Greening Consulting

Information Environment Metadata Schema Registry: Market Proposition

Document details

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Marketing Plan and Proposition – Executive Summary

Objectives

The objective of the marketing plan was to develop an IEMSR market proposition based on a set of clearly defined stakeholder usage scenarios and business cases. The plan was developed to support the prioritisation and focus of IEMSR developments. It was updated and enhanced during the project to reflect decisions made on development priorities and feedback from user testing and evaluation. Finally, a stakeholder engagement plan was proposed as a necessary step to support the transition of the IEMSR from a prototype to pilot shared service, and the realisation of a true market proposition, i.e. a service that is fully operational and accessible.

Potential users

The primary target 'market' for the IEMSR is the UK education community, both Higher Education (HE) and Further Education (FE). However, the potential market within the UK could be considered to include stakeholders of the Common Information Environment and their efforts to improve online information accessibility.

Within this target market several stakeholder groups and potential IEMSR usage scenarios were defined and characterised:

Stakeholders	Potential uses	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.	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

Table 1: Stakeholders of the IEMSR

Use case demonstrations

During June and July 2006 a series of use case demonstration meetings with targeted stakeholders were held (see Table 2).

The series of demonstrations given to IEMSR stakeholders highlighted a universal interest in the registry and its associated tools. The feedback from all stakeholders consulted was positive and there was a common interest in seeing the pilot project progress towards on operational service. Each stakeholder consulted was able to articulate use cases and could see potential benefits from using the IEMSR in addressing their own interests and needs.

Date	Organisation	Attendees	Stakeholder
01/06/06	UKOLN, Bath	Julie Allinson, JISC Digital Repositories Support Officer	Content provider, service provider

12/06/06	JISC, Bristol	Neil Roberts, Digital Repositories Phil Vaughan, Shared Services	Funders/Programme managers
19/06/06	JISC, London	Balviar Notay, Portals/Presentations	Funders/Programme managers
20/06/06	British Library, Boston Spa	Bibliographic Standards and Metadata: • Robina Clayphan • Corine Deliot • Jan Ashton Neil Wilson, Head of Bibliographic Development Bill Oldroyd, e-Architecture Alan Dunskin, Metadata Quality Control	Funders, Content provider, Schema creator, service provider
27/07/06	CETIS	Phil Barker, Metadata and Digital Repository Coordinator	Schema creator

Table 2: Summary of IEMSR use case demonstration meetings

An analysis of the feedback captured from the use case demonstrations was made against an operational IEMSR service scenario. Several issues that would require consideration before the IEMSR project could make a transition to a service were highlighted. These included:

- Validation of software deployed;
- Review and assessment of registry functionality and services in response to additional user needs captured during demonstrations;
- Implementation of user authentification and data validation processes;
- Scope of service offering;
- Service provision and maintenance responsibilities;
- Service promotion and presentation within and beyond the JISC IE;
- Preservation and sustainability of the service.

The way forward - stakeholder engagement plan

It was concluded that the current IEMSR requires a period of development and consolidation before it can be considered a true market proposition. A stakeholder engagement plan that identifies key stakeholders and their anticipated relationships with the IEMSR through this period of transition was outlined. It recommends steps that the IEMSR project should take to ensure stakeholder engagement is maintained through this important phase of activity. An overview of this plan is presented in Figure 1. The main components of this plan are:

Key Stakeholder Group

The purpose of this group is to provide review and evaluation input at set milestones throughout the development cycle. This input is required to ensure the service development remains focused on stakeholder needs and to ensure the service delivers demonstrable stakeholder benefits. The Key Stakeholder Group builds on the relationships that have been established and developed with key stakeholders during the project.

Areas of Collaboration and Liaison

The areas of collaboration and liaison are clusters of activity that could present users (human or machine) of IEMSR. Initially these clusters represent targets for dissemination and promotion. It is anticipated that raising awareness of the planned pilot service will stimulate interest in individual projects and activities to collaborate in the later stages of IEMSR service development.

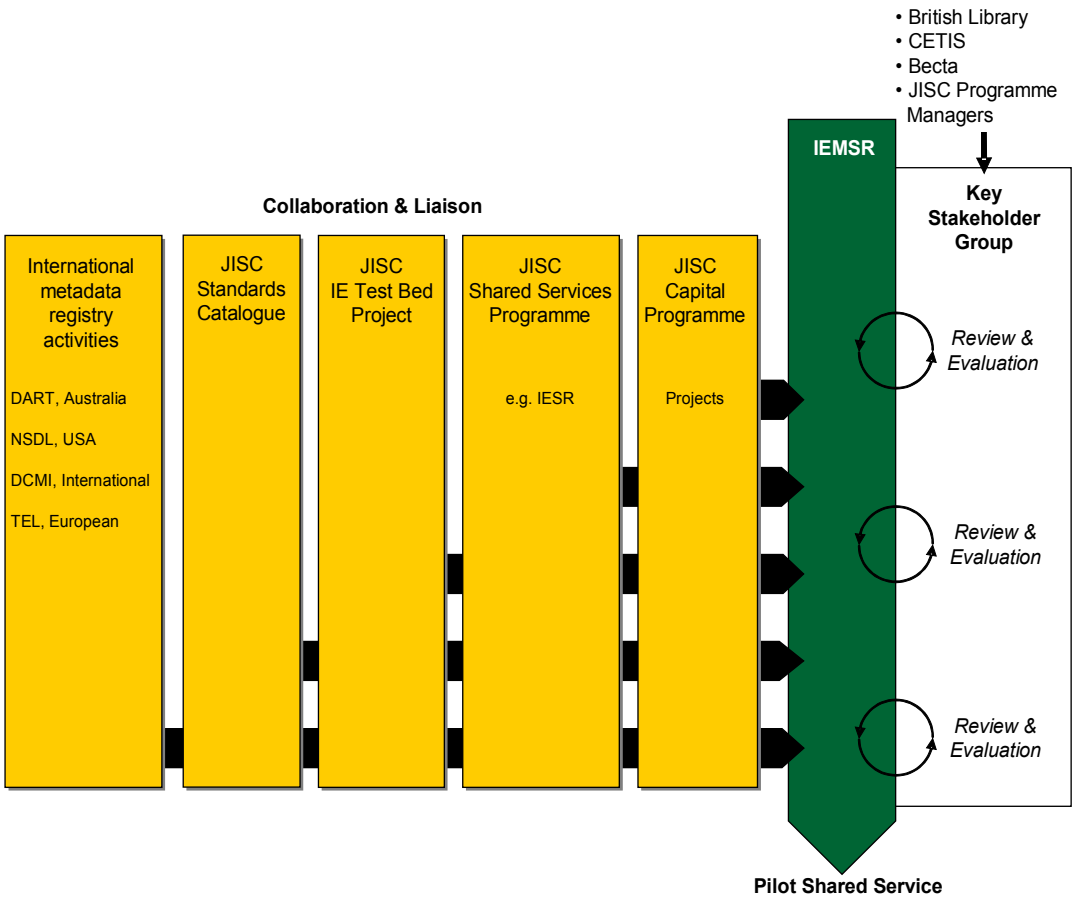

Figure 1: Stakeholder engagement plan

1.INTRODUCTION

This document is the Marketing Proposition, version 1 for the Information Environment Metadata Schema Registry (IEMSR) – phase two, a project funded under the JISC Shared Services Programme. This document is an update to the two versions of the Marketing Plan document issued during the course of the project – Marketing Plan v1, 29 March 2006 and Marketing Plan v2, 6 July 2006.

The intended audience of this document is the JISC programme manager and the IEMSR project team. However, it is possible that sections of the market proposition document could be made available for wider dissemination.

1.1Background

The IEMSR project aims to *"develop a metadata schema registry as a pilot shared service within the JISC Information Environment. Metadata schema registries enable the publication, navigation and sharing of information about metadata."* [Ref. 1]. The ambition is for the IEMSR to act as the primary source for authoritative information about metadata schemas and recommended by the JISC IE standards framework. The Registry is targeted at the UK education community where both Dublin Core (DC) and IEEE Learning Object Metadata (LOM) standards are used. The IEMSR currently focuses on DC and IEE LOM application profiles (AP)

The IEMSR project was initiated in January 2004 through funding from the JISC Shared Service Programme. At the end of phase one (June 2005), the IEMSR project had achieved the following:

- Produced a full set of documentation (Usage scenarios, functional requirements and data models);
- Developed a set of IEMSR service components:
  - Data creation tool
  - Registry server
  - Registry website;
- Created a set of test data for indexing by the server;
- Held a user evaluation workshop.

Phase two of the IEMSR project will run for fourteen months from July 2005 to September 2006. The main objective is to refine and enhance the IEMSR based on specific user requirements and guided by a set of focused use cases.

1.2Purpose and approach

The objective of the marketing plan was to develop an IEMSR market proposition based on a set of clearly defined stakeholder usage scenarios and business cases. The plan was developed to support the prioritisation and focus of IEMSR developments. The relationship between the marketing activities and the core IEMSR development work is illustrated in Figure 1-1. The diagram illustrates the central processes and highlights the specific responsibilities of the development (internal aspect) and marketing activities (external aspect).

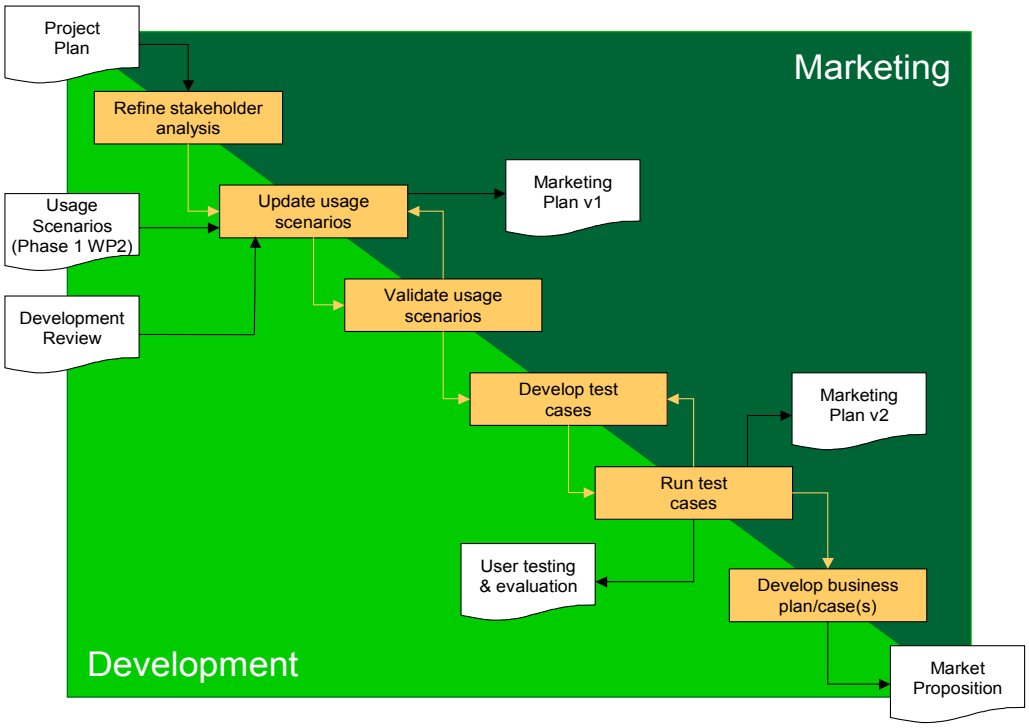

Figure 1-1: Workflow and logic

The marketing plan was updated and enhanced during the project to reflect decisions made on development priorities and feedback from user testing and evaluation. This market proposition document builds on this work and proposes a stakeholder engagement plan that identifies key stakholders and their anticipated relationships with the IEMSR through an anticipated period of transition from prototype to pilot shared service.

1.3List of acronyms

AP	Application Profile
BECTA	British Educational Communications and Technology Agency
BL	British Library
BLAP	British Library Application Profile
CEN	European Committee for Standardisation
CETIS	Centre for Educational Technology Interoperability Standards
DCAP	Dublin Core Application Profile
DCMI	Dublin Core Metadata Initiative
DfES	Department for Education and Skills
FE	Further Education
HE	Higher Education
IE	Information Environment
IEEE	Institute of Electrical and Electronics Engineers
IEMSR	Information Environment Metadata Schema Registry
ILRT	Institute for Learning and Research Technology
JISC	Joint Information Systems Committee
LOM	Learning Object Metadata
LTSC	Learning Technology Standards Committee
MARC	Machine-Readable Cataloguing
MODS	Metadata Object Description Schema
RDN	Resource Discovery Network
ReSET	Rejuvination of Science, Engineering and Technology
RSLP	Research Support Libraries Programme
TEL	The European Library

2.THE INFORMATION ENVIRONMENT METADATA SCHEMA REGISTRY

This chapter defines some key terms used in this document, provides an overview of the IEMSR project, and provides a generic characterisation of metadata registries and their potential uses.

2.1Definitions

The definitions presented in Box 1 are not necessarily universal and may have different meanings in other environments/communities.

Box 1: Definitions

Metadata
Data about other data.

Metadata elements or ***elements***
The "words" of metadata – concepts used to describe data (e.g. Author, Title and Subject).

Metadata elements sets or ***vocabularies***
A group of elements that is useful for describing resources of a particular type, or for a particular purpose (e.g. Dublin Core, IEEE LOM)

Metadata instance
A catalogue record using metadata elements to describe something.

Data models
Data models are the "grammars" of metadata language – formalised world views that provide a context for metadata by defining the structural relationships between different types of elements and sometimes by characterising the things to which the elements refer.

Uniform Resource Identifier
Uniform Resource Identifiers (URIs, also known as Uniform Resource Locators - URLs) are short strings that identify resources in the web: documents, images, downloadable files, services, electronic mailboxes, and other resources. (source www.w3.org)

Schemas
In general terms, any organisation, coding, outline or plan of concepts. In terms of metadata, a systematic, orderly combination of elements or terms. (source: dublincore.org)

Application profile
A declaration of the metadata terms an organisation, information resource, application, or user community uses in its metadata. In a broader sense, it includes the set of metadata elements, policies, and guidelines defined for a particular application or implementation. (source: dublincore.org)

2.2The project

The Information Environment Metadata Schema Registry (IEMSR) is a development project funded by the Joint Information Systems Committee (JISC) through its Shared Service Programme. The IEMSR project is developing a metadata schema registry as a pilot shared service within the JISC Information Environment (IE).

The aim of the project is to develop a pilot registry service within the JISC IE providing information about DC and IEEE LOM metadata schemas and application profiles.

The project began in January 2004 and is now in its second phase:

- Phase 1: January 2004 – June 2005;

- Phase 2: July 2005 – September 2006.

The project is managed and led by UKOLN, the University of Bath. Other project participants include:

- Institute for Learning and Research Technology (ILRT), University of Bristol – core partner;
- Centre for Educational Technology Interoperability Standards (CETIS) – non-funded associated partner;
- British Educational Communications and Technology Agency (BECTA) - non-funded associated partner;
- ESYS plc – external evaluators (Phase 1 only)
- British Library – contributor (Phase 2 only)

For further information on JISC, the JISC Shared Services Programme and the JISC Information Environment please visit their website: www.jisc.ac.uk. The IEMSR project website is at: www.ukoln.ac.uk/projects/iemsr.

2.3What is a metadata schema registry?

A metadata schema registry is an application that provides services based on information about metadata vocabularies, the component terms that make up those vocabularies, and the relationships between terms (Baker *et al*, 2003). Metadata schema registries enable the publication, navigation and sharing of information about metadata. More specifically, the contribution and role played by a metadata schema registry can be described as follows:

> "*A metadata registry provides machine-readable information about the metadata schemas in use by particular metadata-based services. The primary intention of this service is to allow portals, brokers and aggregators to automatically determine information about appropriate search terms and the structure of metadata records that will be returned to them. However, metadata registries also provide a useful human-oriented service, allowing people to see what metadata schemas are in use by which services - providing a basis for metadata schema sharing and re-use.*"
>
> (source: Powell, 2003)

The main role of the IEMSR will be to act as the primary source for authoritative information about metadata schemas and APs recommended by the JISC IE standards framework.

2.4How could I use a metadata registry?

Metadata registries have multiple potential uses across a wide range of disciplines. Usage scenarios for registries might include the following (taken from Baker *et al*, 2003):

- A cataloguer needs to know the best practice for describing a particular type of resources. (A query to a registry might return a list of metadata element sets classified by use.)
- A federation of information providers wants to harmonise metadata usage among its members. (A registry might present descriptions of how metadata element sets have been applied so that a reader can compare areas of similarity and difference.)
- An information provider needs to translate its metadata into the shared format of a digital library federation. (A registry might link to crosswalk services that can batch-convert records from one format into another.)

- An implementer wants to construct an AP, re-using existing elements as far as possible. (A registry allows searching and browsing of data elements grouped into sets and profiles.)
- A software developer wants metadata tools to update their configurations automatically. (A registry might point to or provide machine-processable schemas.)
- Ten years from now, an archive needs to interpret and convert metadata records from 2002. (A registry might hold historical versioning information on standards or on particular applications.)
- Chinese speakers want to view or process metadata prepared in Germany. (A registry might specialise in providing translations or annotations in multiple languages.)

The IEMSR does not intend to support all of the above uses. The project will focus on a small number of specific use cases to illustrate the functionality and benefits to stakeholders.

2.5What is the JISC Information Environment?

The JISC IE, its role in supporting FE and HE communities, and the role of the IEMSR is introduced in the IEMSR functional description [Ref. 5]. The summary presented below is an extract from this document.

> *The Joint Information Systems Committee (JISC) administers the provision of a wide range of digital content for use in higher and further education. That content is of diverse types (text, still images, maps, video, audio, datasets, software, learning resources) and is made available by different classes of content provider (individual educational institutions, sector-wide providers operated by JISC, commercial publishers, other public sector sources) and under varying different terms and conditions (open access, institutional subscription).*
>
> *The JISC Information Environment is a "set of networked services that allows people to discover, access, use and publish" [Ref. 6] resources within the UK HE and FE community. The JISC IE is not itself a single system or service; rather, it is a framework of services that can be used in combination as components to deliver functionality of interest to an end user. Furthermore, the environment is not a closed one: some of the service components used in the JISC IE to support educational users are also used to deliver services to other user communities.*
>
> *Central to the concept of the Information Environment is the principle that service components are combined to deliver functions to a user. Indeed as many of the resources of interest are physical resources (books, paper documents), users frequently combine the use of digital services (discovering, selecting and locating an item by querying a library catalogue) and physical services (requesting and accessing the located item by using the reference or lending service of a library lending or a document delivery service).*
>
> *The architecture* [see Figure 2-2] *also categorises services according to the general class of activity they perform: that categorisation may be useful in outlining how different service components within the IE might interact with the IEMSR:*
>
> - ***content providers (provision)**: make collections of items available, and disclose metadata about their resources through structured network services;*

- ***presentation layer services**: provide the human user with a "personalised, single point of access to a range of heterogeneous network services, local and remote, structured and unstructured";*
- ***fusion services**: bring together metadata records, by searching or gathering or as the result of manual cataloguing;*
- ***shared infrastructural services**: support the activities of all the other services within the JISC IE.*

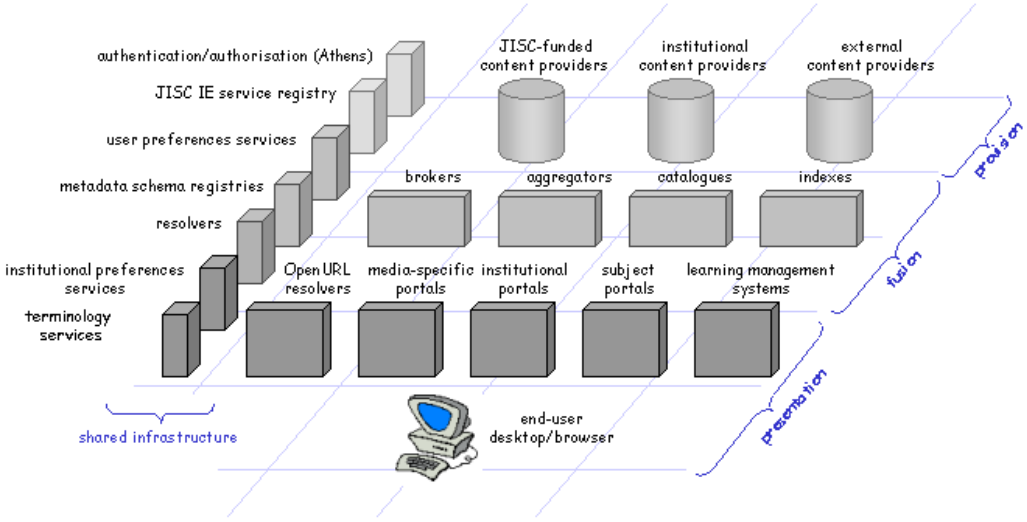

Figure 2-2: The JISC Information Environment Technical Architecture
(Diagram by Andy Powell)

Further information on the JISC IE is available at: www.jisc.ac.uk/ie

3.MARKETING AUDIT

The purpose of this chapter is to summarise the marketing environment; the key stakeholders and target users of the IEMSR.

3.1Who are the potential users?

The primary target 'market' for the IEMSR project is the UK education community, both Higher Education (HE) and Further Education (FE). However, the potential market within the UK could be considered to include stakeholders of the Common Information Environment[1] and their efforts to improve online information accessibility.

There are also several activities/initiatives outside the UK that present potential opportunities for the IEMSR. These include:

- DART – dataset acquisition accessibility and annotation e-research technologies, Australia (http://dart.edu.au). DART is a proof-of-concept project set up to develop tools to support a new collaborative research infrastructure in Australia.

  Part of the project will develop and provide access to a centralised repository/registry of metadata schemas and ontologies. This activity will build on the work of IEMSR. A set of prototype tools and a preliminary registry are planned to be developed by September 2006.

  The DART project is funded by the Australian Commonwealth Government's Department of Education, Science and Training (DEST).

- National Science Digital Library (NSDL) Metadata Registry[2], USA. The NSDL Metadata Registry provides projects within NSDL and beyond with the means to register their metadata schemas (element/property sets) and schemes (controlled vocabularies) for purposes of discovery and reuse in support of metadata interoperability. In addition, *"the NSDL Registry will support the machine mapping of relationships among terms and concepts in those schemes (semantic mappings) and schemas (crosswalks)."*[2].

  The project is using the open-source Dublin Core Metadata Initiative (DCMI) registry application as its development base. The registry application will be developed to support:
  1. the automated creation and maintenance of schemas and application profiles by NSDL projects;
  2. the submission of schemas and schemes to a registry workflow for review and publication.

  The NSDL registry is being designed to function as part of a network of distributed registries.

- Canadian Association of Research Libraries (CARL) Institutional Repositories Pilot Project[3]. This project is a Canadian initiative to implement institutional repositories at several Canadian research libraries. One strand of the project is developing an AP for a set of Canadian institutional repositories. This will help to improve the effectiveness of metadata indexing systems that harvest metadata from compliant archives.

[1] http://www.common-info.org.uk
[2] http://metadataregistry.org
[3] http://www.carl-abrc.ca/projects/institutional_repositories/institutional_repositories-e.html

- The European Library Metadata Registry[4]. The TEL metadata registry provides an overview of all metadata elements that are, or have been, potential candidates for use in TEL APs. The functionality and presentation of the TEL metadata registry are currently under review and will be refined during 2006 (details of the TEL metadata registry are provided in section 3.1.5).

- European Digital Library[5]. Digital Libraries, one of the flagship initiatives of *i2010 – a European Information Society for growth and jobs*, aims at making European information resources easier and more interesting to use in an online environment. The strategy for its development is in place and the European Commission issued the following press release:

  "The consultation results have helped the Commission to further define the practical set-up of the European Digital Library, which will provide a highly visible, multilingual access point, dedicated to the digital resources of Europe's cultural institutions. It will build upon the TEL-infrastructure, currently the gateway to the catalogue records of collections in a number of national libraries, which also gives access to a range of digitised resources of the participating libraries.

  (source: European Commission, Brussels, 02 March 2006 IP/06/253)

  A European Metadata Registry (EMR) could be a functional tool that can be developed to support interoperability between European institutions. 'The European Metadata Registry' was the title of a workshop held at the 2006 European Library Automation Group conference[6]. The workshop attempted to assess if there is a need for an EMR, if this need is short or long term (given emerging technologies) and if so, what should it be and will ELAG recommend the creation of an EMR and why.

Within the target market several user groups/stakeholders have been identified (see Table 3-1). Table 3-1 outlines the areas of potential stakeholder interest in IEMSR, and the level of importance attached to their requirements by the IEMSR project.

The stakeholders presented here are by no means exhaustive; it is likely that there are further potential stakeholders. However, at this stage these are identified as priority cases based on their early levels of interest in the project. It is anticipated that this list of stakeholders will be updated during the project.

Stakeholders	Potential uses	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.	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	Access to machine-readable schemas and application	Medium

[4] http://www.theeuropeanlibrary.org/metadatahandbook/index.html
[5] http://europa.eu.int/information_society/activities/digital_libraries/index_en.htm
[6] http://www.cimec.ro/elag/

Stakeholders	Potential uses	Importance
products and services to JISC IE	profiles deployed within JISC IE.	
Other registries	Re-use application profile models, re-use source code.	Medium

Table 3-1: Stakeholders of the IEMSR [adapted from Ref. 1]

The following sections characterise selected key stakeholders and potential use scenarios of the IEMSR.

3.1.1 Metadata schema creators

Schema creators can be characterised by individuals/organisations that need to design standards-based formats for their own metadata records following best practice in a particular field of knowledge. A metadata schema registry should enable schema creators to declare and maintain their own schemas without the need to have an in-depth knowledge of the complex schema language.

A schema creator may use the registry in the following ways:

- Create an application profile and load to the registry;
- Amend an existing application profile description and reload to the registry;
- Delete an existing application profile and load an updated version to the registry;
- Create a metadata vocabulary and load to the registry;
- Amend an existing metadata vocabulary description and reload to the registry;
- Delete an existing metadata vocabulary and load an updated version to the registry;
- Discover and select an existing application profile;
- Discover and select an existing application profile, adapt the application profile description for a new application profile and load to the registry;

Detailed descriptions of the use scenarios listed above are presented in A.

3.1.2 Service/System developers

There are many potential service/system developers of JISC IE shared infrastructure services. These are typically machine-to-machine interactions between shared services and other presentation, fusion, provision and other shared services (see Figure 2-2). Presentation services are discussed here to illustrate the potential uses of the IEMSR.

Presentation services are largely consumers of metadata that need to understand the characteristics of metadata records used by other services. Presentation services include web portals, which typically process metadata describing resources made available by content providers. These metadata records are then made available through a human user interface. An example of a presentation service is the resource discovery network (RDN) and the RDN hubs (e.g. Altis, Artifact, BIOME, EEVL, GEsource, Humbul, PSIgate, SOSIG);

Potential presentation users may use the registry for:

- Portal display;
- Portal search and display;
- Portal inference, search and display;
- Discover and analyse data provider DCAPs.

Detailed descriptions of the use scenarios listed above are presented in B.

3.1.3Funders

Programme funders can be described as agents that encourage the re-use of existing application profiles and metadata terms to promote interoperability within the JISC IE. Programme management, including specific support roles, may be interested in monitoring the uptake of application profiles loaded on IEMSR as an approach to evaluating progress towards interoperability.

However, the valued added by the IEMSR will depend on input from the community (as well as people using the content on the registry) and building up this support is a key factor for future sustainability.

A programme manager may want to use the registry to survey the extent of use of individual application profiles. An example use scenario is provided in C.

An additional role that could be considered in this stakeholder group is the registry administrator. It is assumed that the administrator would be part of an operations team, funded by JISC that delivers the IEMSR service.

The registry administrator may use the registry in the following ways:

- Load a data source to the registry;
- Reload a data source to the registry;
- Withdraw a data source from the registry.

Detailed descriptions of the use scenarios listed above are presented in C.

3.1.4Commercial software/service providers

This stakeholder group represents commercial software/system providers that are under contract to develop IE components - shared infrastructure, fusion, provision, and presentation. A developer may use a registered schema base to configure metadata creation tools, merge metadata from a diversity of sources, or convert records from one format or standard into another.

The metadata tagging tool developed by Schemeta/Knowledge Integration for Curriculum Online[7] is one potential user of the registry. Curriculum Online is an online catalogue comprising metadata records that describe educational resources. Suppliers of resources are required to provide metadata that describes each of their resources. A tagging tool is provided to help suppliers describe their resources.

Example IEMSR use scenarios by the Online Curriculum tagging tool may include:

- Tagging tool display;
- Discover XML schema to support tagging tool development.

Detailed descriptions of the use scenarios listed above are presented in D.

3.1.5Other registry activities

Two registry activities have been identified as potential opportunities for IEMSR. These are outlined below.

British Library

[7] www.curriculumonline.gov.uk

The British Library (BL) has developed a BL Application Profile (BLAP) that uses 50 terms and 17 encoding schemes. The terms are taken from the following namespaces:

- DCMI Metadata Terms (http://dublincore.org/documents/dcmi-terms/)
- MODS elements (http://www.loc.gov/mods)
- TEL terms (http://www.theeuropeanlibrary.org/metadatahandbook/telterms.html)
- BL Terms (http://labs.bl.uk/metadata/blap/terms.html)

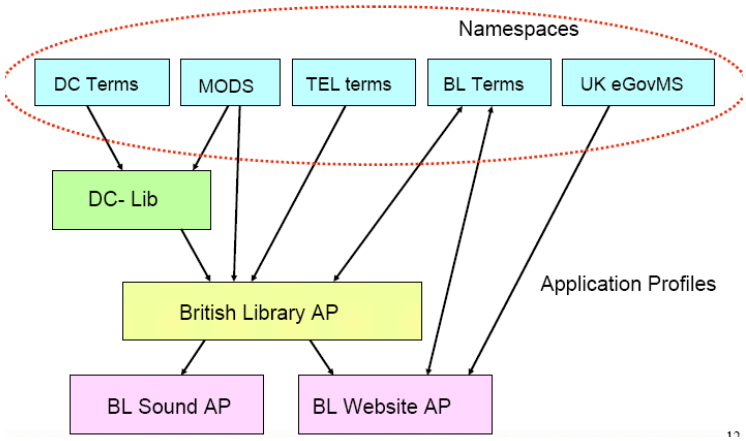

Figure 3-3: B-LAP application profiles and & namespaces [Ref. 7]

The BLAP has two proposed uses. First, to provide a metadata standard for use in digitisation projects (e.g. newspaper, journal and conference articles, sound, web pages, administrative) where MARC records are not going to be created[8]. Second, as a format that encompasses enough of the common elements from other BL databases to allow conversions that will enable high level cross-searching.

The issues of interoperability introduced by digitisation projects are described by the BL [Ref. 7]:

- Projects often have some external funding and involve a collaborative approach;
- Historically, there has been a development of customised metadata formats: material type, timescales, budget, available expertise;
- Standalone systems, usually with a web presence on the BL website;
- Without portal functionality these cannot be cross-searched with other BL resources;
- There are interoperability difficulties both internally and externally.

Digitisation projects can develop their own AP based on B-LAP under the following conditions:

- Terms may be added if they have generic applicability;
- BL usage rules, recommendations and constraints are added;
- Is expressed following the CEN DCAP guidelines (European Committee for Standardisation Dublin Core Application Profile - www.cenorm.be/sh/mmi-dc).

Whilst the above does not describe a metadata registry activity, it does introduce a need outlined by the British Library for "*a system that can handle multiple different metadata formats and provide a common but customisable tool for data entry*" [Ref. 7].

[8] B-LAP is not the only alternative to MARC21. BL are also experimenting with MARCXML and MODS. The format used on any particular occasion will depend on the uses to which the metadata will be put (source: email correspondence with Robina Clayphan, BL)

The European Library

The European Library (TEL) is a central point of access (web portal) to European heritage collections. The portal enables integrated searching in descriptions of collections and digitised and printed objects. A component of TEL is the TEL Metadata Handbook that has been developed to help national libraries and data providers with entering collections into TEL.

The metadata handbook[9] contains:

- A metadata registry containing a broad range of metadata elements and their characteristics;
- Collection descriptions;
- Input forms and style sheets for update and usage of the metadata registry and collection description database.

The metadata registry provides an overview of all metadata elements that are, or have been, potential candidates for use in TEL APs. The TEL AP for Objects v1.4 is based on the Library Application Profile proposed by the DCMI-Libraries Working Group. The TEL AP for Collections v1.4 is based on the TEL Application Profile for Objects version 1.4 and the RLSP collection description schema.

The structure and layout of the TEL metadata handbook and metadata registry are currently under review, and are likely to be revised during the course of 2006. A European Metadata Registry for museums, libraries and collections is also under discussion within the TEL Metadata Registry Group:

> *"By insisting on Dublin Core compliant metadata for The European Library these standards are being enforced. There is however a need to 't*ranslate' from some legacy meta*data schemas in use by some libraries such as Unimarc, Marc21 and MAB into a common schema such as Dublin Core which is the basis of the TEL Application Profile. In addition creating automatic crosswalks from the TEL Application Profile to other metadata schema such as EAD would vastly increase the interoperability of data held in different cultural institutions and repositories. The European Library proposes the creation of a European Metadata Registry, capable of producing relevant crosswalks and encompassing new metadata schema"*[10].

The IEMSR project team is well connected with TEL and has/will participated/participate in TEL Metadata Registry Group meetings. A member of the IEMSR project will be facilitating a workshop 'The European Metadata Registry' at ELAG 2006 in co-ordination with TEL. The workshop aims to reach an agreed definition and scope for a European Metadata Registry in the context of the European Digital Library.

[9] http://www.theeuropeanlibrary.org/metadatahandbook/index.html. Accessed 24 February 2006

[10] Taken from TEL Metadata Registry Group discussion note - European Metadata Registry as part of EDL, under the e*plus* programme (email correspondence Jill Cousins, TEL)

4.AUDIT ANALYSIS

The marketing audit highlights that there are several key stakeholder groups all with potential uses of the IEMSR. However, to provide focus for the continued development of the IEMSR it is important to identify priority targets, or hotspots, where the application of the IEMSR can demonstrate user benefit.

An analysis of the market audit is presented in the table below. This analysis highlights the key strengths and weaknesses of the IEMSR in terms of functionality and use case definition. Also highlighted are opportunities and threats in the wider implementation environment.

Strengths	Weaknesses
• The functions of the IEMSR for metadata schema creation are well defined. A set of core use scenarios based on these functions has been produced. The characterisation of this stakeholder group is the most mature and there are several opportunities to explore (e.g. the increasing trend in the development of e-print archives as a mechanism for disclosing institutional assets).	• The survey use scenario described for the funders stakeholder group appears ambitious given the current state of the IEMSR. However, the programme/project management use scenarios are important to the sustainability of the IEMSR and the promotion of interoperability within the JISC IE. The project should investigate these use scenarios further. • Machine-to-machine development work has not progressed substantially since the IEMSR project start. Presentation services, in particular portals, defined within the shared service stakeholder group represent a strong opportunity for IEMSR. The project should assess the feasibility of focusing on presentation service use case to demonstrate IEMSR machine-to-machine capability.
Opportunities	**Threats**
• There are several external (to the core JISC IE) projects and initiatives that aim to improve interoperability between digital resources (e.g. European Digital Library, The European Library, British Library, Common Information Environment). There are opportunities beyond the immediate IE for the potential application of the IEMSR. The IEMSR should explore these opportunities and potential use cases further.	• Within all stakeholder groups, the uptake and success of the IEMSR will depend on input from the stakeholder community (as well as people using the content on the registry). Building up this support will be a key factor for future sustainability. • It is unlikely that the commercial software/service provider stakeholder group will be willing to co-operate with IEMSR development unless there is an incentive (funding) to do so. The project should be cautious if developing relationships in this area.

5.USE CASE DEMONSTRATIONS

Issue 1 of the IEMSR marketing plan[11] defined a set of marketing objectives and action plan for validating use cases and running test cases with targeted stakeholders. During June and July 2006 a series of use case demonstration meetings with targeted stakeholders were held (see Table 5-2). The following sections summarise the feedback on the IEMSR use cases and its potential service role within the JISC IE.

Date	Organisation	Attendees	Stakeholder
01/06/06	UKOLN, Bath	Julie Allinson, JISC Digital Repositories Support Officer	Content provider, service provider
12/06/06	JISC, Bristol	Neil Roberts, Digital Repositories Phil Vaughan, Shared Services	Funders/Programme managers
19/06/06	JISC, London	Balviar Notay, Portals/Presentations	Funders/Programme managers
20/06/06	British Library, Boston Spa	Bibliographic Standards and Metadata: • Robina Clayphan • Corine Deliot • Jan Ashton Neil Wilson, Head of Bibliographic Development Bill Oldroyd, e-Architecture Alan Dunskin, Metadata Quality Control	Funders, Content provider, Schema creator, service provider
27/07/06	CETIS	Phil Barker, Metadata and Digital Repository Coordinator	Schema creator

Table 5-2: Summary of IEMSR use case demonstration meetings

5.1Julie Allinson, JISC Digital Repositories Support Officer, UKOLN

Julie's role as Support Officer involves supporting the 25 projects within the programme. The support provided includes advice and guidance, exploiting synergies across the programme and beyond, synthesising project and programme outcomes and liaising with other national and international repositories activities. Julie was approached because of her knowledge of the individual projects within the programme and her understanding of issues of interoperability within the repositories community.

The JISC Repositories Search Service project was discussed as a development that will require standardisation of metadata exposed by repositories to allow federated searches with clear links to full text and the ability to handle different versions of documentation. To support this activity an ePrints AP is being developed based on the DC abstract model. A prototype DCAP will be reviewed by a working group in September 2006. Assuming the new DCAP is approved this will then be used by development projects over the next two and half years. Interoperability with other international repositories activities (e.g. DARE[12], Netherlands; ARROW[13], Australia) will be an important consider for the projects.

A use case of a potential IEMSR service was expressed: analysing the current 'landscape', discovering who uses what AP. This analysis was a preliminary step undertaken as part of the process for developing an ePrints AP. Numerous internet searches of institutional repositories were required to assess what schemas/APs were being used and by whom. The existence of a central registry that held and maintained this type of information would have saved time and effort.
The following improvements to the IEMSR were suggested:

- Advanced key word searches would allow richer analysis of IEMSR content (assumes the individual entries are held in a centralised registry);

[11] IEMSR Marketing Plan - issue 1, 5 June 2006
[12] http://www.darenet.nl
[13] http://arrow.edu.au

- An annotation/comments field for registered APs would add value by allowing owners to add contextual information and usage experience;
- IEMSR would need to be an operational service, not a project, before institutional repositories are likely to register their APs;
- The registry should consider image/media repositories APs in use by this community;
- In the case where an AP is under discussion it would be useful if the IEMSR could provide functionality to allow community comments/feedback on individual APs, i.e. lifecycle management;
- It would be useful for the IEMSR to support mappings (static or dynamic) e.g. ePrints to DSpace.

In summary, the IEMSR (as an operational service) would add value to the research-creation-publication process and support interoperability across institutional repositories. An IEMSR demonstration to the ePrints working group could be arranged, but Julie will report back to the group in the short term.

5.2JISC: Neil Jacobs (Digital Repositories Programme), Phil Vaughan (Shared Infrastructure Services Programme)

Both programme managers provided feedback on the demonstration and suggested areas where an IEMSR service could support their programme management activities. Neil stated that spreadsheets were currently used to capture information about schemas and APs used by individual repositories. It was remarked that this was not an optimum approach and that there were limitations in terms of data management and query. Information currently captured includes:

- Whether a repository project is using a schema;
- What element sets are used
- What encoding scheme is used for individual properties

Repository projects were stated to have different levels of knowledge about, and use of AP/schemas. It was also remarked that repository projects include repositories of all types of data, including geographical and scientific data.

The following anticipated uses of an IEMSR service were outline:

- Programme planning – a tool to assess the communities that are well served by APs/schemas, i.e. to identify any gaps (this assumes the registry is populated and maintained);
- Dissemination – promotion to an international audience of the schemas/APs used by digital repositories in the JISC IE for the purpose of encouraging wider interoperability. It was suggested that it would be useful for the registry to allow the logging of lessons leaned/experiences/decision points associated with individual entries;
- Evaluation – verification of project deliverables, i.e. whether the repository is using the appropriate/agreed schema/AP.

The following suggestions/improvements to the IEMSR were suggested:

- Authentification of users would be important to ensure integrity of data if the IEMSR became an operational service and used across the wider community;
- A link between the IEMSR and Information Environment Service Registry (IESR) would be useful to allow programme managers to establish what services were using which schemas.

The scope of a future IEMSR operational service was discussed. Two questions were raised:

- To what extent would the IEMSR support standards other than DC and LOM? e.g. scientific and geographical data;
- Would the IEMSR provide information about the schemas/APs supported by repository software package?

5.3JISC: Balviar Notay (Portals, Presentations & Resource Discovery Programmes)

A recent JISC call 'Delivery to Discovery' was brought to the team's attention. The call has a repositories strand that may yield projects that intend to develop schemas/APs. This could be of interest to the IEMSR project and an update on the successful projects will be provided in the coming weeks.

The Visual and Sound Materials Portal Scoping Study and Demonstrator Project[14] was mentioned as another instance where a common AP may need to be developed for the visual and sound materials community. This was suggested as a potential opportunity for the IEMSR. It could provide support to the community in the development lifecycle of an AP. Phase one of the visual and sound materials project is currently under review.

The IEMSR as a potential operational service was discussed. The following observations were made:

- Projects may need to do mappings between schemas. Would IEMSR offer this as a service?
- Would the scope of the IMESR support other data types not described using DC and LOM, e.g. geographical data?
- If the IEMSR becomes an operational service it will need to consider its own 'presentation', i.e. how it promotes itself within and outside the JISC IE. The IEMSR RSS feature demonstrated during the meeting was stated as a useful tool for raising awareness across programme and projects.
- If the intention for the IEMSR is to act as a reference point, will the IEMSR create links to other registries in other thematic communities?

5.4British Library

The British Library expressed an interest in the IEMSR as a tool to support the management of its BLAP (see 3.1.5), its element sets and its 'child' application within the BL. The BLAP has been applied and modified for internal projects. The BLAP and its child applications are currently managed using spreadsheets. The use of spreadsheets for this management function was stated to be acceptable, but limiting. It was remarked that the IEMSR appeared to offer a wider range of tools that would support the management and use of the BLAP within the BL. In addition, the BL is interested in sharing/interacting with other activities to encourage interoperability. The IEMSR, assuming it becomes an operational service, would provide a mechanism for wider promotion.

The BL expressed interest in conducting an IEMSR test case and the following tasks were agreed:

1. Upload the BLAP elements sets to the IEMSR;
2. Create the BLAP and child applications and register on the BLAP;
3. Provide feedback to the project team on the above processes.

It was agreed to conduct the test case during July and August and that feedback would be provided in September.

[14] http://www.jisc.ac.uk/index.cfm?name=project_vsmportal

The following additional observations were made when discussing the IEMSR as a future operational service:

- The assurance of service sustainability over the long term is important to give confidence to its user base. BL considered the possibility that it could host and maintain the IEMSR as they have extensive experience in preservation;
- How would the IEMSR ensure that it has the latest versions of hosted elements sets? This was stated as an important factor if the IEMSR is to become a trusted resource and service.

5.5CETIS: Phil Barker (Metadata and Digital Repository Coordinator)

The Centre for Educational Technology Interoperability Standards (CETIS) is a JISC funded distributed advisory centre that is managed by the Bolton Institute of High Education. CETIS' primary remit is to advise the UK FE/HE sector on the strategic, technical and pedagogic implications of educational technology interoperability standards, provide technical advice and support to FE/HE institutions, JISC research programmes and initiatives on the uptake and implementation of these standards and specifications. CETIS plays an important role in developing application profiles of standards and specifications that are tailored to meet the requirements of the UK educational community.

CETIS is an associate project partner providing guidance and requirements from the perspective of the IEEE LOM user community.

During the demonstration of the IEMSR server and website Phil made several comments and observations. These are summarised below:

- The structure of the server and presentation of the data creation tool appears DC-focused. For example, LOM has a hierarchical structure and it is often best to treat this in a tree based search structure, rather than the browse approach adopted by the IEMSR. Contextual based searching would also be useful.
- Notes are used to support many of the LOM terms. This is part of the educational process required to increase and improve the use of LOM. The Registry will need to be able to accommodate and present these notes.
- A collaborative working environment would be a useful addition to the Registry. This would support the lifecycle of APs. The development of an AP is often a grafting and pruning process of the tree hierarchy. During this process it would useful to know who is using the individual elements of the AP so that redundant elements can be pruned. This requires human to human contact.

Following the demonstration it was agreed that Phil would perform at test of the Registry by adding an AP constructed under the ReSET project[15]. The AP is based on the JORUM[16] AP with the addition of a few constraints.

It was also suggested that the Registry could be promoted to the LOM community through the CETIS metadata email list (cetis-metadata@jisc.ac.uk).

5.6Implications for an operational service

The series of demonstrations given to IEMSR stakeholders has highlighted a universal interest in the registry and its associated tools. The feedback from all stakeholders consulted was positive and there is a common interest in seeing the pilot project progress towards on operational service. Each stakeholder consulted was able to articulate use cases and could see potential benefits from using the IEMSR in addressing their own interests and needs.

[15] http://esdstudent.gcal.ac.uk/reset
[16] http://www.jorum.ac.uk

The results from the discussions suggest there would be variations in the level of use of the IEMSR by the different stakeholders groups, and that this variation would change during the evolution of the IEMSR. Figure 5-4 illustrates an example of these potential variations for selected stakeholder groups.

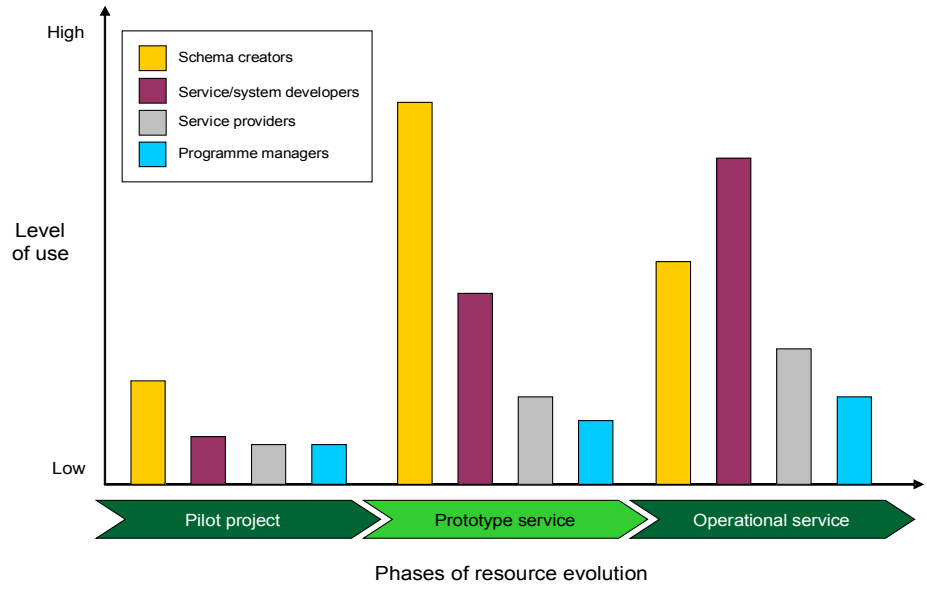

Figure 5-4: Scenario: IEMSR usage by key stakeholders through phases of service evolution

In the pilot project phase level of use is likely to be low across all stakeholders. Schema creators may have a moderately higher level of interest as the project encourages agencies/organisations/projects to test and populate the registry. However, level of use is likely to be relatively low compared to later phases of evolution as awareness of the project is likely to be limited. Assuming the pilot project progresses to a prototype service, one can imagine a dramatic increase of use across all stakeholder groups. The greatest increase could be seen in schema creators as JISC funded projects across several programmes are encouraged to register existing schemas, and communities are encouraged to use the IEMSR tools to assist the development of schema appropriate for specific thematic applications. Progress towards interoperability across thematic applications (e.g. digital repositories) within the UK and internationally could see an increase of IEMSR use by service developers and service providers. These stakeholders may use the IEMSR as a point of reference to establish schemas recognised as 'community standards' that should be used by services. During the prototype service phase programme managers' use of the IEMSR could increase, reflecting the need to monitor and evaluate increased project activity in this area.

Once the IEMSR makes a transition to an operational service, one could envisage a decrease in use by schema creators. This decrease reflects the point at which the majority of schemas in use across the JISC IE are registered. The main use by this stakeholder group is anticipated to be periodic revisions to existing schemas. The level of use by other stakeholders is likely to increase with the greatest rate of increase witnessed by service/system developers. This increase is attributed to continued growth of service developments in the JISC IE.

The operational scenario presented above provides an example of the characteristics of potential service use by selected stakeholder groups. However, there are several important issues that must be considered before the IEMSR project can make a transition to a service. These include:

- Validation of software deployed;
- Review and assessment of registry functionality and services in response to additional user needs captured during demonstrations;
- Implementation of user authentification and data validation processes;
- Scope of service offering;
- Service provision and maintenance responsibilities;
- Service promotion and presentation within and beyond the JISC IE;
- Preservation and sustainability of the service.

6.STAKEHOLDER ENGAGEMENT ON-ROUTE TO PILOT SHARED SERVICE

The previous chapter highlights a common interest among stakeholders to see the IEMSR project evolve into an operational shared service. Several issues that would inhibit this service development were also summarised. Before the IEMSR can be considered as a true market proposition, i.e. a service that is fully operational and accessible, the current IEMSR requires a period of development and consolidation. During this period (estimated at approximately 3 years) it is important to increase stakeholder awareness and participation to ensure the service development continues to meet the requirements and expectations of key stakeholders. It is also imperative that the benefits of the service are clearly articulated and that they are fully understood by the stakeholder community.

This final chapter outlines a stakeholder engagement plan that identifies key stakholders and their anticipated relationships with the IEMSR through this period of transition. It recommends steps that the IEMSR project should take to ensure stakeholder engagement is maintained through this important phase of activity.

The plan is based on the assumption that the continued development of the IEMSR is funded through the JISC Capital Programme.

6.1Stakeholder engagement plan

Figure 6.1 below, presents an overview of the suggested stakeholder engagement plan.

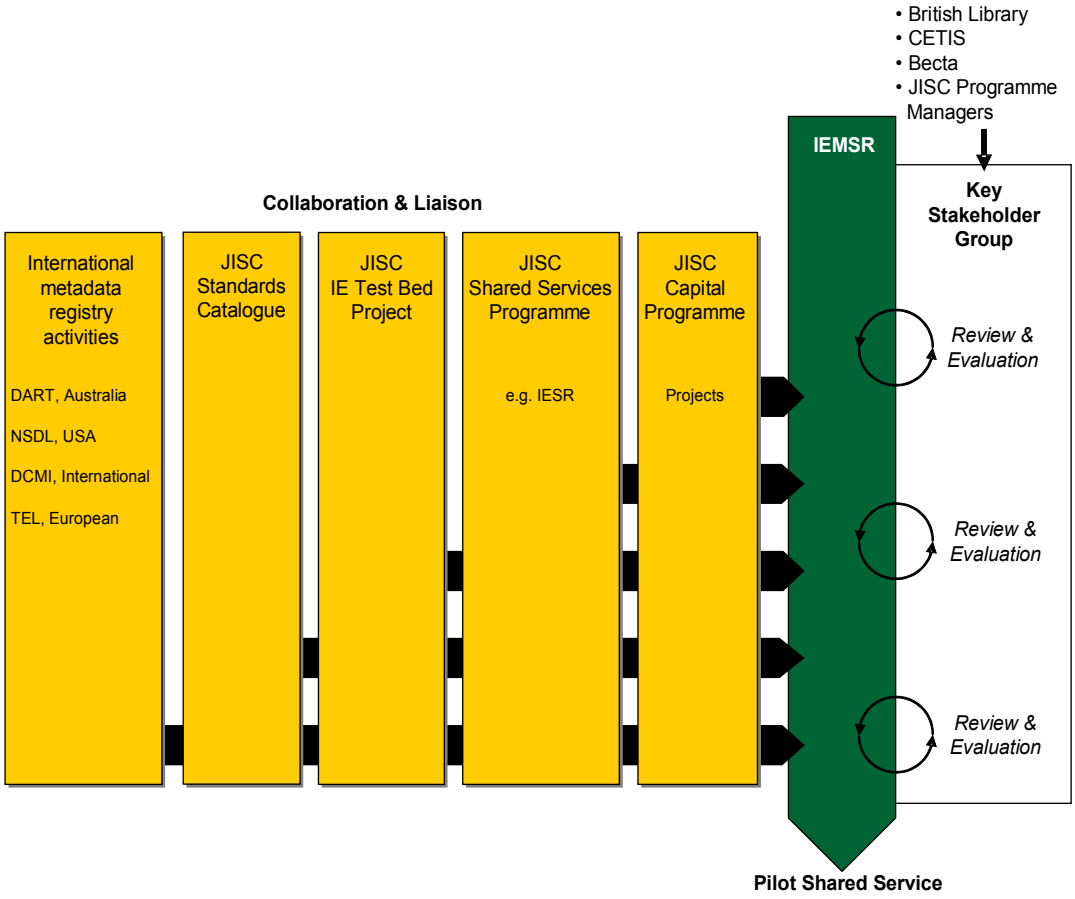

Figure 6-1

Figure 6-5: Stakeholder engagement plan

Figure 6-1 shows three main elements, the progression of the IEMSR project towards a pilot operational service, a key stakeholder group, and areas of collaboration and liaison. The engagement plan for the key stakeholder group and areas of collaboration and liasion are outlined below.

6.1.1Key Stakeholder Group

The purpose of this group is to provide review and evaluation input at set milestones throughout the development cycle. This input is required to ensure the service development remains focused on stakeholder needs and to ensure the service delivers demonstrable stakeholder benefits. The Key Stakeholder Group builds on the relationships that have been established and developed with key stakeholders during the project. In particular, this plan should capitalise on the positive feedback captured through the user case demonstrations and subsequent offers of user testing.

The proposed membership of this group includes representatives from funders/programme managers, schema creators and content providers. It is anticpiated that members of this group will, in general, benefit from the opportunity to:

- review the scope of the service and influence the development priorities;
- test and evaluate the service at key development milestones;
- identify and influence the prioritisation of areas of collaboration. For example, the participation of JISC programme managers would encourage closer collaboration between IEMSR and other JISC-funded projects).

It is suggested that this group meets at least bi-annually to allow representatives to have a contructive input to the service development. The scheduling of these meetings should be alligned with critical milestones in the service development schedule.

6.1.2Areas of Collaboration and Liaison

The areas of collaboration and liaison are clusters of activity that could focus interaction with IEMSR users (human or machine). Initially these clusters represent targets for dissemination and promotion. It is anticipated that raising awareness of the planned pilot service will stimulate interest in individual projects and activities to collaborate in the later stages of IEMSR service development.

The core of these clusters comprises other JISC-funded activities and specific programmes that are concerned with improving interoperability within the frameowrk of the JISC IE. Also included are other international activities, including the National Science Digital Library (NSDL) USA, Dataset Acquisition accessibility & annotation e-Research Technologies (DART) Australia, Dublin Core Metedata Initiative (DCMI) and The European Library. These represent external (to JISC) activities that share a similar ambition in improving interoperability through the promotion of metadata standards and the sharing of their application.

It is anticipated that over the period of IEMSR transition it will be necessary for the IEMSR project to liase closely with some of these activities. For example, the recent JISC Capital Programme announcement[17] makes specific reference to the need to at least reference the IEMSR:

> *"D37. Important elements of the developing UK repositories infrastructure are shared, machine-to-machine services such as the Information Environment Services Registry and the Information Environment Metadata Schema Registry19. Any agreements on repository interoperability will need to include*

[17] http://www.jisc.ac.uk/funding_circular03_06.html

reference to the ongoing work of machine-to-machine services in, for example metadata application profile registration, and collection descriptions." [18]

Also, part of the DART activity aims to develop a metedata registry for stakeholders in Austarlia. This work builds on IEMSR:

One work package will develop and provide access to a centralized repository/registry of metadata schemas and ontologies….This work package will build on the open source software tools being developed within the JISC IE Metadata Schema Registry Project (IEMSR) by UKOLN and ILRT.[19]

Over the transition period the IEMSR will need to gradually extend and educate its user base to ensure it is in a strong position once launched as an operational service. The IEMSR project should be proactive in engaging in collaborative work and promoting the service to this stakeholder group as they reresent future service users.

[18] JISC Circular 03/06: JISC Capital Programme, Appendix D: Repositories and Preservation Programme

[19] http://dart.edu.au/DART_Bid_Document.pdf

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Appendix A:Use scenarios – metadata schema creators

Title	**Amend existing DCAP description and Reload to Registry**
Narrative	Dorothy is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a DC Application Profile for this purpose and has previously loaded a description of the DCAP to the IEMSR Registry Server. She wishes to amend the description of the DCAP to reference two additional properties. She downloads the Data Source containing a description of the selected DCAP. She uses the IEMSR Data Creation Tool to edit the description of the selected DCAP. For each additional property, she describes how it is to be used, and specifies the vocabulary encoding schemes and syntax encoding schemes required. She saves the Data Source. She authenticates to the IEMSR Registry Server, amends the description of the Data Source, and reloads the Data Source to the server. The server responds by confirming which descriptions have been amended.

Title	**Create DCAP and Load to Registry**
Narrative	Cecilia is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a new DC Application Profile for this purpose and wishes to share that DCAP with other implementers via the IEMSR Registry Server and the IEMSR Web site. She uses the IEMSR Data Creation Tool to create a description of the DCAP. For each property, she describes how it is to be used, and specifies the vocabulary encoding schemes and syntax encoding schemes required. She includes references to supporting documentation available on the project Web site and to an XML Schema used to support an XML binding for the DCAP. She saves the new Data Source. She authenticates to the IEMSR Registry Server, provides a description of the Data Source, and loads the Data Source to the server. The server responds by confirming which descriptions have been added.

Title	**Delete existing DCAP and Reload to Registry**
Narrative	Eleanor is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a DC Application Profile for this purpose and has previously loaded a description of the DCAP to the IEMSR registry server. However the requirements for the project have changed, the DCAP is obsolete and she wishes to delete the description. She downloads the Data Source containing a description of the selected DCAP. She uses the IEMSR Data Creation Tool to delete the description of the selected DCAP. She saves the Data Source. She authenticates to the IEMSR Registry Server, amends the description of the Data Source, and reloads the Data Source to the server. The server responds by confirming which descriptions have been removed.

Title	**Amend existing Metadata Vocabulary description and Reload to Registry**
Narrative	Gloria is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a Metadata Vocabulary for use with a DC Application Profile and has previously loaded a description of the Metadata Vocabulary and its member properties and classes to the IEMSR registry server. She wishes to amend the description of one of the properties. She downloads the Data Source containing a description of the selected Metadata Vocabulary. She uses the IEMSR Data Creation Tool to edit the description of the selected property. She saves the Data Source She authenticates to the IEMSR Registry Server, amends the description of the Data Source, and reloads the Data Source to the server. The server responds by confirming which descriptions have been amended.

Title	**Create Metadata Vocabulary Description and Load to Registry**
Narrative	Fiona is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a new DC Application Profile for this purpose and wishes to share it with other implementers via the IEMSR Web site. Her DCAP requires the use of a new set of properties and classes defined for the purposes of her application. She uses the IEMSR Data Creation Tool to create a description of this new Metadata Vocabulary and its member properties and classes. For each property and class, she specifies a URI, label and definition, the status of the term, any supporting documentation, and, where appropriate, subproperty and subclass relationships with terms from the Dublin Core vocabularies. She saves the new Data Source She authenticates to the IEMSR Registry Server, provides a description of the Data Source, and loads the Data Source to the server. The server responds by confirming which descriptions have been added.

Title	**Delete existing DCAP and Reload to Registry**
Narrative	Hannah is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She has developed a DC Application Profile for this purpose and has previously loaded a description of the DCAP to the IEMSR registry server. She also created a description of a Metadata Vocabulary for use with this DCAP. The DCAP has been amended and no longer references the properties and classes in this Metadata Vocabulary and she wishes to delete the description. She downloads the Data Source containing a description of the selected Metadata Vocabulary. She uses the IEMSR Data Creation Tool to delete the description of the selected DCAP. She saves the Data Source She authenticates to the IEMSR Registry Server, amends the description of the Data Source, and reloads the Data Source to the server. The server responds by confirming which descriptions have been removed.

Title	**Discover and Select DCAP**

Narrative	Abigail is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She uses the IEMSR Web Site to find a number of existing DC Application Profiles designed for similar purposes. She browses the descriptions of the DCAPs, and the descriptions of the properties used in each DCAP. She retrieves some of the supporting documentation referenced. She selects one of the DCAPs as suitable for use for her project, and records the identifier of that DCAP. She also records the URI of an XML Schema used to support an XML binding for the DCAP. She notifies the repository administrators so that they can view the description of the DCAP using the IEMSR Web Site and so that they can use the XML Schema as the basis of the metadata format supported by the OAI-PMH interfaces offered by the repositories.

Title	**Discover and Select DCAP, Adapt DCAP description for new DCAP and Load to Registry**
Narrative	Beatrice is a metadata analyst working on a project in which several digital repositories are required to exchange DC-based metadata records describing ePrints. She uses the IEMSR Web Site to find a number of existing DC Application Profiles designed for similar purposes. She browses the descriptions of the DCAPs, and the descriptions of the properties used in each DCAP. She retrieves some of the supporting documentation referenced. She selects one of the DCAPs as potentially suitable as the basis of a DCAP for use for her project if it is amended to remove the use of two mandatory properties. She also records the URI of an XML Schema used to support an XML binding for the DCAP. She downloads the Data Source containing a description of the selected DCAP. She uses the IEMSR Data Creation Tool to create a description of a new DCAP, adapted from the description of the selected DCAP. She deletes the references to the properties that are not required. She also downloads a copy of the XML Schema used to support an XML binding for the original DCAP and creates an adapted version for the new DCAP. She adds a description of this XML Schema to the Data Source. She saves the new Data Source. She authenticates to the IEMSR Registry Server and loads the Data Source to the server. The server responds by confirming which resources have been added. She notifies the repository administrators so that they can view the description of the DCAP using the IEMSR Web Site and so that they can use the XML Schema as the basis of the metadata format supported by the OAI-PMH interfaces offered by the repositories.

Appendix B:Use scenarios – Data curators and service providers

Title	**Portal Display**
Narrative	A portal application harvests metadata records conforming to a single specified DC Application Profile from several content provider repositories and offers search and browse interfaces to a user. The portal retrieves a description of the DCAP from the IEMSR registry server and uses that description to provide labels when the metadata records are displayed to a user.

Title	**Portal Search and Display**
Narrative	A portal application harvests metadata records conforming to a single specified DC Application Profile from several content provider repositories and offers search and browse interfaces to a user. The portal retrieves a description of the DCAP from the IEMSR registry server and uses that description to construct the search form displayed to a user and to provide labels when the metadata records are displayed to a use

Title	**Portal Inference, Search and Display**
Narrative	A portal application harvests metadata records conforming to multiple specified DC Application Profile from several content provider repositories and offers search and browse interfaces to a user. The portal retrieves descriptions of the DCAPs from the IEMSR registry server. It also retrieves descriptions of the properties and classes referenced within those DCAPs. It uses the descriptions of the properties and classes to perform subproperty and subclass inferencing on the harvested data to facilitate searching (e.g. to establish that dcterms:modified is a subproperty of dc:date). It uses the DCAP descriptions to establish provide labels when the metadata records are displayed to a user.

Title	**Discover and Analyse Data Provider DCAPs**
Narrative	Angela is the developer of a portal application which harvests DC-based metadata records describing ePrints from several digital repositories. She uses the IEMSR Web Site to discover which DC Application Profiles are used by the data provider repositories. She browses the descriptions of the DCAPs, and the descriptions of the properties used in each DCAP, particularly the vocabulary encoding schemes used for the subject property. She uses this information to analyse the range of metadata which the portal application must manage and to assess what services the portal can usefully provide. (N.B. Currently this can not be done using IEMSR data only, because IEMSR does not hold information on which DCAPs are deployed by which Services.)

Appendix C:Use scenarios - funders

Title	**Survey DCAPs**
Narrative	Adele is the manager of a programme which has funded the development of digital repositories. As part of her concluding report for the programme she wishes to obtain information on the ways in which the DCAPs deployed by repositories deploy vocabulary encoding schemes. She uses the IEMSR Web Site to discover which DC Application Profiles are used by the repositories developed within the programme. She browses the descriptions of the DCAPs, and the descriptions of the properties used in each DCAP. She uses a simple PHP script (or XSLT transform etc) to issue custom queries to the IEMSR Registry Server using the SPARQL query language. She collates the query results to analyse the use of vocabulary encoding schemes by the repositories. (N.B. Currently this can not be done using IEMSR data only, because IEMSR does not hold information on which DCAPs are deployed by which Services.)

Title	**Load Data Source to Registry**
Narrative	Amelia is the administrator of the IEMSR Registry Server. She has identified an RDF Data Source available on the Web that describes a set of properties and classes of interest to the IEMSR user community, and wishes to make that data available via the IEMSR Registry Server and the IEMSR Web site. She authenticates to the IEMSR Registry Server, provides a description of the Data Source, and loads the Data Source to the IEMSR server. If necessary, the system requests additional data that is absent from the Data Source but required by the IEMSR. She provides the additional data. The server responds by confirming which descriptions have been added.

Title	**Reload Data Source to Registry**
Narrative	Barbara is the administrator of the IEMSR Registry Server. She has been notified that an RDF Data Source available on the Web previously loaded to the IEMSR Registry Server, has been updated, and wishes to make that updated data available via the IEMSR Registry Server and the IEMSR Web site. She authenticates to the IEMSR Registry Server, specifies the Data Source, and reloads the Data Source to the IEMSR server. If necessary, the system requests additional data that is absent from the Data Source but required by the IEMSR. She provides the additional data. The server responds by confirming which descriptions have been added, amended or removed.

Title	**Withdraw Data Source from Registry**

Narrative	Christine is the administrator of the IEMSR Registry Server. She has been notified that an RDF Data Source previously loaded to the IEMSR Registry Server is now obsolete, and wishes to withdraw that data from the IEMSR Registry Server so that it is no longer available from the IEMSR Web site. She authenticates to the IEMSR Registry Server, specifies the Data Source, and withdraws the Data Source from the IEMSR server. The server responds by confirming which descriptions have been removed.

Appendix D:Use scenarios – commercial software/service providers

Title	**Tagging Tool Display**
Narrative	A metadata tagging tool supports the creation of metadata records conforming to a single specified DC Application Profile. The tagging tool retrieves a description of the DCAP and its member property usages from the IEMSR registry server, and uses that description to provide labels, tool-tips and help information for the form that is presented to the metadata creator.

Title	**Discover XML Schema**
Narrative	Annette is the developer of a metadata tagging tool that supports the creation of metadata records conforming to a single specified DC Application Profile. She uses the IEMSR Web site to obtain a description of the specified DCAP and an XML Schema that supports the XML serialisation of metadata descriptions conforming to the DCAP. She uses the XML Schema in the development of the tagging tool.