

Collaborative Tools Strategy

University of California, Berkeley

This document presents a strategy for supporting the sweeping changes in scholarly and administrative work brought on by a new generation of computer- and internet-based collaborative tools available to, and in use at, the University of California, Berkeley. In reaching the goals outlined within this proposal, the campus will make it easier and more natural for people to work together – to collaborate – using information technology tools and services.¹

Introduction: the current landscape

This strategy arises from an explosion of collaborative tools and technologies available to the faculty, students, and staff of UC Berkeley. Like many other universities nationally and internationally, the campus is wrestling with how best to handle the costs of supporting these technologies, how to manage the responsibilities and risks they present, and how to help its members appropriately and productively adopt the new options before them. The landscape in which the campus operates has a number of salient features.

Collaboration is fundamental to scholarly work.

Collaboration, across time and space, is the fundamental method of scholarship...

— Scholarly Information in a Digital Age
Consultation Paper, University of Melbourne, February 2008

Science in the twenty-first century is increasingly a game of data curation and analysis, involving hundreds or thousands of players distributed all around the world.

— Jon Udell, Microsoft Corporation (and former InfoWorld columnist), April 3, 2008

Collaboration has long been a key element of scholarly work, and that trend has accelerated in recent years. In part, this is due to the near ubiquity of information technology (IT), which has increased both the range and speed of collaborative activity. In a growing number of disciplines, particularly in a number of the biological and physical sciences, technologically-mediated collaboration is simply how work gets done.

1. By "collaboration," the authors of this strategy mean work done by two or more persons working together on non-routine cognitive tasks, as peers, in an interactive manner. "Collaborative tools" are information technology tools that support those tasks. The capabilities provided by these tools include:

- Email
- Calendaring and scheduling
- Content sharing (photos, videos, bookmarks, files, etc.)
- Group interaction
- Workspace-oriented collaboration.

Representative examples of group interaction tools include discussion forums and conferencing tools, wikis and other collaborative authoring tools, tools for coordinating tasks and projects, and social networking tools. For a more complete discussion of collaboration, please see "Spotlight: Definition of Collaborative Tools."

Scholars in all fields today share documents, discuss ideas, make decisions, plan projects, and schedule meetings electronically. Moreover, incoming students and younger faculty arrive on campus with established online identities, accounts, and tools of choice. They bring raised expectations about the availability, ease of use, and accessibility of collaborative tools and services on campus.

Yet technologically-mediated collaboration is often too hard today. All too commonly, collaboration using IT tools and services is neither simple, wholly productive, nor satisfying.

Collaboration works best when collaborating partners can rapidly begin working together, using tools that allow them to interact around the same data. For example, partners writing and editing a document together need to be able to view each others' changes; roll back to earlier versions when their newer writing hits a dead end; and whatever happens, avoid having multiple, out-of-sync copies floating around. These tasks are far easier when participants use the same application, and have a single place to store drafts of the document.

On the Berkeley campus, this type of environment isn't always available when needed. There are many barriers to getting all participants in a collaboration working productively from the start. Shortcomings of the current environment include:

- *Few widely shared collaboration tools.* CalMail (email) and bSpace (course- and project-related worksites) are the only two campus-run collaborative tools that are available, free of charge, to the entire campus community. For many tasks, faculty, students, and staff rely on familiar and widely available desktop productivity tools such as Word and Excel, even though these tools aren't designed specifically for collaboration. Beyond these, however, there aren't many other collaborative tools in broad use; most are used only within segments of the campus community.
- *Guidance around tools is missing or inadequate.* The diverse selection of new tools and services has been too much for campus IT providers to keep up with, let alone vet and support. As a result, collaborating groups frequently have to invest significant time and effort researching, trying out, and deciding upon tools and services before they can begin working effectively. Similarly, individuals must often rely upon their personal networks to learn about new products and services, and for help when adopting new tools and technologies into their practice.
- *Difficulties in collaborating with off-campus partners.* Partners in a cross-institutional collaboration often do not have access to common tools and services. When they employ the workaround of having one institution provide collaborative tools, there are often hindrances in granting access to non-members. In addition, data "locked up" in those tools may no longer be available to outside partners once the project ends.

Innovation is rapidly occurring outside the campus. Many of the new collaborative tools and services being adopted by members of the UC Berkeley community are hosted by outside providers. These new tools and services break down the boundaries between collaboration, content, and community. They are quite appealing to users for many reasons, including sophisticated and easy-to-use interfaces, lower costs (often free), and lower barriers to entry (often just filling out a form requesting an account).

However, using external services may unintentionally expose the users and the University to unacceptable risk, with dire consequences. Concerns center upon legal and financial liability, privacy, and the potential for valuable data to be lost. For example:

- Are external services acceptable hosts for student, financial, and health data? For data from promotion cases, donor rolls, even conference registrations?
- Will the University be given the opportunity to legally contest requests for discovery of its data, when that data is stored with external services? Will it even receive notification of discovery requests made via National Security Letters?
- What other uses can external services make of the data obtained from campus users? Are there patterns, for example, that can be deduced from usage logs?

- What happens when a service goes away or changes its business model, taking university data with it? Or when the person whose account contains the data leaves campus? How will others retrieve it?

Because of the risk potential of these tools, it is clear that the University cannot afford to ignore these issues. Yet, due to the rapid change and innovation in this area; to the many people coming to campus with established preferences for tools and practices; and to the decentralized nature of IT support on campus, it is equally clear that mandating collaborative tool selection centrally is no longer a viable activity.

Campus IT, generally, is moving toward a blended model. Driven by the pace of innovation in industry and pressures for cost efficiency, IT organizations at UC Berkeley have begun moving towards a new approach, blending services sourced through multiple providers and delivery models. This change is occurring beyond the realm of collaboration.

Services that have historically been provided by campus- or unit-level IT staff are today also being developed by individual campus units acting as "centers of excellence;" by multi-campus systems and consortia of higher education institutions; by open source development communities; and by commercial vendors. Tools and services are now supplied in the form of traditional installable software packages; as cloud computing services and hosted software-as-a-service; and as composable task and data services hosted on- and off-campus.

Funding for IT is increasingly limited. At the same time, budget limitations constrain campus spending. In the wake of the housing price collapse, the worldwide credit crisis, and the ensuing downturn in the state economy, the State of California has significantly cut funding to higher education. As a result, central and departmental IT units face flat or reduced funding for the next several years. In this environment, it will be even more challenging to provide the new or enhanced services the campus needs to support collaboration, particularly in competition with other pressing campus needs, IT-related or otherwise.

The higher education community is just now facing these challenges. Across higher education, not just at UC Berkeley, IT planners are grappling with the challenges presented by this new landscape. Their institutions face the same exigent needs: to support the growing collaboration needs of research, teaching, public service, and campus administrative and staff business; to meet the increased expectations of incoming students and faculty; and to reduce costs.

In this landscape of profound change and rapid innovation, higher education IT leaders wonder how best to balance the demands they face. The turmoil of the situation, it seems, has slowed their response to it. A survey, taken in December 2006 of campus Chief Information Officers participating in the Common Solutions Group, revealed that while this issue was front and center for the 21 CIOs that responded, only two of their campuses had a formal strategy in place to address the new reality.

Why establish this strategy?

... **[I]ncreasing emphasis on collaboration [is] a critical factor for UC's future success** ... an imperative is to develop tools and services to enable communities within UC to work more effectively together and with partners outside UC.

— Information Technology Guidance Committee, University of California, *IT Guidance Report*, December 2007 (emphasis added)

This strategy seeks to guide the University of California, Berkeley campus towards an information technology environment in which people can easily and naturally collaborate with colleagues and partners, within and beyond its boundaries. Ultimately, engaging in richly-textured collaborative activities online should be as straightforward as

making a phone call, or sending email to a colleague, is today.

By recognizing that collaboration is a critical success factor for the Berkeley campus and University of California system, and by seeking to make technologically-mediated collaboration more seamless and productive, this strategy aims to:

Fulfill the campus's and University's missions. If this strategy is successful, it will help the campus community more effectively engage in the activities at the heart of its mission: teaching, research and public service. Every one of these three fundamental pursuits, along with the day-to-day administrative and staff business of the campus, is increasingly becoming dependent on effective collaboration, within and across various campus units, as well as with partners outside the campus. Our outside partners, with whom we collaborate to carry out these missions, represent a truly diverse set of educational institutions, industries, governmental bodies, community organizations and public constituencies, in our local area and worldwide.

Obtain competitive advantages for the campus. Doing collaboration well delivers important competitive advantages to the campus and University, extending not only into particular disciplines and scholarly activities, but also into public service, campus business, and other endeavors. By providing services that enable effective technologically-mediated collaboration, we can:

- Better attract and retain faculty and students.
- Enhance the quality of the research in which our scholars are engaged.
- Support the Campaign for Berkeley's focus on research collaboration.
- Improve the quality of services delivered by staff.
- Improve planning on the part of campus administrators and managers.
- Broaden and deepen the campus's partnerships with external customers, partners, and funders of research and other activities.

Enhance the campus's role in tackling humankind's important challenges. Finally, and perhaps most crucially, doing technologically-mediated collaboration well is necessary for the campus community to play an important role in tackling humankind's important challenges.

The augmentation of human capability [through collaborative tools and architecture ...] is nothing less than a survival issue for our species. We face some really serious challenges. The only way we're going to be able to tackle them is to figure out how to work together in shared information spaces.

— Jon Udell, Microsoft Corporation, December 8, 2006

The challenges to which the Berkeley campus community responds continue to grow in size and importance. The list is long, daunting, and ever-growing: global, highly interdisciplinary issues like climate change, peak oil, fresh water shortages, and environmental pollution; medical-related pursuits such as combating widespread disease occurrence in many developing countries, applying genetics discoveries to real-world applications and tackling increasingly drug-resistant infectious diseases; and challenges in the social sciences and humanities, such as reducing high dropout rates in California high schools and preserving the wisdom of increasingly endangered world cultures, just to name a few.

Making collaboration easier and more natural will help the campus and its partners focus on solving these challenges, not on the details of how to work together.

The strategy: expand choice and lower barriers

In these areas of rapid innovation I don't think the campus can make a choice for the users that will be lasting; in fact, making and trying to enforce choices will slow progress. Rather, I would urge you to focus on creating a framework into which new things could be introduced easily. For example, we need an identity management system that works across vendors, and a way of capturing and archiving content that works across many vendors and applications. ... I think our local resources are, in general, better devoted to getting the framework established, getting a variety of things working together, and dealing with infrastructure issues like data security and identity management.

— Dave Messerschmitt, Roger A. Strauch Professor, EECS
Comment posted on the IST-Data Services blog, March 27, 2008

The fast pace of innovation in the field of collaborative tools, when viewed in conjunction with the other challenges in the current landscape – the shortage of universally-available campus supported tools; the attractiveness (and risk) of solutions offered by external providers; and growing limitations on IT funding – leads us to conclude that the best option for supporting collaboration through information technology is to "embrace the chaos." This tenet is at the core of the UC Berkeley Collaborative Tools Strategy.

"Embrace the chaos": a two-part strategy. Embracing the chaos means providing a structure to manage a rich set of possibilities, helping well-informed people make smart choices about using and supporting collaborative tools.

The strategy that arises from this principle proceeds in two complementary directions:

Provide guidance to expand choice. Provide the campus community and campus IT providers with several, parallel types of guidance related to collaborative tools and services, with the intent of expanding the range of tools and services available to users and facilitating informed selection among these choices.

Lower barriers to collaboration. Lower the barriers that currently make it difficult for campus people to work together, and with outside partners, by improving infrastructure and adopting frameworks that foster collaboration.

Implementing the strategy: seven goals

Six goals, all of which implement individual aspects of the two strategic directions, are listed below. A seventh goal addresses the need to periodically review the campus's collaborative behaviors, and to refresh this strategy as necessary.

Work toward several of these goals is already well underway on campus in the areas of handling restricted and sensitive data, governance of institutional data, storage, and identity management. In those cases, these goals are intended to highlight this work and to emphasize its value in supporting collaborative tools and services. In some instances, additional resource investments in these areas, perhaps accompanied by expansion of the scope of current work, may be required.

Many of these goals are intended to be relevant to the campus's distributed set of school and college-level, departmental-level, and even unit- and workgroup-level IT providers, in addition to the campus's central IT organization, Information Services & Technology (IST). Efforts can be undertaken at the most appropriate scale, while nonetheless recognizing that coordination between the IT organizations on campus is essential to achieving the greatest cost savings.

Provide guidance to expand choice

The following three goals seek to provide the campus community and campus IT providers with guidance related to collaborative tools and services, to help expand the range of choice of these tools and services, and to facilitate informed selection.

GOAL 1. Provide enhanced information and guidance to all members of the campus community on collaborative tool selection and use.

Defining and choosing the right tool: this is often overlooked and yet one of the most important aspects of collaborative technologies ... providing good advice/recommendations about what to use. It's one thing to have a big catalog listing every tool you have and what it does, it's harder to tell people what they need. ... when people call me and say, "I need an account on [a particular collaborative tool] I often know after a minute of questions that their group will not be able to use [that tool] and steer them towards a better tool for their needs."

— K. Estelle Dodson, Collaborative Technologies, NASA Astrobiology Institute and NASA Lunar Science Institute
Response to the Findings, April 18, 2008

a. *Guide informed choice by building communities around the use and support of collaborative tools.*

Create a collaborative tools registry to facilitate the creation of communities around the support and use of collaborative tools, and allocate resources sufficient to ensure its sustainability. The "registry" is an online resource center in which any campus provider or campus user of a collaborative tool or service can identify that it is being used on campus, after which a community of practice can – given sufficient interest – organically form around it.

In the registry, for any collaborative tool or service:

- Campus-wide and unit-level IT providers can make assertions of their level of support for that tool or service, based on the support tiers defined in Goal 2 (see below).
- Users of the tool or service can rate the tool and discuss their experiences with it. They can describe how they've used it to perform their work, solve problems, or deliver services; document problems they've found with it; share best practices with one another, including those gleaned from others who use that same tool outside the campus; make recommendations for sets of complementary tools that can be used in combination; and suggest referrals to alternative tools.
- Ratings, measures of activity and popularity, and assertions of support can help guide users toward tools and services that others have found to be useful and well-supported. Search and tagging capabilities can similarly help steer users toward tools and services that can meet their current needs.
- Users can register to receive notifications of changes to those services/tools.

Implemented successfully, a tools registry, and the communities that form around it, would stretch limited campus IT resources and help foster a true culture of collaboration.

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include campus units with an interest in or responsibility for online tools that allow communities to work together, such as the Application Services department (<http://ist.berkeley.edu/as>) within IST; the Service Desk unit (<http://ist.berkeley.edu/cs/service/>) within IST-Client Services; the Data Services department (<http://ist.berkeley.edu/ds>) within IST, or a similar campus body. The ultimate scope of participation

would encompass the entire campus.

b. *Provide guidance around storing and using university data in collaborative tools.*

Clarify, rationalize, and publicize the privacy, policy, legal, contractual, ownership, and intellectual property risks associated with storing and using university data in various collaborative tools and services. In parallel, provide clear guidance to the campus about what types of data can be stored, and activities performed, in various collaborative tools and services, especially those not under the direct control of the campus or University.

Some of the key risks in using university data in collaborative contexts, whether hosted either on- and off-campus, include exposure of restricted and sensitive data, such as Social Security numbers, human subjects data, health data, and certain types of student data; and exposure of sensitive internal academic and administrative discussions, intellectual property, and the like that can be compelled through National Security Letters, subpoenas, and other forms of discovery.

In light of these risks, even within an environment in which services are blended from many different sources, the campus's and University's data stewardship responsibilities may require that certain collaborative tools be supplied and hosted exclusively by the campus, and administered directly by campus- or unit-level IT providers, rather than by outside providers.

More information: For a more detailed discussion of this sub-goal, please see "Spotlight: Legal and Policy."

Moving forward: As there are many aspects of accomplishing this goal, it touches on the work of several distinct groups and committees. These include the Campus Information Security and Privacy Committee (CISPC) (<https://security.berkeley.edu/cispc/>) and the campus's Data Stewardship Council (<http://datasteward.berkeley.edu/>). Additionally, the Security, Privacy and Policy department of the campus Office of the CIO (OCIO) (<http://technology.berkeley.edu/cio/sppc/>) can provide support for these efforts. Some of this work may be carried out in conjunction with the Office of the General Counsel of the Regents of the University of California, and with University of California-wide communities that have a focus in this area.

GOAL 2. Establish a common framework and vocabulary for defining support for collaborative tools.

Define a vocabulary of tiered support for specific collaborative technologies. This will facilitate decisions around and support of collaborative tools in several ways:

- By giving IST and other campus IT providers a scale on which to assert the extent of support offered for a collaborative tool. This support can be provided campus wide, as in the case of IST, or within a particular division, department or other organizational unit, by other campus IT providers.
- By making it much easier for members of campus- or unit-level communities to understand the level of support for, and hence the appropriate use of, a tool.
- Finally, by providing the IT community with a vocabulary to talk about whether the level of support for a tool should be enhanced or reduced, and a framework for making those changes successfully. It is straightforward to communicate that:
 - "Tool X should be moved from support tier 4 to support tier 2 within the next six months"; or
 - "Campus (or our department) needs a tool in category Y, which we can afford to introduce at support tier 4"; or
 - "Tool Z no longer meets our customers' needs, or has been supplanted by a different tool or service. It should be moved to support tier 5."

An initial definition of these support tiers follows.

Tier	Restricted Data OK	Local Backup	Locally Audited Security	Mission Critical OK	Local Authentication	Local Authorization	Protects Privacy, Data Ownership	Local Support	Future upgrades and transitions supported	Warning	Prohibited
1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
3					Usually	Usually	Yes	Yes	Yes		
4								Yes			
5											
6										Yes	
7											Yes

- **Tier 1:** Fully supported. Security is performed or audited locally. All data is backed-up on campus systems. Fully integrated into local authentication and authorization services. If the service is run by a non-campus entity, the local provider has contracts in place regarding data security, ownership, and privacy. This service has a defined service level agreement and would be appropriate to use for mission-critical functions. The Data Stewardship Council has certified this tool as being an appropriate repository for restricted data.
- **Tier 2:** Fully supported. Security is performed or audited locally. All data is backed-up on campus systems. Fully integrated into local authentication and authorization services. If the service is run by a non-campus entity, the local provider has contracts in place regarding data security (protection against unauthorized access and against data loss), ownership, and privacy. This service has a defined service level agreement and would be appropriate to use for mission-critical functions.
- **Tier 3:** Fully supported. May be fully or partially integrated into local authentication and authorization services. If the service is run by a non-campus entity, the support provider has contracts in place regarding data security, ownership, and privacy. It would be appropriate to use this service for day-to-day tasks and operations.
- **Tier 4:** Supported. A service for which end user support is available, but there are no other assertions about its suitability for any given task. The individual is left to make the decision about the risks and benefits of using such a service. The support provider may or may not have a contractual agreement with the supplier of that service.
- **Tier 5:** The support provider makes no recommendation regarding, and provides no official support for, this service. The individual is left to make the decision about the risks and benefits of using such a service.
- **Tier 6:** The support provider recommends against using this service. The support provider will not provide support or assistance of any kind to users of this service.
- **Tier 7:** The support provider prohibits using this service. This tier of support covers tools that are unsafe, malicious, illegal, or violate campus or departmental policy.

Moving forward: An appropriate venue for initiating or continuing work on this goal is the Information Technology Architecture Committee (ITAC) (<http://technology.berkeley.edu/architecture/itac/>).

The usefulness of these support tiers can be assessed – and where necessary, refined over time – by experiences with their day-to-day use in the contexts of Goal 1a, "Guide informed choice by building communities around the use and support of collaborative tools," and Goal 3, "Provide criteria and guidance to IT staff to assist decisions about which collaborative tools to formally support" (below).

GOAL 3. Provide criteria and guidance to IT staff to assist decisions about which collaborative tools to formally support.

Develop and publish guidelines and criteria for making decisions about which collaborative tools and services receive support and investment. These should result in the selection of tools that:

- Are based on the collaborative needs and practices of the targeted campus communities.
- Are made available to the broadest possible number of users that need them. This often means making choices that will help eliminate (or significantly reduce) the cost of a service to the end user.
- Avoid user or data lock-in to a particular tool choice.

More information: For a more detailed discussion regarding this goal, please see "Spotlight: Tool Selection Criteria."

Moving forward: An appropriate venue for initiating or continuing work on this goal is the Information Technology Architecture Committee (ITAC) (<http://technology.berkeley.edu/architecture/itac/>). This effort may also benefit from criteria and expertise being developed within a number of consortial needs assessment and software development projects in which UC Berkeley plays a major role, on how to take general purpose collaborative tools and adapt them to fit the needs of particular academic communities.

Lower barriers to collaboration

The next three goals seek to lower several of the barriers that currently make it difficult for campus people to work together – and with their outside collaborative partners – using common tools and around common data.

GOAL 4. Provide enhanced identity management services.

... [P]eople will want to share with collaborators beyond campus boundaries; this is surprisingly hard to do today.

— Clifford Lynch, Coalition for Networked Information
Response to the Findings, April 23, 2008

Campus people need to be able to define with whom they collaborate, and around which data. This requires that we invest in the campus's identity management infrastructure, to better identify people, groups, and other entities – both on campus and among our collaborating partners – and give them the appropriate access rights to various resources in collaboration tools and services.

The intent of this investment is to make it easier and more natural to:

- *Collaborate with people who aren't part of the campus community.* Implement identity management solutions that make it easier to add outside people to campus collaborative contexts, as well as to allow members of the campus community to participate in collaborative contexts offered by others. Collaborative activities at UC Berkeley increasingly involve participants from other higher education institutions, government, industry, non-profit organizations, community groups and members of the public, and their participation must be accommodated.
- *Maintain and discover communities, particularly communities of practice.* Develop solutions to facilitate the maintenance and discovery of communities, in particular "communities of practice." A great deal of campus collaborative work occurs within these informal campus communities, consisting of people who learn together and share common objectives in both academic and administrative contexts, and their

members often span multiple campus units and job titles. Currently, users struggle to find relevant groups to join, as well as to maintain their connections to communities as their affiliations or contact information changes.

- *Manage access to collaborative resources by group and role.* Provide the ability to easily assign access to tools, data or to other resources based on role. Giving access by role (e.g. approver of purchase requests for a particular unit) or group (e.g., campus people and their off-campus collaborators who focus on 19th century Russia in their research) can greatly reduce the overhead needed to work collaboratively.

More information: For more detail regarding this goal, please see "Spotlight: Identity Management."

Moving forward: An appropriate venue for initiating or continuing work on this goal is the Central Infrastructure & Campus Applications unit within IST-Infrastructure Services, which develops and administers the CalNet system, the campus's unified authentication and directory service. Some of this work is being carried out by that group in conjunction with consortia of other UC campuses and other higher education institutions.

GOAL 5. Train our workforce to work with and support new collaborative technologies and architectures, while protecting privacy and keeping data secure.

The campus will need to develop the skills of its workforce through training and hiring practices, to work in a collaborative environment that will increasingly consist of tools, services and data sourced from multiple providers and via multiple delivery models, both on- and off-campus.

One of the risks of "embracing the chaos" is that using and providing collaborative tools and services can become more confusing and cumbersome, for both customers and IT providers, in an environment where services are sourced from different providers and delivery models. Additionally, restricted and sensitive data may be at a higher risk of inappropriate access. Growing the following skills within the campus workforce is essential in such an environment:

a. *Data handling skills.*

Develop and provide ongoing educational offerings and training for campus employees, academic and administrative, who handle restricted and sensitive data.

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include the Campus Information Security and Privacy Committee (CISPC) (<https://security.berkeley.edu/cispc/>), the Security, Privacy and Policy department of the campus Office of the CIO (<http://technology.berkeley.edu/cio/spc/>), and the campus's Data Stewardship Council (<http://datasteward.berkeley.edu/>). The System & Network Security unit within IST-Infrastructure Services (<http://ist.berkeley.edu/is/ia>) can also serve as a resource and provide support to the groups developing this training.

b. *Information technology skills.*

Enrich the skills of the campus workforce to rapidly build IT services, often from blended components. These skills include the ability to create, supply, and support services based around technologies that combine multiple IT providers and delivery models; to design and build services that provide access to institutional data through open standards (see Goal 6.b., below); to rapidly build lightweight services or prototypes; and to combine, filter, transform, and add value to data obtained from multiple sources.

More information: For a more detailed discussion of aspects of this sub-goal, please see "Spotlight: Service Blending IT Skills" and "Spotlight: Lightweight Development IT Skills."

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include the Technology Staff Development department of the campus Office of the CIO (OCIO) (<http://technology.berkeley.edu/cio/tsd/>), the campus Center for Organizational and Workforce

Effectiveness, and hiring and technology managers in individual campus units.

c. *Business process analysis and user-centered design skills.*

Grow the campus's skills in business process analysis and in user-centered design through training, job specifications and hiring. Business process analysis skills allow the campus and its units to capably analyze and, where necessary, re-engineer campus business processes, many of which take place in collaborative contexts. User-centered design skills can make a major contribution toward providing collaborative tools and services that can be used effectively and productively by customers, while reducing ongoing support costs.

More information: For a more detailed discussion of aspects of this sub-goal, please see "Spotlight: Business Process Analysis Skills".

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include two campus communities of practice: the Business Process Analysis Working Group (BPAWG) (<http://stafforg.berkeley.edu/bpawg>) and the User-Centered Design group (subscribe to ucd@lists.berkeley.edu for information), working in conjunction with the campus Center for Organizational and Workforce Effectiveness and other appropriate campus units. Campus managerial and business services groups, such as the Academic Business Officers Group (ABOG), will likely also be important stakeholders in this process.

GOAL 6. Make it easier to use and share data in collaborative tools

a. *Make institutional data more readily available for use in collaborative contexts.*

Appropriately provide the institutional data of the campus within a wide variety of collaborative contexts. This delivers compelling advantages to the participants in those contexts, and can often dramatically improve the quality and productivity of their work. As one illustrative example, the many sources of institutional data about instructors, students, and courses offered within course sites in bSpace help make those sites rich and productive environments for instruction and learning.

Despite these advantages, obtaining programmatic access to institutional data so that it can be used by collaborating groups is often far more difficult today than it needs to be. This data needs to be made available for productive use by clarifying and streamlining data availability, ownership and governance; making it straightforward to request and receive timely access to data; and providing simple and consistent interfaces through which programmers can access that data.

More information: For a more detailed discussion of this sub-goal, please see "Spotlight: Institutional Data."

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include the Institutional Data Management & Governance Initiative (<http://administration.berkeley.edu/idmg/about.htm>).

b. *Use open standards for data representation and transport.*

Encourage and, where appropriate, mandate open standards for representing and transporting data, as well as simple, consistent interfaces through which data can be accessed, in campus-provided or campus-supported information technology tools and services. These both give collaborating partners substantially greater ability to collaborate around the same data, and help facilitate choice among tools and services.

Illustrative examples of these standards and interfaces include:

- Specifications for transporting data, such as IMAP for retrieving email messages, CalDAV for sending and retrieving calendar events, and XMPP for instant messaging and a variety of other real-time communications.
- Formats for representing data in standard ways, often using XML-based vocabularies, such as MathML for mathematical formulae and GeoRSS for geographic data.
- Feed formats, such as RSS and Atom, for packaging collections of data.
- Service oriented technologies, such as an enterprise service bus and web services based on the REST architecture and the SOAP/WS-* family of specifications. Collectively, these technologies provide platform- and language-independent programming interfaces for providing, transforming, discovering, and obtaining data. They also make it easier to perform complex business tasks by combining a set of relatively simple services.

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include the Information Technology Architecture Committee (ITAC) (<http://technology.berkeley.edu/architecture/itac/>); the Collaboration Tools group within IST-Infrastructure Services, an active proponent and implementer of open standards; and projects based on open standards and a services architecture, such as Kuali Student (<http://student.kuali.org/>) and Student Systems 2012 (<http://students.berkeley.edu/wiki/ow.asp?HomePage>). This sub-goal is closely related to, and thus there may be some opportunity for synergy with, goal 6.a., "Make institutional data more readily available for use in collaborative contexts," above.

- c. *Provide a shared pool of storage and related services that collaborative tools can use.*

Create a common space to store data used by many different collaborative tools. By doing so, the University can realize several benefits, including:

- Facilitating the rapid interchange of data between tools.
- Reducing the overhead of managing quotas and other user administration issues on a per-tool basis.

A shared approach to storage could also spur the creation of shared services such as long-term archiving, persistent URLs, and the storage and transfer of very large data sets. These and similar value-added services can be provided as a service layer on which collaborative tools can build, rather than having to each independently implement their functionality.

More information: For a more detailed discussion of this sub-goal, please see "Spotlight: Storage."

Moving forward: Appropriate venues for initiating or continuing work on this sub-goal include the Storage & Backup Services unit within IST-Infrastructure Services (<http://ist.berkeley.edu/is/platforms/storage>), the Andrew File System (AFS)-related activities of the Collaboration Tools unit within that same department (<http://ist.berkeley.edu/is/ia>), the Media Vault Project (MVP) (<http://mvp.berkeley.edu/>) within IST-Data Services, and many innovative initiatives taking place within a number of different campus departments outside of IST.

Periodically reevaluate the collaborative landscape

The final goal recognizes that campus collaborative needs and technological environments change rapidly, making it necessary to re-evaluate this strategy and its goals at periodic intervals.

GOAL 7. Periodically re-evaluate collaborative practices/needs and technologies.

How should we develop our scholarly information and technologies, services and infrastructure to achieve our research, learning, teaching and knowledge transfer aspirations over the next decade?

Rapid and unpredictable changes in information technology mean that we will need to reconsider this question every few years.

— Scholarly Information in a Digital Age
Consultation Paper, University of Melbourne, February 2008

Companies generally focus too much on "buying" collaboration rather than on the behaviors it enhances. Focus on augmenting specific behaviors, not on generalized support for collaboration.

— Tom Austin and Betsy Burton, Gartner analysts
Define Collaboration Before Planning a Strategy, December 1, 2004

Identify a campus unit, committee or other body and assign it to refresh the understanding of collaboration on campus every couple of years.

The strategy laid out in this document is based on research performed in 2008. However, campus collaborative practices, the capabilities of the tools and services that can support those practices, and the legal and policy environments in which those tools are used are continually changing. As a result, periodic reassessments are needed.

The intent of these reassessments is to:

- Identify strategic collaborative behaviors that aren't well supported by information technology tools and services.
- Guide IT investment to better support those behaviors.
- Continue to maintain the campus's collaborative tools and services strategy, identifying when minor adjustments or significant changes – even to the extent of changing the fundamental tenets of the strategy – might be required.

These future reassessments can potentially be significantly "lighter" than the effort which resulted in this initial version of the strategy, requiring fewer participants and a smaller sample size. This can be accomplished by focusing on areas in which collaborative behaviors and needs are rapidly changing, as well as on new strategic initiatives and their associated collaboration needs. These reassessments can also build on the approaches and frameworks included in this strategy and its supporting documents.

Moving forward: An appropriate venue for initiating or continuing work on this goal is the Data Services department (<http://ist.berkeley.edu/ds>) within IST, or a similar campus body.