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Founded in 1876, in the foothills of the Rocky Mountains, the Boulder Campus is the flagship of the four-campus University of Colorado system. The CU system also includes the University of Colorado at Denver, the University of Colorado at Colorado Springs, the University of Colorado Health Sciences Center in Denver, and Central Administration. The Boulder campus offers more than 150 fields of study across ten colleges and schools. The campus community includes 3,333 staff and 1,217 faculty members in 270 departments supporting more than 24,000 students. (Public Relations, 1996-97)  
Information Technology Services maintains 30,871 faculty, staff, and student email accounts for the Boulder campus and Central Administration.

In the fall of 1996, the University of Colorado at Boulder implemented a service for using electronic mail as a means to send campus-specific information to its faculty and staff. At the same time, a subset of the student population received the upcoming semester's invitation to register, which includes the date and time the student may begin the registration process, via email. This fall, the same E-Memo service for faculty/staff is available to direct-cast an email message to the student population, and the invitation to register is being delivered by email only; no hard copy of the invitation is being mailed. A migration to an electronic delivery mechanism raises many issues. Do the obvious benefits of using electronic communications clearly outweigh the problems? This presentation describes the many difficulties that developed with CU Boulder's attempt to 'electrify' our internal memo process -- both technical and administrative. This paper also covers our solutions and raises many of the interesting issues that must be dealt with when migrating to an electronic delivery mechanism.

# Using Electronic Mail as an Official Means of Communication

While Web programmers spend feverish nights attempting to develop the next 'killer app', the current king of the network application is thriving; electronic mail, or email, is the best known and most popular application of the Internet. The use of email has exploded in the past year. Email is easy to use and open 24 hours a day, 7 days a week. According to a recent report from Forrester Research, "In 1992, approximately 2% of the U.S. population enjoyed access to e-mail. Now 15% of the U.S. population uses email. Forrester anticipates that this growth will continue, and that by 2001, 135 million people in the United States will be communicating through e-mail." More and more people are seeing email as a way to communicate quickly and affordably with the campus community. However, an official campus email communications mechanism requires more than what email can offer today. At the University of Colorado we've enhanced and added to the general capabilities of our existing email infrastructure to give us an electronic, campus-wide distribution system for important university communication.

## Origination

In the fall of 1994 a feasibility study was commissioned to determine if printed communications destined for the most popular campus mailing list, Deans, Directors, and Department Heads, could be migrated to an electronic format. At the time, we found that just about 50% of the deans, directors, and department heads had an email account. Further more, of those that did have an email account many expressed concerns about receiving important announcements via email. It was discovered that many deans, directors, and department heads had a secretary log on for them and read their email, having the secretary decide what should be printed out and passed on, and what could be ignored. Clearly, a major shift in thinking was required before we could proceed. Luckily, this paradigm shift occurred without a major effort on our part. By the fall of 1995, 85.5% of the Deans, Directors, Department Heads, and Central Administration had an Information Technology Services' (ITS) supported email account, and most of the administration and staff realized the importance of keeping their email account password secure.

## Current System

UCB Mailing Services is the Boulder campus service department that provides the paper-based, intra-campus communications system; Mailing Services maintains the mailing lists and delivers the mail. Here are the steps to request a standard paper-based campus mailing:

- 1) The customer calls and schedules a mailing and receives an updated count for the list. Mailing Services provides a date for processing and delivery, which is normally three to four days from the initial contact.
- 2) The customer obtains the requisite number of copies, usually from Copy Center, a campus copying service, and provides them to Mailing Services with an Interdepartmental Order and Invoice (IN).
- 3) All mailings to the list MUST
  - a) Originate from a University entity, such as a department or student group;
  - b) Concern University business only; no personal or commercial correspondence is permitted
  - c) Not concern fundraising
  - d) Not promote political or religious viewpoints

Mailing Services audits all submitted mailings and/or faculty-staff list/labels requests for compliance with the University *Release of Faculty-Staff Labels Policy* and *Use of Boulder Campus Mailing Services Policy*.

## Proposal

In the fall of 1995 selected individuals from both Mailing Services and ITS formed a Bulk-Email working group and developed the following proposal: Provide the Boulder Campus the ability to send a memo electronically to a select group of campus employees that have an email address maintained by Information Technology Services (ITS). Mailing Services will create two lists of recipients: 1) A list of employees that have an email address, and 2) a list of those without email. The most popular list is the Deans, Directors, and Department Heads mailing list, but almost any list that Mailing Services maintains for hard-copy mailings is available, as well as unique selections based on customer-defined criteria. The customer is given the choice of sending a printed communication via campus mail to the recipients with no email address. These 'residuals' will incur the normal charges of a hard-copy campus mailing. Charges for the email portion of the service are used to cover administrative costs of list maintenance and infrastructure support.

### *Key points*

- ◆ Cooperative effort between UCB Mailing Services and Information Technology Services. Mailing Services is the logical department to manage the process because they are in the business of intra-campus communication delivery and maintain the existing delivery lists using carefully crafted extracts of the Human Resource database. Information Technology Services created the actual mailing mechanism and provides the email addresses to Mailing Services.
- ◆ By using the existing policy for the *Release of Faculty-Staff Labels*, no time was wasted developing a specific policy for bulk email communications. This was the easiest way to get the application up and running.
- ◆ Provide a choice for mailing hard-copy to residuals. By not excluding employees that do not have an email account the process addresses the problem of communicating with the entire campus and not just to the 'technically endowed'.
- ◆ Charging for the service. Mailing Services charges for list maintenance with paper-based mailings so charging for use of the lists with email is no different. Because of the increased strain on email system resources this service created, an infrastructure support fee is included.

## Goals

The two departments involved had different objectives, but fortunately, these objectives were not in conflict. ITS was noticing an increase in Listserv activity. Customers were asking ITS to pre-load new lists with email addresses. Departments were beginning to see Listserv technology as the way to broadcast an email message, but ITS wanted to steer people away from using Listserv in this manner. Mailing Services was looking for ways to reduce campus delivery costs, and at the same time reduce the amount of paper being used for intra-campus communications. Customers were looking for a fast and inexpensive way to communicate with the campus community.

### *Why not use existing Listserv technology?*

The campus Listserv was designed to provide an open forum for discussion on a wide range of topics. Customers may subscribe to any list about a favorite subject and play an active part in the discussion. If the list subject is no longer of interest, the customer has the ability to 'un-subscribe' from the list. A customer that chooses to un-subscribe from a list receives no more email from that list. Any member of a list may take part in the conversation, or begin a new topic.

Many campus information providers were starting to see Listserv as a way to broadcast a single message to a group of individuals, where no reply was expected, or desired. This kind of use of the campus Listserv is problematic for several reasons. It is certainly a departure from the idea of an open discussion group, as these types of messages are meant to be read, but not directly responded to. In addition, the current Listserv software makes no attempt at optimizing the delivery path, or timing of the delivery. Noticeable delivery delays occur when sending an email message to a list, and when the software is in the

process of delivering an email to a large number of recipients, server processing decreases dramatically. The idea of having a list moderator maintain the subscription information is also a problem. New employees, departed employees, and email address changes are all events that a list moderator would have to be aware of to keep his list current.

## Scope

The Bulk-Email Working group determined the scope of the project:

- ◆ Convert campus paper-based mailings to electronic mail for any general campus announcement directed to a Faculty/Staff list that can be converted to email addresses from campus box numbers
- ◆ Offer the same functionality for student communications<sup>1</sup>
- ◆ Call the application the campus Electronic Memo service or E-Memo for short. E-Memo is the mechanism to send an official campus communication to a list of campus recipients
- ◆ Steer the campus community towards E-Memos rather than a Listserv list when the number of recipients is greater than 200

Personal content messages, or messages where there is a one-to-one correspondence between the message content and the recipient would be addressed after general broadcast E-Memos were up and running. It is much easier to send the same message to all recipients than sending a unique message to each recipient.

## Environment

ITS was not going to change the current email infrastructure just to accommodate bulk-email. E-Memos had to leverage the existing email technology. The campus email service supported by ITS is *sendmail* based on the Simple Mail Transport Protocol (SMTP). Sendmail is included with the UNIX operating system. ITS maintains a database of email addresses which is distributed nightly to other ITS servers. A process known as 'mailhome' allows a customer to update the database with information about the customer's email account. The information stored in the database includes:

- ◆ The server where the customer reads her email using a server based email reader like pine, or uses POP3 to deliver the mail to a local PC.
- ◆ 'First dot Last' email address. Rather than using the UNIX account name, CU Boulder uses an email alias using the customer's first and last name combined with a period.  
Example: Burton.Fox@Colorado.EDU
- ◆ Up to three additional aliases. This is to accommodate nicknames, and less formal monikers.

The database maintains one *mailhome*, even if the customer has multiple computing accounts, and ensures that all the customer's email is delivered to one account.

An email account is not mandatory at CU Boulder. Students may 'self create' an email account via a Web form. The student is authenticated by entering the CU identification number, and a Personal Identification Number (PIN). Self-account creation is not possible for Faculty/Staff because the Human Resource system does not maintain a PIN for each employee. An authorized staff member may request an email account from the ITS Help Desk over the telephone or by email for a new Faculty/Staff employee. Alternatively, the new employee can go to ITS Help Desk directly and after showing proper identification receive an email account.

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<sup>1</sup> Most students live off campus so any attempt at communication with the general student body usually involves a first class mailing, a very expensive venture.

## Deliverables

The E-Memo request form is found under Mailing Services' home page on CU Boulder's Web server. The form has links to an E-Memo style guide; in addition, each field heading in the form is a link to field-specific help. The customer can click a button to send the E-Memo to her email address so that she can see exactly how the E-Memo will look as an email message. Customers seemed reluctant at first to use the Web form. In the beginning, most customers asked Mailing Services to migrate their document into the Electronic-Memo format. Fortunately for Mailing Services, this happens less often as customers grow accustomed to entering data into Web forms.



Mailing Services' Virtual Mailroom page

## Cost

The E-Memo system cost less than \$1,000 to develop. The items created were an E-Memo request Web form, an email filter, an E-Memo order entry process, a delivery scheduler, and an E-Memo processing menu. Mailing Services' existing administrative billing system did not require programming modification. A new operations code was added to denote an E-Memo job for administrative processing. One Mailing Services staff member is spending approximately 20% of her time managing the E-Memo process.

The main delivery script was created using general funds. No recharge was made to Mailing Services for the script. This enables ITS, or anyone else for that matter, to use the script to deliver bulk email if the list of email addresses is maintained by the mailer.

## Benefits

With regard to our stated goals, E-Memo has been an unqualified success. Standard paper-based campus mailings are down 18% this fiscal year. If all E-Memos were replacements for hard-copy memos, 211.8 cases of paper were saved, more than five pallets worth. The cost savings for Mailing Services' customers have been substantial. Distribution charges for a hard-copy memo to the Deans, Directors, and Department Heads list, for instance are about \$95. This doesn't include the cost of making hard copies, nor does it factor in the cost of recycling the paper. An E-Memo sent to the same list of recipients, assuming no residuals, costs \$36.41.

Period	Total E-Memos	Avg./day	Total Recipients:	Avg. list size
FY 96-97	223	1.2	569,008	2,552
First full year - (9/30/96 - 9/29/97):	320	1.3	861,860	2,693
FY 97-98 (Through Oct):	159	1.8	490,041	3,082
October 97:	55	2.4	197,369	3,589
Total 9/30/96-10/31/97:	382	1.4	1,059,049	2,772

Additional benefits of the E-Memo system were soon realized:

Because of the cost savings over a traditional paper mailing, departments that could not previously afford a campus mailing now could communicate campus-wide.

One of the first events marketed with an E-Memo demonstrated just how effective electronic communications could be. The "Staff Appreciation under the Stars" was a free lunchtime show at the planetarium offered by Staff Council. The event had been offered before without generating much interest. However, when an E-Memo publicized the event, the response was overwhelming. Two additional shows were scheduled because of the number of positive responses, and the popularity was directly attributed to the E-Memo.

## Issues

In the course of two years of running E-Memos, several issues have developed.

- ◆ Although the process was supposed to be gentle to system resources, the impact was still noticeable when running during the middle of the day. It was decided that normal E-Memos would be scheduled between the hours of 5 PM and 8 AM, and only urgent, very time-sensitive E-Memos would be scheduled during working hours.
- ◆ A style guide was developed to help customers with some of the basics of email communication. E-Memo senders were discouraged from using fancy formatting, and from sending more than a couple of pages of text.
- ◆ The increase in campus communication requests was not expected, as the number of campus mailings had been consistent from year to year. E-Memo was created to replace the delivery mechanism -- not to generate new mail. However, Mailing Services is hearing from departments that have never mailed to the campus before. Many departments now feel they can cost effectively 'mail' to the campus community.
- ◆ One of the most popular lists for paper-based mailings has no equivalent in E-Memo. The departmental secretaries list, better known as 'Please Post' can not be converted to email because it is addressed to the department and not to an individual. To get around this, mailers are sending to *all* faculty and staff. The savings to the customer are still significant as compared to a paper mailing.

- ◆ No confirmation of receipt exists. Initially, not enough disk space was allocated to hold all the spooled E-Memos. This caused some recipients to receive only the subject line of the E-Memo with no text body, and others did not receive anything at all. It was also impossible to tell exactly where in the list the job had failed. Some in the Bulk Email working group thought we should apologize to the mailer, and return the money, but not send the memo again. Others in the group concurred that a refund was in order, but that the delivery had to be made again to instill confidence in the process. The job was sent out again with an apology at the top to anyone who might have received the message twice.
- ◆ E-Memo is not a substitute for a Web-based calendar of events. The contents of some E-Memos might be better suited for a campus wide calendar of events, and yet it is very difficult to decide what events warrant an information 'push' down to an employee's email box, and which should be posted for interested people to go and discover.
- ◆ E-Memo has a few detractors. A number of employees feel that all unsolicited email is 'SPAM', a term used to describe trivial, useless email devoid of any real value. Some other complaints:
  - Too many insignificant mailings among the important ones
  - Too many E-Memos altogether
  - Some people wanted to be removed from the list
  - Some E-Memos were too long to be effective

## **Future**

Many departments at CU-Boulder are moving away from centrally supported email, and towards managing their own email service. ITS has the capability to remove unread date-sensitive E-Memos from the in-box of the email servers that ITS supports. ITS can not perform this function on machines maintained by other departments. When a department chooses to offer its own email services, very often the existing ITS email address is forgotten, and email is left unread on the ITS servers. Enterprise-wide directory services are required to maintain our high percentage of known email addresses.

Attitudes towards email are changing. Soon no one will think receiving email is a special event. The incredible results achieved by marketing an event via email will disappear. Also, paper based mailings will continue to decrease with the continued advancement of email technology. Before email overtakes other forms of communications, the issues of security, and reliability in addition to directory services, must be addressed. The Federal laws regulating standard mail may seem tedious, but they are what make standard mail the trusted delivery mechanism of choice today.

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Campus Box 9  
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<a href="http://www.colorado.edu/MailingServices/ememo_hlp.html">http://www.colorado.edu/MailingServices/ememo_hlp.html</a>	Directions for E-Memo
<a href="http://www.colorado.edu/MailingServices/StyleGuide.html">http://www.colorado.edu/MailingServices/StyleGuide.html</a>	Style guide for E-Memo
<a href="http://www.colorado.edu/MailingServices/ememo/ememo.html">http://www.colorado.edu/MailingServices/ememo/ememo.html</a>	E-Memo request form