

# Information Services Infrastructure Redesign Proposal – part 2



Information Services  
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## **Executive Summary**

Information Services is evaluating its technological infrastructure towards the goal of providing integrated services to the Bryn Mawr Community. This integration involves two components. We proposed the first – a migration from Novell to Windows for file storage, networked printing, and user authentication - to this group in July. This document presents our research and recommendation concerning the second component: integrated email and calendaring services. In the spring, we will deliver an implementation plan that will address policy and desktop management changes as well as user training and migration to the new services.

The current computing infrastructure was built ten years ago and has since evolved in a piecemeal way in the hands of a dozen different system administrators. As new, highly desirable features have emerged, and more and more of the community come to rely on them, this environment has become increasingly difficult to support. A wholesale restructuring, such as we're doing, is rare and we recommend it with great sobriety and an awareness of the need to properly support the community through these changes. The impact of the transition closely informed the development of this recommendation and will similarly inform the implementation plan. Properly executed, this restructuring will provide access to the community to a more feature-rich, reliable, and flexible environment.

The report below details the reasons the project team unanimously chose Zimbra server as the campus messaging platform. Briefly, Zimbra delivers a well-integrated, highly-effective desktop environment on all supported platforms: via Outlook on Windows PCs, iCal and Apple Mail on Macintosh, and a similarly powerful web client that works equally well on Windows, Macintosh and Linux computers. It also delivers a highly reliable, extensible, and supportable server "back end," ensuring security and privacy for the College's data. This server was deemed to outperform the other two possible choices: Microsoft Exchange and Google when evaluated across five discrete areas: 1) user functionality, 2) sustainability, 3) trends in the technology market, 4) the total cost of ownership and 5) suitability for the Bryn Mawr environment. In many ways Zimbra offers the best that Google offers to students and the best that Exchange Server offers to administrators. This report includes a detailed explanation of the evaluative criteria and process.

The last section of this document is an estimated budget covering all expenses needed to complete the Novell to Windows transition, the new email implementation, and the upgrades of campus computers to the Vista and Mac OS 10.5 operating systems. We anticipate that the features present in our current environment can be delivered for \$506,000 to \$665,000, which Information Services can fund through reserve funds that have been accrued over the past two years with this project in mind. Our current Novell and email servers are due to be replaced, independent of these technology changes, and the annual funding set aside for their replacement accounts for about half of the total project expense. The budget proposal also identifies some policy and technology additions to advance the reliability of the College's technology infrastructure. Those suggestions will require further discussion over the next few months.

## Background

In April 2007, Bryn Mawr College Information Services began a strategic review and planning effort regarding the college's information technology infrastructure. The ideal solution will be sustainable, flexible, and dynamic but, above all, will provide the necessary features and capabilities to facilitate easy collaboration and communication. Two main goals emerged from an April brainstorming of library and computing staff: to provide feature-rich collaborative tools that integrate into the user's experience and to provide better services through consolidation onto fewer technology platforms and software variants. The community would benefit from better tools and an environment that fosters the delivery of consistent and high performance service.

## "Messaging" Solutions and Selection Criteria

There are numerous options for how an institution provides email to its members; there are far fewer solutions that provide a tight integration of email with calendaring, task management and document sharing. This type of integrated communications, which we strive towards, is called "messaging". Another explanation that might be useful is the distinction between the server and the client. Users read their email in a "client" (e.g. Eudora, Thunderbird, Webmail, Outlook) and that client sends and receives emails from a "server" (e.g. Exchange, Zimbra).

Microsoft Exchange Server defined this "messaging" arena in the early 1990s, and it became the de facto standard for business. About 3 years ago Google introduced Gmail, which is similar but web-based; this past February Google launched a new service to offer email hosting with an institution's domain (i.e. a brynmawr.edu address). Five years ago Zimbra launched an open source solution that rivals Exchange and which will soon have 30 Million mailboxes among its clients. All of these solutions are terrific products and each would offer a significant, but not equivalent, improvement over our current environment. Our evaluation set out to understand their differences and to weigh the relative positives and negatives across five discrete areas: user functionality, sustainability, trends in the technology market, the total cost of ownership, and suitability for the Bryn Mawr environment.

The table below summarizes our evaluation of how we rated the solutions; the sections that follow provide a context and explanation within each category. The value in each cell is the average score from our team of nine staff members from across Information Services. The scale is 1 to 5 points, with 5 being most desirable. As shown, Zimbra rated highest and is a unanimous recommendation by our group. It should be noted that Google was a close second place as will be elaborated in the sections that follow. Also note that our testing determined that Outlook was the best client solution whether it was connected to Exchange or Zimbra on the server.

### Relative Ratings

	User Functionality	Sustainability	Trends / Positioning	Total Cost of Ownership	BMC Suitability	Total (avg)
Exchange Server	3.2	4.2	3.2	3.4	2.6	<b>146 (3.3)</b>
Zimbra	4.3	4.1	3.8	3.6	4.3	<b>178 (4.0)</b>
Google	3.6	3.8	4.2	4.4	2.7	<b>164 (3.7)</b>

## **Who are we and what do we need?**

What do we need to retain from our current environment and what needs to be improved? And what about our current environment will influence the type of solution that is most appropriate for us?

We have been fortunate to have a stable email solution which has been unavailable for fewer than three days, in total, over the past 10 years. Our new solution needs to be as reliable as our current solution. However, our “work horse” has been a bit unwieldy and has not kept pace with the demands for larger quotas and additional features like emailing using an off-campus ISP (e.g. Verizon) and integration with a central directory (i.e. fewer passwords and emailing to someone knowing only their first and last name). Our new solution needs to be built with current technology, and it needs to be able to adapt as the market and technology changes.

Finally, our current environment has allowed a lot of autonomy for individual members of the community. Many members of our community prefer to store their email on their local computer due to privacy concerns. We support seven different ways of viewing email (aka email clients) across four years worth of Mac and PC platforms. Approximately 30% of our faculty and staff and 40% of our students work on Macs; after being stagnate those percentages have started increasing here and elsewhere over the past year and a half. This level of variety greatly complicates Information Services' ability to support the community and there would be an improvement in service responsiveness and quality if more standardization could be adopted. A single solution would create a significant improvement in service.

## **How did we evaluate?**

We began our evaluation by identifying over 200 user-side and server-side features ranked as either required or desired. We created a test lab and installed evaluation copies of Exchange Server and Zimbra as well as a test domain on Google. Using test accounts, our staff exercised the three products on all combinations of Mac and PC operating systems and the commonly used web and desktop clients. They made note of how each product performed.

We also surveyed the faculty and the rest of the community and received 455 responses that aided our identification of important features and their tradeoffs. A few items of note:

- 33% of respondents email from multiple accounts
- 78% use email to schedule meetings/events
- 71% use email to archive important correspondence
- 83% regularly use email at work and home
- 24% use email abroad
- 78% of respondents prefer a central data storage solution to a local solution

Finally, in the “other comments” section, 6% requested a client more like Gmail, 9% expressed concern about losing mail during a desktop upgrade, and 12% offered that they would like more consistency of software versions across campus to aid in file sharing and support. This level of unsolicited opinion in these areas reinforced our observations and our goals for this redesign.

We discussed policy and philosophy implications with three senior administrators (John Griffith, Jenny Rickard, and Jerry Berenson) and two members of CLIC (Rick Hamilton, Penny Arm-

strong). That group discussed a good many issues, including the tradeoffs of outsourcing and the role of personal choice regarding browser choices and location of one's email (central or local). From this group we sensed that personal choices could and should be reduced and controlled to improve overall service, and that outsourcing, especially to Google, is an intriguing idea but one that would likely meet with resistance from a significant number of faculty and staff.

We are part of the CLAC consortium of 66 liberal arts institutions. A number of those institutions are moving to Zimbra, a few have Exchange and only one has outsourced to Google (Hope College), although others are considering it (including Macalester). We talked with five institutions: Occidental and Villanova, who are on Exchange; Bucknell and Franklin & Marshall, who are implementing Zimbra; and Hope, who outsourced to Google this year. We also talked with Doug Grundman who works at Google and was referred by Helen Grundman, Bryn Mawr Mathematics Department.

In addition, we talked with Haverford and Swarthmore, both of whom are considering changes to their email solutions. Both are seriously considering Zimbra and Google. Haverford is considering using Google for student accounts and Zimbra for faculty-staff accounts, and Swarthmore is unsure what direction they will take under new IT leadership but is leaning towards Zimbra. If Bryn Mawr moves forward with Zimbra we could provide a leadership position for the TriCo.

As a final step, 15 members of the community (1 faculty, 3 students and 11 staff members) volunteered to test these three products and various desktop clients and web-based clients on both Macintosh and Windows computers.

We started this evaluation in a peripheral way in July and in earnest in October. We have given this decision tremendous thought and have had a lot of difficult and complicated conversations in order to try to reach a well-reasoned and appropriate decision that will yield the best results for Bryn Mawr College.

### **Criterion 1: User Functionality**

Before testing, our team compiled a list of over 200 features that we felt the mail system might have and determined whether those features were required or simply desired. We wanted to choose the system that offered the most features appropriate for our community based on current functionality while also looking to improve in specific areas such as quota management and consistency of experience while working from home or on leave. The group tested all features on 6-8 different combinations of clients and systems. Below is a summary of the key findings.

All three options offered a big improvement in user interface and a more modern experience of "messaging". All three offer the ability to reduce the number of passwords by authenticating against Active Directory. And for all three we would be able to increase quotas and users would continue to receive email even if they reach their quota. Another very desirable feature was the ability to look up a community member based on first and/or last name without knowing their specific email address; that feature works fairly similarly in all three.

The biggest difference between the three systems was the way the web clients functioned. Zimbra's web client looked and worked essentially the same regardless of platform and browser.

Google is entirely web based so it functioned the same across platforms. Exchange's web client lost significant functionality on a Mac, allowing only the most basic of functions and it uses a proprietary technology which would slow down webmail performance, particularly internationally. Recall that 83% of survey respondents regularly use email at work and home. Those users and the 24% who use email abroad will benefit from the faster technology of Zimbra and the uniformity of webmail experience regardless of the browser available on those personally or commercially owned computers (e.g. at an Internet café or guest institution during a sabbatical).

Other features and differences among the products included:

- Integration of calendar and email—each system is integrated but each works slightly differently depending on the platform and client used. The Microsoft Outlook “client” (meaning the software is installed on the computer) offered the most functionality for displaying email and calendar information stored on the “server” by both Exchange and Zimbra. Events could be accepted from an email through a one-click process. The community testers were very pleased with this feature as well as the features for emailing from the calendar. Recall that 78% of survey respondents mentioned use of email to schedule meetings/events. Google was less integrated than either Zimbra or Exchange.
- User interface/layout – Outlook with either Exchange or Zimbra offered the most flexibility in how email and calendar items were displayed and put “everything in one place.” In testing with users, most found their way around Outlook without any assistance. Google has separate views for calendar and email.
- Filtering/Tagging/Organizing—All three had different ways of allowing people to organize their mail. Google and the Zimbra web client offer tagging as an option while Exchange has categories. Only Zimbra web and Exchange offer an option for folders. The Zimbra web client was more “Web 2.0” about its tagging and filtering. The Google email search feature leverages their core business and is extremely fast and effective.
- Calendar and document sharing—each offered different ways of sharing calendars and documents within the system and with the public (i.e. colleagues at other institutions). Zimbra and Google use more open and universal standards. None of the three options would display TriCo colleague availability while proposing a time for a meeting (as we currently have) although it’s possible that if all three schools implement Zimbra, we might be able to develop or procure a module to provide that functionality.

### **User Testing**

Everyone was generally happy with both Outlook and the Zimbra web client. Google did not receive rave reviews and some testers expressed concerns about privacy and security. On the Mac, people were not happy about the lack of functionality on the Exchange web client nor the lack of a desktop client on the Mac that can interpret and display all of the functionality offered by Exchange. One student was so impressed with the Zimbra interface that she said she might stop forwarding her email to Google if we went with Zimbra.

### **Criterion 2: Sustainability**

This category encompasses the ease with which I.S. can support each option considering issues of system administration, user support and integration of account creation and deletion with trig-

gering events in PeopleSoft as well as the recruiting and training of I.S. staff on the systems and desktop support responsibilities. Overall, each of these systems rates well in terms of sustainability. The biggest impact on sustainability will be the policy issues that will be presented in our next report.

System Administration – the system administrators had the opportunity to install trial copies of both Exchange Server and Zimbra Server and found both to be solid options. There are ways in which Exchange Server is more of a packaged solution which makes it harder to break, but also makes it harder to look under the hood in the event of a problem. Although we considered the completely “open source” option for Zimbra our project team preferred the option of having the company provide patches and a technical support line, which will improve the sustainability of the Zimbra server component. Automated account creation and deletion is similar in Exchange and Zimbra and would, at the moment, require a bit more of a manual process in Google.

User Support -- the future behavior of the user experience in the three options is very hard to predict and is tied to the issue of technology trends. The Microsoft Outlook client has been the gold standard for at least a decade and there’s no reason to think that users will suddenly have a bad experience with a new version or that I.S. will feel the need to recommend another client.

I.S.’s ability to provide consistent, high quality user support is more affected by the number of email clients that are supported than it is by particular features of any of the current clients. The feature set that becomes available within the Outlook client (with either Exchange or Zimbra as the server) makes Outlook clearly the most fully featured desktop client for PC users and one that will hopefully draw users to it. We are proposing that the College support one client of each platform (Outlook on the PC and likely AppleMail on the Macs) plus the Zimbra web client. We are also proposing that users who elect outside of these choices would position themselves outside the College’s I.S. support policy.

In the final phase of the redesign we will recommend a policy for refreshing the software on college-owned computers; more consistency on the versions of operating systems, and fewer supported email clients. These and other infrastructure changes will make I.S. much more effective in supporting the email needs of the community and better able to support broader desktop needs.

Staffing – the number of businesses in the Philadelphia area that are using Exchange gives it a clear advantage in terms of our ability to find trained staff. Exchange administrators are well-paid in the industry and we might have difficulty retaining system administrators with Exchange experience. Our current email system is on the same operating system as Zimbra (i.e. Linux) and our staff members are well-prepared to support it. The simplification of our client and desktop configurations will make our desktop support positions more desirable and more satisfying.

The Vendors – Microsoft is obviously a blue-chip company. Zimbra is a five year old company with less of a track record about their upgrades. As is common in the open source community, users vote on new features. Our group had some differences of opinion on how to rate Google on sustainability. There is concern about the level of community anxiety about certain features which would be lost, e.g. advanced calendaring, shared mailboxes and mail merging to email. There is

concern that our community, as a whole is not very adventurous when it comes to technology and that Google's fast rate of change might be disturbing and require a good deal of user support.

### **Criterion 3: Technology Trends and Positioning**

Although the three options have a large overlap in their feature set there is a great difference between what parts of the market they are targeting.

Microsoft is very much geared towards the small business environment, many of them completely "Microsoft shops" using exclusively Microsoft tools for desktops, storage, email and web servers. A significant portion of Microsoft's business is this arena and its prior track record makes it unlikely that they will start supporting Macs equally. Microsoft's development cycle has slowed down and its products are typically large (in file size) and not nimble or efficient. Prior security problems have been remedied for the most part, but its email services do not have a lot of traction in higher education, especially with small colleges.

Google is almost the polar opposite in terms of their approach to the market. At the moment, Google is the epitome of innovation; they are rolling out new products and significant feature improvements on a monthly basis. The Gmail service is extremely popular with college-aged students and their recent (Feb. '07) hosting of higher education email is an important part of their business model to engage college-aged students. Google's cash reserves and economies of scale allow them to have hundreds of data centers and quota limits that are famously increasing every day. There is no doubt that positioning with Google would serve students very well; the question is whether Google is committed to meeting the needs of administrators, e.g. they only recently released the technology to allow users to access their email in a desktop client with offline access to their email and they have only limited support of mail folders. It's unclear how the product will evolve given that the web-based "ISP" type community is their core constituency. All of that aside, Google is an exciting company and their products will continue to be impressive.

Zimbra in many ways is the best of both Microsoft and Google in terms of where they are positioned in the market. Zimbra has significantly fewer users at the moment, 10 million mailboxes to Microsoft's 140 million mailboxes. Zimbra was recently selected to host all 20 million of Comcast's mailboxes and Yahoo purchased Zimbra within the past year with the stated goal of improving the experience of current Yahoo email consumers. Being a five year old company gives Zimbra a relatively short track record but it also gives them an innovative flavor, a commitment to modern infrastructure (AJAX) and a Web 2.0 focus that is clear in their product features and interface. Their products and company have received numerous prestigious awards.

It seems that Zimbra is quickly becoming very popular in the liberal arts college environment and is a likely solution for both Haverford and Swarthmore (although neither institution has made a decision at this point). That positions us well for mutual staff support among our peer institutions and for requesting and/or developing enhancements as needed. For example, Zimbra offers the ability to extend the functionality with components they call "zimlets". Zimlets can do things like display a map when you hover over an address. We or another institution could write a zimlet to display the class year and major of a student sending an email. We can create community calendars, extracted from our events system that lists, for example, all Athletic events or

all lectures. Keeping or attracting our community members to one email system would facilitate scheduling among those groups and enable them to see and select from community calendars.

A discussion of “positioning” would be incomplete without a specific comment about the viability of outsourcing as a direction. There is no doubt that email is much more of a commodity service than it was ten years ago and that the expectation of up-time is much higher than it was ten years ago. That raises the question of whether the email hosting should be outsourced either to Google or possibly to a vendor that does “application service providing” (ASP). ASP’s have multiple data centers and usually offer some economies of scale as well while having no vested interest in the data nor in which application they are hosting. In other words, by recommending that Google is not the right solution for Bryn Mawr at this time we are not dismissing the possibility that outsourcing of our Zimbra solution might be warranted at some point or even that we might not want to consider the Google solution 3-5 years from now. At this point we don’t feel it is necessary or desirable in launching the level of integration we intend to provide between email, file storage and reduced passwords.

#### **Criterion 4: Total Cost of Ownership**

Total Cost of Ownership (TCO) is a concept that attempts to accumulate all of the current and future expenses needed to support a product. It involves out of pocket expense as well as staff expense and even opportunity cost.

A few years ago Exchange was significantly more expensive than Zimbra but a combination of reduced prices and our AICUP agreement makes the cost of Exchange software and client access only slightly higher than what we’re proposing for Zimbra. It’s typical for Microsoft to charge more for additional modules, e.g. email integration with mobile devices, and that could lead to an increase in cost over time. In addition, there is a conventional wisdom that Windows based servers are not as efficient as Unix and therefore need machines with more memory and processing power in order to provide the same performance. These issues plus possibly higher costs for staff makes Exchange the most expensive of the three options.

It’s hard to compete with free, but some on our team felt that we would be unlikely to get the community to completely buy-in to hosting their email at Google and that we might need to keep some element of parallel service to appease those concerns as well as to address some calendaring needs they aren’t addressing at the moment. In addition, we could need more network bandwidth since email within the TriCo is currently on a separate and equally large network as our outbound traffic. With Google, all email would be sent off-campus and then back on-campus.

#### **Criterion 5: Suitability for Bryn Mawr College**

This category is both a summary of our sense of the politics and sensibilities of our community and also, honestly, our sense of how well the product fits within our I.S. culture. Overall, will this product be successful at Bryn Mawr?

This criterion yielded the greatest consistency within our team and the greatest differentiation between the three products. Specifically, all of our nine team members gave Zimbra either a 4 or a 5 for Bryn Mawr suitability and we all gave both Exchange and Google 2’s or 3’s. Those rat-

ings are a clear indication that we both feel more comfortable with Zimbra and also feel that it is the appropriate solution for Bryn Mawr College at this time.

One of the most interesting aspects of our conversations with the other institutions was the way in which their particular situation matched up with an appropriate solution. Hope College had previously provided only web-based email; they have a very small I.T. staff and a history of outsourcing technology; those factors combined to make Google a logical choice for them. Occidental had almost exclusively Windows servers which made Exchange the logical choice. Franklin and Marshall has close to 80% Macs on their campus which makes Zimbra a logical choice. The institutions who've expressed interest in moving to Google are ones, like Haverford and Macalester, which have had more than one multi-day email outage within the memory of the community.

Reflecting on those environmental factors that define Bryn Mawr and that influence our decision, three issues come to the forefront. First, we have a significant and growing number of Mac users – currently approximately 30% of college-owned computers and 40% of students. Second, our faculty and staff feel strongly about their email client. Third, we are a skeptical lot and we don't embrace the technology leading edge.

The size of our Mac base makes Exchange an ill-advised choice - the reduced functionality of the Exchange web interface and the lack of a Mac client for Exchange would be difficult to justify and would make it difficult to provide a consistent experience and improved desktop support.

Our community's general skepticism about commercialism makes the Google option one that would require a lot of conversation and persuasion. At this point, that hurdle doesn't seem worthwhile because the product isn't as fully functional for staff as the other products, nor is the interface as comfortable. This option is not customizable and would force standardization; it could be seen to "push" commonality rather than "pulling" users towards it as fully featured client and web combination would. During the second session with the CLIC faculty and senior staff representatives, someone mentioned that we need to keep the option of locally stored email, because we would undoubtedly have some faculty who would be uncomfortable storing their email on the server. Neither faculty representative to that meeting felt that they or their colleagues would be ready to engage with Google and the uncertainties that come with that option.

Our testing confirmed that Zimbra/Outlook would provide a reasonably comfortable transition for the community. Over the 10 or more years of college-supported email, we have build up an extraordinarily wide range of 'supported' email clients. Many in our community have strong affinity for one or more of the features available through historically supported options. Outlook includes all the features of Eudora and Thunderbird, and many more. Its interface has a comfortably similar "look and feel" to the Microsoft Office suite, while allowing users the ability to customize extensively. Macintosh users will get nearly identical functionality via the Zimbra web client. Windows users who don't like Outlook may safely prefer the web client. By offering two powerful, flexible, customizable messaging clients, Zimbra satisfies the community's historical need for personal choice while ensuring that Information Services can deliver support sustainably. A single client option will require support from the top down, and will result in significant improvements in service.

### **Preliminary Project Budget**

The following are the required “base” components to provide an upgraded version of the current feature set. The projected total expense can be covered by the reserve and operating funds that I.S. has set aside over the past two years with this project in mind. These are not final figures.

File storage and servers (due for replacing)	\$260-300 K
Domain and ActiveDirectory login (additional)	\$30-50 K
Messaging (software)	\$10-25 K
Messaging (servers and storage)	\$35-45 K
Messaging (Mtg Maker & email data conversion)	\$25-35 K
Move to Vista and OS 10.5 (hardware upgrades)	\$20-30 K
Staff augmentation (for user training & upgrades)	\$40-60 K
I.S. training and training materials	\$40-60 K
Contingency	10%
TOTAL:	\$506-665K

The following items are ones that fit the goal of creating a sustainable environment but which have strategic and expense implications that require further conversation and investigation.

Upgrading department or grant owned computers to support Vista	\$20-30 K
System to manage software installs/upgrades	\$40-50K
Storing all currently local email on the server and allowing for growth over next 4 years	\$30-40K
User desktops centrally backed up	??
Creating a storage failover (in Canaday)	??

Funding the first of these centrally would facilitate the Vista upgrade and desktop supportability for all concerned. The second item would improve software consistency across campus and reduce desk-side visits thereby increasing responsiveness to common requests. The third and fourth items are related to the desire not to lose data, which currently happens to several faculty members per year. Central storage would also facilitate the ease of machine upgrades and consistency with home access, a direction that was supported by the survey.

These budget figures will be updated in the third and final part of this strategic planning process. Since we are retiring some products and adding others it's unclear at the moment whether there will be an impact on the operating budget.

### **Conclusion**

We are excited about the direction that our choice in messaging will take us. The team has taken as many aspects as possible into consideration while making this decision, keeping in mind the culture of our community, where we are and where we want to be. We feel strongly that we've made a good decision for that community. Moving to a limited number of clients will provide our community with superior support. Storing email on the server will lead to less heartache when crucial messages are lost as a result of hard drive failure or damage. Having a more state of the art client and server combination will position us to take advantage of features that can create more efficient working environments and even help build community. Students might be able to see campus activities alongside their own schedule. Faculty might use the calendar to schedule department and committee meetings as opposed to spending days going back and forth via email. Email may not seem like the most exciting or innovative technology, but increasingly, we all live in our inboxes. It should be functional, reliable, efficient, and even a little bit fun. Zimbra with the Outlook client will be all these things. It's an excellent choice for Bryn Mawr.

Respectfully submitted,

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### ***and the "Messaging Project Team"***

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### ***and the "ISIR<sup>1</sup> Management Team"***

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<sup>1</sup> ISIR = Information Services Infrastructure Redesign project

David Sturgis, Head of Administrative Information Systems