

Cover Sheet for Proposals (All Portals: Investigations into User Requirements & Sustainability sections must be completed)

Name of Lead Institution/Organisation: University of Hull

Partner Organisations: University of Oxford, University of Edinburgh, University of York, Newark & Sherwood College

Name of Proposed Project: Contextual Resource Evaluation Environment (CREE)

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Area(s) of Proposal: Area A (Portal Demonstrators)

Length of Project and cost to JISC over its Life 18 months, at a cost to JISC of £150,000

Proposed Project Start date 5 January 2004

Outline Project Description:

CREE Will:

- Assess, test and document user requirements of portal-embedded and non portal-embedded search and resource-push interfaces, together with other aspects of JISC portal functionality and integration, in a broad range of user contexts. Ensure that the results of these actions are disseminated effectively to the HE/FE community.
- Investigate and document generic aspects of adapting a range of existing search tools and toolkits (JAFER toolkit, BALSAs, Heirport, Google APIs, cross-search) to be conformant with the WSRP and JSR 168 standards, thus facilitating their integration with any conformant national or institutional portal. Ensure that the results of this activity are disseminated effectively to both the HE/FE community and relevant standards bodies.
- Investigate in detail, test and document the practical integration of these tools with reference portal implementations. Further test this integration with a broad range of users, evaluating the effectiveness of different modes of searching using combinations of embedded and dedicated interfaces. CREE will actively seek other national and institutional portal reference implementations with which to test software components.

Contextual Resource Evaluation Environment (CREE) **A Response to the JISC Portals ITT from the Universities of Hull, Oxford, Edinburgh and York and Newark and Sherwood College**

Introduction

The emergence of the JISC Information Environment has been paralleled by significant interest in, and adoption of portal technology across the Higher Education sector and beyond. Each development addresses, in part, similar questions: How do users relate to, organise and work with the vastly increased number of resources and information systems available to them? How does an organisation ensure that the substantial investment they make in these services achieves the maximum possible take up and use? Portals – of whatever type – seek to address these questions by presenting the user with a coherent view of disparate resources, data and applications. When linked to identity management services, a portal targets delivery of these services to the user in a granular, potentially personal, manner. By adding profile services, a portal may enable a greater or lesser degree of user choice and selection of the services available, and the priority in which they are presented.

Yet much within this emerging landscape remains unknown. Despite an increasing tendency to resolve tight bundles of service functionality into more discrete services, and base these services around common standards and specifications, islands remain where integration is difficult or impossible. The user, then, is frequently faced with a contextual “jump” *which is driven by limitations in systems themselves*, rather than by user need. These “jumps” may range from institutional portal to VLE to Library System, and to the broader range of subject, media and community portals available in the Information Environment and externally. It is no surprise that many users express bewilderment at the number of web “starting points” and “one-stop shops” with which they are presented, and turn instead to generic search tools such as Google for resource location.

A major reason for the success of search engines is the open and interconnected nature of the web. By contrast, scholarly data is typically accessed under licence, and is stored in a form inaccessible to standard web crawlers. While a number of publishers have individually indexed the full text content of their holdings to make it searchable, the coverage of each is necessarily limited to their own material, and does not provide the joined-up picture required for scholarly use. Publishers may come to realise, however, that full indexing, with exposure of document snippets, provides the best possible advertisement for their wares. In the longer term, the main problem may be to find a sustainable business model for both providers and consumers that would make the application of search engine technology to the whole scholarly corpus practical. In the short term, a number of issues surrounding technology and user requirements need to be addressed.

Standards have recently emerged which may provide technical solutions for portal and broader system interoperability. A Java Community Process standard, Java Specification Request (JSR) 168, describes a common method of rendering a “portlet” (a portal component frequently also referred to as a “channel”). In supporting remote execution, JSR 168 complements the OASIS Web Services for Remote Portlets (WSRP) standard, which enables remote application functionality to be accessed and used from a “local” portal. JSR 168 and WSRP are being rapidly adopted by the vendor community. Details of adoption are provided as annex 1 of this proposal.

Taken together, these standards potentially offer a great deal of flexibility in the integration of nationally and locally provided services. But whilst these developments *suggest* a means of providing a measure of integration to portals within the Information Environment, and to an institutional portal *technically*, little evidence is available to support *why* users might want this, or

how they might want it to appear in practice in the daily context of learning, teaching, research and administration.

The WSRP standard is both new and complex. In effectively syndicating portal application functionality, WSRP, for example, requires both a consumer and producer element, thus increasing the complexity of any test environment. Issues surround the WSRP use of SAML (Security Assertion Markup Language) and how this might integrate with local or national identity management services, such as Athens. The interface of WSRP (and Web Services Standards generally) with existing technologies employed within the JISC Information Environment Architecture, such as z39.50 and SRW, OAI, OpenURL and RSS, together with those supporting newer Learning Object repositories such as ICONEX, JORUM+ and the NLN, are likely to be of similar complexity. An extensive period of testing by the community in a variety of contexts will be required for exploration of these issues. This testing, however should be driven squarely by user need and experience, rather than by simple technical feasibility. Investigation and elaboration will be required if the promise of portal and Information Environment interoperability and integration is to be effectively realised.

It should be noted that WSRP and emerging JSR 168 best practice enable control of portlet look and feel by transformations applied by the host portal. This impacts not only "branding" issues, enabling visual integration and consistency, but also those around accessibility for individuals with disabilities. CREE will investigate and document these aspects of JSR 168 and WSRP functionality. This action will build on established work by the University of Hull in adapting the uPortal framework for accessibility¹.

The lead partner in CREE, the University of Hull, has demonstrated considerable commitment to analysis of user requirements across a broad range of potential resources made available through its institutional portal, port.hull. These resources have consistently been located within a broader context. The documentation which initiated the development of the Hull portal and established the internal Digital University Project in 2001, noted prominently that resources integrated with the institutional portal included those

"...such as library electronic resources available by subscription, or resources provided by national subject gateways and the developing DNER²."

Work undertaken in the University of Hull and UKOLN led PORTAL Project (Presenting national Resources To Audiences Locally, FAIR Programme) which in part analysed user requirements of institutional portals in terms of both external and internal resources, produced a considerable response from users in both the HE and FE Sector (around 650 responses to a web-based questionnaire alone). The research based on the results of this survey, together with face-to-face focus groups and interviews, has received a very positive reception from the national and international community. PORTAL has demonstrated a clear commitment to the widest possible dissemination of these results, and engagement with the community, in an extensive range of presentations and publications which may be accessed from the project Web site³.

CREE will build on this established work, which generated considerable data regarding *which* services users wished to access, by extending it to the domain of *how* they wish to access and use those services, and *where* those services might best be surfaced best in a series of specific

¹ Summarized in "Accessible to All" (2.22MB ppt) Ian Dolphin and Robert Sherratt JA-SIG Summer Conference, June 2003 available at <http://www.hull.ac.uk/imedia/presentations.html> (verified November 28 2003 ID)

² <http://www.digital.hull.ac.uk/downloads/bdup-may01.pdf> (verified November 28 2003 ID)

³ http://www.fair-portal.hull.ac.uk/pubs_and_pres.html (verified November 28 2003 ID)

and generic demonstrator contexts. The evaluation strand of CREE will encompass user research in both search and portal based community-building services. User requirements research will incorporate the distinct requirements of FE by the involvement of an FE partner (Newark and Sherwood College) at each stage of development. This strand of activity will be extended to community education (both formal and informal) in the context of an Heritage Lottery Fund supported project based at the University of Hull, which integrates a rich range of archaeology-based resources⁴.

The development strand of CREE will address search, and resource-push services facilitated by WSRP in detail, including issues surrounding the integration of WSRP and four toolkits (BALSA, Xgrain, Heirport, JAFER), together with work around education-specific deployment of the Google APIs and cross-search functions. Particular attention will be given in this strand of development to examination of the potential for embedding service discourse within WSRP enabled business logic, providing both significant data *and* re-useable components to enrich the further development of both national services and institutional portals.

Given the relative lack of user familiarity with community aspects of national or local portals⁵, development activity in this area will focus on the production of a technical feasibility study based on results obtained from the user research strand of the project.

Methodology

CREE will undertake parallel strands of activity in the areas of user needs evaluation and demonstrator development. As far as possible these strands are organised to reduce dependencies and potential stop-points on the critical path. CREE recognizes from the outset that, although the project strand dealing with user needs analysis will be rooted in traditional methods of desk-based research, including a synthesis of the outputs of current portal projects, the area under examination is in many senses *new*. Actions to gather first-hand data from a range of users in order to provide a measure of verification and elaboration of their requirements are therefore an essential complement to desk-based activities, and of particular significance in testing and verifying the re-usable software components produced by CREE partners.

Project deliverables will take the form of documentation and software components. In a project of this duration and nature, it is important to recognise that whilst extended consolidated documentation is of value, the requirement to rapidly iterate interrelated strands of user needs analysis and technical development requires more concise documentation at frequent intervals. Document deliverables are therefore divided into categories of summary and extended, enabling the rapid dissemination of salient information at regular and frequent intervals. This approach closely follows the IDEAL (Initiating, Diagnosing, Evaluating, Acting, Learning) model adapted from the Carnegie-Mellon Software Engineering Institute Capability Maturity Model (CMM)⁶. A project website will be established at the outset of CREE to facilitate dissemination and communication. Existing mailing lists, such as Portals, JISC-Development, JASIG-Announce, JASIG-UK and Educause portals will be widely utilised for further dissemination.

⁴ A brief description of this project is included in this proposal as annex 2

⁵ This is determined three factors: (i) Many national HE/FE community-based portals are at an early stage of development (ii) Many institutional portal developments regard community aspects as a secondary priority (iii) Many of the features which support community building around an institutional portal (such as threaded messaging capability) are either locked within a closed VLE, or at an early stage of integration and unavailable in a granular manner across the portal development.

⁶ <http://www.sei.cmu.edu/ideal/ideal.html> (verified November 28 2003 ID)

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Consortium Partners and Principal Roles

Members of the CREE consortium have proven track records in the areas the project primarily addresses: user needs analysis and the development and adaptation of standards-conformant software toolkits and frameworks. This track record will ensure that the project commences with the requisite skills, human resources and background work to “hit the ground running” and accomplish its objectives.

Lead Partner: The University of Hull e-Services Integration Group, Academic Services

Project management and co-ordination. User requirements analysis lead. Adapt generic criteria for user requirements to institution. Production of overall portal functionality demonstrator. Institutional portal framework integration – Testing search tools/toolkit adaptations with two portal reference implementations – uPortal, Sun ONE/JES Portal Server.
Aspects of this work will be subcontracted to Subcontractor 1, im+m, and 2, the JAFER development team.

Partner 2: The University of Oxford (Computing Services) - User requirements analysis participating partner. Adapt generic criteria for user requirements **to institution.**

Partner 3: The University of Edinburgh (EDINA)

Investigation of integrating BALSAs search tools with portal via WSRP; Investigation of integrating of Xgrain cross search of abstracting and indexing (A&I) databases within portal channel via WSRP.

Partner 4: Newark & Sherwood College

User needs analysis participating partner. Adaptation of generic criteria for user requirements to institution. Co-ordinate liaison with FE Community.

Partner 5: The University of York (Archaeology Data Service) – Investigation of integrating z39.50 HEIRPORT search tool with portal via WSRP.

Subcontractor 1: IM+M (Instructional Media + Magic)⁷

Support for generic adaptation of search toolkits to WSRP conformance, support for the specific adaptation of WSRP enabled search toolkits to the uPortal framework. Co-ordinate feedback from the demonstrator strand to relevant standards bodies.

NOTE: im+m is a US-based company, which was founded in 1996. It participated in the early development of the IMS and AICC specifications and in the application of these standards to the development of learning content for U.S. community colleges. Since 2001 im+m has focused its efforts on the JA-SIG uPortal project, providing overall project management and software development. uPortal is an open-source, open-standards enterprise portal for higher education, with at least 100 sites in production globally. It is one of the most successful open-source collaborations in Higher Education, and was recently selected fourth in the InfoWorld "Top 100 IT Projects" of 2003⁸. The breadth of im+m experience in standards conformant software development (particularly portal technology, WSRP and JSR 168) together with their continued involvement with standards bodies and the highly competitive rates they have offered the consortium, make them essential partners in CREE.

Subcontractor 2: The JAFER team – Investigation of integrating JAFER z39.50 and configurable cross-search (z39.50-RDN-Google) toolkit with portal via WSRP.

⁷ Further information regarding IM+M is available from <http://www.immagic.com/> (verified November 28 2003 ID).

⁸ http://www.infoworld.com/article/03/11/07/44FEiw100prof4_1.html?s=feature (verified 27 November 2003 ID)

Strand 1: Evaluation

Desk-based research & User-Centred Design activities

- 1) Literature survey and initial desk-based research undertaken, analysis (month 1 and ongoing).
Summary document deliverable (S1D1) at end month 1.
- 2) Establish detailed criteria based around S1D1 for evaluation of existing use of search tools, including generic search tools, and each specific search interface involved in CREE. These criteria will contrast embedded and dedicated search interfaces, and include factors such as
 - a) Context/purpose of search
 - b) Tools used
 - c) Order of tools used
 - d) How tools used
 - e) How results accessed and displayed
 - f) Most important/priority functions
 - g) Least-used functions
 Supplemental criteria will be developed, adapted to the specific needs of three representative institutions; The University of Oxford, The University of Hull, and Newark and Sherwood College. These criteria will dovetail with institutional user needs analysis activities, which will provide contextual information.
Summary document deliverable (S1D2) (end month 2)
- 3) Adaptation of web-based card-sort toolkit developed by ICONEX/PORTAL Projects⁹, based around established principles of User Centred Design developed at IBM¹⁰. This will provide a series of rapid-completion web-based surveys based on (2) above. NB: Technically, this is based around an XML data source rendered by a Flash object with output of results into a database. Adaptation of this object can be completed rapidly when criteria are established in detail.
Software deliverable (S1D3) (end month 3)
- 4) Publicise surveys through appropriate lists and journals. Provide incentive prize draw (Amazon vouchers) for completion (end month 3)
- 5) Develop criteria for focus groups at each Strand 1 institution to complement criteria developed under (2). Focus groups organised at each Strand 1 partner to provide verification of web-based survey.
Summary document deliverables: criteria (S1D4) (end month 3)
- 6) Focus groups at strand 1 institutions test software components produced under strand 2. iterate as appropriate.
Summary feedback (S1D5) (months 6-16)
- 7) Develop criteria for evaluation of community-based portal functionality, implement as (3) above.
Summary document deliverable (S1D6), software deliverable (additional surveys) (S1D7) (end month 8)
- 8) Focus groups initial results analysis (end month 6).
Summary document deliverable (S1D8) (end month 6)
- 9) Questionnaire initial results analysis.
Summary document deliverable (S1D9) (end month 6)
- 10) Review questionnaires and identify further issues/revisions. Iterate above, with document revisions as appropriate for remainder of project.
Summary document deliverable (S1D10) (months 6-18)
- 11) Production of an interactive visualisation demonstrating the effective range of portal functionality requested by users. This visualisation will simulate a portal and be capable of adaptation to a variety of contexts (S1D11) (end month 12)
- 12) Extended literature review and amended comparative analysis at project conclusion Extended document deliverable (S1D12) (end month 18)

⁹ http://www.learndev.hull.ac.uk/portal_survey/ (verified November 28 2003 ID)

¹⁰ http://www-306.ibm.com/ibm/easy/eou_ext.nsf/Publish/570 (verified November 28 2003 ID)

Strand 2: Demonstrator Development

The Demonstrator strand of CREE is divided into 3 principle workpackages, with discrete activities addressing the adaptation of specific tools within those workpackages.

Hull will provide a reference uPortal and Sun Portal server implementation to support work undertaken in this strand. IM+M, with considerable experience in portal development and channel implementation, will provide support for development teams at each stage of this strand and liaise with appropriate standards bodies.

Workpackage 1 (Months 1-6)

A detailed investigation of the potential of JSR1 168 and WSRP for search integration involving Oxford, JAFER team, York (Heirport), Edinburgh (Xgrain/BALSA/Google API's), Hull, and IM+M. This will be documented as **summary document deliverable S2D1**. JAFER, Heirport and Xgrain/BALSA will then be adapted by each provider to enable basic demonstrator integration with the reference portal implementations. Each range of adaptations will be documented in **summary document deliverables S2D2-5** (per tool/toolkit). Adapted tools and toolkits will be available as **software deliverables S2S1-4**.

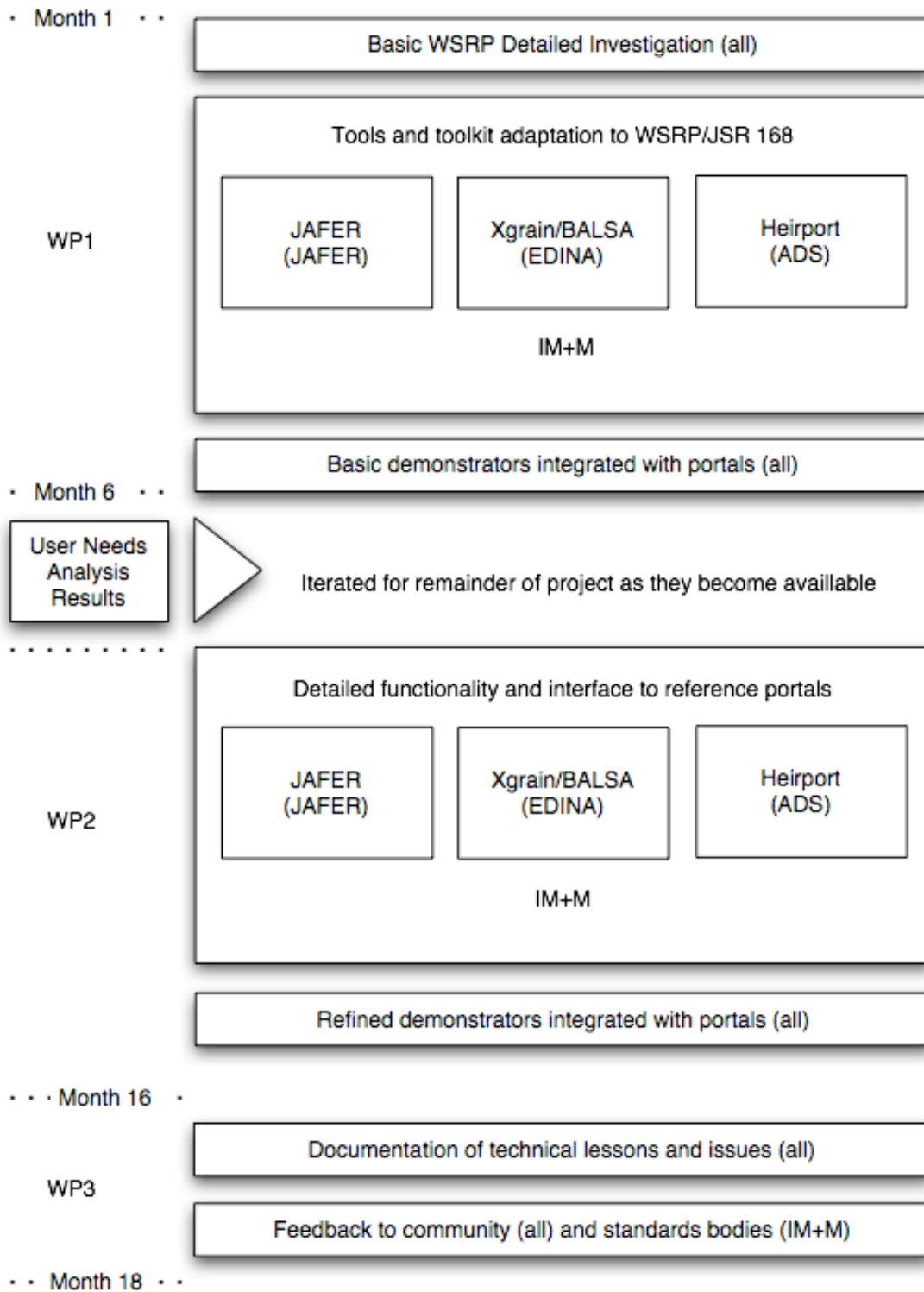
Workpackage 2 (Months 6-16)

Based around priorities determined by user needs analysis, tools and toolkit adaptations will be refined and rich integration with a host portal enabled where appropriate by each tool/toolkit provider/adaptor indicated in WP1. Both summary document deliverables S2D2-5 and **software deliverables S2S1-4 will be updated and revised during the course of this workpackage**. A **feasibility study** examining the technical potential for JSR 168 and WSRP enabled integration of community and other aspects of portal integration, building on S1D6 will be produced by month 14 (**S2D6**).

Workpackage 3 (Months 17-18)

Summary document deliverables will be combined and provided as an **extended study (S2D7)** and disseminated widely to both the education, standards and vendor communities.

Strand 2: Demonstrator Development - Visualisation



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Annex 1: Adoption of JSR 168 and WSRP by the Vendor Community

Plumtree, Vignette, and Sun have announced support of JSR 168. IBM has contributed Pluto code to the Apache Software Foundation that is the reference implementation of JSR 168 (as Apache itself is a reference implementation of HTTP). This code is being incorporated in the IBM WebSphere and Vignette product line, and may be announced as being used in other products soon. Under the SAKAI project, uPortal compliance with JSR 168 is being accelerated so it will be available for production by August 2004. Under the same project, current University of Michigan collaboration applications under CHEF will be rewritten to be JSR 168 compliant and available, tested, and implemented under uPortal. Similarly Indiana University will make its assessment application and MIT will make its Stellar virtual learning environment available as JSR 168 portlets. The January 2004 release of uPortal will have a WSRP consumer that includes all of the functionality of uPortal current remote channel; full compliance will be included in uPortal 3.0.

Annex 2: Valley of the First Iron Masters

“Valley of the First Iron Masters” is a £95,000 HLF-funded collaboration between the University of Hull and the East Riding Archaeological Society. The Project will create an internet-based virtual representation of the physical area of the Foulness Valley in East Yorkshire, a particularly rich source of archaeological evidence. An interdisciplinary team including archaeologists, teachers of History and Geography, software developers and interaction designers will develop specifications for an environment and series of interactive components which will re-create the process of discovery and interpretation on screen. Particular emphasis will be given to the development of an experience which is valid from multiple perspectives: archaeological, learning and entertainment. The project will pay particular attention to issues surrounding standards for software development. The software developed will conform to appropriate standards for interoperability, including appropriate metadata classifications.

Beneficiaries will include:

- * The interested general public who are unable to visit the physical location
- * School students and lifelong learners, who require engaging and stimulating historico-archaeological content for learning
- * The local community, who will gain an enhanced understanding of their local historico-archaeological context
- * Site visitors, who will enhance their visit with supporting contextual information
- * Schools, which will gain richly interactive and engaging content which is focussed on National Curriculum targets.

The project aims, in part, to provide a bridge between the general public interest in archaeology and more scholarly materials. Embedding JSR 168/WSRP enabled Heirport functionality appropriately in this environment will greatly broaden the range of user requirements analysis within CREE.