

E-Communication Project Self-Study Report

The ITS process for implementing projects includes reviews at key milestones. Typically, these reviews are conducted internally within ITS and, occasionally, include review and comment by stakeholders across campus. Given the size and breadth of the E-Communication Project, we are broadly sharing this report in order to seek your input.

To share your comments, please contact the authors of this report:

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The project website (<http://www.uiowa.edu/ecommunications>) also includes a means for providing feedback.

Report Structure

This report is organized into 4 parts:

- Part 1 provides the history, recommendations and current status of the E-Communication Implementation Project.
- Part 2 discusses internal and external changes since the implementation project began.
- Part 3 identifies and analyzes options for replacing the Blue E-mail Cluster.
- Part 4 details the new recommendations for the implementation project and future tasks to be considered.

Part 1: History, Initial Recommendations, and Project Status

In July 2005, ITS sponsored a multi-collegiate team to study the current state of and future need for electronic communication tools at The University of Iowa. The team published their results in late 2005. The report included a number of themes identified by the team and a series of recommendations based on these themes. The E-Communication Core Group recommendations were presented to ITS and to the subsequent E-Communication Implementation Team.

Key Themes

1. E-mail has become the most important means of electronic communications, even more important than the desk phone.
2. People want to easily send, receive, share and save large files and need robust tools for managing those files.
3. Members of the campus community want less spam.
4. Some people want additional security, and some indicate problems with existing security practices.
5. The campus community has strong and varied opinions about calendaring. Some view group calendaring as critical, some see little need for it, and some are opposed to it.
6. People want fast and responsive access to their e-mail system from wherever they read mail.
7. The standard University e-mail address (firstname-lastname@uiowa.edu) is important. Most people agree that off-campus routing is necessary.
8. Many members of the campus community prefer freedom of choice when selecting their personal computers and the applications that run on them.
9. Some welcome advanced electronic communications, but others are less tolerant or desiring of it.
10. There is a need for more education about the proper and effective use of electronic communications

Recommendations and Current Status

- 1. Continue to support the Blue Cluster and the Exchange services. Support any unit that requests moving their entire population from the Blue Cluster to Exchange with appropriate notice.**
 - ✓ Met with collegiate partners to discuss the differences between Blue Cluster e-mail and Exchange e-mail and offered the option to move student groups to Exchange. At the request of the colleges, student Exchange accounts were created for the following colleges:
 - Dentistry – 400 students moved to Exchange (June 2006)
 - Law – 750 students moved to Exchange (August 2006)
 - Business – 120 fulltime MBA students moved to Exchange (September 2006)
 - Business – 4000 undergraduate students moved to Exchange (January 2007)

2. Improve Webmail performance on the Blue Cluster.

- ✓ ITS upgraded the network and storage infrastructure, which led to significantly improved Webmail performance.

3. Enhance the Exchange Service as needed to accommodate any unit request that, with appropriate notice, their entire population can be moved to Exchange.

- ✓ Completed infrastructure upgrades
 - Added storage space in support of new quota levels
- ✓ Initiated an internal pilot to test the new version of Exchange (Exchange 2007), which is scheduled to be deployed on campus in Summer/Fall 2007.

4. Raise disk quotas significantly. The underlying hardware should be configured to easily handle additional increases in the future.

- ✓ Established new quota levels, to be implemented pending completion of the infrastructure upgrades. New quota levels (in megabytes) are as follows:
 - Faculty/Staff will increase to 250/300/350 (note that the three numbers refer to 1) the base quota, 2) the limit at which warnings are received, and 3) the level at which message send capability is restricted)
 - Graduate Students will increase to 100/150/200
 - Undergraduate students will increase to 50/75/100
- ✓ Identified the Cyrus software as a replacement for the Blue Cluster and developed a plan for implementing. For more information on Cyrus, see <http://cyrusimap.web.cmu.edu/> .
 - Webmail interface (IMP) upgrade completed in August 2006
 - Recommendations on a strategy to replace the Blue cluster e-mail service will be issued in January 2007.

5. Improve the quota processing on the Blue Cluster to warn users at the soft and hard quota limits, and make it easier to recover once the disk quota has been exceeded.

- ✓ This requirement is to ensure that the replacement for the Blue Cluster exhibits a user friendly method of quota management similar to that of Exchange. Exchange provides an email warning when the second quota level (soft quota) is exceeded and subsequently restricts sending capability when the third quota (hard quota) limit is reached. Please see recommendation 4 for details on quota levels.

6. Reduce the amount of spam.

- ✓ Default spam rejection level was increased from 99% probability to 90% probability on January 11, 2007.

- 7. Continue to support the standard University e-mail address (*firstname-lastname@uiowa.edu*) and off-campus routing. Adjust policies and educate students about the risks of routing e-mail off-campus.**
 - ✓ Provided target search tool to new Exchange collegiate units enabling them to monitor on-and-off campus routing.
- 8. Provide the infrastructure to allow faculty, staff, and students to easily send e-mail from off campus using the same desktop e-mail client (Eudora, Netscape, Outlook, etc.) used on campus.**
 - ✓ Exchange users can now send e-mail from off campus.
 - ✓ For users of the Blue Cluster, webmail access allows the sending of e-mail from off campus. For other e-mail clients, this ability is pending the strategy to replace the Blue Cluster.
- 9. Better publicize desktop client availability for both on and off campus use.**
 - ✓ Conducted a campaign in spring/summer 2006 to educate users on clients, anti spam, and electronic etiquette issues. This training will be repeated as part of ongoing ITS training efforts.
- 10. Coordinate with other e-mail providers on campus and at other Regents institutions to align message size policies and filter/reject policies.**
 - ✓ Increased message sizes on the campus e-mail gateways from 20 to 30 MB.
- 11. Consult with other e-mail providers both on and off campus to propose and support methods of moving and sharing large files now sent via e-mail.**
 - ✓ Provided a website with recommendations on the most effective ways to share large files.
<http://www.uiowa.edu/ecommunications/topten/index.html>
- 12. Accommodate sending encrypted documents and using digital signatures.**
 - ✓ Identified as a future project.
- 13. Study creating both student and faculty/staff portals to present information such as University calendars and academic deadlines that is now sent via e-mail.**
 - ✓ Identified as a future project.
- 14. Provide more education about the proper and effective use of electronic communications.**
 - ✓ Conducted electronic etiquette education and training spring/summer 2006. Please see training information at <http://www.uiowa.edu/ecommunications/class.html> .

Lessons Learned

The recommendations from the E-Communication Core Group provided general guidance, but further investigation was required to create a detailed implementation plan, specifically with regard to the recommendations both to substantially increase quotas capacity and to maintain the Blue Cluster e-mail system. Technical experts in ITS-Systems and Platform Administration (SPA) recognized that those two

recommendations were fundamentally incompatible, because the current Blue Cluster architecture is unable to support a significant increase in quotas.

Based on additional review and analysis, the E-Communication Implementation Team recommended replacing the Blue Cluster with a new architecture based on the Cyrus software. The team spent several months investigating the software, consulting with other sites (including Indiana University, a major user of Cyrus), and designing the new system.

The Cyrus architecture required reassessing many of the operational components and policies in place for the Blue Cluster e-mail system. The new architecture would necessitate changes in many areas, and provide opportunities to improve processes and policies in other areas. To streamline decision-making and encourage parity between the two e-mail systems (Cyrus and Exchange), the E-Communication Implementation Team determined that, where possible, the service parameters of the Cyrus installation should mirror those of the existing Exchange system.

Even with that heuristic in place, the team confronted significant fundamental service decisions on a wide range of issues, including mail recovery for customers, data storage and backup policies, folder deletion, retention of deleted messages, and routing of mail directed at the blue.weeg.uiowa.edu address. New considerations and limitations arose frequently as the team became more familiar with the Cyrus software and further refined the service parameters.

As these changes and decision points accumulated throughout the 2006 implementation period, it became clear to the team that the resulting, newly created “Blue” service conflicted with the original recommendation to “maintain the Blue Cluster e-mail service as users know it today.”

Project Financials

Project budget (based on Cyrus implementation)		\$925,000
Less total purchases to date		<u>(\$460,002)</u>
<i>Hardware purchases</i>		\$377,435
Storage hardware	\$315,255	
Linux servers	\$42,854	
Windows servers	<u>\$19,326</u>	
Total hardware	\$377,430	
<i>Software purchases</i>		<u>\$82,565</u>
Anti-spam/antivirus software*	\$73,254	
F5 load balancer licensing	<u>\$9,311</u>	
Total software	\$82,565	
Total purchases to date		\$460,000
Remaining budget		<u>\$465,000</u>

*Cost is for a 3-year license

Part 2: Environmental Changes

During the present review process, several major changes were noted as having occurred over the 12 months of the implementation project. While no single change indicates a need to review the direction of the project deliverables, in their totality these environmental changes, along with the lessons learned during the implementation project, present a compelling argument to reassess our base assumptions and resulting direction.

Continuing Faculty/Staff Migration to Exchange

The majority of faculty and staff were moved from the Blue Cluster to Exchange in 2003-2004, leaving approximately 2000 faculty and staff members on Blue. Since that time, migration of faculty and staff to Exchange has continued and there are now approximately 1700 faculty, staff and emeritus faculty remaining on the Blue Cluster. The Tippie College of Business faculty and staff completed the Exchange move in August of 2006 and most other colleges continue to look for opportunities to move remaining Blue Cluster users to the Exchange service.

Repeated Questions Regarding the Rationale for Two Systems

Throughout the project, many people on campus (including leadership, IT support staff, and end users) have asked in public and private forums why there is a need to provide two campus e-mail systems. In addition, the IT Review Final Report noted many instances of users discussing duplicate systems and specifically citing e-mail as an example.

Auditor's Review and Report Referencing Parallel Systems

A review conducted by the Board of Regents Internal Audit Department, cited the need to identify and reduce parallel systems on campus. The report contained the following corrective action response — “Management ... will assess email and messaging services to determine which are unnecessarily redundant. We will develop plans to consolidate as many existing systems as possible, recognizing that certain functional, security, and healthcare issues may require a separate email service, within a reasonable timeframe.”

Better Definition of Home/Individual Users and Work/Institutional User Attribute Models

The Gartner Research Group and other organizations have published several user attribute models for e-communication including a recent ECAR Bulletin by Louisiana State University. LSU (Hadden and Voss, November 2006) posits that there are two distinct user types on their campus:

1. “Individual users” are driven by cost, capacity, and mobility
2. “Institutional users” are driven by reliability, integrity, and control

An internal analysis of University of Iowa survey data compiled by the E-Communication Core Group found similar results. Specifically, survey responses from students, faculty and staff revealed five factors which appeared to influence users' responses:

- Use of **mobile devices**
- **Scheduling** with others
- **Instant messaging**
- Maintaining a **personal calendar**
- **Security** – including encryption and virus scanning

Based on those factors, a cluster analysis revealed four distinct clusters among the responses. When compared to the demographic data gathered in the survey, these distinct patterns became clear:

- Faculty are mostly uninterested in instant messaging, and many are uninterested in any electronic communication technologies beyond basic e-mail.
- Staff are generally more interested than faculty in new technology related to electronic communication.
- Graduate students vary greatly in their electronic communication interests. This is consistent with the variety of ages, programs, and work situations among graduate students.
- Undergraduate students are far more interested in new communication technologies than are any other group.

Qualcomm Decision to Make Eudora Open-Source

In mid-October 2006, The University of Iowa licensing for the Eudora e-mail client from Qualcomm was due for renewal. At that time, Qualcomm indicated their intention to move Eudora to open source on the Mozilla platform. This change is of concern to the University for two reasons:

1. The support standard set by the ITS E-mail Team is, in large part, a reflection of the support received from Qualcomm. As Qualcomm relinquishes responsibility for Eudora, ITS will almost certainly not be able to provide the same high level of support in place today.
2. Because Mozilla already has a large community around its own e-mail client, Thunderbird, there are questions about the robustness of future releases of Eudora — for example, how actively will the community enhance the product? The success of an open source product relies heavily on the size of and support from the community. As the community dwindles, so does the support for the product.

More Mature Outsourced Offerings from Microsoft and Google

Both Microsoft and Google have moved aggressively into the market for providing outsourced e-mail services to the higher education community. While these vendors were beginning to identify the necessary components to provide e-mail on a large scale at the beginning of our implementation project, neither was mature enough to warrant a detailed investigation at the time.

This market has accelerated considerably through the fall of 2006, culminating in an announcement in October that Arizona State University moved 65,000 e-mail accounts to Google Apps for Education. Outsourcing enterprise services is a complex issue with impacts in many areas and will require significant analysis. However, these more robust offerings, in conjunction with the other advanced communication services bundled with e-mail, and a seemingly advantageous cost structure, merit a comprehensive review.

Opinions of New Users

E-mail is essentially a service for University of Iowa faculty, students, and staff. Therefore, it is vitally important that the team understands the use patterns, the needs, and the opinions of the end users. To help achieve this understanding, ITS identified a group of undergraduates from the Tippie College of Business who recently moved from Blue to Exchange. Prior to late fall 2006, undergraduate Exchange users were few in number. However, the decision by Business to move all students to Exchange established a group who could compare and contrast the two systems.

A focus group consisting of the Undergraduate Leadership Council in the College of Business met with ITS staff to provide opinions and feedback from their perspective, both as users of the service and as a student leadership body. Overall, the feedback from the students regarding Exchange was positive. Favorable comments included the message preview pane in the Outlook Web Access (OWA) web interface and the calendar function. Many of the students had used or are using Exchange at work, so the transition from Blue was easy for them. However, several students mentioned that it was difficult to move e-mail messages from their existing account on the Blue system to Exchange.

With regard to usage patterns for the calendar function, one student used the calendar on a regular basis with faculty and staff. She stated that she did not usually initiate invitations unless responding with a time change to a meeting proposal originating from a faculty or staff member. When she and the other students were queried on why they didn't use the calendaring tool, they responded that there are not yet enough other students on Exchange to make it viable for scheduling meetings. The students were also very interested in having the ICON course management interface with Exchange so that their calendars reflect their course schedules.

Current Statistics for University of Iowa E-mail Users

In an attempt to understand use patterns, statistics were analyzed from the campus mail routing and provisioning systems. This data provided information on the number of users on each system, as well as the target they were using to receive their e-mail.

Faculty and Staff use of alternative e-mail targets:

- 1719 active and emeritus faculty and staff have Blue accounts. Almost 300 of those are targeted to an e-mail service other than Blue (17%)

Breakdown of off-campus email targets chosen by users:

- From January 2006 to January 2007, the number of @uiowa.edu addresses targeted to Gmail has increased from 1585 to 3660 (+130%)
- From January 2006 to January 2007, the number of @uiowa.edu addresses targeted to Hotmail has increased from 5368 to 6524 (+22%)
- From January 2006 to January 2007, the number of @uiowa.edu addresses targeted to Blue has decreased from 24985 to 22552 (-10%)

Part 3: Options for Replacing the Blue E-mail Cluster

As noted earlier in this report, a key recommendation from the 2005 E-Communication Final Report that has not yet been implemented is to “raise disk quotas significantly.” The team encountered challenges as they attempted to implement this recommendation specifically for the Blue Cluster service, and, in the end, were forced to reconsider how best to achieve the goal of this recommendation.

A further constraint on the project is the need to decommission the existing Blue system which is well beyond the reasonable lifespan for the architecture on which it is based. The current architecture, while acceptable for the smaller quotas currently in place, is not capable of efficient management of the number of individual messages generated by the proposed new quotas. Users would certainly have a significantly downgraded experience. The current timeline for decommissioning the Blue Cluster is fall 2007.

The Implementation Team investigated a number of options for addressing this recommendation and identified the following as the most viable:

Option 1: Implement the identified Cyrus architecture

Option 2: Move all Blue Cluster users to Exchange

Option 3: Use an outsourced option to replace the Blue Cluster

Each option has merits, and each has costs and risks associated with implementation. While the team believes that the outsourced option to Google or Microsoft has the potential to provide a large long-term cost savings for the University as well as meeting, or exceeding, the needs of the majority of the student users, we do not believe that the option is achievable by the fall 2007 deadline to decommission Blue.

Based on the constraints of the existing Blue system and the time necessary to fully understand and evaluate the outsourced offerings, the decision to be made at this point of implementation is to: 1) Continue with the plan to implement Cyrus to replace Blue, or 2) add capacity to Exchange and migrate the Blue users.

In considering these two options, we have focused our analysis on three areas: infrastructure, financial impact, and user experience. Option 3, outsourcing student e-mail, is referenced in broad terms and will also require analysis of retention, access, and other policy issues.

Infrastructure

Overview:

For this review, infrastructure is defined as the underlying architecture (design, configuration etc.) supporting the user interface. While the decision to choose a specific e-mail system (Cyrus, Microsoft Exchange, or an outsourced solution) will clearly affect users, decisions regarding infrastructure details such as the number of servers, the configuration of those servers, back-end data storage, etc., should remain mostly transparent to users. Many CITL members and some members of the original E-Communication Core Team felt that these decisions could best be made by ITS, as ITS

had the best insight into future enterprise architectural needs, as well as carrying the burden of supporting the resulting system.

Infrastructure Summary:

Microsoft Exchange has the advantage in terms of being a “known entity.” Clearly, the campus Exchange implementation has proven itself to be reliable and, while there may be concerns with some of the functionality of the Exchange 2003, it is difficult to argue with the reliability, performance, and overall effectiveness of the service. The latest version of Microsoft Exchange, Exchange 2007, which may address some of the functionality concerns, is currently available for testing and a small instance has been implemented within ITS. The current ITS schedule calls for full deployment of Microsoft Exchange 2007 by mid-2007.

Neither Cyrus nor an outsourced option is fully understood today in terms of infrastructure that would need to be implemented in our situation. We can, however, say the following about the infrastructure needed for these two options.

Cyrus Implementation. The implementation team encountered many unforeseen questions and potential risks while investigating and executing the Cyrus development tasks in the project. As an example, despite a cautious approach, ITS Engineers were forced to react to a serious performance degradation experienced in August when the new webmail version was deployed.

Outsourced Options. The performance and stability of an outsourced option are known quantities, given the widespread use of Google and Microsoft services. The unknown elements involve the interface of the outsourced product with U of I provisioning, mail routing, what control the University and its users would retain over their mail, and how our existing policies would or would not match with those of the outside vendor.

Financial Impact

The financial analysis below includes implementation costs for each option, staff time to develop, test, and support, as well as an estimated Total Cost of Ownership.

Implementation Costs

Table 1 captures costs for 5 year capital estimates for hardware configuration and installation, mail routing, anti-virus, storage, backup, system administrators, and other associated maintenance costs.

Table 1. Overall Costs (Five year total)

Implementation Method	Total
Cyrus with Exchange 2007*	\$4.3 Million
Exchange 2007 only**	\$3.5 Million

*Assumes 23,000 Cyrus accounts and 12,000 Exchange 2007 accounts

**Assumes 35,000 Exchange 2007 accounts

Table 2. Staff Time for Implementation (all measured in hours)

This table provides information regarding the staff time required to implement each service. Exchange costs reflect only the effort necessary to move users from Blue to Exchange 2007. Costs associated with upgrading from Exchange 2003 to 2007 are not included since this work will need to be completed as a regular cost of doing business.

It is important to note that in addition to monetary costs associated with each hour of labor, each hour also represents lost opportunity for staff members to work on other projects.

Service	Hardware Installation	Software Installation	*Software Development	Provisioning	Client Testing	**Training and Documentation	Total Hours
Cyrus	20	20	200	250	360	480	1090
Exchange 2007	120	0	0	50	180	160	470

**Software Development refers to programming work to create integration components i.e., user account management, quota handling, reporting, account migration, etc.*

*** The estimates for migration and training include effort necessary to move accounts from Blue to the new service, train support staff and end users, and the effort to create supporting documentation.*

Total Cost of Ownership[†]

The estimates below, based on 35,000 accounts, include: capital costs and annual maintenance for hardware, software, and data storage; software licensing for anti-spam and anti-virus protection; account provisioning; and e-mail routing and personnel costs. Microsoft Client Access License (CAL) and Microsoft Premier Support Service (PSS) costs are not included, because they are parts of other agreements and cover numerous Microsoft products.

Service	UIOWA Estimate Per account per year
Cyrus	\$24.65
Exchange	\$20.18

Summary:

The financial analysis indicates an advantage for Exchange 2007 when comparing the ongoing costs associated with moving all users to Exchange 2007 to the initial and ongoing costs of implementing Cyrus.

Part 4: Recommendations and Future Actions

Recommendations for the E-Communication Implementation Project

Given the limited useful lifetime of the existing Blue system, the unknowns of the outsourcing options, and the tradeoffs of a replacement for the Blue Cluster based on Cyrus when compared to Exchange, we recommend the following:

- Discontinue the Cyrus implementation project as a replacement for the Blue Cluster
- Move the remaining users with Blue accounts to Exchange, while maintaining the spirit of the initial E-communication recommendations by increasing quota levels and supporting diversity of choice through multiple e-mail clients
- Continue to investigate the outsourcing of e-mail, possibly moving selected groups of students on a trial basis

Implementation Options

There are several options for implementing these recommendations that will need further discussion and analysis. These options are outlined in this section.

Options for Moving Blue Users to Exchange

The majority of users remaining on the Blue system are students, with a small number of faculty and staff. As we consider options for decommissioning the Blue Cluster in the fall of 2007, we will investigate at least the following options for moving users to new e-mail services:

1. Move all remaining Blue users to the existing Exchange service
2. Move all students to Exchange and maintain a small instance of the Blue Cluster for remaining faculty and staff
3. Move all students except for May 2007 graduating seniors to the existing Exchange service

Options for Outsourced e-mail

The outsourcing of some portion of the University e-mail to either Google or Microsoft Live is an intriguing option, but this solution requires more analysis and would be difficult to implement in the timeframe necessitated by the fall 2007 decommissioning of the Blue Cluster. Given more time to explore the concept of outsourcing, this might become a viable option in the future, but appears unlikely within the current time constraints.

In addition, if outsourcing becomes a viable option in the future, the potential to recoup hardware costs associated with Exchange appears to be greater than with Cyrus. This would occur primarily through reuse and reallocation.

To continue to explore the potential of outsourcing, we recommend administering one or more pilot programs to existing students. Both Google and Microsoft would warrant serious consideration based on feature sets and past performance.

Recommendations for Future Endeavors

As perhaps the most fundamental IT tool in use today, e-mail pervades every aspect of our lives. In addition, as we use e-mail more often and ask more of it, our expectations of the service and available features increase correspondingly. These service expectations place greater demands on the infrastructure to support the service, and lead to significantly increased costs to provide the service.

Recent events, however, may indicate a shift in the paradigm of providing e-mail for higher education institutions. As the ECAR LSU report concludes, "With pressures increasing on higher education institutions to find ways to do more with less, e-mail provisioning is a challenge for which there are solutions that maintain or improve quality of service while significantly reducing costs." Certainly the University of Iowa finds itself in this situation of increasing demands on service and decreasing availability of funds to meet those needs.

Therefore, we recommend that ITS continue efforts to explore the evolving needs of the campus with regard to all forms of electronic communication, including, but not limited to, e-mail, text messaging, instant messaging, blogs, portals, and wikis. The review and assessment conducted by the 2005 E-Communication Core Team is the seminal effort in this ongoing need to understand how ITS can support the campus needs for e-communication and it lays the foundation for future efforts.