

Proposal to the JISC:

developing personalisation for the information environment (2)

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Cover + 8 pages

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Cover sheet for proposals

JISC Invitation to Tender:

(NB: All sections must be completed)

Developing Personalisation for the Information Environment (2)

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| Name of lead institution/organisation | Curtis+Cartwright Consulting Ltd. |
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| Length of project and Total cost to JISC over its life: | 8 Months, £89,652.50 |
| Proposed project start and end dates: | 1 November 2007 – 2 July 2008 |
| Outline proposal description | <p>This study will scope how the JISC Information Environment may make use of adaptive personalisation in order to enhance the user experience. It will consider the ways in which infrastructure established to support the UK Access Management Federation (the UK Federation) could support adaptive personalisation of JISC services, and the potential privacy and legal barriers to such use.</p> <p>There will be three phases: Initiation and background, Foresight, and Analysis and reporting. Phase 1 will establish the landscape surrounding personalisation and privacy, Phase 2 will consider how this landscape could and should be developed in the future, and Phase 3 will synthesise the information gathered into a consistent set of analysis, advice and guidance, and identify opportunities for development of demonstrators.</p> |

1 Introduction

1.1 General

- 1.1.1 This proposal has been produced by Curtis+Cartwright Consulting Limited (Curtis+Cartwright) in response to an Invitation to Tender (ITT) from the Joint Information Systems Committee (JISC). It concerns how personalisation can be supported in JISC services in conjunction with federated access management.
- 1.1.2 This version of the document has been redacted to remove commercially-sensitive information.
- 1.1.3 We have proposed an innovative solution to the issues raised by the ITT, engaging directly with users, and developing an understanding of the future drivers affecting personalisation. To successfully complete a wide-ranging study such as this demands specific experience of federated access management, futures techniques, privacy and personalisation issues as well as JISC activities such as the e-Framework and Information Environment. We have this experience.

1.2 Objectives of this study

- 1.2.1 Most major Internet sites use personal information to tailor the way that their sites are presented to users. The JISC provides or funds a range of services which are available online, and wishes to investigate how these services may be personalised for users. Many already offer some degree of customisation (where a user may choose elements of functionality to be displayed, for example), but there may be opportunities to personalise sites adaptively in a way which is transparent to the user. This may be based on information which is already known about the user (*eg* the institution they attend) or on information obtained by tracking user behaviour (*eg* which types of books they search for in a library catalogue).
- 1.2.2 This study will scope how the JISC Information Environment (IE)¹ may make use (or should be developed to make use) of adaptive personalisation in order to enhance the user experience. It will specifically consider the ways in which infrastructure established to support the UK Access Management Federation (the UK Federation) could support adaptive personalisation of JISC services, and the potential privacy and legal barriers to such use.

1.3 About us

- 1.3.1 Curtis+Cartwright is a friendly technology and management consultancy helping public sector organisations make best use of current and emerging ICT. We provide advice and personnel, often where there is a need to address business issues involving these technologies. Our assignments range from general management consultancy and risk management within a technology environment, through more specific technology-enabled business change, to detailed technology analyses.
- 1.3.2 We were established in 1999, on the foundation laid by our staff members' extensive experience of performing consultancy assignments in the UK public sector over some 25 years. The long term relationships we have with our clients reflect our excellent reputation.
- 1.3.3 Curtis+Cartwright occupies a distinctive position in the consultancy market, working across the boundary of business and technology strategy, where technology supports, and is supported by, business processes in achieving business objectives. We have extensive experience of applying these concepts within the education and research sector.

2 Background

2.1 Personalisation of online services

- 2.1.1 To personalise is to "design or produce (something) to meet someone's individual requirements."² This may be based on the express wishes of the recipient (*eg* ordering a T-Shirt with the name of a club on it), or with varying degrees of transparency to the recipient based on

¹ <http://www.jisc.ac.uk/whatwedo/themes/information_environment.aspx> [accessed 12 October 2007].

² *Concise Oxford Dictionary*, 10th ed edited by Judy Pearsall, OUP 2001.

information held by the provider (*eg* a good teacher will modify their style of presentation based on their understanding of their students' capability and engagement).³

- 2.1.2 In the context of online information systems, these approaches are known as *customisation* and *adaptive personalisation* respectively. Adaptive personalisation can encompass both personalisation based on data held elsewhere (APOD) and personalisation based on user activity (APUA). To continue the previous analogy, a teacher employing APOD may alter course materials based on information about students' prior exam performance, whereas employing APUA might entail altering the pace of delivery dependent on whether the students are "keeping up".
- 2.1.3 Most major interactive websites allow customisation as well as APOD and APUA. For example, the auction site eBay allows customisation (the site can be set to email a user automatically when a new item matching selected criteria is listed), APOD (by sending appropriate marketing email based on a user's geographical location), and APUA (showing items which are similar to those which have been recently viewed).
- 2.1.4 Personalised content may be useful both pedagogically and administratively. e-Learning materials can be personalised to the visitor, but likewise shared services providing, for example, procurement support could be personalised to suit the needs of the user. Content may be personalised according to what material a user has authorisation to access. Personalisation provides clear benefits, as evidenced by its increasing use by major service providers (including those such as Elsevier which operate within the education sector).

2.2 JISC Information Environment

- 2.2.1 The JISC IE presents a model by which content-providers are linked to users through "fusion" and presentation layers. The IE has an associated technical architecture which specifies the protocols which services within the IE should use to deliver and consume information.
- 2.2.2 The IE presents a high-level picture of service interactions and protocols, but does not in itself deliver workflows and models which will lead to the development of real-world services. The focus within the JISC for developing service-orientated approaches to the re-use of published data is the e-Framework for Education and Research, jointly sponsored by the JISC, the Australian DEST, New Zealand's MoE, and the Netherlands' SURF. The e-Framework is currently being populated. International initiatives (including the Liberty Alliance) must be considered within this study.

2.3 Federated access management & attribute transfer

- 2.3.1 Federated access management "builds a trust relationship between Identity Providers (IdP) and Service Providers (SP). It devolves the responsibility for authentication to a user's home institution, and establishes authorisation through the secure exchange of information (known as attributes) between the two parties."⁴
- 2.3.2 Although the Shibboleth technology supported by the UK Federation was designed around the concept of anonymous or pseudonymous access to resources, it has the potential to transfer any data held by the IdP in association with the user to the SP. In most cases not all information held will be desired or required by the SP. In addition, there may be security and/or privacy concerns regarding the release of sensitive information to a third party, and potentially legal issues regarding the disclosure of personal information.
- 2.3.3 An important concept within Federated Access Management is the utilisation by an IdP of an Attribute Release Policy (ARP), which specifies which attributes may be released to which SPs under which conditions.

³ These definitions are derived from *Personalisation in presentation services*, Neil Smith, Seb Schmolter and Nicky Ferguson, July 2004.

⁴ <http://www.jisc.ac.uk/whatwedo/themes/access_management/federation/federation_faq.aspx#2> [accessed 12 October 2007].

3 Key issues in conducting the study

3.1 Difficulty in expressing privacy concerns

- 3.1.1 The interpretation of "privacy" can be nebulous, depending on the individual, the situation, the context, the perceived level of individual control and many other factors.⁵ Given the complexity of perceptions surrounding privacy, it can be challenging to express the nature of individual concerns. Individuals may be not have well-articulated views regarding privacy until an event causes them to feel exposed.⁶
- 3.1.2 Given the personal and perhaps capricious nature of privacy concerns, it will be necessary to consider in some depth how users could control aspects of their own privacy online, especially if their institution is releasing personal information to other SPs. It will be necessary to consider what trade-offs between privacy and functionality will be acceptable to users.

3.2 Provision of data

- 3.2.1 Institutions currently utilise a wide range of identity-management systems.⁷ Information which may be important to personalisation of Internet resources may not be readily accessible to the IdP service.
- 3.2.2 The UK Federation utilises the eduPerson schema, although only four attributes are mandatory. These attributes alone seem unlikely to facilitate useful APOD,⁸ although the infrastructure will support bilateral agreements to share whatever data is agreed between IdPs and SPs. It is possible that eduPerson may not represent an appropriate schema for representation of personal information which may be utilised in personalisation (eg disability or ethnic status cannot readily be represented in eduPerson).
- 3.2.3 Further, there are a wide range of possible standards for the representation and transfer of information regarding users.⁹

3.3 Difficulties in empowering users to control attribute release

- 3.3.1 Central to the concept of privacy is that the individual must have control over the release of their own information.¹⁰ This concept is extended into UK law through the Data Protection Act (1998), which places significant responsibilities on those who process personal information.
- 3.3.2 Although some preliminary work has been undertaken to allow user-control of ARPs,¹¹ the existing tools are complex and not easily comprehensible to non-technical end-users. To develop appropriate mechanisms to help users understand the implications of choosing whether to release their data to a third party will require considerable effort in designing user interfaces, information flows, and support materials. There is likely to be a resultant burden on institutional and SP user-support facilities.

⁵ *Self-disclosure, privacy and the Internet*, Adam N. Joiner and Carina B. Paine, in *The Oxford Handbook of Internet Psychology*, Oxford University Press 2007 and references therein.

⁶ For example, <http://www.theregister.co.uk/2006/09/07/facebook_update_controversy/> [accessed 14 October 2007].

⁷ *CC273D001 Federated access management: institutional preparedness study*, Matt Shreeve and Max Hammond, December 2006, *CC298D003 Federated access management: institutional preparedness study II*, Max Hammond and Matt Shreeve, June 2007.

⁸ eduPersonTargetedID and eduPersonPrincipalName may be used to support personalisation, but do not by themselves provide information regarding the user which would be of use for APOD.

⁹ Including, for example: the IE Technical Architecture, the e-Framework Service Usage Models and Service Expressions, the IMS Specifications, the UK Access Management Federation Technical Specifications and Recommendations.

¹⁰ Two influential analyses of privacy are those in *Privacy and freedom*, Alan Westin, Atheneum 1967, and *The environment and social behaviour*, Irwin Altman, Brooks/Cole 1975.

¹¹ For example, ShARPE <<http://www.federation.org.au/twiki/bin/view/Federation/ShARPE>> and SPIE <<http://www.oucs.ox.ac.uk/rts/spie/>> have both developed tools to allow editing of ARPs [both accessed 14 October 2007].

4 Our approach

4.1 Project plan

4.1.1 In order to best meet the varied requirements of this ITT, we propose a broad range of data gathering and analysis activities, separated into three phases. Phase 1 will establish the landscape surrounding personalisation and privacy, Phase 2 will consider how this landscape could and should be developed in the future, and Phase 3 will synthesise the information gathered into a consistent set of analysis, advice and guidance, and identify opportunities for development of demonstrators.

Phase 1: Initiation and background

4.1.2 This phase of the study will provide the foundations which will support the remainder of the project. Management and reporting mechanisms will be established, and information regarding the background and context will be identified, collated and analysed.

Workpackage 1: Initiation

4.1.3 The aims of this workpackage are to:

- confirm the study aims and objectives;
- agree the detailed workplan and timescale for the project;
- confirm management arrangements with the JISC programme managers;
- discuss approach to arranging scenarios workshops (see below).

Workpackage 2: Landscape study

4.1.4 The aims of this workpackage are to:

- identify extant information to support the conduct of the study, including:
 - those sources listed at point 14 within the ITT, and any other published reports and papers of relevance;
 - published and developing standards of relevance to any area of the project, including attribute transfer, identity management and privacy control;
 - an audit of the current and potential use of personalisation by JISC services, and current development activity in the area;
 - current and recent JISC-funded or other tools to support customisation or personalisation of Internet resources;
- engage with key stakeholders at JISC services including TechDis and the national datacentres, MIMAS and EDINA;
- identify useful examples of the use of APOD or APUA in education and research in the UK or worldwide;
- define terminology used throughout the project;
- identify attendees for the scenarios workshops (see below).

4.1.5 Key stakeholders will be interviewed in person or by telephone to solicit their views and to develop a good working relationship. International stakeholders will be interviewed by telephone or by email.

4.1.6 Information regarding current and potential use of personalisation and customisation by JISC services will be collated and categorised in a database.

Workpackage 3: Interim report

4.1.7 This will present the results of the landscape study, including:

- examples of use of personalisation in education;
- an audit of the use of personalisation within JISC services and an initial analysis of opportunities for the development of personalised services;

- analysis of, and collated information regarding relevant initiatives, standards, projects and tools;
- an initial analysis of the potential of the UK federated access management infrastructure for providing information of use in personalising services;
- analysis of the legal issues surrounding the transfer of personal information for personalisation.

Phase 2: Foresight

4.1.8 This phase of the study will investigate how the environment surrounding privacy and personalisation may develop in future. There will be two elements: a study to investigate how current HE and FE students regard privacy and self-disclosure online, and the development of some “scenarios” to consider alternative possible futures, and how personalisation could be used in each future.

Workpackage 4: Investigation of student perceptions

4.1.9 There is a wide range of published material considering anonymity, privacy and self-disclosure online.¹² However, it is possible that the different requirements and levels of trust involved in education result in different and nuanced perceptions of privacy, especially with the dramatically increasing use of Web 2.0 systems, and social networking sites. We believe that, given the potential minefield surrounding privacy issues, to engage sufficiently with end users will require a direct approach, rather than – for example – a survey. For this reason, we propose undertaking a study specific to UK HE and FE, through a series of focus groups.

4.1.10 This element of the work would be undertaken by Mindset Research Ltd, with whom we have a successful working relationship and have conducted prior work for the JISC.

4.1.11 Four focus groups will be conducted, two consisting of HE students and two of FE students, each group in a different location. Each will consist of 9-10 participants, with recruitment criteria agreed in advance. The detailed content of the focus groups will be agreed following the results of the initial data gathering, but may for example follow a structure such as:

- moderator introductions and explanations (research sponsor reasons for research, what will happen with the data Market Research Society guidelines, *etc*);
- respondent introductions (names course interests, *etc*);
- warm-up – topics might for example include: internet usage, feelings about technology, usability and acceptability of study aids available, usage of sites such as Amazon that learn user profiles and behaviours;
- broad attitudes towards transfer of personal information;
- understanding of how and when this happens, user permission being implicitly or explicitly given, role of institutions in transferring data of users;
- extent to which these issues have been considered;
- extent to which they have concerns;
- must there be a “pay-back” for sharing personal information? (*ie.* what user benefits would be required to justify it?);
- principles, parameters and rules for using personal and sensitive data.

Workpackage 5: Scenarios generation

4.1.12 In order to consider how to develop personalisation services, it is necessary to attempt to understand the possibilities as to how the overall environment may develop. These scenarios will provide a technological and human context within which the planning of future development can be grounded. There is a suite of tools available to help investigate the future, known collectively as “futures methods”. This workpackage will use a scenario building method to achieve its aims.¹³

¹² *The Oxford Handbook of Internet Psychology*, Oxford University Press 2007.

¹³ Scenarios are a range of self-consistent and plausible future states, selected to span the range of likely future conditions. Each scenario provides sufficient detail that participants in the process (and consumers of the outputs) can visualise the

- 4.1.13 This workpackage will:
- investigate the views of institutional staff regarding privacy, anonymity and self-disclosure online, by engaging with authorities in the field;
 - generate scenarios regarding personalisation of online resources from technological and societal perspectives, based on two workshops consisting of stakeholders drawn from the UK HE and FE staff communities;
 - analyse the outputs of these workshops and associated activity in order to identify key interventions which could support “desired” scenarios.
- 4.1.14 We propose that the JISC provide logistical support for these workshops (venue, promotion, *etc*), and have allocated £6,000 for this activity. The details of this arrangement will need to be discussed during project initiation.

Phase 3: Analysis and reporting

Workpackage 6: Development of use-cases and identification of demonstrators

- 4.1.15 Based on the results of the diagnostic and prognostic elements of this study, a range of use-cases for personalised services will be generated. Working with interested stakeholders, these use-cases will be developed into detailed, costed proposals for demonstrators which could be developed with JISC support. We will agree with the JISC what constitutes an appropriate set of demonstrators given JISC funding constraints, desired breadth and depth of ideas and required depth of detail.
- 4.1.16 Where appropriate partners for developing demonstrators cannot be identified, potential demonstrators will be proposed in a more generic form based around the use-case, and without costing. If appropriate, these more generic use-cases could be submitted for inclusion as Service Usage Models (SUMs) within the e-Framework.

Workpackage 7: Synthesis and final report

- 4.1.17 This workpackage will synthesise the information and perspectives gathered throughout the project, and will present a comprehensive report to answer to the issues raised by the ITT, including:
- an examination of the views of HE and FE staff and students regarding privacy, anonymity and self-disclosure online;
 - an analysis of the issues which are likely to be of key relevance in the future, and how the JISC can influence the development of a preferred “future scenario”;
 - detailed proposals as to how the federated access infrastructure can be used to support personalisation, focusing on JISC services within the IE;
 - a set of principles for personalising services, handling information, the trade-offs required *etc*;
 - use-cases for the use of personalisation in online educational or administrative services;
 - detailed proposals for demonstrators, and the associated costing;
 - any general recommendations for the development of personalised services, and proposals for future work, including implications for the IE, the e-Framework and federated access management.
- 4.1.18 We are happy to discuss any additional dissemination requirements at the kickoff meeting. For example, the JISC may wish to produce press releases following the student perceptions study and scenarios exercise, and we would be keen to assist in their preparation.

environment and contribute to understanding the events that would lead to that scenario, and the requirements which would be present in that scenario. A good introduction (from a national foresight perspective) is available at <http://forlearn.jrc.es/guide/3_scoping/meth_scenario.htm> [accessed 15 October 2007].

4.2 Risk assessment

| Risk | Probability | Impact | Mitigation |
|---|-------------|--------|--|
| Difficulty in identifying attendees for scenarios workshops. | L | M | Utilise expertise and contacts of JISC stakeholders, national datacentres, representative groups such as UCISA, and Curtis+Cartwright's contacts within HE and FE institutions. |
| Limited availability of stakeholders for interview or for workshops. | L | M | The timescale and degree of float for this project allows for flexibility in the arrangement of stakeholder engagement activities. Stakeholders will be identified and engaged as early as possible in the process. |
| Appropriate partners for the development of demonstrators cannot be identified. | M | H | During the conduct of the earlier phases of this study, stakeholder institutions and services will be considered (and potentially approached) regarding the possibility of conducting a demonstrator project. Any use-cases which do not have associated demonstrators will be clearly set out to facilitate issuing a call, if desired. |
| A consistent picture of privacy concerns cannot be identified. | H | L | Perceptions of privacy can vary strongly between individuals. It will be necessary to understand the "spread" of opinion, and to develop tools which cater for the range of views. |
| Proposed Curtis+Cartwright or Mindset Research staff are not available. | L | M | We have alternative staff with similar experience to replace or support Matt and Max. Mindset have access to a wide pool of associates. |

5 Proposed team

5.1.1 Curtis+Cartwright offers a knowledgeable team with significant relevant experience in internet and networking technologies, and advising the development of technology infrastructures. The proposed core team comprises the following individuals :

- **Dr Max Hammond** is a Researcher with substantial experience of ICT within the education sector, and a thorough understanding of the impact of current internet technologies on user behaviour and perceptions. Max has current experience of supporting the JISC, including reviewing JISC Legal, reviewing the outputs of the JOS development programme, reviewing Intute, collating the outputs of the Core Middleware Technology Development projects, and conducting an institutional preparedness study to examine readiness and demand for federated access management. Max also has substantial experience of the education sector with a thorough understanding of ICT technologies (including those which underpin "Web 2.0"), privacy and security, federated access management and user behaviour. He has undertaken survey design and analysis for the JISC in his work on the Core Middleware preparedness studies. He has designed, implemented and managed a wide variety of websites, web-based information systems and e-commerce sites. Max would conduct the majority of the research, and would manage stakeholder engagement and the student perceptions study.
- **Matt Shreeve** is a Consultant who has excellent experience of supporting the JISC, for example in conducting the evaluation of the Core Middleware programmes, managing the institutional preparedness studies, review of JOS outputs, *etc.* Matt has much relevant experience of developing and deploying new technologies, and has substantial experience in the use of futures thinking, including scenarios building. He has extensive technical knowledge and skills from his computer science degree combined with a broader socio-economic, human and organisational and legal background from his technology policy studies. Matt would be project manager, and would provide expert input to the study and support stakeholder engagement.
- **Dr Geoff Curtis** founded Curtis+Cartwright and has some 30 years of experience managing and conducting a wide range of consultancy assignments. He has current experience of working for the JISC, for example in reviewing Intute and conducting the

review of the organisation and governance of the JISC Advisory Services. Geoff would have overall responsibility for quality assurance of the study outputs, and would provide high-level support to the project team as required.