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UCISA Award for Excellence 2009

Application Form

(Submission of an entry assumes acceptance of all the conditions relating to the award as described above.)

Institution Name **De Montfort University**
(in partnership with Southampton Solent University)

Originating Department **Information Services and Systems**

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Objective of the *Project/Service*

To demonstrate how SOA applications can be built rapidly in multiple University environments

Description of the *Project/Service*

The project was a collaboration between two quite different Universities which run completely different applications. The challenge was to implement two completely different Enterprise Services Buses in the Universities and implement connectors to 4 very different types of applications and then to demonstrate that a SINGLE reporting program could retrieve data from the two Universities WITHOUT changes to the logic of the report.

Supporting documentation about the *Project/Service*

See attached Presentation which was given by the project team and systems integrator to a JISC Workshop in January 2010

Name of Staff involved (including job titles and email addresses)

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STEP-C – Demonstrating Service Oriented Architecture

Traditionally, Universities have chosen application systems from a variety of suppliers to support their administrative and learning processes. IT departments then had to develop a complex web of interfaces between systems. Typically, the Student Record system alone might have more than 10 sets of interfaces making it expensive and time-consuming to implement, maintain and upgrade.

To meet the demands for more lean and agile systems the sector needs a technology shift towards 'Service Oriented Architecture' (SOA) which basically implements a 'backbone' (an 'Enterprise Service Bus'- ESB) to which any application makes a single connection. Information can then be passed between any two University applications or to an application residing on the Internet via the ESB. New systems can be connected or disconnected easily from the backbone.

Within the commercial world, SOA has driven huge productivity gains in application developments. The efficiency savings come not only from the ease of connecting applications together – using well documented 'connectors' with standard interface definitions – but also because the 'process engineering' which defines how information should be processed within the SOA architecture can be readily re-used to develop a new solution by reflecting changes to the business process. Also, by ensuring that the application is designed using 'SOA best practice' then it is independent of the actual Enterprise Service Bus utilised and also of the specific application which is being connected to.

Thus a SOA-based application which has been written to connect to one application (Moodle) to retrieve certain information should work equally well if that application were to be replaced with a different one (e.g. Blackboard).

A few Universities have pioneered developments towards an SOA environment e.g. Cardiff University, City University and others. There have been some successes but limited further take-up of SOA across the sector because each solution has been uniquely geared to a single University. Also, there are numerous myths that SOA is 'expensive', 'complex', 'takes a long time', 'would not fit my particular Institution' etc.

The STEP-C project was funded by HEFCE/JISC in 2009 as part of the Flexible Services Delivery programme to show how SOA solutions could be implemented in ANY University by demonstrating how to solve the 'generic' rather than specific problems.

The project

1. Demonstrated a complex solution in two quite different Universities which run quite different application systems;
2. Implemented 2 different ESBs from different vendors (IBM and Microsoft) at the two Institutions;
3. Chose FOUR quite different types of applications at each University to connect to the ESB – some systems were already Web-Service enabled (or so their vendors claimed!), some were connected via Application Programme Interfaces (APIs) and some had never been designed to be connected to an ESB.

To make the situation even more challenging, the project sought to test whether a single report could retrieve the same basic information from either University system WITHOUT any programming changes – i.e. that it should be ‘blind’ to the fact that the two Universities were running completely different application systems and different Enterprise Service Buses!

Southampton Solent and De Montfort Universities collaborated to define the set of requirements and then actively managed a team of systems integrators, Fulcrum Logic. The University staff extracted representative data from live application systems and then ‘spoofed’/’anonymised’ the personal information so that development teams in India and the United States could create testable solutions. The resulting solutions were then implemented on servers within each University within a TEST environment but using copies of real data to demonstrate that the solutions worked.

The project insisted that ALL project documentation, ideas and intellectual property were to be transferred from the systems integrator to the HE sector – so that all lessons could be made available to every UK University. Thus, the key deliverable of the project is NOT the demonstration that an SOA-based solution can be constructed quickly – but that all of the key decisions and ways of designing and implementing the solution are being made available (in a ‘Cook Book’ style) to every UK University.

The project was completed within 3 calendar months and successfully demonstrated at a JISC Flexible Services Delivery workshop in January 2010.

This project enables any University to explore building a SOA-enabled IT environment by providing ‘cook-book’ advice on how to design and implement SOA-based architectures and it demolishes many of the myths which may have prevented many Universities from getting to grips with a proper SOA architecture.

Looking to the future, there are discussions happening to extend the project in many ways in order to explore:-

- a) Replacing one of the Enterprise Service Buses or application systems to show that the SOA design is truly independent of these components;
- b) Extending the scenarios used to include updating scenarios;
- c) Demonstrating, at another University, how the solution could be connected to yet more commonly used application systems

Longer term, this project work could be used to begin developing HE sector-wide standards for connectors which should be supplied by vendors so that their application can be readily connected to an Enterprise Service Bus. This will make it much easier for Universities to mix, match and replace application systems and also to develop solutions which cut across multiple application systems.

By opening up the doors in to the SOA environment and showing how to create such solutions, this project has demonstrated how the sector can improve its efficiency in this key area.

Why is this project “Excellent”?

This project demonstrates excellence in the areas of:-

Innovation This is a truly innovative project to demonstrate how to solve the generic problems of SOA in TWO quite different University environments – and to complete the project in a remarkable short period of time (three months).

Systems Integration This project demonstrated how to link together 4 applications at De Montfort (Student Records, Finance, VLE and GoogleMail) via an Enterprise Service Bus. And similarly at Solent (Student Records, Library, VLE). Then it demonstrated running the same reporting query across each of the Institutions. This is a remarkable feat of systems integration – especially with the complete development was executed within 3 months.

Return on Investment The project was funded with £90k of HEFCE/JISC funds plus major amounts of De Montfort and Solent staff time and resources. It has clearly delivered everything which was envisaged at the beginning of the project and has created for the entire sector a set of intellectual property which can be used to construct future solutions for ANY University.

Collaboration This project was actively managed by two very different Universities a long way distant from each other. The project team also included a systems integrator who was very new to the sector and had architects and developers based in India, the US and also the UK. At the two Universities, the project teams required skill sets from the technical areas and many different application systems areas. Hence, this project represented a truly complex set of collaborations – to create a complex solution in a few months.

This project therefore demonstrates an exceptionally **high Return on Investment** to the entire sector by opening up a set of technological solutions all institutions to ; it **demonstrates excellence** both with the technical complexity of what was achieved but also in the project management of a truly complex, multi-institutional set of teams within a remarkably short project timescale. It also clearly demonstrates the **transference of Best Practice** by publishing both the Intellectual Property and the ‘Cook Book’ explanations of what other Institutions should do to get started in this field.

A further major benefit of this project is that the sector can now show potential vendors what can be achieved on a very small budget and within a narrow window of time. This could become a truly powerful negotiating tool with potential vendors – and details of the project financial, planning and project reports/methodologies will be available to any UK University which requests them.
