



ePortfolio Extension Toolkit (ePET)

Faculty of Medical Sciences Computing Unit, University of Newcastle upon Tyne

Project Plan (Version 1.3, 20/09/04)

Overview of Project

1. Background

In 2003 a UK government white paper “The Future of Higher Education” stated that the use of portfolios would “enable learners to understand and reflect on their achievements and to present those achievements to employers, institutions and other stakeholders”. The UK Quality Assurance Agency for Higher Education in its “Guidelines for HE Progress Files” articulated its expectation that by 2005/6 all students in UK higher education will have access to the Personal Development Planning aspect of the Progress File. It is not surprising then that as the 2005 academic year approaches the sector’s interest in portfolios and particularly their electronic implementations is reaching a peak.

As part of the School of Medical Education Development, the Faculty of Medical Sciences Computing unit (FMSC) at the University of Newcastle upon Tyne has been involved in the specification and delivery of Personal Development Planning (PDP) environments and ePortfolios since 1998. During this time our development partners have included the Universities of Nottingham, Sheffield, Leeds, and Dundee, the Postgraduate Institutes for Medicine and Dentistry (PIMD) in the Northern Deanery and London and most recently a consortium of six Dental Schools across the UK. Currently the unit is leading an FDTL4 consortium project developing ePortfolios linked to VLEs, and it is this project which forms the springboard for this project.

Initially investigating the level of flexibility required to create an institution wide ePortfolio and later deploying the same in both undergraduate and postgraduate arenas, the unit has developed considerable experience and expertise in this area¹. Our ePortfolios are currently being used or piloted with a wide range of learners. In supporting these different subjects and purposes, the development team recognized that while each requires specialized tools, there is a common set of core tools which are applicable to all instances of the ePortfolio that have been developed so far

These Generic tools along with their underlying data structures have formed the foundation of several sophisticated and instance-specific eportfolios which have been used to serve the requirements of diverse subject communities¹. However, this set of tools is not yet currently standards-compliant nor is it interoperable outside of the environment in which the tools were developed.

Widespread interest in the electronic portfolios so far developed is evident in our own experiences of the FDTL-4 funded ePortfolios project <http://www.eportfolios.ac.uk/>. This project has an extensive dissemination agenda, and the demand is very high for the tools being developed within it. While the project has only been running for 18 months, there has been interest in the ePortfolio system it is developing, but particularly in the Generic standalone ePortfolio demonstrator which is distinct from the VLE-embedded ePortfolios being developed by the project partners. Over 170 individuals from various academic disciplines and UK institutions registered via the project website to use the ‘ePortfolio demonstrator’. There has been explicit interest in having the ePortfolio system modified for local use from a wide range of institutions².

Even in its current state, not open source, not WS enabled, and not yet standards compliant we have considerable interest in the ePortfolio and so we are keen to take the next step to make it more

¹ <http://www.eportfolios.ac.uk/experience>

² University of Wales College of Medicine, Bristol Veterinary School, University of Northumbria, University of St Andrews, Queen Marys’ University (St Margarets), Sheffield University, University of Plymouth, University of Leeds, University of Dundee, Guys, Kings and Thomasess, University of Birmingham Medical School, University of Teesside, Aston University and University of Coventry.

accessible to other institutions. We have chosen to take a RESTian approach to WS for several reasons; it is a well-understood and documented approach, used to provide a WS interface to large-scale services such as Amazon and Google, it allows for the bookmarking of resources within the ePortfolio system and the development platform used by the FMSC (Zope) has a highly developed URI publishing scheme that lends itself to RESTian approaches very well.

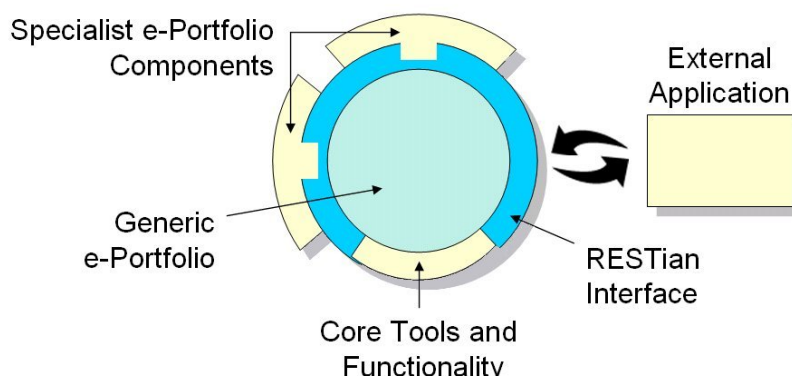


Figure 1 : Concept diagram of the RESTian interface to the “Generic ePortfolio” illustrating REST based communication with the Core Tools and Functionality of the ePortfolio (described in Table 1) and with Specialist Components and External Applications which could be provided by external developers.

A related JISC-funded core middleware (JISC 01/04: Inter-institutional Authorisation Management to Support eLearning with reference to Clinical Teaching (IAMSECT)) project has created much interest in the community. This project is Shibboleth-enabling the BlackBoard V6.1 installation at Newcastle University as well as our own bespoke medically-orientated VLE written in Zope, and these tools will be available to input into this current proposal. Allied with a robust, distributed authentication solution such as that offered by the IAMSECT project this project could be well placed to develop into an ePortfolio “service” either at a regional level or for the community as a whole, allowing users to assemble their own ePortfolio systems with relative ease, and in a short time scale.

Although there are some systems focussing on (and delivering) skills recording facilities, there is no system currently available in the UK that is offering a scaleable Web Service to an existing ePortfolio system, providing support for the full PDP process.

2. Aims and Objectives

The aim of the project is that the generic ePortfolio toolset be consolidated, extended, fully documented, and offered to the educational community as a freely available, standards-compliant, open source, Generic ePortfolio tool.

A REpresentational State Transfer (REST) based interface will be developed around the data structures of the ePortfolio, following advice from CETIS, to provide Web Service (WS) fronted access to data and functionality, and all tools comprising the Generic ePortfolio will be redeveloped to use this interface. Other groups or institutions wishing to make use of the Generic ePortfolio would be free to use existing tools or to add instance specific applications (see figure 1) to suit their own requirements and would be encouraged under the terms of the licence to publish these back to the community as reusable functionality.

3. Overall Approach

Overall Development Approach: The work required to convert the current ePortfolio into a Web Services fronted open source product is broad and complex and as such has been subdivided into discrete workpackages (see accompanying ePET Workpackages document). These workpackages to an extent interrelate and so the outcomes of one workpackage may effect others falling either earlier or later in the overall plan of work. To maintain the flexibility required to go back and alter workpackages which may have already been completed the project will employ rapid prototyping methodology to its systems analysis and design processes which will also allow it to adapt to changes in portfolio requirements and the standards to which it will conform.

Interoperability: Interoperability will be addressed by conforming to the IMS LIP / UK LEAP specifications and as such the project will need to maintain close links with both CETIS and the Centre for Recording Achievement (CRA) to monitor developments in both specifications.

Scope and Boundaries: The project will develop the core portfolio toolset as described in the initial bid and make this available to the JISC community. It may in the course of the project explore the use of the RESTian interface in certain instance specific portfolio tools (e.g. tools within the Medical, Dental, and Contract Research Staff portfolios) as a proof of concept, however the project is not in a position to make these tools themselves available under the same terms as the Generic Portfolio as their IPR rests with other projects and funders.

4. Project Outputs

The project will produce a functioning Generic ePortfolio (which will have undergone piloting in three separate projects) available to the educational community as an open source product under the Creative Commons³, or other appropriate licensing arrangement. The package would be downloadable from the ePortfolios website (www.eportfolios.ac.uk) and would be comprised of:

- fully documented source code for the Generic ePortfolio written in ZOPE⁴
- the data structures which underpin the ePortfolio as both SQL code and data diagrams
- a report showing adopters how to replicate the development environment.

It is also expected that this project will contribute to the WS debate by trialling the REST approach to implementing an educational WS. This is an area of increasing interest in the web development community and should provide both the JISC community and CETIS with valuable information as to the benefits and problems encountered in taking this approach.

5. Project Outcomes

- 1.) A fully documented Generic ePortfolio available to the educational community as an open source product under the Creative Commons, or other appropriate licensing arrangement. This would comprise of the internally documented source code for the Generic ePortfolio written in ZOPE along with the data structures as both SQL code and data diagrams and full documentation showing adopters how to replicate the development environment.
- 2.) A RESTian interface to the core data structures and functionality within the Generic ePortfolio allowing data to be both written to the ePortfolio, and published from it in several different formats including IMS LIP / UK LEAP and IMS ePortfolio compliant XML.
- 3.) An IMS LIP / UK LEAP compliant interface for the import and export of MIS batch data to the portfolio (working with the IO-Nodes project).
- 4.) A set of ePortfolio components adapted from the current generic tools (see above) which make use of the REST interface creating a series of plugins which operate as portlet components to the ePortfolio.
- 5.) A proof of concept linkage between the BlackBoard V6.1 institutional VLE and the ePortfolio server to demonstrate the interoperability that is possible with WS enabled systems. If possible, other linkages will be made to internal University of Newcastle services, the principles written up and made available.
- 6.) A final report documenting the Generic ePortfolio, its installation and setup, and the protocols for communicating with its associated REST interfaces to support its adoption in other institutions and its linking to other components or systems.

6. Stakeholder Analysis

Stakeholder	Interest / stake	Importance
Centre for Academic Development, University of	See this project as a potential	medium

³ http://www.ltsn-01.ac.uk/interoperability/creativecommons_html/

⁴ <http://www.zope.org>

Newcastle upon Tyne	method to deliver institutional portfolios linked to the BlackBoard system	
University of Bristol School of Veterinary Medicine	Wish to use portfolio as a base for their own clinical case development tools.	medium-high
University of Wales College of Medicine, University of Northumbria, University of St Andrews, Queen Marys' University (St Margarets), Sheffield University, University of Plymouth, University of Leeds, University of Dundee, Guys, Kings and Thomases, University of Birmingham Medical School, University of Teesside, Aston University and University of Coventry.	All have expressed an interest in either using or evaluating the ePortfolio within their own institutions, however, the current FDTL4 project does not have the capacity to support this interest.	medium
CETIS	This project will provide valuable information on the REST approach to the provision of Web Services	low-medium

7. Risk Analysis

Risk	Probability (1-5)	Severity (1-5)	Score (P x S)	Action to Prevent/Manage Risk
Staffing - Any significant staff illness, or problems in the identification of a suitable technical author would pose a moderate risk to the project.	2	3	6	The decision to draw staff expertise and time from the existing FMSC development team minimises our exposure to this threat and the use of a technical author who will, by the time this project commences, be already employed by one of our sister departments reduces the chance that we may be unable to attract a suitable applicant for such a short term project. Additionally the use of in house staff will be more economical to the JISC than seeking a technical author on a consultancy basis.
Technical - The rapid prototyping development cycle to be applied to this project is highly effective at delivering short life cycle projects, but it is prone to creeping specifications as functionality develops. There is a risk that if this occurs, the resources identified above may not be sufficient to deliver in the	2	2	4	A 10% contingency has been added to the staffing budget to allow the project to draw on extra development staff from the FMSC if required. <i>In the case that this contingency is not required, will be paid back to JISC or included in other areas of the budget at JISC's discretion.</i>

timescale allowed to the project.				
External - Specifications for UK LEAP and ePortfolio are still evolving and while this project will conform to the latest documented specifications it is recognized by the project team that these may continue to evolve beyond the end-point of this project.	4	1	4	For its own interest the team will endeavour to update the appropriate tools as new versions of the specifications are published.

8. Standards

REST (REpresentational State Transfer): is not a standard, nor is it a technology as such, but refers to an architecture style of networked systems. It provides an alternative to the use of SOAP messaging in the provision of Web Services and is currently being widely debated as the architecture of the next generation of Web Services [Ref: http://www.prescod.net/rest/rest_vs_soap_overview/]

XML (Extensible Markup Language): a subset of SGML that is designed to allow generic SGML to be served, received, and processed over the Web in the same way as HTML. XML is designed for ease of implementation and for interoperability with both SGML and HTML. [Ref: <http://www.w3.org/TR/2004/REC-xml-20040204/>]

IMS LIP (Learner Information Packaging): is a specification designed to address the interoperability of internet-based Learner Information systems with other systems that support the Internet learning environment. The intent of the specification is to define a set of packages that can be used to import data into and extract data from an IMS compliant Learner Information server. [Ref: <http://www.cetis.ac.uk/profiles/uklip>]

WSDL (Web Services Description Language): an XML language for describing Web services. WSDL is used to describe Web services based on an abstract model of what the service offers. [Ref: <http://www.w3.org/TR/2004/WD-wsdl20-20040803/>]

CSS2 (Cascading Style Sheets, level 2): a language that allows web authors and users to attach style (e.g., fonts, spacing, and aural cues) to structured documents (e.g., HTML documents and XML applications). [Ref: <http://www.w3.org/TR/1998/REC-CSS2-19980512/>]

9. Technical Development

Apart from the proprietary operating systems which come pre-installed on most of the development machines used by the team, the ePortfolio has been constructed in an Open Source development environment. Because it is delivered across the web it is accessible to any standard web browser running on any operating system. Current implementations of the ePortfolio run on a UNIX platform (SunOS 5.8), however, the application server (Zope) and database (MySQL) used to construct the ePortfolio are platform independent, with versions available for a variety of operating systems including Windows, Solaris and Linux (to date the ePortfolio has been successfully ported to Windows and Macintosh environments).

The application server and database are Open Source developments and as such freely available to non-commercial or educational organisations. The application server, Zope is an object-orientated publishing environment for creating dynamic web sites. Zope was chosen for its facilitation of rapid collaborative web development and built-in support for content management, user authentication, database integration, and other features. Python, an Open Source scripting language, was also installed as it is required by the Zope environment. The database used to store the e-Portfolio data is MySQL which is a robust, high performance relational database using Generic Structured Query Language (SQL).

The development environment described above was chosen specifically because it supports the collaborative development methods required to deliver a project of this scale to time and budget. The ZOPE environment provides multi-author support with versioning and rollback control.

10. Intellectual Property Rights

All IPR directly related to the ePortfolio software belongs to the University of Newcastle upon Tyne and to the organisations funding previous projects associated with the development of the ePortfolio. Since it has been a stipulation of all of these funding arrangements that the products of any development agreement be made available to the educational community of the UK free of charge, the project team see no reason that these would interfere with the requirements of the Tools for eLearning programme.

Looking more widely than the software itself, apart from the proprietary operating systems which come pre-installed on most of the development machines used by the team, the ePortfolio has been constructed in an Open Source development environment. Because it is delivered across the web it is accessible to any standard web browser running on any operating system. Current implementations of the ePortfolio run on a UNIX platform (SunOS 5.8), however, the application server (Zope) and database (MySQL) used to construct the ePortfolio are platform independent, with versions available for a variety of operating systems including Windows, Solaris and Linux (to date the ePortfolio has been successfully ported to Windows and Macintosh environments).

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Project Resources

11. Project Partners

While the project has no formal partners in this development it has an agreement with LTSN-01 (Medicine, Dentistry and Veterinary Medicine) to provide consultancy to support the projects development of XML messaging and the querying of remote systems.

12. Project Management

The project will be staffed from within the School of Medical Education Development at Newcastle University and will report to the Project Director who is also the Head of School. It will be answerable to the School Executive Board who will oversee its progress and ensure adherence to budget and timelines (a copy of this document will be circulated to all Board members at the commencement of the project).

All major project decisions will be taken by the two Project Leads after consultation with appropriate team members or external experts.

Due to the short timescale and clearly defined outcomes of the project it will not be necessary to set up a local management / steering committee.

Project Staff:

The following is a list of all staff directly involved in the project along with contact details. The amount of time each project member spends on project activities can be found in Section 14 of this document.

Project Director: Geoff Hammond, Head of School of Medical Education Development,
G.R.Hammond@ncl.ac.uk

Project Lead / Manager: Paul Drummond, Deputy Director, Faculty of Medical Sciences Computing Unit,
Paul.Drummond@ncl.ac.uk

Project Lead: Tony McDonald, Assistant Director, Faculty of Medical Sciences Computing Unit,
Tony.McDonald@ncl.ac.uk

IT Advisor: John Moss, IT Advisor, Faculty of Medical Sciences Computing Unit,
J.D.Moss@ncl.ac.uk

Senior Developer: Simon Cotterill, Senior Research Associate, Faculty of Medical Sciences Computing Unit, S.J.Cotterill@ncl.ac.uk

Systems Administrator: John Snowdon, Systems Administrator, Faculty of Medical Sciences Computing Unit, John.Snowdon@ncl.ac.uk

Developer: Gordon Skelly, Curriculum Support Officer, Faculty of Medical Sciences Computing Unit, G.J.Skelly@ncl.ac.uk

Developer: David Teasdale, Research Associate, Faculty of Medical Sciences Computing Unit, David.Teasdale@ncl.ac.uk

LTSN Consultant: Paul Hollands, Information and Web Support Officer, LTSN-01, Paul.Hollands@ncl.ac.uk

Administrative Support: Rukia Mayanja, Secretary, School of Medical Education Development, R.N.Mayanja@ncl.ac.uk

Technical Author: (to be appointed)

Technical Consultant: (to be appointed)

Training Requirements:

At present the project has not identified any staff training needs. Its staff have been chosen based on existing expertise in this area of development and as such are in a position to contribute immediately to the project development. However, should training requirements become apparent during the course of the project it is envisaged that they will be met in-house with the cooperation of other areas of the University (e.g. Netskills, ISS, LTSN-01)

13. Programme Support

There are no specific areas at this stage of the project in which the team would seek the support of the programme manager, although it is the aim of the project team to maintain an ongoing dialogue with CETIS staff in relation to the application of the REST interface.

14. Budget

The project budget can be found in Appendix A. The comments in this section relate to changes made in the budget as a result of discussions with the JISC Programme Team as well as justification of those sections of the proposed budget where the original requirement was unclear.

The £4,500 which was originally listed under the budget heading “Dissemination” in the project proposal has, following discussions with Richard McKenna, been moved to the more appropriate budget heading of Travel and Subsistence. This sum represented the costs of attending a Programme Initiation Meeting, two two-day working meetings during the term of the Programme and a final End of Programme meeting. It was based on two project staff attending each meeting and allowed for the buyout of staff time including preparation, travel, accommodation where required, and a small expenses budget to cover parking, taxis etc. Combined with the travel and accommodation costs required to support the project working with early adopters this brings the overall Travel and Subsistence budget to £6,500.

Following discussions with Richard McKenna, the sum of £4,372 for the provision of a project server to act as a test-bed for the development work will remain in the budget. The provision of a REST interface to the ePortfolio will inevitably compromise the security of the server on which the software is based at certain phases of development. The application of security protocols to a REST interface is acknowledged as one of the more difficult of the development tasks in implementing a safe interface to ePortfolio content. It would be in breach of several existing Service Level Agreements we have in place to knowingly run a potentially insecure development project from our existing service delivery servers. For this reason the project has requested a separate server (specifications below) on which to develop the RESTian ePortfolio. This server will be sufficiently powerful to act as a test-bed for any early adopters who need to try out the ePortfolio’s interfaces with their own software systems.

Server Specifications:

MacOS Server v10.3 (Dual 2GHz PowerPC G5, 4GB DDR400 ECC SDRAM, 750 Gb Hard Drive, DVD/CD-RW)

Cost: £4140.87
Educational Discount: £-420.00
VAT 651.15
Total Cost: £4372.02

The sum requested for consumables has been reduced by £450 to reflect the fact that projects will not be expected to produce dissemination materials from the initial project budgets. This amount reflects the cost of producing project flyers and posters for internal Programme dissemination events.

Appendixes

Appendix A. Project Budget

	JISC Contribution Requested			Institution Contribution			Total
	YR1	YR2	YR3	YR1	YR2	YR3	
Staff (list all staff with FTEs and salary scale range)							
Project Director: G Hammond 0.1 FTE	0			6,300			6,300
Project Lead: P Drummond 0.4 FTE	12,201			4,880			17,081
Project Lead: A McDonald 0.4 FTE	12,201			4,880			17,081
Senior Developer: Simon Cotterill 0.4 FTE	0			7,050			7,050
IT Advisor/Developer: 0.2 FTE	5,223			2,089			7,312
Systems Administrator: 0.2 FTE	3,533			1,413			4,946
Senior Web Developer 0.4 FTE	5,011			2,004			7,015
Junior Developer: 0.4 FTE	3,282			1,313			4,595
External Technical Consultancy	7,500			0			7,500
LTSN-01 Consultancy *	1,983			793			2,776
Technical Authorship 0.5 FTE	9,778			3,911			13,689
Project Administrative Support: 0.2 FTE	1,766			706			2,472
10% Development Contingency **	5,375			2,150			7,525
Travel & Subsistence (include attendance at relevant programme meetings)	6,500			0			6,500
Equipment (specify individual items over £10k)	4,372			0			4,372
Dissemination activities	0			0			0
Evaluation activities	0			0			0
Other (please specify)							
Consumables	550			0			550
School Actual Costs (phones, photocopying, etc)	690			0			690
Total	79,965			37,489			117,454

Total requested from JISC	79,965						
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* LTSN-01 have agreed to waive overhead for this project input

** In the case that this contingency is not required, will be paid back to JISC or included in other aspects of the budget at JISC's discretion.