



Project Summary

The University of Michigan, Indiana University, MIT, Stanford, and the uPortal consortium are joining forces to integrate and synchronize their considerable educational software into a pre-integrated collection of open source tools. This will yield three big wins for sustainable economics and innovation in higher education:

- A framework that builds on the recently ratified JSR 168 portlet standard and the OKI open service interface definitions to create a services-based, enterprise portal for tool delivery
- A re-factored set of educational software tools that blends the best of features from the participants' disparate software (e.g., course management systems, assessment tools, workflow, etc.)
- A synchronization of the institutional clocks of these schools in developing, adopting and using a common set of open source software.

The products of this project will include an Enterprise Services-based Portal, a complete Course Management System with sophisticated assessment tools, a Research Support Collaboration System, a Workflow Engine, and a Technology Portability Profile as a clear standard for writing future tools that can extend this core set of educational applications.

The modular, pre-integrated tools will greatly reduce the implementation costs of one or more of these tools at any institution. The Sakai Project Core universities are committing over \$2 million per year to launch and support this two year project. The core universities are also committed to implementing these tools at their own institutions starting in Fall 2004 through the duration of the project. The commitment of resources and adoption is purposefully set on an aggressive timeline to swiftly integrate and synchronize the educational software at the core institutions. This effort will demonstrate the compelling economics of "software code mobility" for higher education, and it will provide a clear roadmap for others to become part of an open source community.

Project Motivations and Contributions

Higher education will continue to invest in IT as an essential element of executing its teaching, research, and service missions in effective and economically-sustainable ways. IT, particularly software development and implementation efforts, are very expensive and challenging to align to the common and unique needs of various institutions. 'Code mobility' via open source communities holds great promise for an economically-sustainable IT investment path for higher education, yet real barriers impede the realization of this promise. The Sakai Project will bring considerable, synchronized, focused energy to overcome these barriers and accelerate a new path for code mobility in higher education in the core areas of online teaching, research and provision of campus portals.

Historical Barriers

Thus far, two main barriers have consistently defeated various efforts to pool higher education software development investments that could leverage obvious economies of scale: First, unique local technical architectures, including heterogeneous hardware, software interoperability requirements between systems, and diverse user interface requirements, have impeded great software at one institution from being moved to another even when it was available as no-fee, open source software. Second, inter-institutional timing differences of when a particular software need has mobilization, funding, and attention have impeded pooling requirements and development resources in synergistic ways, leading to fragmented efforts, competing and incomplete open source offerings, and weak interoperability.

Overcoming Barriers to Application Sharing

The technical barriers can now be overcome by distilling the accumulated architectural knowledge and programming experience gained in building these systems into a Technology Portability Profile (TPP) that provides four essential elements for code mobility.

1. **Service Interface Definitions:** The Open Knowledge Initiative Open Services Interface Definitions (OSIDs) have provided an essential first contribution to solve the technical challenge. Local implementations of the OSIDs at an institution integrate heterogeneous local architectures (e.g., an authentication system or directory service) by using common connectors that enable code mobility for OKI-based application software (e.g., a CMS, library system, collaboration tool, etc.).
2. **Standard Portal:** Advanced CMS's are based on portals that aggregate class information and services and allow the user to personalize and customize their views of these classes, services and information. At the same time, university-wide services are migrating from independent web-based interfaces that accessed siloed systems (e.g., Bursar, Library, Registrar, CMS, etc.) to enterprise-wide portals that integrate a personalized view of the full range of the university's services and information. The uPortal effort has brought forth a powerful portal environment that has commanded broad adoption, but it currently lacks the recently ratified JSR 168 portlet specification needed for tool interoperability. A standards-based portal that can be used as both the academic portal for the CMS as well as for delivering other university services via the JSR-168 portlet standard is a core building block of the TPP.
3. **Tool Interaction Framework:** Tools need a framework to provide a consistent way for invoking other tools and passing information among them. For example, a homework drop box tool developed at one university may need to invoke and pass a grade to a grade book tool developed at another. This framework provides a common place for these tools to interact with each other in a standard way. It also provides services like notification that cross tool boundaries. The U Michigan CHEF project has developed such a portal-based framework which provides the environment for a large set of course management tools.
4. **Localized User Interface:** Institutional adoption by faculty and students often relies on user interfaces that match other familiar systems. A user interface includes colors, fonts, logos, and navigation aids that can be localized as needed without disturbing the underlying functionality of the software. The TPP will provide standard methods and description of best practices for Sakai-based tool interfaces to be customized and modified by user institutions

The maturing of the OKI OSIDS, recent demonstration of a working tool interoperability framework at U. Michigan, and industry ratification of the JSR-168 portlet specification make the timing perfect for developing a full Technology Portability Profile for higher education. But, while specifications, standards, and profiles are numerous in higher education, it is large adoptions that give a specification momentum to become a universal and wide spread standard. The TPP provides the basis for two activities that overcome barriers standing in the way of real working systems, and barriers due to timing. These are described in the next section.

Project Contributions

The Sakai Project will bring three very quick primary contributions to deliver the promise of code mobility in higher education. Primary contributions are within the control of the project participants to ensure and deliver. They are summarized here and expanded upon in detail in a later section.

Direct Contributions

- The first contribution will be the previously described Technology Portability Profile that will describe the integration of OKI's OSIDs, a user interface abstraction for localization and the new JSR-168 portlet specification. This Profile integrates the successes and lessons of Michigan's CHEF interoperability framework, and JA-SIG's uPortal, and describes a common path forward for their respective developer/user communities.
- The second contribution is that Michigan, Indiana, MIT, Stanford, and uPortal will all license their considerable intellectual property and/or experiences with large scale application software (e.g., Course Tools, Work Tools, Navigo Assessment, Oncourse, Stellar, uPortal, OneStart, Eden Workflow, CourseWorks, etc.) into a re-factoring of best features. This will include an enterprise-scale course management system, distributed research collaboration tools, and an enterprise services portal (described in more detail below), and others that have been conformed to the Technology Portability Profile. All Sakai tools will be both modular and also pre-integrated to work with each other. The software will be made available to the world at the same time via an open source license.
- The third contribution overcomes the barrier of institutional timing by synchronizing the development and implementation clocks of four complex institutions: Michigan, Indiana, MIT, and Stanford. All institutions are committing to an initial implementation of the Sakai tools, as a campus-wide CMS and/or campus-wide enterprise Portal by Fall of 05 when the tools are fully released. Synchronized clocks will greatly facilitate further shared developments in the years beyond the Sakai Project.

Secondary Contributions and Educational Partners Program

Secondary contributions are no less valuable and in the longer run may be more valuable to the educational community. They are described here as secondary contributions as they are premised on the actions of others who are not within the direct control of the Sakai Project Core participants.

These large scale deployments of common applications based on the TPP at four complex institutions will clearly demonstrate the real viability of open source code mobility for higher education. The synchronization and TPP also provide a common means for pulling together the considerable extended user communities of uPortal, OKI, and Michigan's CHEF Project.

The Sakai Project is also developing an Educational Partners Program that includes resources for community development, training, shared best practice, and early access the TPP and Sakai applications. The goals of the Educational Partner's Program include

- To involve a wider community in the Sakai Project's open source vision, economics, and innovation
- To mobilize distributed resources for development and support of Sakai tools
- To initiate a 'market of tools/components' that will run in the Sakai framework
- To manage interaction with the Sakai Core development team
- To coordinate activities with other organizations, such as IMS or country-level agencies
- To build on the experiences of the JASIG, CHEF and OKI training and conferences
- To generally engage in Sakai community development of shared best practice

The education community will benefit greatly from a Technology Portability Profile that provides an open, non-proprietary, and fully articulated specification for interoperable software. Any institution or commercial entity can build to this Profile, thus helping all institutions integrate software from multiple sources as their timing may require.

The economics of software for the education community are greatly served by a proven set of pre-integrated, modular, open source applications that any institution can adopt incrementally or as an integrated set of tools. Adopting institutions of any size or technical sophistication will be freed from annual licensing fees for Sakai Project software. Thus, money that would have been spent on licensing and integration can now be devoted to other academic priorities for an institution.

For more information:

Contact Jim Farmer or submit a request using the Request form.