

# Sakai 3 Proposal

A proposal for a next generation Sakai

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Sakai Foundation



## SUMMARY

This document outlines the ambitions for a next generation Sakai Collaboration and Learning Environment. It attempts to represent the thinking of many individuals in the Sakai community about where Sakai should be headed.

## Introduction: Why Sakai 3?

The time has come for a significant change in Sakai. The current system has been successful in enabling campuses around the world to benefit from the community source collaboration envisioned by the founding universities and the Mellon Foundation. Still, many things have changed since Sakai's inception. Sakai end users, increasing familiar with "Web 2.0" technology, are demanding an environment that is more flexible and affords them greater control. Social networking has exploded on the scene. Uses of Sakai in research and administrative collaboration have proven extremely valuable. New standards and open source projects have emerged that Sakai can leverage and integrate with. New models of web development have emerged, models that leverage client-side technology, significantly improve productivity and lower the bar for meaningful contributions and Service Oriented Architecture has emerged as a design and deployment preference for institutional systems. Most significantly, the traditional role of Course Management Systems & e-Portfolios is rapidly changing and there is broad recognition that the current platforms need to evolve substantially to meet the long-term needs of users and institutions.

The Sakai community has also learned a great deal. Increased adoption has revealed the breadth and complexity of use cases and it has become increasingly clear that portions of the code would benefit from a substantial rewrite that lowers maintenance costs while retaining flexibility to meet local needs. The limitations of the "site" as the organizing principle of Sakai are increasingly felt as institutions use Sakai in more contexts and across many years. Areas of production stress in the code and database have been identified and substantially improved, but we are reaching the point of diminishing returns with the current architecture. Sakai's SOA implementation has proven extremely valuable in practice, and yet could be improved to adhere to current standards and make it maximally compatible with new projects like Quali. And, finally, the relative scarcity of Java developers on campus makes it imperative to simplify Sakai programming, thereby opening Sakai to a broader group of developers and increasing our capacity to innovate as a community.

In summary, our ambition is not merely an incremental improvement of Sakai nor is it to copy Google. Our goal is not simply to create a better and cheaper version of Blackboard. It is time to arrive at a clearer understanding of the capabilities that represent needs unique to education and for the Sakai community to focus its development effort on providing these capabilities while taking advantage of established open-source efforts to provide more generic capabilities. We should, in short, strive to create a different type of *academic* collaboration system. Institutions that choose Sakai 3 will be choosing to run a qualitatively different type of system. This is the kind choice we should provide to the educational community. Not just a choice between open source and proprietary.

For all of these reasons a group of institutions, led by Cambridge, Georgia Tech and UC Davis and including Indiana, Michigan, Toronto, Berkeley and the Sakai Foundation, have begun to develop a vision and preliminary technology for a next generation Sakai. This Sakai will be based on a new set of core Sakai services (the “kernel”) that leverages best of breed open source technologies (e.g. Jackrabbit and Shindig) to enable development resources to be focused on what is truly special about academic collaboration. It will showcase a new, user-centered interface that is both easy and enjoyable to use. And it will include new capabilities, like social networking and flexible content authoring, that today’s users expect from a web application.

This core group has begun to make progress. The beginnings of a new kernel have emerged. Design work has started on a new user experience. New concepts for many aspects of Sakai are being discussed and analyzed. While many areas need further conceptual and technical work, the path forward is increasingly clear and achievable. The remainder of this document provides more detail on the proposed approach, articulates the benefits for your campus and describes how to learn more about and participate in the effort.

## Sakai 3.0 for Users

There are a number of changes envisioned in the Sakai 3.0 user experience. From a look and feel perspective the current UX Initiative is already pointing the way to a more responsive, flexible, widget-based user experience (see some samples of this work at <http://ux.sakaiproject.org> and <http://3akai.sakaiproject.org>). This work is resulting in significant improvements to the user experience, improvements that are critically important, but perhaps not sufficient. Beyond this usability work there is a set of conceptual changes that need to be made. Many of these changes require changes to the core Sakai architecture. We highlight a few of these changes here: Social Networking, Content Creation & Management, Moving beyond Sites and Breaking Tool Silos.

### Social Networking

Academic research and teaching are sometimes solitary experiences, but increasingly they are becoming collaborative endeavors. There is a trend towards greater openness in university teaching, and group activity often enhances learning. The emergence of 'Social Networking' web sites such as FaceBook, LinkedIn and MySpace has created a new standard of convenience for creating online spaces that can be used to collaborate in small groups and to present profile information to peers. Innovative features such as 'activity feeds' are proving addictive in sustaining online engagement and there is increasing openness of the social networking platforms through the Facebook APIs or the OpenSocial APIs promoted by Google and is being adopted by almost all social networking sites.

However, many social networking sites require the member to grant the site owner liberal licenses covering the member's work, thus limiting the security with which confidential

research or teaching can be carried out on such platforms. Moreover, the interfaces and affordances of such sites are not well adapted to academic purposes (e.g. LinkedIn profiles do not readily display publication lists).

The incorporation of Social Networking into Sakai, using the Apache Shindig project, will enable new models of interaction among users of the Collaboration and Learning Environment, in a manner suitable for academic work, but will also facilitate collaboration among Sakai institutions in which the members of a network at a trusted partner institution can be given access to the network(s) of a Sakai adopting school for research, learning, and the formation of peer groups of many kinds. While we do not know exactly what direction this work will take we believe it is critical that universities play a leading role in the development of social networking technology on campus. We cannot afford to leave this to Facebook or MySpace or Blackboard.

### Content Creation and Organization

Authoring content inside Sakai is awkward. There are some special purpose tools, like Melete/Modules, for creating structured content for a particular purpose. There is no tool designed to let users create unstructured or semi-structured web pages to share with others. Creating an HTML page in resources and then adding the web content tool and pointing to the HTML page is one way to go about it, but it is awkward and overly complex. Even creating references to existing content is complex and unwieldy.

And yet, creating content is a lot of what academic work is about. Instructors create syllabi for their students. Students, working alone or in groups, complete homework assignments for submission to the instructor. Research groups share and elaborate ideas in wikis and other collaborative writing software. Administrators write policy and procedure documents. And so on. In the meantime, web-based collaborative authoring tools like Google Docs/Sites/Groups have increased expectations about what is possible online.

Sakai 3 recognizes that content creation and organization is a primary activity of Sakai users, whether they be instructors or students or researchers or staff. Providing simple template-based authoring and flexible tools for organizing and presenting content will be a primary focus of Sakai 3. On the technology side, we will leverage industry standards (JCR) and open source technologies (Apache Jackrabbit) to support content storage. This will provide a significant improvement in capability (e.g. versioning) and reduce the amount of code the Sakai community needs to support. And, of course, we are not talking about creating our own HTML editor. There are a few capable open source tools we can lean on for this purpose, the current leading candidate being TinyMCE because of its flexibility, extensibility and focus on accessibility.

Finally, Sakai 3 recognizes that many things should be treated as content. Discussion forum and blog posts, assignment submissions, user profile information and online test answers could all be usefully regarded as pieces of content. Taking an “everything is content”

approach to Sakai 3 will allow much more flexibility in searching, organizing, tagging and otherwise manipulating items in Sakai.

## Moving beyond Sites

Sites are the primary organizing principle of today's Sakai. Site context is a deep and rigid assumption for nearly all functionality, and it stands in the way of activities that might extend across sites or operate independently of them. The notion of a *group* in Sakai stands as a particularly strong example of unnecessary site dependence. In Sakai 2, groups only exist within a site. If you want to address a particular group of individuals they need to all be members of a single site. If the same group needs access to multiple sites then that group needs to be recreated. In Sakai 3 groups are treated as first class citizens. Users will be capable of managing groups independent of sites. They can create groups, referencing an external system as needed (e.g. an SIS like Banner perhaps through the IMS Enterprise Specification or via a more generic LDAP provider), and later worry about what that group has access to.

This line of thinking will be applied to other items in Sakai, including Users and Content (and Tags and Permissions). Content is another excellent example where the primacy of the site is more tyranny than convenience. While content can be made public, it exists inside a particular site context. Moving content between sites or referencing content from another site is cumbersome and unnatural. In Sakai 3 content will be a first class citizen as well. Content owners can organize content in a variety of ways and make it available to various users, groups and sites as they see fit. Instead of the *site's* content we will think about the *user's* content or a *group's* content, both content they own and content they have access to.

## Breaking the Tool Silos

Tools are another important target for change. Sakai's "tool silos" are well recognized and restrict natural workflows that reflect user models of academic activity. While more intuitive "cross tool" interactions are more and more common in Sakai 2, the underlying architecture and original technologies makes this difficult at best. Sakai 3 will be constructed around smaller units of capability (in the form of true SOA services) that can be quickly stitched together to provide intuitive workflows. We need to think of the relevant items in Sakai (from discussion posts to assignment submissions to test questions to portfolio reflections) and the activities relevant to those items. These items and activities will surface in many different places depending on the context. Sakai 3 should respect the context and present the workflows that make sense inside them.

## Sakai 3 for Technologists

We have learned a great deal in the last several years and, at the same time, new technologies and techniques have emerged. Much progress has been made, to be sure, on

the current architecture and code base but we are reaching the point of diminishing returns. Armed with the insight gained from the current experience, we are in a good position to establish backing technologies that both improve the product and reduce the maintenance burden on the community. The resulting Sakai 3 will deliver a variety of technical benefits, including the following:

- **Scalability and Resilience:** While Sakai has achieved impressive levels of scalability already with installations of over 200,000 users, achieving good performance at this scale has required a significant investment. With the knowledge we've gained about Sakai usage patterns and the inclusion of new "internet scale" open-source technologies, Sakai 3 will both achieve new levels of scalability and will make it simpler to run a smaller installation.
- **Improving Developer Productivity:** Recent community efforts in client-side development have underscored just much more efficient Sakai development can be. Today, a substantial depth of technical skill and attention to a large number of details are required to achieve even results, and the consequences of this difficulty ripple outward: less gets done, fewer people are able to do it, and usability experts are effectively held at arm's length. Sakai 3 services will provide JSON data feeds allowing JavaScript developers to create user interfaces and, if desired, generally function independently of Java developers. This also frees Java developers to spend less time on user interface rendering and focus on the scalability and quality of the core services
- **Code Quality and Maintainability:** The maturity of other open source projects now allows us to consider swapping out whole regions of Sakai services with 3<sup>rd</sup>-party code. By judicious incorporation of such services our overall quality can be improved, our APIs can be made more standard, and our maintenance burdens and risks lightened. In addition, Sakai has traditionally had very little test code. This oversight increases burdens on QA cycles by not exposing problems quickly enough, ultimately forcing us into a post-release reactive posture with regard to critical bugs. 3<sup>rd</sup> party code must be examined for the quality of the test coverage it brings with it and we should extend full coverage to Sakai services.
- **Installation and Maintenance:** Sakai is too difficult to build for staff that are not experienced Java developers and too difficult to install for staff that are not sufficiently technical. A smaller, tighter kernel and a mechanism for easily adding/removing tools will allow new Sakai users, deployers and developers have a more positive and productive initial experience. This is important to the growth and overall health of the community. A more efficient, easier to maintain installation has many benefits, most notably that staff can spend more time on innovation.

## Sakai Use Cases

Up to this point in time, Sakai has been defined by the existing product category that best matches how particular campuses are using it. Thus Sakai may be an ePortfolio system, a Course Management System, a Virtual Research Environment, or even a web-based file store. This has been both a strength, demonstrating the platform's flexibility, and a weakness, creating more diffuse communication and development effort. The development of Sakai 3 will allow clear delineation of the underlying platform technology and the various deployment profiles supported on that platform.

When we do what has been described above, Sakai will acquire utility in many corners of the institution beyond the current teaching and learning base. One goal of Sakai 3 is to support more open teaching and learning practices. In doing so, Sakai begins to acquire some of the characteristics of a content management system. This is explicitly recognized in some of the underlying technology choices of Sakai 3. The boundaries for Sakai will continue to blur and to increasingly be expressed in terms of which broad capabilities do we want to offer to which users rather than which product category does Sakai occupy. So rather than saying that "Sakai is a CMS" or "Sakai has an ePortfolio tool" we should say: We're using Sakai to support student portfolios and to provide technology support for teaching & learning on campus.

On the other hand, for those institutions that *do* want to offer Sakai as a niche it should be easy to configure an installation with those characteristics. Two examples follow:

- **Sakai 3 as a portfolio system.** Content in Sakai 3 will no longer be tied to sites. The ability to make content public or private and in general, to control the access various groups have to particular content, will be much more flexible and controllable by the user. The unstructured and semi-structured content authoring in Sakai 3 will allow for free-form portfolios. Tagging will be built in, with tag vocabularies built by the user or provided by the institution, allowing content to be more easily assembled. Through all of these improvements it should be possible to create portfolios that more easily meet the typical portfolio uses cases: student self-expression, an electronic resume and institutional analysis.
- **Sakai as a group collaboration system.** Group projects are often more fluid than classes and definitely last longer. Participants can change rapidly, participants from outside the campus are more likely to be involved and, generally speaking, the proportion of users creating content for use by the group is higher than in courses. Research projects may have special archiving needs. Projects also often want to have a public presence and be able to use the "same space" for the work internal to the project and communication with the outside world. Sakai 3's group and content management capabilities should provide an attractive package for organizations wanting an on-campus system for project collaboration. Yet Sakai 3 should integrate

will with off-campus systems (e.g Google docs) and therefore provide individual groups with flexibility on the specific tools they use.

## Benefits on Your Campus

In summary, the Sakai 3 effort is designed to bring a number of benefits to your campus, including:

- **Increased user satisfaction** – A more fluid and flexible Sakai, one that is both pleasurable and efficient to work with, will allow users to focus energy on improving the quality of their work.
- **Improved stability & quality** – In addition to the obvious user satisfaction that comes with stability and quality, your campus IT and support staff will have more time for other activities.
- **Increased scalability** – The ability to support more users per application server will reduce the overall cost of ownership of Sakai and can let your organization serve additional customers (e.g. a local school district) that might previously have been too expensive to consider.
- **Fewer local customizations** – As an Open Source product, customizing Sakai for your local needs should continue to be one of the main benefits of using Sakai. By ensuring that more use cases are covered “out of the box,” however, your local customizations can really focus on what is unique to your organization.
- **Simpler integration** – Sakai already has a reputation for being an excellent application to integrate with other campus systems. By building on and improving Sakai’s service-orientated architecture, these benefits will continue to accrue as more campus systems support SOA.
- **Easier development** – Allowing a wider variety of developers to contribute to Sakai creates a wonderful virtuous circle. More participants can help the project and existing contributors will be more efficient. This means more staff time for local customizations and, more importantly, innovation.

All of these add up to a lower total cost of ownership and better value for your investment. What your campus chooses to do with the additional resources—spend them on other project or increase the amount of innovation in the development and use of Sakai is up to you.

## Getting your Campus from Sakai 2 to Sakai 3

Everyone is familiar with many issues in the Sakai product, from dissatisfaction with aspects of the user experience to concerns about the size and complexity of the current code base. Many of those who know Sakai best believe that this is the opportune time to make significant changes to the Sakai design and technical architecture. Not only have new technologies emerged that allow us to design and build software in different ways, user expectations have changed with the emergence of Web 2.0 technology and the "social" web. We need to take advantage of these technologies and respond to these shifting expectations quickly. This is an especially important time for Sakai adoption. Continued questions about the commercial offerings have led many organizations around the world to look elsewhere. The current Sakai, while sufficiently capable of replacing an existing instance of WebCT or Blackboard, is not significantly different from the commercial products to provide a real advantage as a product.

That said, there are many schools with significant resources committed to "classic" Sakai who need incremental improvements to their versions while they develop plans for moving their user bases to a significantly different Sakai. Many of these schools would not be able to move to such a significantly different version until the 2010 or 2011 or even 2012 academic year. We can't ask them to stick with 2.5 or 2.6 until that time. The approach is to simultaneously start Sakai 3.0 while continuing incremental development on 2.x code base.

We will introduce a preview version of Sakai 3 in the summer of 2009. This will be suitable for running project collaboration sites but will probably not have full support for teaching and learning or portfolio uses cases. Still, it should allow your campus to begin to introduce key stakeholders to the changes to begin to create buy-in and even excitement for the upcoming change. It also provides an opportunity to present the core Sakai 3 development team with real feedback from real users.

We anticipate the following schedule for transition:

- **Q1 2009:** Sakai 2.6 will be available.
- **Q3 2009:** A maintenance release of Sakai 2.6 will be available (maybe 2.6.2 or 2.6.3). A *preview* version of Sakai 3 will be available. It will not be functionally equivalent to Sakai 2.6 and will not be suitable for most campuses in production. It could be used on a pilot basis to begin to pave the way for the future transition to Sakai 3.
- **2010:** Sakai 2.7.0 will be available (early in the year). It will contain significant tool improvements and new functionality. At the same time, the first production-ready version of Sakai 3 will be ready. New adopters will be encouraged to use this. Existing Sakai 2 users may move depending on the complexity and scope of their change process.

A “hybrid” mode will be available. It will allow Sakai 2 and Sakai 3 to run side by side and appear as single system to users. Configuration settings will allow you to determine which capabilities are drawn from Sakai 2 and which are drawn from Sakai 3.

- **2011:** Sakai 3 will be in full swing. Maintenance releases for Sakai 2.7 will be available for those institutions in transition. There will be no version 2.8<sup>1</sup>. Schools will be encouraged to migrate to Sakai 3 this year or next.
- **2012:** Formal maintenance releases for the Sakai 2.7 code base will cease although we will maintain the branch for another year if there is sufficient community interest. Organizations can continue running Sakai 2.7 through this period but should have migration underway or planned.
- **2013:** Everyone in the community is running a version of Sakai 3. Design work has certainly begun on Sakai 4.

## Your Feedback

The Sakai Foundation and the universities involved in the Sakai 3 effort would like your feedback. To this end, we’ve created several polls on a Sakai server that is being used as a test-bed for many of these ideas. To let us know what you think, follow these instructions:

- Go to <http://3akai.sakaiproject.org>
- Create an account or log in using your existing account.
- Use the “Add Widget” button to add the “Personal Tools” widget if it isn’t already available.
- Click the “Membership” link in the “Personal Tools” widget.
- Join the “Sakai 3 Vision” site.
- Go back to the Dashboard.
- Use the “Sites” widget to navigate to the “Sakai 3 Vision” site you just joined.

You can also provide feedback on the Sakai email lists. We suggest advocacy for general discussions with cross posting to sakai-dev for technical topics.

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<sup>1</sup> Of course, Sakai being an open source project, there most certainly can be a version 2.8 if there is sufficient interest. What this really means is that the organizations supporting the vision in this document will not be putting resources into versions past 2.7.

## Participating in the Effort

Once we get feedback on the overall direction and vision we will be providing additional information about how to get involved in the coming weeks. In the meantime, you can follow what's been happening in the following locations:

- A development server is available at <http://3akai.sakaiproject.org>
- A Google group has been formed for K2. This is a technical group and can be found at <http://groups.google.com/group/sakai-kernel>. A Google group was used rather than collab & confluence because of issues some of the key participants had in accessing confluence at the time the work started. And because the group wanted a direct experience with another product being used for project collaboration.
- The Sakai Foundation will be sending occasional updates and perhaps running a series of webinars to explain the effort. Stay tuned for more information on these.