

# OneStart/EDEN – A Description of IU's Transaction Processing/Recordkeeping Environment

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## Introduction

During the last few years we have been hearing a lot about web portals and the information and services they provide to their users.<sup>1</sup> According to Eisler in an article on portals in higher education from *Syllabus Magazine*,

A campus portal may be defined as a single integrated point for useful and comprehensive access to information, people, and processes. While portals have a rapidly evolving set of features and characteristics, they can be described as both personalized and customized user interfaces providing users with access to both internal and external information. Portals can be used for a variety of activities which generally fit into three main categories – gateways to information, points of access for constituent groups, and community/learning hubs.<sup>2</sup>

With their proliferation into all aspects of life, how can we, archivists and records managers, leverage them in our efforts to capture, maintain, and preserve electronic records (ER)? At Indiana University we have been exploring their use as part of the second phase of the IU Electronic Records Project. I have been involved with the design and implementation of IU's campus portal, OneStart<sup>3</sup>, and the shared infrastructure, EDEN (Enterprise Development ENvironment), that provides services to member applications.

## Background

In 1998, Indiana University released its five-year Information Technology (IT) Strategic Plan.<sup>4</sup> Among the recommendations and proposed actions were the replacement of several enterprise wide applications and the re-engineering of other legacy applications to web-enable them. Also, like many other colleges and universities, IU is implementing PeopleSoft's Human Resource Management System (HRMS) and Student Information System (SIS). The implementation of these software applications provided an excellent opportunity to integrate all of the enterprise applications at IU. The integration plan involved a transaction-processing environment that would provide access to these applications through a coordinated, unified front end and an infrastructure made up of components that would be shared among applications including a workflow engine and a global inbox for administrative messages.

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<sup>1</sup> If you would like more information on portals, and portals in higher education in particular, I recommend visiting the research report on portals from Eastern Michigan University's University Computing at <http://ucinfo.emich.edu/aboutUC/research/portals.cfm>. It includes an extensive list of references.

<sup>2</sup> Eisler, David L., "The Portal's Progress: A Gateway for Access, Information, and Learning Communities," *Syllabus Magazine*, September 2000, 14 (1). Online at [http://syllabus.com/syllabusmagazine/sept00\\_fea.html](http://syllabus.com/syllabusmagazine/sept00_fea.html)

<sup>3</sup> The original published name for the portal was MyIU. As stated in the FAQ on the project's website, "The MyIU name reflected the current convention in portal naming. While it's easy to guess, it also left out our colleagues who are Purdue faculty and students." Online at <http://www.indiana.edu/~onestart/project/index.htm>

<sup>4</sup> Indiana University, *Architecture for the 21<sup>st</sup> Century: An Information Technology Strategic Plan for Indiana University*, May 1998. Online at <http://www.indiana.edu/~ovpit/strategic/>

The requirements gathering began in March 2000 with a Joint Application Design (JAD) session involving IT developers and managers and representatives of several key functional areas including Human Resources, Timekeeping, Student Information, Financial Management, Accounts Payable, Purchasing, Electronic Research Administration, and the Indiana University Information Environment. From this session and additional meetings with these functional areas during the summer of 2000 a vision for the portal emerged. It would provide a unified front end to IU services with single sign-on and authentication and 24x7 availability, role-based customization, usability-tested personalization features, application integration, an adaptive user interface, and a completely user-centered environment. It would also make use of a component-based design (CBD)/Web services methodology and standards approach. This approach allows for the development of a shared infrastructure.

OneStart can be referred to as a “next generation” portal since it is more than an information portal. Not only is it flexible and responsive to change, it utilizes a distributed model for content creation. OneStart provides the framework for others to publish their services and content. The first iteration of OneStart, a pilot for staff terminal services users, went live on May 11, 2001. A second iteration with some additional functionality and a new interface was released August 23, 2001.

### **University Archives Involvement**

Where does the University Archives and recordkeeping fit into OneStart and EDEN? In the initial proposal submitted to the National Historical Publications and Records Commission (NHPRC), the project’s goals in regards to the new PeopleSoft systems were to establish recordkeeping requirements and metadata specifications, create business process models, identify records, and incorporate the requirements and specifications into the systems. Around the time I began working on the ER project in April 2000, the director of the PeopleSoft implementation thought our efforts would be better directed towards the new transaction-processing environment. Her feeling was that records would be created, modified, or deleted by users using forms presented through the portal. These forms would then use the workflow engine in EDEN for routing and approval before updating the PeopleSoft tables. We jumped at this opportunity since this environment would allow us to also capture records created by other applications utilizing the workflow engine. Ultimately, our goal is to build into the EDEN workflow engine the mechanisms for capturing records along with all relevant metadata as they are created and for directing records to the records management system.

Since May 2000, I have been an active participant on the OneStart/EDEN core development team. Recordkeeping is viewed as both a separate application that will eventually be integrated like other enterprise applications and as a set of requirements that the portal, workflow engine, and other components need to incorporate. During the requirements gathering stage, I worked with smaller teams concerned with document creation and workflow. I explained our current versions of the functional requirements for recordkeeping systems and metadata specifications and worked with the teams to incorporate these requirements. During meetings with functional areas, I also was able to help flesh out requirements related to specific application records and data management needs. During this process I did a lot of educating on the importance of electronic records management and received a basic understanding of the technical concerns the other team members had to consider.

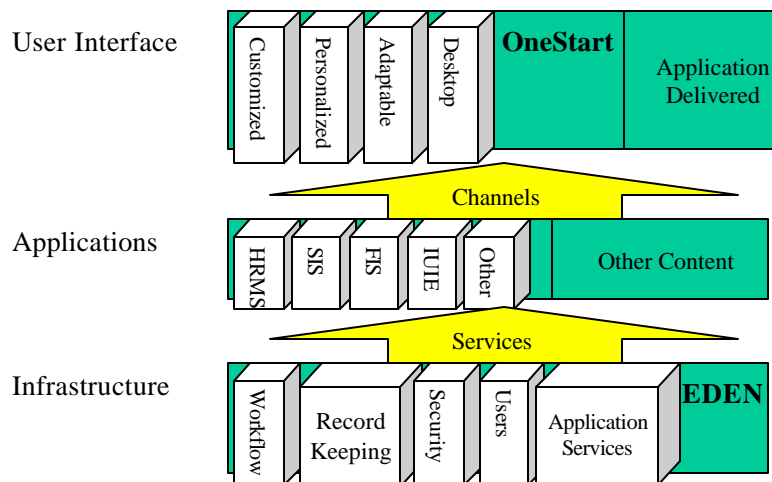
In addition to working with these two teams, I was also a member of the development methodology team. As part of the NHPRC project, we have been pushing the need for business process modeling in every arena currently available to us in the university. By participating on this team, we have been able to help shape the development methodology that OneStart, EDEN, and, hopefully, other new applications will use during the analysis and design phases of their development. Since the portal project is ongoing, the methodology is a living document that is reviewed at the end of each iteration of the application.

Focusing on the business requirements and defining the business processes or functions is key in this methodology. This will help identify the requirements needed for the application. These requirements are then mapped to business objects and usage scenarios. The business objects are then mapped to components or services. It is important, however, to avoid implementation details during this process. This is the most difficult aspect for many programmers since they want to jump in and start coding. Specific tasks such as use cases, sequence diagrams, and class diagrams that are found in the methodology are based mainly on the Unified Modeling Language (UML).<sup>5</sup>

From Fall 2000 to Spring 2001, I continued to work with the portal developers first writing use cases then helping turn the use cases into a portal prototype designed to test the feasibility of some of our requirements and for usability testing. I continued to provide as much technical assistance as I was able including helping with screen design and proofreading sequence diagrams. Once the programmers began coding, I switched to working again on the workflow engine, which had been delayed due to a lack of personnel. We began a new round of interviews with functional areas such as Purchasing to make sure that the requirements previously gathered were still valid and to see if there were requirements that were missing. We also began developing a new conceptual design for EDEN, explained in more detail below.

### Current Conceptual Design

As mentioned previously, OneStart and EDEN are being developed using component-based development.<sup>6</sup> A component is a specific piece of enterprise functionality that can be reused in future development and integration. As you can see in the diagram below, some of the components that are part of EDEN included a workflow engine, recordkeeping, security, and an inbox. A key difference between components and objects is that components clearly separate specification from implementation allowing for easier reuse. Components also have published interfaces that should be independent of their implementation in order to facilitate integration.



**OneStart & EDEN Component-Based Development**

<sup>5</sup> More information about UML can be found at <http://www.rational.com> and from many other web sites and books.

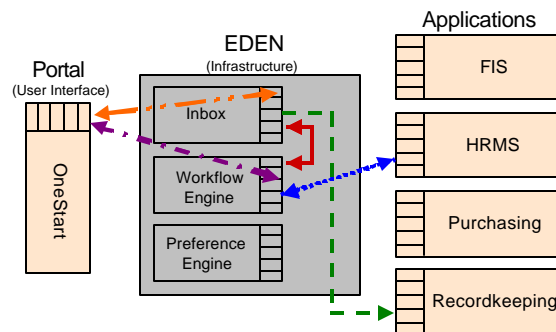
<sup>6</sup> This overview of component-based design (CBD) comes from a presentation given at CUMREC 2001, A Higher Education Technology Conference (an EDUCAUSE affiliate) by James Thomas and John Walsh, "Indiana University Has Embarked on a Journey to Create the "Next Generation" Web Portal," which can be found at <http://www.educause.edu/asp/doclib/abstract.asp?ID=CMR0105>

A component-based approach has several benefits. First, it creates a repository of reusable business functions that also allows for the replacement of specific functions without affecting the rest of an application. Secondly, it aids rapid application development by assembling existing components and services. Thirdly, CBD can improve the agility, flexibility, and scalability of an application. Finally, as long as components agree upon the protocol to be used (the language and the subject being talked about), an application does not have to reach into another application's database for information. They only interact through their published interfaces.

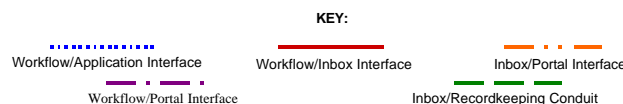
Workflow is "the automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant [human or machine] to another for action, according to a set of procedural rules."<sup>7</sup> What we are calling a workflow engine is the software that facilitates that automation. As Chen notes in "The Paradox of Digital Preservation," a recent article in *Computer*, a journal of the IEEE Computer Society, "Starting from creation and ingestion, we should integrate the workflow process with the preservation process: appraisal, verification, maintenance and, eventually, retirement."<sup>8</sup> At Indiana University, we are attempting to do this by utilizing the workflow engine. What follows is a very high level overview of the engine and its potential for electronic recordkeeping.

When the IT community and functional areas at IU talk about the e-docs that will be routed by the workflow engine, they are generally referring to electronic forms that are connected to database records. These electronic forms are much like the traditional paper forms they replace. E-docs generally do not include other file types such as scanned images although the engine will be able to accommodate these. The workflow engine will route e-docs for activities such as completion, approval, or notification.

The diagram below illustrates the current conceptual design for EDEN, the workflow engine, the inbox and recordkeeping. Since this is conceptual, very little concerning implementation will be discussed. Also, as far as EDEN is concerned, OneStart is just another application like the Financial Information System (FIS) or the Human Resources Management System (HRMS). However, it does have a special relationship since the portal is the user interface for the inbox and other EDEN services. For this reason, OneStart has been set to the left of EDEN rather than grouping it with the other applications.



**EDEN Workflow Engine and Electronic Recordkeeping**



<sup>7</sup> From <http://www.e-workflow.org/>, a workflow portal sponsored jointly by the Workflow Management Coalition (WfMC) and the Workflow And Reengineering International Association (WARIA)

<sup>8</sup> Chen, Su-Shing, "The Paradox of Digital Preservation," *Computer* (IEEE Computer Society), 34(3), p. 24-28.

The best way to explain the rest of the diagram is to use an example involving a document from the HRMS. The HRMS will have a component that represents a particular document type such as a Personnel Action Form (PAF). The system will register routing rules with the workflow engine on how the it should route. The workflow engine routes an XML representation of the document from node to node through the business process. The HRMS owns the data and is responsible for its storage and management. However, the workflow engine does tell the HRMS how that should be done in order to maintain the document's route. All communication between the HRMS and the workflow engine is conducted between their respective interfaces.

The process begins when someone initiates a PAF for a new employee named Joe in the HRMS. Whether Joe's PAF needs to be routed to another node for completion or is ready to begin the approval process, the HRMS sends a representation of the document to the workflow engine when it is ready to be routed. The PAF undergoes a discovery process to find the node where it needs to stop next based on the routing rules mentioned above. Nodes will have an associated inbox, which may be for a person, machine, or another process. In this example, the document is sent to a person's inbox by the workflow engine. The inbox is viewed through the portal. At this point, the employee will only have a list of available documents. After the employee selects Joe's PAF from his or her inbox, the request is sent to the workflow engine. The workflow engine will call on a HRMS component for a representation of the document. The component will request the workflow engine to check the status of the PAF (the document's state and what actions can be taken) and will then provide a representation of Joe's PAF that is displayed through a OneStart channel. After whatever action is taken, the discovery process begins again until the PAF reaches its final node.

In this conceptual design, recordkeeping functionality would be added by including a recordkeeping node. To capture the document when it becomes a record or evidence of a transaction, routing rules could direct the document to that node. The attached inbox would have a conduit that passes the document into a recordkeeping system or repository to be managed. Each document in the recordkeeping system would include the metadata attached at its creation in addition to all metadata gathered whenever it is routed through the engine. Since the record has been captured as part of its associated process, we can be assured that the metadata also contains all of the appropriate contextual information that may be missing if captured at a later date.

At this time, IU does not have, nor plans to have any time in the near future, a document management or recordkeeping system. Having identified a means for capturing records from the various university systems, we are now exploring a partnership with the Indiana University Information Environment (IUIE), which is IU's data warehouse, in order to provide a repository for these records. This is a fairly new and exciting effort that would allow us to make use of existing university resources.

### **Conclusion**

So, where does IU's portal efforts fit in with those at other colleges and universities? Several schools have developed or are developing portals but their numbers are still few. Most of the portals are simply information portals without the middleware such as an integrated workflow engine. Some of the universities with more developed portals are just now talking about adding this middleware layer. Also, IU is taking a unique development approach. Instead of the portal content being created by the portal team as is the case at the Universities of Minnesota and Texas have done, content creation will be distributed across the IU campuses and offices.

I currently do not know of any college or university that is trying to incorporate recordkeeping into their portal and shared infrastructure like we are proposing at IU. If there are colleges, universities, or

corporations out there that are developing portals with the infrastructure that we have described, we would certainly like to hear from you.

Finally, some archivists and records managers may question the value of becoming involved in aspects that are not exactly related to electronic recordkeeping. However, using my skills set in ways that help others makes them more likely to help us as we try to implement electronic recordkeeping practices at IU. It is by forming partnerships and sharing resources that we can continue the work that we have begun with the grant money from NHPRC. This is key to ensuring that the University's electronic records are captured and then maintained throughout their lifecycle.