

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

Daryl R Hoffman
Lead Applications Developer,
OSD
The Pennsylvania State
University

Changing the way a University does business can be a major undertaking. At Penn State University, a mainframe-based homegrown workflow system has been in place for the past twenty years. The current workflow system **Electronic Approval System, (EASY)**, uses a user-based approval approach and allows for a lot of flexibility. Authorized users set up forms that require approval within their own work units or across the entire University system.

Over the past two years the University has evaluated products and solutions to replace the now outdated legacy workflow system. Administrative Information Services (AIS) has decided to make the transition to a role based workflow system, something that was lacking in the current workflow strategy. At the same time, AIS also made the decision to move to a J2EE (Java 2 Enterprise) environment and make the workflow system Web based rather than 3270 or mainframe-based.

Administrative Information Services has decided to leverage the current University LDAP repository (authorization) and Kerberos (authentication) to provide the role based approach necessary to integrate with a product from Software AG/Fujitsu, iBPM (Interstage Business Process Management). The administration has

given our team two years to work on implementing the role based system and re-engineering the existing EASY forms to the new workflow model.

The Administrative Information Services unit of Information Technology Services (ITS) at Penn State formed a team of 5 developers with diverse backgrounds to begin the implementation and design of the new workflow system. The team was given tools to allow them to create a J2EE Web-based application framework and leverage the legacy data, LDAP and Kerberos to accomplish their tasks.

In cooperation with the Academic Services and Emerging Technologies group, the workflow development team will work on the development of the LDAP schema and the definition of the roles and their corresponding attributes.

This paper will discuss how the newly formed Open Standards Development Team (OSD/Workflow) will work on implementing the strategy to replace the current Penn State workflow system.

The presentation will briefly demonstrate how LDAP, Kerberos, IBM Websphere and Fujitsu Interstage Business Process Management (iBPM) tool will be used to create a new workflow system that will be used at Penn State. The presentation will also briefly demonstrate the Undergraduate Education Research Travel Request form as a prototype for implementing the new workflow application.

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

Penn State's Current Workflow System

The current workflow system is a legacy system that is home grown and the approval paths are based on a user ID, and tied more to a person, rather than the role they may be acting in.

The EASY (workflow) process is created on the legacy system and each path is manually filled in with a user ID that is unique to each person at Penn State. The current system also allows for nine levels of approval or review, with the lowest level, 9, being a user ID with read only access to a process or a part of a process.

The current workflow system has its limitations, and so, Administrative Information Services began to investigate alternatives and decided to use a tool that would leverage the LDAP

repository and make the new workflow system role-based and not user or person based.

Penn State's LDAP Directory Services

Penn State uses IBM's Tivoli Directory Management as the basis for its current implementation of LDAP. Academic Services and Emerging Technologies (ASET) has implemented a standard LDAP schema with some additional features specific to Penn State. Each user at Penn State is assigned a unique identifier that stays with them as long as they remain in the LDAP repository. In addition, object classes have been created and the LDAP schema was modified to provide for additional attributes that are necessary for limiting access to specific approval paths that will be provided within workflow (budget, account, approval spending limits, etc).

DESC	<ul style="list-style-type: none"> • Workflow Attributes
MAY	<ul style="list-style-type: none"> • psAccountNumbers • psCostCenter • psDollarThreshold • psFormName • psFormType • psFundCategory • psFundType • psMnemonics • psObjectCode • psProjectNumber • psSubobject • psTaskNumber
NAME	<ul style="list-style-type: none"> • PSUWorkflow

Figure 1

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

The above figure illustrates the attributes that may be given to a user in a workflow role. A value is not required for ANY of the above attributes, and several of the attributes listed above are also multi-valued.

DESC	<ul style="list-style-type: none"> • none
MAY	<ul style="list-style-type: none"> • dmsdir • iflownotification
NAME	<ul style="list-style-type: none"> • iflowperson

Figure 2

This figure illustrates two attributes necessary for the iBPM product that are used to determine where a user's attachments are stored by default (*dmsdir*), and whether or not they would like to receive an email "notification" when a workflow process is running and requires their action (*iflownotification*).

This notification is based on their Penn State Access User ID and the role that is assigned to a step in the review of a workflow process.

Data for the LDAP directory is fed from the legacy systems. At Penn State these legacy systems are separated into a student records system and a financial or

business system. Data is currently fed on a daily basis from the student system (ISIS), and on a weekly basis from the business system (IBIS). The workflow team is currently working with the IBIS staff to make the updates occur more frequently and at some point the desire is to also allow this to happen daily because a user will not be able to access a workflow form without first being created on the IBIS system.

The roles will be created as the processes are built or re-engineered into workflow. There will be role assigners who will be given access to a tool being created by ASET that will allow them to assign authorized individuals to a role and to set or modify their attributes.

For example, if there is a role defined as *wfg.046.financial.officer*, then the role assigner may assign a user who is currently in LDAP and assign their attributes based on those that are currently listed above and possibly others as they become required and are defined.

Once the roles are defined, the roles are then added to a special group in LDAP defined for iBPM, *iflowGroups*. The *iflowGroups* will look something like this:

cn	<ul style="list-style-type: none"> • iflowGroups
member	<ul style="list-style-type: none"> • cn=wfg.robot1,dc=psu,dc=edu • cn=wfg.robot2,dc=psu,dc=edu • cn=wfg.robot5,dc=psu,dc=edu • cn=wfg.QA,dc=psu,dc=edu • cn=wfg.up.science - eberly college.dean,dc=psu,dc=edu

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

	<ul style="list-style-type: none"> • cn=wfg.up.015.engr.sci.&.mechanics.dept.head,dc=psu,dc=edu • cn=wfg.up.028.biology.dept.head,dc=psu,dc=edu • cn=wfg.up.028.chemistry.dept.head,dc=psu,dc=edu • cn=wfg.up.028.physics.dept.head,dc=psu,dc=edu • cn=Role,dc=psu,dc=edu • cn=TWFAAdminRole,dc=psu,dc=edu • cn=TWFDDev,dc=psu,dc=edu • cn=wfg.commonwealth.campus.vice.president,dc=psu,dc=edu • cn=wfg.executive.vice.president
--	--

The members are then added and the role will appear as something similar to this:

cn	wfg.up.028.biology.dept.head
member	psdiridn=370665,dc=psu,dc=edu
member	psdiridn=367185,dc=psu,dc=edu
member	psdiridn=602719,dc=psu,dc=edu
member	psdiridn=471206,dc=psu,dc=edu

This LDAP management tool, affectionately referred to as the “WebRAT” (Web Role Authorization Tool), being developed by ASET will not only be used for workflow, but also for assigning users to roles in any role-based system implemented at Penn State now or in the future. If the role that a user is being assigned to requires approval from other role assigners or role stewards, then the WebRAT will also initiate a workflow process using a call to the generalized interface.

J2EE Development

Administrative Information Services has chosen IBM’s Rational Application Developer (RAD) as its J2EE

development environment. The OSD team was given the RAD development tool and based on the limited Java exposure in the group, only a few were able to begin to work on the framework that would be used to create the backbone for the workflow application processes.

The workflow framework will be used to control authentication and authorization, retrieval of a user’s current work items that are awaiting action, limited browsing and searching, and general workflow process functionality.

The Websphere workflow application will run on the Linux/390 environment and utilize generalized interface calls that will be used to implement the Web services provided by the workflow engine.

The Generalized Interface

The Generalized Interface (GI) is a tool that was created within AIS and uses XML/RPC calls that currently is used

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

mostly to retrieve data from the legacy systems utilized at Penn State.

Workflow is now requesting the GI to allow the developers who will use workflow and the iBPM product to make the Web service calls using SOAP.

The GI is a home-grown system that is currently based in the Smalltalk environment and runs on the Windows platforms. The GI also utilizes a load balancer which was also implemented as a home grown way to balance the workload among services or would allow the GI team to specify a group of defined machines to only do one specific task, i.e. retrieve student grades or update an employee's benefits.

The Workflow Engine

After careful review and extensive analysis, AIS moved towards using a tool developed by Fujitsu and now supported by Software AG, Interstage Business Process Management, as its workflow engine.

AIS also made a strategic decision to have the software vendor port the code that was currently available on Windows and Unix, to a Linux environment, so that it could be deployed in a mainframe environment running Linux/390 (formerly referred to as zLinux).

The iBPM product provides a development tool for creating the actual "process flows" that currently uses a Java applet running from the iBPM application server, but will soon be running from the Websphere environment. The applet provides widgets which the developer can drop

within the template and create a process flow. The applet is Web-based and uses RMI to communicate with the iBPM server.

The developer, when creating the process, sets an activity within the template and then assigns a role to that activity for action. The iBPM engine then queries the LDAP server or a cached replica of the LDAP data and assigns the users to that step in the process.

In addition, iBPM provides APIs and Web services (SOAP), that allow the developer to implement their JSPs or other HTML or Web pages and receive the necessary information from the iBPM server in order to present it to the user.

Training

The OSD team received extensive training on each of the products. The training was done on-site and included training on XML, Tamino, Websphere/RAD, JSP and Java Servlet Development, iBPM training. The training was necessary because of the diversity of the group.

There were several in the group who came from a structured programming background, and two who had experience in Smalltalk/Object-Oriented programming. One of the members of the OSD team had actual "hands on" experience in creating a J2EE application based on JSPs.

Workflow: Updating a Legacy Workflow System Utilizing Modern Tools

Conclusion

The J2EE, role-based implementation of workflow at Penn State is still in its infancy, and the developers, project leaders and management continue to learn how to best utilize and implement the new technology.

The first forms that will be implemented within the workflow system will be the Undergraduate Research Travel Request, Sabbatical, Request for Leave, Supplemental Check Request (SUPP) and the Purchasing Card Update and Creation (APCA/UPCA).

The current plan is to release a prototype for testing mid-2006 with a possible production date of sometime in the final part of 2007. The initial production release will be a limited release, but once the workflow processes are placed into full production on the Web, the forms will be turned off on the legacy system.

As workflow evolves at Penn State, future reporting structures and applications, data extraction and storage, as well as attachment and document management will continue to be developed and utilized within the workflow system.

The current timeline for the completion of the migration to the role-based workflow system and the removal of the legacy EASY system is two to five years. The project is still new, but the tools are in place to achieve these goals and implement a more defined workflow system here at Penn State.