

**Office of the Vice President and Chief Information Officer
Summary of Activities 2006-2007**

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July 2007

Last year, we began the process of reorganizing the IT-related critical functions around four themes: Collaboration; Access; Alignment; and Hardening and Securing Core Infrastructure Services (formerly: Security and Identity Management). That organization has proven useful and this year's annual report is organized primarily around those four themes. For each theme, we provide a brief review of the theme, a report on major milestones, and identify the challenges and strategies that lie ahead. In addition, we identify a new approach to picking peers for comparison, and summarize our approach to developing and using metrics.

Collaboration

Universities that figure out how to incorporate collaboration into their institutional DNA will be the leaders going forward. The importance of collaboration takes several forms:

- Promoting collaborative learning
- Fostering collaboration between units
- Expanding collaboration with external partners

Goal: Create an environment that supports the full range of collaborative activities of U.Va. faculty, students, and the extended U.Va. community.

2006-2007 Milestones

- Because IT is highly distributed and rapidly changing, it requires IT organizations to develop exceptional communication and collaboration skills and to embrace a culture of change. In the fall, we engaged two consultants (Allan Cohen and Michael Johnston) to provide an organizational assessment of the IT landscape across Grounds and to begin working with ITC and other technology groups to make sure that we have the skills and tools needed to sustain an organization oriented toward collaboration and change. To date, all ITC employees and dozens of people outside of ITC have had an opportunity to participate in workshops led by Michael and Allan. Those workshops, in turn, have led to the creation of a dozen or so collaborative communities that cross organizational boundaries (i.e., they are open to the University community) and focus on critical topics (e.g., IT support for teaching and research, project management, communication, web presence, etc.). This work is ongoing and should articulate well with the workshops that are planned as part of the President's leadership program.
- In collaboration with the Provost, we formed the Collaborative Learning Advisory Committee to provide ongoing advice around classroom related technology issues. That committee is on track to recommend a new course management/collaborative learning system to replace the Toolkit by the end of the summer.
- In fall 2006, ITC introduced "Collab," Sakai-based software that supports research collaborations. The system provides rich support for research groups (including access for external collaborators), student project and study groups, committees, and others collaborating around a common purpose. Collab has

been well-received, with more than 3,500 users and almost 500 collaborative worksites. In addition, the Secretary of Technology is using our service to support 12 of his technology committees.

- We have strengthened organizational contacts and collaboration with the Student System Project and the Office of the Provost, assuring active engagement at multiple levels in the implementation of the student system.

2007-2008 Forecast

- ITC will pilot the new course management/collaborative learning system in the fall, moving to full production and phasing out the Toolkit as soon as practical.
- We will continue to provide organizational support to foster cultures of collaboration within ITC and across Grounds.
- We will provide resources as community-based activities move from formation to action.
- In partnership with the Library and academic units, we will explore the possibility of transforming public computing sites into more flexible collaborative spaces. Originally, public computing sites were created to provide access to both hardware and software. Given that all of our students now arrive on Grounds with computers, the main reason for maintaining public computing sites is to provide access to specialized software. Recent technical developments, however, hold out the promise that software can be delivered in a virtual environment to anyone who is authorized and has access to a computer with an Internet connection. Physical spaces that support collaboration are in high demand as the curriculum becomes increasingly team and project based.
- In partnership with ISDS, we have begun the move to an integrated IT help desk. Under the proposed system, users will be able to call a single number to get IT support. Currently, the number they are supposed to call depends upon the nature of their questions (i.e., administrative computing support versus general academic computing support).

Access

Increasingly, faculty and students expect to live in a world in which they have access to information and tools anytime, anywhere. Our challenge is to enhance the infrastructure to allow us to meet these expectations in ways that are secure and within our financial means.

Goal: Create an environment of ubiquitous access to appropriate IT resources for all core activities.

2006-2007 Milestones

- The computer machine room construction project has been approved as part of 2006-2008 capital plans and funding has been identified. The project is now moving to the design and construction phases. When completed, this facility will

allow us to provide more robust support for core services, allow us to take advantage of economies of scale that are emerging as high performance computing begins to commoditize, and provide key infrastructure to support the growing number of computationally intensive disciplines.

- In collaboration with the Library, developed a plan for supporting and sustaining digital scholarship. The Academic Information Space (AIS) will enable users to work with digital resources, from digital libraries, the web, and their own collections, in an integrated environment that provides powerful tools for analysis, collaboration, and delivery. It provides a roadmap for implementing the tools and infrastructure needed to support digital scholarship during the next five years.
- We have made dramatic improvements in the reliability of ISIS, though it remains the case that ISIS is a brittle system that struggles under the demands that we place on it.
- We are dramatically increasing the number of classrooms that are equipped with projectors and we are offering increased support for instructors and students in technology-enabled teaching and learning. By the Fall semester, only 13 classrooms (out of 174 available) will be without projectors.
- We have completed the RFP process for the System Integrator for our project to enhance cell phone coverage on Grounds (a.k.a., Wireless RFP). The vendor has been selected and work has begun with major progress in student housing, the stadium, and the arena scheduled to be completed in early fall.

2007-2008 Forecast

- We will begin implementing the Academic Information Space. The first phase includes tools that leverage the collection and presentation capabilities of Collectus to allow users to create presentations with objects from the Digital Library, Collab Resources, and images from the Web. The next phase of the AIS will bring the library's on-demand digitizing service into this environment.
- Our National Lambda Rail network connection came online in Feb. '06, allowing us to realize immediately a 10-fold increase in the network capacity upon which our research community depends. While this bandwidth meets and typically exceeds current needs, we will continue to pursue control of off-Grounds fiber-optic cable. We continue to believe that as the Internet2/NLR merger drags on and on, opportunity will accrue to institutions that have direct control over fiber assets. In addition, controlled fiber should allow us to exploit the very low marginal cost of additional capacity in support of research and teaching.
- We will move the computer room building through design and initiate construction.
- In collaboration with the Library and academic and administrative partners from across Grounds, we will begin planning and designing the next generation storage architecture.
- We will make increasing use of computer virtualization technologies in order to improve reliability of services and decrease power and cooling requirements. We will develop a pricing model that facilitates and encourages the use of this technology for departmental applications.

Alignment

Information—its creation, preservation, dissemination, and application—is at the core of the mission of the modern research university. As such, it is vital that the information technology environment at U.Va. be closely aligned with the academic mission and priorities of the University, fully informed by technology trends and market forces.

Goal Summary: Create new and more effective ways for faculty, students, and staff to participate as partners in creating the vision and ambition for technology-enabled teaching, learning, and research at U.Va.

2006-2007 Milestones

- In partnership with the CFO and the COO, we have begun to analyze ways to diversify and align the funding models that support IT to ensure that the incentives they create are desirable and sustainable. There is general agreement about the directions that we need to pursue but many details remain to be worked out.
- We have formed a computational science advisory group. This group meets regularly and provides advice on the whole range of issues related to supporting computationally intense disciplines and nurturing a culture of computation at U. VA.
- We have entered into a collaborative partnership with Virginia Tech around supporting computational science and computationally intense disciplines. As part of that partnership, we will launch a “High-Performance/Parallel Computing Boot Camp” this summer in Charlottesville that will be open to UVA and Virginia Tech students and faculty. Virginia Tech, in turn, has offered to provide access and support to our faculty who want to use their large Apple X-Server-based cluster. Their cluster is one of the fastest in higher education.
- In partnership with the Library, we have formed an informal digital scholarship advisory group. Much like the computational science advisory group, this faculty group serves as a sounding board and as a source of new directions and initiatives in the digital humanities and social sciences.
- We completed an evaluation of the various IT advisory groups and clarified the mission of each.
- In partnership with the Office of the Provost, we evaluated and modified the Teaching + Technology Initiative (TTI) and Teaching + Technology Support Partners (TTSP) programs to increase their effectiveness.
- In partnership with the Library, we launched the inaugural “New Horizons in Teaching and Research” conference. This multi-day event provides an opportunity for faculty, students, and technologists to come together to share innovations in teaching and research. The response was positive and turnout was higher than expected.
- We are in the final stages of coordinating and consolidating the Microsoft Exchange services that are already being offered across Grounds, and have

invested in the hardware and support infrastructure needed to meet the inevitable increase in demand for those and related services going forward.

- We met all performance commitments related to Restructuring.
- This year, we began devoting as much attention to questions of what we can stop doing as we devote to questions of what we need to begin doing. By the beginning of the next academic year, we will have retired or set retirement dates for some outmoded services, including USENET Newsgroups, For-Fee Dialin, AppleTalk and IPX, unix.mail, Mulberry, IRIX Operating System, and ftp.Virginia.EDU.

2007-2008 Forecast

- We will complete analysis of funding models and begin implementing them as appropriate.
- We are committed to developing expertise in sourcing discipline. Many of the essential services that we provide have either already commoditized (i.e., they are standards-based with price being the major differentiator among providers) or are on their way to commoditizing. Email, both web-based and IMAP, is an excellent example of a service that now has robust standards and unit pricing that approaches zero. Where commoditization has happened, we need to examine whether there are any compelling reasons for sourcing the service internally. If there are not, we should be prepared to source it externally in order to redirect our staff and potential savings to new services that have strategic value. One implication of this approach going forward is that we will need to develop more expertise in service specification and contract negotiation and we will need to deepen our collaboration with Procurement and General Counsel.
- In close cooperation with the Alumni Association, we will outsource student email to one or more vendors. Under the model, students will keep their UVA-branded email for life, but we will no longer be in the business of running student email servers.
- In collaboration with the VP/CFO, we propose to move the reporting line of ISDS and fully integrate them into the VP/CIO reporting line and functions.

Hardening and Securing Core Infrastructure Services

The University's core computing and communications infrastructure and the services that it delivers are an enabling foundation for much of the University's teaching, research, and administration activity. As the world in general evolves to depend ever more heavily on technology for all aspects of its life, so too does higher education. The University must provide an information technology infrastructure that has a level of redundancy and resistance to threats that is appropriate for the ambitions of the University.

Goal: Ensure that the University's information technology systems and services address emerging risks of system compromise and data exposure while continuing to move the University toward its goals.

2006-2007 Milestones

- In the spring, we discovered that an application containing a data table with approximately 6000 faculty social security numbers had been hacked. While we have had other data exposures (e.g., lost laptops), this incident marks the first in which we believe the sensitive data were the target of the attack. A full debrief of the incident will be conducted in the weeks ahead and we will, undoubtedly, learn much about what did and did not work well in our handling of the incident. On a related note, although we continue our multi-faceted work to harden the University's infrastructure and reduce our reliance on SSNs, we are likely to experience similar security breaches given U.Va.'s long-term reliance on Social Security Numbers, the use of which was once considered routine in higher education.
- Beginning in fall 2006, we accelerated work to secure sensitive data, including eliminating the use of Social Security Numbers as identifiers. Additional measures to strengthen the privacy of personal information include revising and reissuing ID cards, beginning in summer 2007. The project is part of a larger initiative to provide a higher level of assurance that all confidential and otherwise sensitive institutional data are as secure as University resources allow.
- Grounds-wide implementation of the IT Security Risk Management Program will be completed on schedule in summer 2007. All departments will have completed a security risk assessment, developed plans to address any unacceptable risks, and have a business continuity plan in place. Departments are required to submit new plans every three years.
- ITC staff continued enhancement of the University's IT security awareness and training program. Improvements made in 2006-07 include: further roll-out of the online security awareness training for employees, formation of a security awareness partnership with the local community, and sponsorship of a one-day Web application security class and a six-day "SANS Hacker Techniques, Exploits, and Incident Handling" class.
- We have completed an environmental scan to determine the adequacy and reliability of core infrastructure services. Our long-term goal is to provide an information technology infrastructure (i.e., network, e-mail and storage services, teaching and research support systems, and administrative applications) that has a level of redundancy and resistance to threats that are appropriate for the ambitions of the University. Our current estimate for recurring costs associated with hardening and securing the infrastructure is north of \$1 million. ITC has committed approximately \$600k of reserve funds to begin this work and has submitted an addendum request to for one-time funds sufficient to cover the incremental work that can be completed given our current power and space limitations
- We led efforts to implement a new IT security incident reporting policy that covers electronic devices and electronic media. The policy also includes IT security incidents, such as defacement of the U.Va. Web site, unauthorized use of an individual's computing account, and the use of U.Va. IT resources for unethical or unlawful purposes.

- We implemented an emergency text notification system in partnership with the Office of Communication, Student Affairs, University Police, and the hospital.
- In partnership with Virginia Tech, we have installed remote back-up equipment in their facilities in Blacksburg. This equipment allows us to automate offsite storage of backups of key systems and is an excellent example of the savings that are possible through restructuring and collaboration. The Virginia Tech collaboration on remote storage was made possible via our joint work on the National Lambda Rail (NLR) and the resulting very high speed network connection that now exists between UVa and VT as a side effect of that work.

2007-2008 Forecast

- We will make significant progress in hardening the infrastructure. Specifically, we will complete half of the projects associated with our infrastructure addendum request.
- In partnership with ISDS, we will select and implement a comprehensive stress testing environment. This work is critical to improving the reliability of systems as they are modified or upgraded. It will allow us to see how the systems operate and interact before going live in production.
- In partnership with academic and administrative units, we will significantly reduce the use of Social Security Numbers as identifiers across Grounds. We will successfully migrate core systems that currently use SSN to the new University ID.
- In collaboration with the Business Operations Card Services unit, we will leverage the process to re-issue ID cards to all members of the university community to significantly enhance the identity proofing portion of our Identity Management processes. This enhanced process is a foundation that will enable us to complete other work to automate password resets, enable higher levels of authentication assurance for critical on-grounds applications, and prepare for emerging federal and inter-institutional applications based on federated identity management.

Critical Functions Metrics and Management Decisions

We believe it is vital to measure and compare our performance against our peers, objective standards, and our aspirations. Having said this, many of the metrics that we have been using are less than ideal. Some have been identified as part of the critical functions analysis, but others have been identified in a fairly reactive manner in response to urgent requests from various constituents (e.g., BOV, Restructuring, SACS, etc.).

In the next section, we give three examples of the ways metrics have informed and improved specific actions. We then follow those examples with a description of two ways that we want to improve the metrics that we use: identifying a set of peers who will provide broad comparisons and developing a core set of metrics that we consistently track over time and report as appropriate to various constituents.

Three Examples: 2006-07

- **Classroom Technology and Support** - Because well-equipped classrooms and support provide the technical foundation that underpins effective integration of IT in teaching and learning, ITC is dramatically increasing the number of classrooms that are equipped with projectors and is offering increased support for instructors and students in technology-enabled teaching and learning. As of January 2007, the number of classrooms with projectors was 85 ITC-equipped, and 33 equipped by departments, with 56 non-equipped (174 total classrooms). By the end of 2007, the number of classrooms with projectors will be 131 ITC-equipped, and 30 equipped by departments, with 13 non-equipped (174 total classrooms). A more thorough effort to support technology-enabled teaching and learning began in March 2007 with the formation of a collaborative community focused on this area.

These changes have been made in response to recommendations both from an advisory group (UCIT) and requests by faculty. The broad theme/issue these fall under is: Create new and more effective ways for faculty, students, and staff to participate as partners in creating the vision and ambition for technology-enabled teaching, learning, and research at U.Va. The specific goal is: Evaluate and enhance classroom technology support to ensure that it is available and functional when needed.

- **ITC-Library Information Desk** - Student computing has become increasingly mobile (with 95 percent of students using laptops in 2006, compared to 70 percent in 2003), and ITC is adapting its support methods to meet changing needs. In fall 2004, ITC and the Library began testing a joint "Information Desk" (staffed by both Library and ITC employees) in the Science and Engineering Library. Staff were cross-trained to understand the basic core information of both areas. The pilot was evaluated and expanded in fall 2005 to include Alderman and Clemons libraries. In spring 2006, a user satisfaction survey (responded to by more than 1,500 students, faculty, and staff) showed that of those who sought help from a joint information desk in the library, 93 percent rated their service as good or excellent. Library and ITC staff also report that the program works well. The pilot project has been completed, and the program has been institutionalized.

The broad theme/issue this program falls under is: Create an environment that supports the full range of collaborative activities of U.Va. faculty and students. The specific goal is: Partner to plan physical spaces that enhance collaboration and access to information/knowledge.

- **Information Technology Security Risk Management Program** - By the end of this summer, all University departments will have completed their first assessments conducted through the IT Security Risk Management Program, which began in summer 2004. Among the first departments to be targeted were those with the most critical assets to protect, including those that handle sensitive data,

such as legally protected medical and student records. The program includes ongoing security assessments and standardized continuity planning for critical business functions during restoration of any compromised services. Developed by a team of persons from ITC, the Audit Department, Health System Computing Services, and other offices, the programs is led by ITC's Security and Policy Office.

The broad theme/issue this program falls under is: Create an environment that facilitates appropriately authorized access to information and tools while significantly reducing the risk of sensitive data exposure. The specific goal is: Continue building a more security risk-aware culture at the University by completing the roll-out of the Security Risk Management Program

Identifying Peer Comparisons

Because the pace of change in technology is so rapid, we believe it makes more sense to pick a handful of schools that provide good comparisons and help norm general ambitions than it does to attempt to pick comparisons on a technology by technology basis. The problem with the latter approach is that the pace of change makes picking the right comparisons very difficult. By the time the best comparison for any given technology space becomes clear, there is a good chance that the technology will have already moved. Course management provides a good example. Three years ago, there were no viable open source approaches and virtually every institution either had a home grown system or used one of a handful of commercial systems. Today, a significant number of institutions, including most of the institutions that we would broadly categorize as our peers, are going down the open source path. We believe that we will be better served by picking a handful of comparison schools that match or exceed us on a fairly broad set of IT related dimensions and ambitions than we will by attempting to construct comparisons on each specific technology that emerges.

To those ends, going forward we plan to use the University of Michigan, the University of Texas, Indiana University, UC Berkeley, Duke University, and the University of Washington. Each of these institutions meets or exceeds our general IT ambitions and each has a particular area where they set the bar for the academy. For example, Indiana University is making the fastest progress in providing high performance computing and networking. In contrast, Duke University leads in the integration of new technology with the student experience.

Developing a Comprehensive Set of Metrics

In the year ahead, we will re-evaluate the metrics that we have been using for various purposes (e.g., BOV Planning, Commonwealth Restructuring metrics, and assorted surveys and accreditation processes), look at new metrics that may better inform our reorganized critical functions, and create a comprehensive set of metrics that we can track over time and report as needed.