098
Senior consultant	0.2	9,076	11,290	7,802	28,168
Total Staff Costs	0.2	51,981	45,144	21,993	119,118
Travel and Subsistence	6%	2,943	2,490	1,169	6,601
Recurrent Costs:					
Staff training & development	1.25%	650	564	275	1,489
Office consumables, phone, post	5%	2,599	2,257	1,100	5,956
Recruitment costs					
Total Recurrent Costs		2,599	2,257	1,100	7,445
Non Recurrent Costs:					
Equipment		3,000			3,000
Web design consultancy			20,000		
Total Direct Costs		61,173	70,455	24,536	156,164
FTE Related Costs:					
Indirect Costs		53,984	45,344	20,544	119,873
Estates Costs		5,824	4,892	2,216	12,933
Total FTE Related Costs		59,809	50,236	22,761	132,806
FTE Related Costs Requested	33%	19,737	16,578	7,511	43,826
fEC of Project		120,981	120,692	47,297	288,970
Total Funding Requested [Note 2]		80,909	87,033	32,047	199,990

Note 1: Staffing consists of: .2 FTE project management; .5 FTE software development; .3 FTE research officer

Note 2: this represent 69% of the fEC of the project

Full Economic Costs statement

The proposed budget has been constructed on a full economic cost (fEC) basis using the Transparent Approach to Costing (TRAC). The proposal requests a budget that is 69% of fEC, with the University of Bath requesting only a 33% JISC contribution to FTE related costs. The project will deliver a national service so the benefit to the institution is qualitative. The project will provide an opportunity for developing the software development skills and project management skills of existing staff. For a relatively small budget the project will deliver a core piece of supporting infrastructure, and will continue to raise the profile of JISC within the international community.

Appendix B. Workpackages

WP1 Project management

Major deliverables: Project plan – Sustainability plan - Website – Progress report – Final report – Completion Report

Project management will be provided by UKOLN and will be achieved by quarterly project meetings. Communication within the project will be supported by a dedicated project discussion list and informal methods. Financial reports will be supplied by the UKOLN Resources Co-ordinator. Established project management procedures as recommended by JISC will be followed to ensure timely completion of deliverables and an effective outcome. Project management techniques will be of a modest level of complexity, in keeping with the scale of the work involved. Project management will be carried out by Emma Tonkin, UKOLN.

WP2 User requirements

Major deliverables: Updated Requirements Specification – Review of user requirements and prioritised recommendations – Specification for JISC IE integration demonstrator

Evaluate functionality of current software against the IEMS User Requirements Specification (produced in Phase 1). Prioritise requirements emerging from Phase 2 stakeholder demonstrations. Produce updated Requirements Specification.

Review potential for

- m2m interfaces, influenced by requirements of 'intermediate developers' of Web 2.0 style applications.
- establishing interoperability and data exchange between distributed application profile registries.
- METS profile registry

Develop use cases and specify demonstrator of inter-working between IEMSR and other components of the JISC IE, based on use cases from IEMSR phase 2 or Shared Services Review.

Consider how IEMSR will interwork with authentication and authorisation systems.

WP3 Development

Major deliverables: IEMSR architecture and software review – Development plan for IEMSR m2m interfaces – User testing report- Contribute to Integration demonstrator

.Review IEMSR architecture and software with view to move from project to service. Need to consider:

- Robustness and ease of maintenance of software
- Ensure appropriate technology and standards are being used to meet stakeholder requirements, in light of elapsed time since original development,
- Review whether separate registries required for DC and IEEE LOM and implement if necessary
- Review DCAP model, establish the model's robustness in dealing with the inconsistencies/fuzziness of 'real world' APs.
- Review the necessity for a client application and the benefits versus the overhead that it adds to the project.

M2m interfaces/APIs

- Align with Web 2.0 approaches
- Ensure they are as lightweight as possible whilst providing the appropriate hooks to support actual user needs.
- Enhance existing m2m interface as necessary

Organise managed programme of user software testing and usability evaluation of user-facing components

Work with JISC testbed to set up demonstrators between IEMSR and IESR and portals.

Commission Web Design contract to enhance Registry Website interface.

WP4 Release management

Major deliverables: Enhanced registry server - Enhanced data creation tool - Enhanced registry Web interface – Planned releases of enhanced tools

Informed by outputs of WP2 and 3, carry out software development to:

- Enhance registry server
- Enhance data creation tool
- Enhance registry Web interface

Plan release schedule in co-operation with JISC Programme manager

Manage open source software release (SourceForge)

WP5 User Liaison and Advocacy

Major deliverables: IEMSR policies – Advocacy materials - Populated registry server – Report on collaboration with the British Library

Develop collection policy for inclusion of profiles in Registry
Develop persistence, preservation and provenance policies
Develop versioning policy
Specify Quality Assurance methodology

Produce advocacy materials to

- Encourage population of registry
- Encourage AP owners to publish on the web

Progress use of IEMSR by the British Library

WP6 Dissemination and evaluation

Major deliverables: Dissemination plan – Sustainability plan – Papers and Presentations

Liaise with registry activity internationally: NSDL, DCMI Registry, DART, TEL, BL, CETIS, Becta Vocabulary Tool

Liaise with activity related to schema and ontology development, such as the Data Webs project and appropriate NceSS activities

Dissemination of project progress by publication and presentations

Collaborate with programme evaluation activity