

Cover sheet for proposals

**JISC Invitation to Tender: E-Learning Programme -
Technical Framework and Tools Strand call for Technical
Development Projects**

*(NB: All sections must be
completed)*

Name of lead institution/organisation	The University of Oxford
List consultants/partners, if any	The University of Liverpool, Simon Grant.
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Total cost to the JISC: £34,482	
Outline proposal description: This work will provide a springboard from which to launch a fully-fledged Web Service (WS) for the Personal Development Planning (PDP) domain. We will generate a prototype WS specification for PDP in the UK and then develop a fully documented toolkit that will include a Java-based SDK, the PDP WS WSDL and WDDL specifications and UML representations of all the main components.	
Names and contact details of any additional contacts: <i>n/a</i>	

To: JOINT INFORMATION SYSTEMS COMMITTEE, Northavon House, Coldharbour Lane, Bristol, BS16 1QD

Statement of Bona Fide Tender

We certify this is a Bona Fide Tender in that we have not fixed or adjusted the amount of the Tender by or under or in accordance with any agreement or arrangement with any other person. We also certify that we have not at any time before the hour and date specified for the return of the Tender performed any of the following acts:

- i) communicated to any person other than the person calling for the Tender the amount or approximate amount of the proposed Tender, other than for obtaining a quotation for an insurance premium required for the purpose of the Tender.
- ii) entered into any agreement or arrangement with another person so that he or she shall refrain from tendering, or as to the amount of any tender to be submitted.
- iii) offered, paid, given or agreed to pay or give consideration directly or indirectly to any person for having done or for doing, or caused to have done or for doing, in relation to another tender or proposed tender for the said work any act or thing of the sort described above.

In this Certificate, the word 'person' includes any person, or body or association, corporate or otherwise; and 'any agreement or arrangement' includes any such transaction, formal or informal and whether legally binding or otherwise.

Signed..... Name.....

Occupation/Profession

For and on behalf of:

.....
.....
.....

A Web Service Definition for Personal Development Planning

1 Description of the services to be implemented

This project will provide a springboard from which to launch a fully-fledged Web Service (WS) definition for the Personal Development Planning (PDP) domain. We intend to generate a prototype WS specification for PDP in the UK. Note that this not a full IMS LIP WS but is a service based on the [UK PDP application profile](#)¹ for PDP. The potential list of services is detailed in Appendix A but this list will be modified as a result of the initial investigation into what a PDP web service should do.

The initial groundwork to achieve the actual implementation of the WS, (outlined in Section 6,) includes the creation of models of planning and reflection and a formalisation of the PDP process; only then can a service be designed.

We are intending to provide a full definition of the service interface (WSDL specification), but it is beyond the scope of this short project to implement every method listed in the service interface. Without knowing what the interface will contain, it is difficult to explicitly state which interface methods will be defined in full, however, we will commit to implementing a small number of the most useful services in order to demonstrate the feasibility of the adopted approach.

2 Standards intended to be employed

We are aiming at a service interface based on [UK LeaP](#)² – this is an application profile covering the PDP domain based on IMS LIP. (The BSI is currently drafting UK LeaP for public comment [BS 8788].) We will use SOAP for the transmission of data, WSDL and WSDD for the relevant WS definition and will ensure compliance with [WS-I guidelines on WS interoperability](#)³. Where a PDP process is to be returned by a service, IMS Learning Design will be used to represent the process. The LD employed may be elementary, but will at least cover a simple realistic use case.

3 Technology to be used

We will use J2EE technology in order to integrate as simply as possible with the underlying applications (see next section). It is envisaged that we will employ the AXIS WS to help with software development and will use the Eclipse IDE. XDoclet will be used to generate as much code as possible and HTML documentation will be produced using Javadoc.

A test harness will be produced, based around JUnit and /or HttpUnit (and maybe Jakarta Struts) to demonstrate WS compliance. It may also be necessary to use JBoss as an application server to house the Tomcat servlet container.

There are a number of related initiatives underway in the USA namely the Open Knowledge Initiative (OKI), [SAKAI](#)⁴ and the [Open Source Portfolio Initiative \(OSPI\)](#)⁵; Oxford University is looking closely at SAKAI. Throughout the course of this project, we will maintain any current links with these projects initiate new ones and track any relevant work that may be undertaken.

4 Applications used to test the service

There are a few electronic PDP systems in existence; it is proposed to use one of the most advanced systems, [LUSID](#)⁶, as the underlying application in this project; The University of Liverpool has given Oxford University rights to use this software. Both Oxford and Liverpool have experience of LUSID but both institutions could learn from each other in areas surrounding the system. LUSID already has [a very basic file-based UK LeaP import / export](#)

¹ http://www.recordingachievement.org/downloads/UK_LP1_1B_Final.pdf

² <http://www.imsglobal.org/pressrelease/pr031006.cfm>

³ <http://www.ws-i.org/>

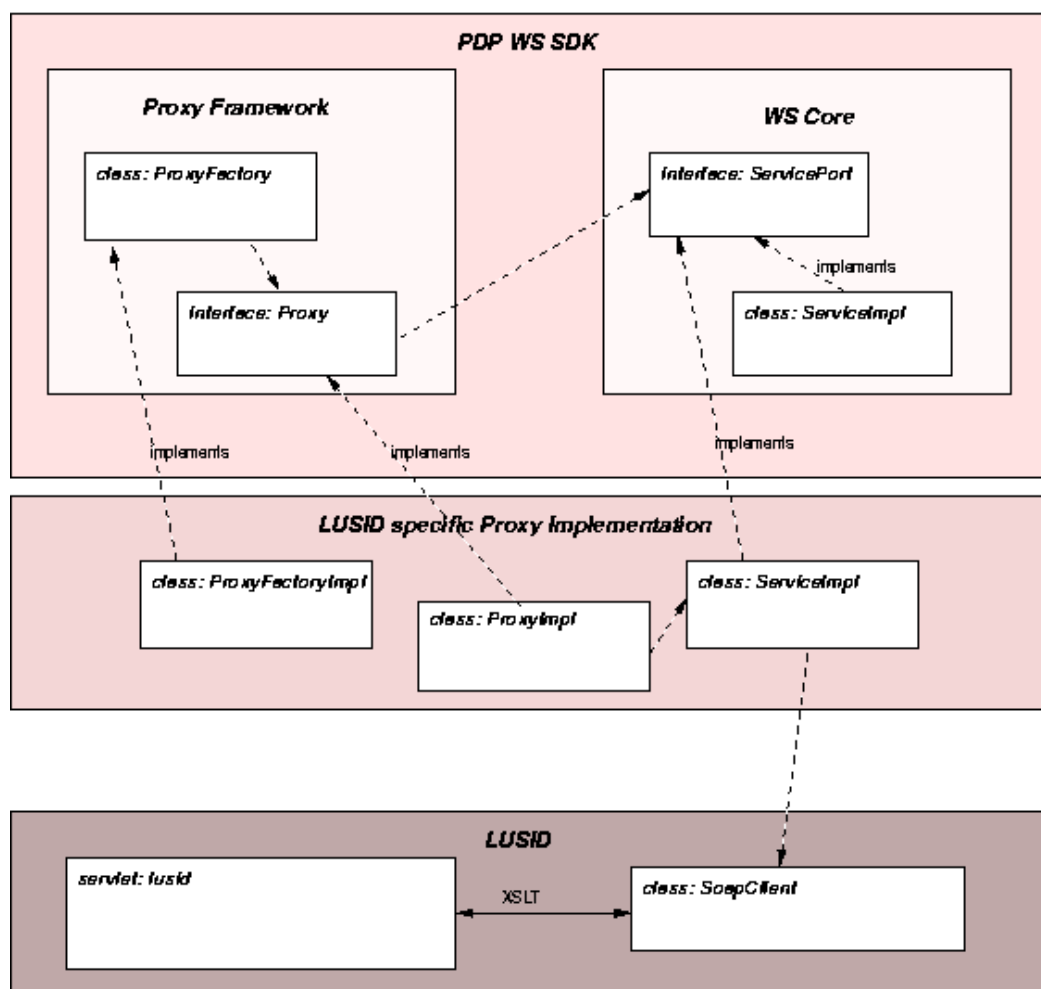
⁴ <http://www.sakaiproject.org/>

⁵ <http://www.theospi.org/>

⁶ <http://lusid.liv.ac.uk/>

[interface](#)⁷ and work to build upon this interface is proposed as part of the project. Oxford University have installed and are currently developing [Bodington](#)⁸ (an open source VLE) that is in daily use across the University. The ultimate goal (which unfortunately is out of the scope of the current tender) is to embed LUSID within Bodington so that a student can use both systems seamlessly without ever knowing that they are leaving the VLE.

The following diagram, attempts to describe the intended architecture.



5 Relevant experience

This project will build on the recent successes of [CETIS LIPSIG](#)⁹, the [Centre for Recording Achievement](#)¹⁰ (CRA) and the work that has been completed as part of the [Developing Learner Profiles across FE and HE](#)¹¹ initiative funded under the [Managed Learning Environments \(MLEs\) for Lifelong Learning](#)¹² JISC project. Members of the proposed project team have also been involved with the [TransportALL](#)¹³ project and have been instrumental in the mapping of the PDP domain to the IMS Learner Information Package (LIP) specification. The team has other relevant experience; this includes the [JAFER](#)¹⁴ project, the e-Science

⁷ <http://www.cetis.ac.uk/profiles/uklip/experience/lusid>

⁸ <http://www.bodington.org/>

⁹ <http://www.cetis.ac.uk/groups/20010801124300/viewGroup>

¹⁰ <http://www.recordingachievement.org/>

¹¹ http://www.jisc.ac.uk/index.cfm?name=project_cra

¹² http://www.jisc.ac.uk/index.cfm?name=programme_buildmle_hefe

¹³ <http://dbweb.liv.ac.uk/cll/client.asp?client=5&unit=81>

¹⁴ <http://www.lib.ox.ac.uk/jafer/staff.html>

programme engineering task force, and the design of certain web service standards (UDDI and SRW). The following personnel will make up the project team:

Simon Grant (SG) is particularly well versed in the technical side of PDP, having played a central role in the original conception and design of LUSID in 1997. Recently he has been involved with a survey of PDP in UK F&HE and is currently playing a key role in the mapping of the domain of PDP and PDR (PD Records) to IMS LIP.

Janet Strivens (JS) (The University of Liverpool) has extensive experience of PDP and has responsibility for the implementation of PDP in The University of Liverpool. She was also part of the project team that devised and developed LUSID.

Adam Marshall (AM) (Oxford University) until recently worked at Liverpool managing LUSID but now works at Oxford University as the senior developer for Bodington VLE. He is an experienced Java programmer, has a good understanding of both PDP and IMS LIP and has been an active participant in CETIS LIPSIG.

Matthew Dovey (MD) (Oxford University) is Technical Manager for the Oxford e-Science Centre and is a world expert in web services. Will sit on internal management committee.

Colin Tatham (CT) (Oxford University) is a senior java developer with experience of working with Bodington and JAFER.

Howard Noble (Oxford University) is an Educational Interoperability expert and will advise the project team at various points. Will sit on internal management committee.

6 Detailed work plan

Oxford University will form their own internal management committee comprising members of the project team and other Computing Services staff. This committee will monitor all development work carried out at Oxford. This committee will have experience in educational interoperability and web service definition and implementation.

6.1 Work package 1 (WP1)

This work package puts into place the foundations on top of which will be constructed the web service.

6.1.1 Description of Work

In order to implement a PDP Web Service it will be necessary to formalise more aspects of the PDP process. In particular, a process model including an entity-relationship diagram will be essential. This model will be constructed based on the CRA survey 'PDP practice in the UK' which identified all [the PDP processes and outputs in use in UK HE and FE](#)¹⁵. The project team includes both the author of the related web site and a very experienced PDP practitioner. It is envisaged that they will collaborate in this work package.

To help with the generation of this process model, it will be necessary to produce a model of reflection – it is necessary to enumerate the categories of reflection not least to inform the definition of a Vocabulary which will allow the <reflection> element of UK LeaP to be related to the records that are being reflected upon. Along similar lines, it will be necessary to draft a model of planning to inform the process model. (The most recent vocabularies can be found at <http://www.cetis.ac.uk/profiles/uklip>¹⁶.)

All models should take into account the impact that e-portfolios are having – the PDP processes need to be related to the e-portfolio-related tasks of marshalling, evidencing and presenting skills and competencies through qualifications, achievements, and products (of learning or whatever). This project will produce 'version 0' of the model that will be circulated for comments.

¹⁵ <http://www.cetis.ac.uk/members/PDPcontent>

¹⁶ <http://www.cetis.ac.uk/profiles/uklip>

The next stage is to consider the functionality that a web service should offer. This will be described in a consultative (plain English) document that will be the most visible deliverable from this work package. Feedback will be solicited and acted upon when the interface is being formally defined.

All outputs here will be tabled to the CETIS LIPSIG (and any other relevant group) for comment and input. The consultative document will be distributed as widely as possible.

6.1.2 WP1 Deliverables

- **d1.1** Model of reflection – report. Due: **21 June 2004**
- **d1.2** 'Version 0' model of reflection. Due: **21 June 2004**
- **d1.3** Model of planning – report. Due: **21 June 2004**
- **d1.4** 'Version 0' model of planning. Due: **21 June 2004**
- **d1.5** Model of some PDP Processes and highlight candidates for implementation – report (incl. entity-relationship diagram). Due: **21 June 2004**
- **d1.6** Recommendation of web functionality. Due: **21 Jun 2004**
- **d1.7** Consultative document explaining the proposed services. Due: **10 July 2004**
- **d1.8** Recommendation of 'core' services to implement in WP3. Due: **10 July 2004**

6.1.3 Personnel and Timescales

SG who will work alongside JS will lead WP 1; 10 May 2004 - 10 July 2004) SG 15 days JS 6 days.

6.2 Work Package 2 – Enhance LUSID

Need to enhance LUSID to understand and respond to a selection of WS calls.

6.2.1 Description of Work

Modify LUSID to both import and export IMS LIP data via SOAP. Implement the Proxy framework defined in WP3. Implement the Service Port defined in WP3. Write new LUSID templates that map to the services that are to be offered as part of this project. Interface the new templates with the service interface.

We currently envisage implementing the following services (see Appendix B for more info); this may change as a result of the previous work-package:

- give me all my PDRs (**B1.1**);
- upload these PDRs (**B1.2**);
- give me my table of contents (**B1.3**);
- retrieve specific PDR (**B1.9**);
- store this PDR (**B1.10**);
- list of PDP activities (processes) (**B1.7**) (this will be a short of choice 'lumps' including planning and reflection);
- learning design for above activities (**B1.8**) (the LD will be very simple here!).

At this stage of development, we will not address the issue of authentication and authorisation and will ensure that all SOAP transmissions will contain basic authentication; role-based authorisation will be ensured by the business logic. (It is understood that in the future, Athens and Shibboleth will be employed to handle authentication and authorisation.)

As LUSID does not hold any privacy meta-data about a user's PDRs we will not expend much effort in this area.

6.2.2 Deliverables

- **d2.1** a demo of core services. Due: w/c **25 Oct 2004**
- **d2.2** Deployment details (WDDL). Due: **29 Oct 2004**
- **d2.3** Development report (useful information for others) Due: **29 Oct 2004**

- **d2.4** IMS LD representation (level A) of two or more PDP processes. Due: **29 Oct 2004**

6.2.3 Personnel and Timescales

10 July 2004 – 29 October 2004; AM 36 days.

6.3 Work Package 3 – Write WS SDK

6.3.1 Description of Work

By referencing the Enterprise Web Services Specification and Demo toolkit, and by taking up the offer of technical support from JISC, we will use J2EE technology to define a reusable PDP Web Service interface. This will include all the relevant components such as a WS-I compliant WSDL, UML models, a compliance suite and appropriate documentation. Feedback from the consultative document will be taken into account and acted upon. Revised documentation will be generated if required.

6.3.2 Deliverables

- **d3.1** SDK including WS core interface (service port and implementation), Proxy Framework (interface and factory). Due: **29 Oct 2004**
- **d3.2** Full service definition (WSDL). Due: **29 Oct 2004**
- **d3.4** UML class diagrams of SDK components. Due: **29 Oct 2004**
- **d3.5** UML diagrams of service implementation architecture. Due: **29 Oct 2004**
- **d3.6** SDK as jar. Due: **29 Oct 2004**
- **d3.7** Javadoc pertaining to SDK. Due: **29 Oct 2004**
- **d3.8** JUnit compliance test suite for PDP WS. Due: **29 Oct 2004**
- **d3.9** Brief guide to using SDK. Due: **29 Oct 2004**

6.3.3 Personnel and Timescales

10 May 2004 – 29 October 2004. CT and AM: 30 days total. The main part of the work will begin after the completion of WP1 and WP2.

6.5 Work Package 5 – Management

Overall management of whole project

6.5.1 Description of Work

Usual management tasks.

6.5.2 Deliverables

- **d5.1** final project report. Due: **29 Oct 2004**

6.5.3 Personnel and Timescales

10 May 2004 – 29 October 2004; AM 22 days

7 Budget

Consultant (Simon Grant): 15 days @ 400 per day	6,000
Research Officer (Janet Strivens, The University of Liverpool): 6 days @ 300	1,800
Developer (Adam Marshall, Oxford University): 66 days	13,601
Management (Adam Marshall, Oxford University): 22 days	4,532
Admin support	549
Travel and subsistence	1,500
Hardware (server plus installation)	5,000
Software	1,500
Total	£34,482

Note: all costs include National Insurance and, where relevant, super-annuation.

9 Risks

Risk: Simon Grant and Janet Strivens are essential to the project – there is unlikely to be a replacement for them should anything happen. If they are late with their work the whole project will be shifted back. Adam Marshall is the only person on the team who knows how LUSID works – his loss would be very awkward too.

Risk: What impact will be felt when IMS define the LIP WSDL. Will this conflict with work done here? It is felt that the WSDL will be at a much lower level than the proposed PDP WS so will have little effect.

Risk: The IMS policy makers reject the proposed modifications to IMS LIP made during the process of developing the PDP application profile. This is unlikely especially as the ePortfolio community are backing the changes.

Risk: There are certain areas missing from the mapping of the PDP domain (for example, a skills framework). It is way beyond the scope of this project to define this framework – this needs to be a national initiative as stakeholders are from many different areas of education. Will such a mapping be led by CRA? These gaps may have adverse effect on the ability to design service? We may simply have to generate some placeholders for a skills framework.

Appendix A Future Work

As implied above, the next stage would be to integrate the PDP WS into a VLE such as Bodington. (This would increase the pedagogic functionality of Bodington to include a reflective learning style.) The PDP processes that the service offers should be specified using IMS Learning Design and sequenced by a tool such as CopperCore. There will also be issues regarding authorization and authentication – Oxford are involved with the Guan Xi project which will provide valuable experience in this area.

A use case may be as follows: The student undertakes some VLE learning activity which involves the generation of some 'product', and then uses the PDP Web Service to reflect upon it.

The process of providing the PDP system with a handle to the actual artefact (stored in an e-portfolio repository or in a VLE) is something that will need to be investigated closely. Here are big issues with version control – what do we do if the artefact has been changed – do the reflections still apply despite the new modifications? This use case also raises the issue of unique Ids.

Appendix B – Draft Service Interface

- B1.1 Give me the whole thing
- B1.2 Transfer the whole thing
- B1.3 Give me my complete table of contents (subject)
- B1.4 Show me what I'm allowed to see (not subject)
- B1.5 Give me the transcript for X at Y institution
- B1.6 Give an application profile template for what will help determine the appropriate steps in PDP at institution Y
- B1.7 Give menu of plausible PDP activities at institution Y, given profile as above.
- B1.8 Give me the Learning Design content for a specific PDP activity chosen from a menu
- B1.9 Retrieve item from given list
- B1.10 Store edited item / synchronise items (subject or agent only)
- B1.11 Store new item or structure
- B1.12 Show me the skills framework for institution Y
- B1.13 Show me items relevant to <skill> chosen from skills framework
- B1.14 Create this new relationship