
Chapter 3: Communications: Email, Workflow & Web

Electronic communication in various forms has become fundamental to campus faculty, staff, and student users. Use of email for communication has been commonplace for many years and typically an assumption is made that “everyone” has campus email service; however, only students are currently provisioned an email account and required to read it as part of the official email policy. A gap exists for faculty and staff who may not have campus email accounts or may use departmental systems that are not registered in the campus email directory. The first section in this chapter includes a recommendation to extend the official email policy to campus faculty and staff and ensure they are automatically provisioned campus email service and receive official communications. It also recommends further centralization of email accounts to improve security and efficiency.

The next section in this chapter addresses the increasing demand for online workflow, typically seen primarily as a means to improve business processes. Moving an existing paper-based process to online can improve speed, make tracking easier, and facilitate quick information retrieval. Online processes are not without risks; security is a major concern. Online services must be developed to ensure data integrity is maintained and the participants are properly identified. Another source of concern is data retention and access years after technology has changed and retrieval becomes difficult. This section recommends the campus work in concert with the University System to develop policies that address records retention; evaluate benefit and risk of moving workflow online; continue leveraging existing infrastructure such as the CUConnect portal to deliver online services; and pay careful attention to technologies being introduced by Microsoft that facilitate workflow and to the Student Information System replacement project which will have major impact on campus processes.

Web content management is the last section in this chapter and recognizes the mix of central and distributed responsibility for provision of information on the campus. Needs identified here include strengthening the campus server infrastructure that provides the “home page” for the campus; creating more comprehensive policies that address security and privacy, technical and graphical standards, and accessibility; and providing a broader suite of training and support for web development and management. The most striking recommendation of this section calls for implementing a web content management system. Such a system would provide standardized software tools to facilitate distributed website management and would enact change management and control. The scope of web content management as defined in this section covers official content from schools, colleges, and individuals but excludes personal content.

3.1 E-mail Policies and Efficiencies

Major Issue: Electronic communication has become essential to all academic and business activities. E-mail service is not universally available and lacks overall coordination and oversight. New technologies have emerged that should be incorporated into an overall strategy for delivering information to students, faculty, staff, and interested community members.

A. Background/Rationale

University administration and faculty can depend on using e-mail to communicate with students as a result of the designation in 2000 that e-mail is an official means of communication for students. That designation resulted in automatic provisioning of university e-mail accounts for students and delivery of e-mail to students through e-memo, buff bulletin and the faculty toolkit in CUConnect. Access for faculty and staff is uneven; central e-mail service is available upon request to all employees but accounts and e-mail addresses are not automatically provisioned. Furthermore, many units operate their own e-mail servers and e-mail address information for their users may not be reliably available to the campus electronic directory. Distributed management of Exchange servers poses a risk in that a compromise or a server failure in this environment can potentially disrupt service for every server. In terms of features, both mobility and a tight integration of e-mail and calendaring are desirable for administrative use. For students, who typically carry cell phones to campus but not laptops and are heavy users of email and text message, mobility is particularly important.

In addition to e-mail, other communications methods are used in a variety of ways but lack an overarching strategy. The portal announcement channel can be used to deliver urgent information to the entire campus but is often overlooked; instant messaging and group collaboration tools are being used in an ad-hoc manner but are not provided centrally; and departments are constructing and delivering bulk e-mail independently of campus mechanisms, sometimes straining resources or failing to reach the desired target audience. Resources are being spent in a distributed manner on campus without regard to coordination or efficiency and reliability considerations; during a crisis, such as a natural disaster or health emergency, this may disrupt the ability of campus executives to respond effectively.

B. Accomplishments to date

Central e-mail services have become more secure, reliable and robust; messages sent inbound to "@colorado.edu" are scanned for viruses and spam and all authentication to central e-mail servers is encrypted. A premium Exchange e-mail and calendaring service is provided on a cost-recovery basis to more than 500 administrative subscribers and an enhanced web-based e-mail and calendar service will be available to all campus constituents by fall 2006. A single portal interface delivers both general and role-specific news and information to all Boulder students, faculty, and staff.

C. Specific Recommendations

E-mail should be considered a utility service provided centrally by the campus to all designated affiliates. The need for premium service that provides e-mail, calendaring,

and mobile access should be recognized and delivered in a cost-effective manner. The number of e-mail servers should be minimized in order to take advantage of economies of scale and improve security and limit reliance on departmental staff whose workload is too heavy. E-mail for all high-level campus administration should reside on the same e-mail server to facilitate day-to-day and emergency communications. The decision to operate a distributed Exchange server should be made at the campus executive level in order to safeguard campus-wide service.

Bulk e-mail delivery should be enhanced to ensure the desired target audience is reached and to allow customization of format and delivery mechanism based on user preference. An overarching strategy for electronic communication should be developed that considers the variety of tools and methods available (such as CUConnect, online newsletters, and web sites) and resources should be allocated to implement and support effective communication tools. Outsourcing of basic services should be considered as providers become available and response to concerns such as FERPA privacy and Open Records Act compliance becomes known

D. Resource Allocation

Cost of the project: low-to medium overall campus cost

Cost for developing policies and standards is low; adoption of centralized e-mail will have limited overall campus impact but will affect individual unit budgets as costs are shifted.

E. Action Plan

Short Term: Develop and implement policies

Long Term: Enhance communication tools, investigate new technologies, and monitor demand and enhance services to respond to changing requirements

Specific Steps

- IT Council should oversee development of policies and standards for use of electronic communication tools and delivery mechanisms that:
 - designate of e-mail as an official means of communication for faculty and staff
 - require centralization of Exchange servers for executive staff
 - require CIO/Vice Chancellor approval for operation of distributed Exchange servers for non-executive staff
- ITS should research campus demand for new tools and technologies and incorporate them where appropriate; this will include bulk communication tools (e-memo, buff bulletin, listservs, mobile communication and calendaring)

Timeline

- Fall 2006 –development of policies (official e-mail; centralization of servers) and standards
- Spring 2007 – ITS and Mailing Services to improve bulk communication tools (e-memo and buff bulletin)
- Spring 2007 – ITS to investigate other communication and collaboration tools, such as listservs, forums, and instant messaging

- Fall 2008 – ITC and ITS to review potential for outsourcing basic e-mail services

Primary Persons Responsible

Bobby Schnabel, Vice Provost for Academic & Campus Technology and
Dennis Maloney, Executive Director, ITS

Evaluation of Achievement

Conduct an annual review of the number of e-mail servers and non-central subscribers; continue to evaluate and improve security on distributed servers; annually evaluate changing technology and subscriber needs.

3.2 Technologies to Improve Workflow

Major Issue: Documents and materials are often routed electronically for review, collaboration, approval, and archival without regard for delivery accuracy and receipt; security and access control; and legal requirements for retention and destruction. With the judicious use of technology, business processes could be accomplished more effectively and more expeditiously but University policies and business practices would need to be examined and re-engineered to successfully implement a robust workflow solution.

A. Background/Rationale

Workflow may be defined as the execution of tasks in a business environment according to procedures and includes the task structure, execution, timing, interdependencies, and monitoring.

Numerous business processes currently rely on paper document processing, which can be slow as documents are routed from person-to-person for review and approval and can easily be disrupted if documents become lost on a desk or when misfiled. In addition, paper storage can become voluminous; documents in hardcopy form are difficult to search; and if the electronic original is lost, are tedious to update. Online workflow can facilitate process improvements as well, such as coalescing multiple sources of data into a single repository and allow progress tracking and automated alerts. However, many staff are used to and comfortable processing paperwork and prefer the sense of security of having something “in hand.”

E-mail is often used, at least informally, for electronic routing and approving of tasks. However, e-mail can easily be spoofed (made to appear to originate from someone else), lacks delivery assurance and tracking, and can be forwarded, retained, or destroyed at will without regard for policy requirements. Electronically signed e-mail is a technology that could leverage the widespread availability and convenience of e-mail to facilitate workflow. Doing so will require building an infrastructure that performs authentication of senders and guarantees the integrity and privacy of the message transmitted. This infrastructure would most likely rely on a Public Key Infrastructure (PKI) framework and would also require the use of suitable e-mail clients.

Campus departments often see a need to streamline workflow that was originally designed to handle paper documents. They seek the speed of electronic transmittal and the ease of searching a virtual file cabinet for a document based on characteristics such as its name, contents, creator, or creation date. A few examples of both administrative and academic forms and workflow that are potential candidates for online workflow include: time reporting, leave requests, travel vouchers, ACard reallocations, performance plans and evaluations, conflict of interest policy compliance, faculty course questionnaires (FCQs), and semester grade submittal.

Several areas must be addressed when adopting electronic workflow. Security is a major concern: signers must be authenticated; the integrity of materials that have been signed must be ensured and safeguarded from alteration and tampering (this includes both the document and signature); privacy must be assured (no one other than authorized individuals may view the document); and auditing should provide confirmation of relevant facts about the signing and who has accessed the document (for read and/or write). It should be understood that documents have varying requirements for security; materials

that lack sensitive information may warrant lighter security controls than those that contain personally identifiable or sensitive information such as social security numbers, student grades, or employee hours worked.

Another concern is archival and retention – electronic documents must be stored, must be retrievable and viewable, and authenticity and integrity must be verifiable throughout the retention period. The quick pace of technology change may make it difficult to retrieve, view and verify documents for the duration that is required by law or regulation, as storage media and devices to read the media become obsolete long before the retention period has expired

There will be pressures to implement workflow in the coming years at both campus-distributed and university-central levels. Microsoft will include embedded workflow in its new operating system and Office 12 application suite. Whatever system is chosen for the new Student Information System (SIS) will have considerable embedded workflow.

B. Accomplishments to date

A necessary precursor to electronic workflow is sound user identity verification and authentication; when someone signs a document, there must be reasonable assurance the individual is who he/she claims to be. ITS has adopted Identikey as the campus-wide authentication standard. All students are issued Identikeys and they are available to all faculty and staff. The Identikey has been strengthened to require a more secure password and plans are underway to provide a secure alternative means of verifying identity (needed to initially acquire or reset a forgotten password).

A CU-System committee has formed to examine document retention requirements, though the scope is limited to hardcopy materials. Another group at that level is working on legal, policy, and technical requirements for electronic routing and electronic signatures.

Numerous forms and workflows have been made available through CUConnect, including iVote (student voting application), Boulder Faculty Assembly voting pilot, student financial aid application, application for Housing (a redirect to a Housing-run application), student address update, Registrar workflow (drop/add and course forgiveness requests; in progress), and Faculty Report of Professional Activities (FRPA; in progress).

C. Specific Recommendations

The campus should work in coordination with CU-System efforts to address policy development regarding streamlining workflow and records retention. The campus should identify forms and workflows that could benefit from moving online; categorize them based on their security requirements, potential for efficiency improvements, and ease of implementation; and coordinate with currently proposed online workflows. The campus should examine the various methods for electronic approval and determine what infrastructure should be built to support electronic routing and signatures. ITS should pay careful attention to Microsoft product introductions because of the potential for significant adoption by administrative departments on campus. The campus should pay particular attention to business process impacts of the SIS replacement project.

D. Resource Allocation

Cost of the project: low to high overall campus cost

Cost for developing policies is low; cost to build infrastructure depends on technology chosen – within the existing CUConnect framework, the cost will be moderate and must be coordinated with other CUConnect priorities, but development of a public key infrastructure system to implement digital signatures will be very high.

E. Action Plan

Short Term: Continue developing policies; categorize forms and workflows based on security requirements and benefits of migrating from paper processes to online workflow; continue and expand efforts to implement forms with limited security risk through CUConnect and build workflow applications according to campus IT architecture and security guidelines and in recognition of existing online workflow processes

Long Term: Implement signed e-mail; convert hardcopy-based workflows to online as demand and resources permit; coordinate campus implementation of Microsoft-based workflow activities; integrate the new Student Information System into the campus environment

Specific Steps and Timeline

- Fall 2006 – IT Council to charter ITIAG with identifying and categorizing forms and workflows that are candidates for migrating to online
- Winter 2006 – IT Council to work with CU-System based groups that are defining retention requirements and specifying technology
- Ongoing – ITS to build forms and workflows into CUConnect as prioritized by CUConnect Steering Team as funding permits
- Ongoing – ITS to continue investigating signed e-mail
- Ongoing – ITS to investigate and participate in coordinated implementation of workflow-enabled systems such as Microsoft operation systems, applications suites, and SIS replacement project

Primary Persons Responsible

Bobby Schnabel, Vice Provost for Academic & Campus Technology

Evaluation of Achievement

IT Council to review work performed by ITIAG and CU system groups. CUConnect team to survey campus constituents regarding processes that could be put online

3.3 Web Content Management

Major Issue: CU-Boulder needs to develop much more comprehensive web hosting and support services to provide a robust, consistent, and well coordinated web presence. The lack of a strong set of centrally provided services has led to a fragmented web infrastructure and significant inefficiencies as departments struggle to overcome this lack of centrally provided services by developing skills and building and managing infrastructure for themselves.

A. Background/Rationale

At CU-Boulder, institutional and departmental web sites serve over 100,000 sessions each day. Academic and administrative departments use the Web extensively to offer services and present marketing information to prospective students; parents; alumni and donors; students, faculty, staff, and administrators; campus visitors; news media; opinion leaders; researchers and academicians; and the general public.

Many of these web sites are highly successful. For example, the primary means of marketing to prospective students has shifted to the Web and over 80 percent of admissions applications received for 2006 were online. Services offered through CUConnect are used by 99 percent of students. Institutional, college and school, and many departmental sites follow CU-Boulder web identity standards and policies.

Over the last decade, however, CU-Boulder's web presence has experienced tremendous, largely uncoordinated, growth. This growth has come without sufficient investment in a comprehensive technical or support infrastructure to meet the web development needs of the campus community. Within the current CU-Boulder web presence, a large number of campus web-based applications and static pages are developed and hosted by individual departments on an ad hoc basis without oversight, coordination, or centrally provided support.

Web infrastructure was addressed in the 2002 IT strategic plan, but inadequate funding for a comprehensive approach and other priorities prevented much action on this plan. A comprehensive web content management, hosting, and support strategy is needed to ensure that web-based content is in compliance with campus web branding, privacy, and security policies, and to gain efficiencies by making it easy for departments to create and manage their own content without having to independently buy and manage infrastructure and develop or hire web site development expertise.

B. Accomplishments to date – if applicable (if the subject area was covered in ITSP2002)

Some infrastructure improvements were made to the central web infrastructure as a result of the 2002 plan recommendations. Specifically, it was moved to a cluster to improve failover capability and disk capacity has been added.

In addition to the recommendations in the 2002 plan, ITS' Managed Services group is offering a hosted web site service for departments who don't wish to manage their own web servers.

Web Identity Standards were approved by the Chancellor in July of 2003. The Web Identity Standards and free templates are online, free individual consultations are available, and brownbag seminars are offered.

CUConnect, the Boulder campus portal for students and employees, launched in January 2004. Departments can use CUConnect to present news and announcements to their employees and constituents.

WebCentral, a site outlining web services, resources and policies, launched in February 2005.

Several policies addressing web development, privacy and security have been developed and are awaiting legal approval.

C. Specific Recommendations

The CU-Boulder web presence is essential to its mission of teaching, research, creative work and public service and contains a complex network of institutional and departmental web sites. Further analysis is needed to fully outline an effective model for the CU-Boulder environment, but following are initial recommendations to improve the consistency and security of the CU-Boulder web presence and meet the needs of web developers:

1. Institute and enforce more comprehensive policies and guidelines for official CU-Boulder websites in relation to security, privacy, technical standards, graphical identity and content, accessibility and URL establishment.
2. Implement a new central web server infrastructure and offer a broader suite of central web hosting and web server and web application management services.
3. Develop a broader suite of centrally provided and generally funded, web development and management support services. Support service must have the capacity to provide proactive outreach to departments and provide training and some one-on-one guidance for managing campus content.
4. Implement a content management system that will increase the efficiency of managing and updating website content but is suitable for the university's highly distributed environment. After further investigation, it will be necessary to choose one of two models:
 - A set of standardized software tools and templates for developing and managing content that will be distributed to website managers.
 - A database-driven system with a suite of tools for staff to manage and maintain website content, including sharing of content across sites and change management capabilities.

Under either model, these tools should enable following of guidelines and policies for content management. Use of the tools should be well supported through centrally provided support services and they should be provided as part of using any centrally managed web infrastructure.

This strategic plan is specifically focused on managing official campus content, including content of schools and departments. Excluded from scope are:

- Personal content including personal employee or student web pages that are not academically focused or are not related to the mission of the university.
- Personal content that *is* academically focused. This content is increasingly taking the form of blogs and e-portfolios and is covered by section 1.6 of this strategic plan.

It's possible that an implementation of this strategy can also facilitate management of these types of personal content, but doing so is not considered a requirement on the outset. It should be noted that consideration does need to be made on how central web content management services interact and interoperate with these other potential web content services.

D. Resource Allocation

High impact.

Properly implemented, this plan involves three significant investments:

- New central web server infrastructure hardware and software plus infrastructure for bootstrapping a more robust hosting and server management service for departments,
- Training and on-going staffing to provide support services,
- Web content management software site licenses for the campus.

E. Action Plan (short-term: 12 months; long term: 12-36 months)

Specific Steps

Short Term:

- Gather input from website developers on service needs.
- Draft and/or revise policies and guidelines.
- Define features and tools necessary for content management.
- Begin investigating content management solutions that fit the campus environment.
- Specify a new centrally managed infrastructure to replace the existing www.colorado.edu server. Propose short- and long-term migration plans for existing content.
- Begin development of a service plan for centralized, hosting, management and support of campus web sites.

Long Term:

- Select a content management solution.
- Develop a plan and timeline for rolling out the content management solution.

- Formalize and communicate campus content management services, policies and guidelines.
- Implement selected content management system and migration plan.
- Develop and roll-out new services: support and training services for web development and content management; central web hosting and administration services.

Timeline

- Fall/Winter 2006/2007: Gather input from website developers on service needs
- Fall/Winter 2006/2007: Policy and guideline development
- Winter 2006/2007: Research content management software. Specify new web server infrastructure.
- Spring 2007: Draft service plan for web support services
- Summer 2007: Install new infrastructure.
- Summer 2007: Make recommendation for content management campus license
- Summer 2007: Begin communicating web development and management policies and guidelines
- Summer 2007: Draft new service plan for web site hosting and administration services
- Winter 2007/2008: Purchase content management solution and develop support and management services
- Winter 2007/2008: Begin implementation of content management solution
- Summer 2008: Roll out comprehensive web support and management services

Primary Persons Responsible for Action

Dennis Maloney, Executive Director of ITS and the new Associate Vice Chancellor for Strategic Communications

Evaluation of Achievement

Customer satisfaction reviews of centrally provided web hosting, management, and support services.

Measurable increase of compliance policies and standards, including identity standards, and policies on privacy and security. An analysis of compliance would occur before and after the project.

High demand for services.