

# Information Technology Task Force

Final Report

June 2009

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## Executive Summary

Provost David McLaughlin and Executive Vice President Michael Alfano created the IT Task Force in Spring 2008. It was charged with examining information technology across NYU, in the central Information Technology Services (ITS) unit as well as in the school IT units; developing the global IT strategy to support the Global Network University (GNU) in general, and NYU Abu Dhabi in particular; and investigating opportunities for administrative efficiencies.

In recognizing the increasingly important role of IT at NYU, the Task Force made several overarching recommendations that are critical for NYU's success.

The Task Force identified that IT needs to be treated as a strategic part of how NYU differentiates itself in the 21<sup>st</sup> century.

IT has historically been viewed as a set of services in support of education and research. Now, IT is so integral to all activities at NYU that it can no longer be viewed in this fashion. Instead, IT has become a strategic asset in achieving NYU's larger aspirations.

Therefore, the Task Force recommends that the NYU leadership engage more fully in setting IT direction, and determining IT priorities and investments. This engagement will ensure alignment of IT with the institution's goals and plans for education and research.

The Task Force identified the role of the Chief Information Technology Officer (CITO) as critical to the overall planning for IT at NYU, for central units and Schools.

NYU has a Chief Information Technology Officer, a role that in most institutions is called a Chief Information Officer. The CITO has three primary roles: 1) leading the central IT organization (ITS); 2) coordinating the School IT directions; and, 3) leading strategic IT planning across all of NYU.

The CITO reports to the Provost and the Task Force recommends that this reporting relationship continue. Strengthening the connection to the Executive Vice President's Office is also recommended, especially as the CITO coordinates the identification of efficiencies through information technology across the institution.

The Task Force identified the importance of creating a governance model for reviewing IT priorities and allocating resources effectively across NYU.

The Task Force recommends that the current CIO Council be reconfigured or disbanded and replaced with an IT Leadership Council that will serve to determine University-wide priorities, funding, and opportunities for efficiencies. Critical to the success of this group will be the identification of representatives who can speak for the unit's leadership and can commit unit resources and attention. Therefore it should include the CIOs of the various schools as well as appointed IT representatives from schools that do not have CIOs and from the various administrative units. The Task Force strongly encourages the leadership of schools and administrative units to include their CIO or IT representative in strategic decision-making. Also critical to this Leadership Council's success is the determination by NYU's leadership about the level of authority that Schools and the University administration have regarding IT directions and efficiencies, and their communication of the IT Leadership Council's work to the broader NYU community.

The Task Force offered several guiding principles to address the issue of balance between the central ITS and the schools and administrative units.

Most universities, including NYU, have a mix of centralized and decentralized IT services that reflects the culture of the institution, the strengths and aspirations of the University administration and various member schools, and the level of resources. Currently, the IT services offered across the University are highly variable, depending on resources and aspirations of the unit. The Task Force recommends the creation of a more systematic process for making decisions about the most effective way of delivering IT services.

Specifically, the Task Force recommends that ITS and Schools and other units work together to avoid duplicate systems and determine what services could be delivered more effectively through strategic sourcing. There are many different options for service delivery and finding the right balance is important: while too much decentralization can lead to a fragmented IT environment that impedes cross-disciplinary efforts, too much centralization can squelch innovation and local initiatives.

The Task Force identified the following principles to guide IT decision-making.

- Promoting innovation – on the edges and in the center - in uses and sources of IT services;
- Supporting the schools' unique competitive, discipline-specific and reputational needs;
- Encouraging continuous improvement in the quality, efficiency, and accessibility of central IT services;
- Facilitating engagement by members of the NYU community across units and in interdisciplinary work, through integrated IT services wherever appropriate;
- Presenting external audiences with easy, appealing access to current information about NYU; and,
- Leveraging economies of scale wherever practicable, as technologies and services evolve.

## I. Introduction: Task Force Process

The Information Technology Task Force (ITTF) was created in April 2008 by Provost David McLaughlin and Executive Vice President Michael Alfano to validate current ITS strategic plans and develop a plan for information technology that ensures the success of NYU's mission and goals in the coming decades. The Task Force was given a complex charge (attached as Appendix A), including three ambitious objectives:

1. Alignment of IT strategy with overall University and School strategies and plans;
2. Development of IT strategy for NYU's aspiration to become a Global Network University; and
3. Identification of IT efficiencies, as part of NYU's administrative reengineering initiative.

Richard Revesz, Dean of the NYU School of Law, was selected to chair the Task Force, and Pierre Hohenberg, Senior Vice Provost for Research, and Paul Horn, Distinguished Scientist in Residence at the Courant Institute and the Department of Physics, and Executive-in-Residence at the Stern School of Business, were selected as vice-chairs. The membership comprised faculty, staff, and deans from Schools, and staff from administrative units.

In Fall 2007, a distinguished panel of evaluators conducted an external review of NYU's Information Technology Services (ITS). One of the panel's recommendations to the University was to engage NYU's senior leadership more directly in overall technology planning. The Task Force was created as a bridge to connect ITS in particular, and IT in general with the leadership and the broader community. The membership of this Task Force reflects the type of cross-functional leadership envisioned by the review panel, drawing from every corner of the University to bring together faculty, deans, and senior administrators who understand the larger academic mission and are well-suited to align our IT planning with our institutional priorities.

The three-fold charge to the Task Force reflected a variety of converging forces and efforts that were underway at the University. NYU had recently launched two major strategic planning initiatives: NYU Plans 2031, to develop a comprehensive space-planning strategy for the next 25 years, and Framework 2031, to assess the collective academic goals of the institution. These initiatives have evolved into the sweeping vision of NYU as a Global Network University that has been laid out by NYU President John Sexton. The IT Task Force was created not only to create alignment with the planning that was already underway, but to leverage the technology required to facilitate this larger vision. While thinking aspirationally, the Task Force was also asked to balance the pursuit of larger academic goals with the pressing need to be economically efficient, especially in an uncertain economy.

The Task Force first convened in April 2008, and met throughout the 2008-2009 academic year, completing its work in May 2009. It began by establishing a series of operating principles to guide its work (attached in Appendix D). The Task Force's goals were to: develop a set of criteria and principles to guide IT governance and decision making into the future; to benchmark internally and against other schools; to engage the community of users in this process; to provide guidance for schools and units in deciding between providing decentralized IT services and relying on central ITS; to take both a global and local approach to IT planning; and to consider how technology can make the institution more efficient overall.

The Task Force started its work by reviewing the major strategy initiatives of the University; the key elements of the existing ITS strategic plan that it had been asked to validate and

develop; and the central issues underlying IT decisions, including the balance between the central administration and the various schools and units. In the fall, the Task Force undertook a deeper analysis of current IT services and future directions, focusing on the following areas: technical infrastructure; academic computing; research computing; administrative systems; and shared services. The Task Force concluded with a study of governance and funding models. Throughout the entire process, the Task Force developed recommendations that arose from its discussions, which form the basis of this report.

The Task Force formed three subcommittees to focus on key components of its charge. The Global IT Strategy Subcommittee was established early on to oversee the development of an IT strategy that could be implemented to support NYU's goal of opening a new campus in Abu Dhabi by 2010 and laying the technical foundation for becoming a Global Network University (GNU). The subcommittee met throughout the summer and submitted its recommendations to the Task Force in November, which are discussed in section III E.

A Subcommittee on Community Engagement was formed to devise a strategy for seeking input from the community of users across the University. Early on in the process, the Task Force agreed that it is important to engage faculty, students, administrators and staff in setting priorities for future IT initiatives. Faculty and students are increasingly arriving at NYU with ever greater technological savvy and independence. It is important to understand the next generation of users and how technology is being used to establish communities for work, research, play and social networking in new ways. The Task Force therefore decided to conduct a survey to make sure that input from the various users is incorporated into the Task Force's deliberations.

ITS had already entered a partnership with an outside consultant, MOR Associates, to administer a survey on teaching and research, which went out to 1600 members of the community in September. Early in the Fall, the Subcommittee decided to leverage that relationship to administer a separate Task Force survey. A questionnaire was specifically designed to learn how faculty, students and administrators currently use IT services in research, teaching, and communications; how they view IT services at NYU; and what kinds of IT services and tools they expect or wish to see in the future. In October, the IT Task Force survey went out to 1200 members of the community, and the same survey was sent out to the approximately 53,000 remaining NYU community members. The results are in appendices G and H.

The Survey elicited a variety of responses, but recurring themes were the importance of access to resources, especially remote access to digital library and electronic databases; increased wireless presence; improved blackboard service; improved NYU Home email service and greater storage options; web-based collaboration tools such as document sharing; wikis and virtual spaces; more licensed software, including statistical software; 24/7 and backup services; more availability of "smart" classrooms that bring new technologies into the classroom; and greater support services at the departmental and university levels.

In addition, the Subcommittee organized a student panel to engage in a discussion of technology issues with the Task Force. Many of their suggestions were integrated into the Task Force's recommendations below.

The third component of the Task Force's charge was to identify IT efficiencies. A Subcommittee on IT Administrative Efficiencies was created to address this goal, and to make recommendations for ensuring that ITS at NYU is as efficient as can be prudently achieved, and that it is integrated into the planning of all academic and business

practices at the University. This subcommittee was also asked to coordinate with the other University committees that had been formed to address administrative efficiencies in the four following areas: Finance Systems, Construction & Facilities Management, HR Policies, and Revenue Programs.

The Subcommittee investigated ways to achieve efficiencies in ITS operations; to use IT products and services to produce efficiencies; and to encourage effective acquisition, use and operation of IT-related products and services across the University. Its recommendations are discussed in further detail in section III F.

## **II. Overarching Themes**

A number of themes informed the Task Force's deliberations throughout the year. First, the Task Force identified early on that IT needs to be a strategic part of how NYU differentiates itself in the 21<sup>st</sup> century. Second, it identified the importance of creating a governance model for reviewing IT priorities and allocating resources effectively. Third, the Task Force identified the importance of the role and reporting relationship of the CITO. Fourth, the Task Force spent significant time on the issue of balance between central ITS and the schools and administrative units, and developed some principles about balance to guide future decision-making. And last, the Task Force considered the need to evaluate those services that must be provided "in-house" as compared to those that can or should be outsourced.

### **A. IT AS A STRATEGIC ASSET**

A recurring theme of the Task Force's discussions was the need to better recognize the strategic role that Information and Technology services play in advancing the educational mission of NYU. IT is integral to every aspect of the University's core activities, and plays an essential role in research, in the libraries, laboratories, and classrooms, in networking and communications, and in administrative services. It is an important pedagogical tool, and critical to the fulfillment of NYU's vision for global education. Students and faculty are increasingly technologically savvy, and arrive with greater needs and expectations for IT services. In surveying the community, it was clear that faculty and students want NYU to be at the forefront of IT innovation, looking not only at other universities and professional schools for examples, but to the private sector.

Despite its centrality, in the past, NYU viewed IT and IT was managed as a type of service rather than a strategic tool in meeting NYU's larger strategy. IT is now, however, increasingly recognized as fundamentally linked to NYU's future and our ability to excel. Therefore, going forward IT must be viewed as a strategic tool that is necessary to help NYU in achieving its larger goals. In identifying this paradigm shift, the Task Force saw its role as shaping a new way of thinking about IT, and leveraging it as a strategic component of NYU's excellence.

In the benchmarking data that the Task Force considered, NYU lagged other peer schools in the amount of IT investment per student. While long-range planning for IT investments needs to be prioritized, given limited resources, the Task Force also emphasized the need to make strategic investments on the margin where IT will best advance the University's goals and serve as a distinguishing feature. To this end, IT needs to capture more of the attention of the University leadership, earlier and more regularly in the process of formulating and executing strategies and plans.

## B. IT GOVERNANCE

Another key issue the Task Force explored throughout the process is governance. From the outset, it acknowledged the need to create a lasting mechanism for how the University can review priorities on an ongoing basis, being responsive to changes in technology and the context in order to focus our resources effectively.

The Task Force considered the way that the University currently makes decisions, and looked to other universities and the private sector for other examples. There was agreement that high-level strategic thinking was necessary to provide continuity with the process the Task Force started and to guide the University leadership in making decisions about big picture priorities and new initiatives. This high-level strategy should serve as a touch point for day-to-day operations and implementation, which should be left to central ITS and the IT departments of various schools. Someone at the senior leadership level needs to own responsibility for ensuring that IT considerations are central to University decision-making and better integrated into long-range planning. There needs to be an advisory body charged with devising high-level strategy and continuing the work of the Task Force that is comprised of representatives from the various schools and units across the University responsible for IT, such as the CIO Council. At the functional level, ITS and the school IT departments should then be responsible for developing the tactics to implement recommended strategies.

The Task Force concurs with the findings of the 2007 External Review that NYU's IT decision framework must evolve to facilitate this paradigm shift in treating IT as a strategic component of our ability to excel and advance our educational goals. The Task Force therefore sought to recommend a governance structure that aligns with this shift, and that reflects four basic principles: that IT needs to capture more attention from the University leadership at earlier stages of planning; that the University Chief Information Technology Officer should be better connected to the University leadership and involved in the planning for the Global Network University; that the mechanisms to foster cross-University coordination of IT strategies and services be strengthened to achieve optimal return on our investment in IT; and that the University make more effective use of the large number of existing IT advisory groups currently in operation.

### **Recommendations:**

The Task Force recommends the following principles guide the creation of a governance structure to review the University's IT strategy:

***IT should be integrated in Strategic Planning at the leadership level.*** *IT needs to capture more of the attention of the University leadership, earlier and more regularly in the process of formulating and executing strategies and plans. The Task Force recommends that:*

- *The Chief Information Technology Officer, who is charged with defining how NYU uses IT as a strategic asset, should be more closely aligned with the Senior Team.*
- *The Provost, the Executive Vice President and the Chief Information Technology Officer reconfigure or disband the existing CIO Council in order to convene an IT Leadership Council charged with providing recommendations on strategic IT issues. The new Council should include the CIOs of the various schools and appointed IT representatives from schools that do not have a CIO and from the various administrative units. This high-level group should*

advise on University-wide and School priorities, funding and opportunities for efficiencies.

- Each school and other major unit of the University designate a member of its senior leadership, who can speak for and make commitments for the unit, to be the champion for its IT strategy. Critical to the success of this group will be the identification of representatives who can speak for the unit's leadership and can commit unit resources and attention. The Task Force encourages the leadership of schools and units to include the CIO or designated IT representative in strategic decision-making.
- The University leadership should communicate the role and work of the IT Leadership Council to the broader community.

**The University Chief Information Technology Officer.** The Chief Information Technology Officer needs to be better connected to the different elements of the University leadership.

- The Chief Information Technology Officer is currently part of the Provost's Office, and should be regarded as a member of the Provost's cabinet. Given the current organization of the Provost's Office, the current arrangement under which the Chief Information Technology Officer reports to the Provost through the Senior Vice Provost for Research works well, and should continue. And it is important for the Chief Information Technology Officer to have good direct contact with the Provost and with all areas of the Office, e.g. Student Affairs and Global.
- Under the current practice the Chief Information Technology Officer is fully accountable to the Chief Financial Officer. This relationship should be extended to the other units of the Office of the EVP. The Task Force recommends that the Chief Information Technology Officer be invited to join the EVP's senior staff meetings and be fully accountable to the EVP.
- An area of growing importance is NYU's aspiration to become a Global Network University, most immediately manifested in the planning and operations of the NYU Abu Dhabi campus. The Task Force recommends that the Chief Information Technology Officer have a strong presence in the Global and AD leadership and that the IT Officer of the Global and AD organizations have a direct report to NYU's Chief Information Technology Officer.

**Cross-University Coordination of IT Strategies and Services.** The Task Force recommends strengthening the mechanisms for cooperation and coordination between the schools and units that manage IT resources and the central ITS organization to achieve optimal return on its investment in IT. Specifically, the Task Force recommends that NYU:

- Establish NYU-wide policies and practices to
  - Coordinate strategic planning for IT across ITS, schools and other units;
  - Coordinate review of significant IT-related plans, purchases and acquisitions by the schools and other units;
  - Collect and track statistics and metrics about service quality, cost and use.

- *Adopt and communicate NYU-wide Principles about IT decision-making.*
- *The Task Force applauds the results thus far of the strong partnership that has been developed between ITS and the NYU Libraries. It recommends that the Dean of Libraries and the Chief Information Technology Officer promote and support the continued evolution of that partnership, with appropriate participation from the schools.*
- *The Task Force acknowledges the value to NYU of the increasing levels of collaboration and coordination among IT service providers in schools, other major units, and ITS. It recommends that the University formally articulate the obligation on the part of school and unit-based IT leaders of accountability to the University Chief Information Technology Officer, in addition to their direct reporting relationships in their units.*

**IT Advisory Groups.** *The Task Force notes that a number of IT advisory groups are currently in operation, but the members frequently can speak only for themselves and a small group of colleagues, rather than feeling empowered to represent a school or other unit. The Task Force recommends that NYU:*

- *Adopt a practice of periodically reviewing the relevance and effectiveness of advisory groups, instead of automatically reconstituting them.*
- *Revitalize the engagement of students in the IT advisory process, working through the Student Senators Council.*
- *Articulate the charters of advisory groups and providing more regular communications about their work and about technology advances in general to the NYU leadership and more broadly to the NYU community.*

### **C. BALANCE BETWEEN CENTRAL ITS AND SCHOOLS/ADMINISTRATIVE UNITS**

A third area that absorbed a lot of the Task Force's attention was the question of balance. Most universities, including NYU, have a mix of centralized and decentralized IT services that reflects the culture of the institution, the strengths and aspirations of the central administration and various member schools, and the level of resources. Currently, the IT services offered across the University are highly variable, depending on the resources and aspirations of the unit, and there is no systematic process for making decisions about the most effective way of delivering IT services.

There are many different options for service delivery and finding the right balance is important: while too much decentralization can lead to a fragmented IT environment that impedes cross-disciplinary efforts, too much centralization can squelch innovation and local initiatives. Services that are "high-touch" – requiring person-to-person consulting or assistance— are usually best provided by the unit closest to the user, while other services that require consistent handling of data and process are best handled centrally. Innovation tends to start on the edges, but as ideas bubble up, it is necessary to evaluate which ideas should be institutionalized and to weigh the cost efficiencies against the advantage of customized services.

The University ITS plays many roles in centralized *and* decentralized services. It is the central provider of IT services and infrastructure; a partner in innovation with schools, departments, and individual students, faculty, and staff; and a facilitator of discussion regarding effective use of IT across the NYU enterprise. No matter what mode of service delivery is decided upon, central ITS will always play a role in implementation.

The Task Force identified the importance of analyzing new and existing services to determine the most efficient method of delivery. Early on, it created a principle regarding balance, and sought to provide guidance for how to determine whether services should be delivered centrally or locally. The Task Force considered a number of issues, including the importance of fostering innovation; the value in achieving cost economies of scale and efficiencies; the quality and level of service and responsiveness; management control; and ease of movement across units and interdisciplinary work.

The Task Force suggested that central ITS and member schools work together to avoid duplicate systems and determine what services could be delivered more effectively through outsourcing. It identified a series of core questions for central and school IT services to ask when considering whether the increased efficiencies of centralizing IT services outweigh the advantages of customized, local service:

1. Is there a technology service or product that can already do this?
2. How pervasive is the need for this service across campus?
3. Does the service in question have economies of scale for production? Are the marginal costs for this service small or large?
4. Is this service flexible enough to accommodate local requirements?
5. Is the model for supporting this service one that is sustainable?
6. Is this service an essential differentiator for the unit? For NYU?

### **Recommendations:**

At NYU, the scope of IT resources available and the expected levels of IT service vary from school to school, unit to unit. In deciding when to provide decentralized IT services and when to rely on central services, the Task Force recommends schools and units consider several factors, including innovation, cost, service, and management control.

***University-wide guidelines for evaluating the optimum level for service delivery.*** The Task Force recommends that University-wide IT decisions:

- *Promote innovation – on the edges and in the center - in uses and sources of IT services;*
- *Support the schools' unique competitive, discipline-specific and reputational needs;*
- *Encourage continuous improvement in the quality, efficiency, and accessibility of central IT services;*
- *Facilitate engagement by members of the NYU community across units and in interdisciplinary work, through integrated IT services wherever appropriate;*
- *Present external audiences with easy, appealing access to current information about NYU; and*
- *Leverage economies of scale wherever practicable, as technologies and services evolve.*

## **D. STRATEGIC SOURCING**

IT planning at NYU needs to consider "strategic sourcing." As external service offerings evolve, it will become even more important to determine not only which services might

be best provided by central IT and by Schools, but also: 1) which services should be offered by NYU, 2) which services should be sourced to another higher educational institution or consortium, and 3) which services should be sourced to a commercial organization. The Task Force recommends that IT groups across NYU develop the expertise in evaluating which services should be provided "in-house" and those that can or should be "outsourced."

### III. IT Directions and Task Force Recommendations

#### A. TECHNICAL INFRASTRUCTURE

The Task Force first looked at the basic, technological infrastructure, which provides the underpinning for all other ITS services that the University provides. It is the backbone for all members of the NYU community to access the wealth of intellectual and educational resources available at NYU, including a community of faculty and students, a state-of-the-art library system, research databases, and visual resources. The Task Force reviewed materials on Technical Infrastructure including: Data, Voice, Video Networking; Application & Web Hosting; Identity Management; Security; Data Centers. These are the building blocks upon which all other systems are built, information is stored and secured, access is granted or denied, and information is shared around the office and around the world. The Task Force recognized that the community of users increasingly relies on the centrally provided technological infrastructure all day every day, and with the growth of the GNU, an expanded network and disaster recovery capabilities will grow more essential. It was generally concluded that infrastructure services such as network, disaster recovery, security, and identity management are best driven by central ITS as the optimal service level provider due to the aligned goals of the one-campus GNU and the sheer economies of scale offered by central management.

The Task Force focused specifically on ubiquitous wireless service across the NYU campus in public and non-public spaces, and identified it as a priority. This service was repeatedly raised in the survey results and in discussion with students, and there was clear consensus among the Task Force members. It was agreed that ITS should be engaged in the early stages of planning for new and renovated facilities, so that it can prepare for delivery of these types of services. The Task Force recommended that the University set technology standards for new and renovated facilities.

ITS has already procured a larger data center in New York, based on anticipated central ITS future needs as well as the potential needs of member schools for data space. This is another area where NYU should take advantage of the economies of scale that the central University can offer. It was recommended that the University develop a system to align the disparate IT needs of the various independent schools with this shared service, and coordinate with the planning for the GNU.

#### Recommendations:

In recognizing investments in IT infrastructure as critical to NYU's ability to excel, and to providing the level of service expected by students and faculty, the Task Force recommends that:

- NYU should aspire to deliver **ubiquitous wireless service**. A plan for wireless service delivery should be included in the Global IT Strategic Plan that is being developed.
- ITS be engaged in early stages of planning for **new and renovated facilities**. The University's policy on new construction and gut renovation should be revised to require that arrangements for supplying the backbone for wireless and voice-over-IP (VOIP) be included, even if those services are not immediately made available.
- NYU institute a policy that reflects the notion **that ITS is the optimal service provider for infrastructure services**. The Task Force concluded that central ITS is the optimal service level provider for infrastructure services such as network,

*disaster recovery, security, and identity management because of the economies of scale offered by central management. Where service delivery is decentralized, coordination among IT service providers should be facilitated by agreeing upon use of common practices and tools, such as a common trouble ticket tracking system, currently Remedy. Further, the new policy should address legacy conditions and propose a structure to accommodate existing conditions while phasing in the new policy.*

- *NYU improve its **disaster recovery** capabilities. The Task Force endorses plans in progress to improve the University's current disaster recovery capabilities, and expects that, by the end of the current upgrade cycle in FY2014, if not sooner, all the core shared, administrative and academic applications will run in a data center with full backup generator power and, in the event of an outage, will automatically cut over to continue running from another site.*
- *The University plan for the total ongoing staffing that will be needed to operate new and upgraded services and assist people in using them.*

## **B. ACADEMIC/EDUCATIONAL COMPUTING**

The NYU Libraries and ITS have major academic computing roles in the support they provide to faculty and students. They have become partners in jointly implementing and delivering many of the large-scale services offered to NYU faculty, researchers, and students. The Task Force endorses the continuation of their partnership, especially as it makes possible the continued emphasis on seamless use of digital content for teaching, learning, and intellectual exploration. In order to create a technical environment that facilitates and encourages outstanding pedagogy, collaborative learning, and original scholarship, NYU should be both responsive to the current practices of students and faculty and forward-looking in forecasting future trends.

The Task Force considered only some of the many teaching and learning services related to academic computing, including: Computing Labs; Learning Management/ Collaboration (Blackboard & Advanced Learning Exchange (ALEX), based on Sakai); iTunes U; Instructional; Technology Support/Faculty Technology Support; Specialized Labs/Studios, such as the Advanced Media Studio and Digital Studio; and, Data Service Studio. The ITTF concluded that a certain level of uniformity is desirable, in order to accommodate the greatest number of faculty and students, to promote the University's aspirations for cross-disciplinary learning in a global context and to provide robust service cost-effectively. At the same time, it is vital to explore new technological possibilities and, when they prove successful and useful on a larger scale, to make such innovations broadly available, by integrating them into the shared system. Implementing ALEX as a production tool in support of academic and research collaboration is part of that innovation.

It is essential to expand ITS central support for existing instructional technologies, so that greater capacity for individualized consultations and assistance with projects can be available for the growing numbers of faculty who seek them. The Task Force stressed the need to provide a more robust funding mechanism to support faculty who engage in the design of new curricular tools, and encourage innovation.

It is time to undertake substantial improvement in the technologies available in classrooms across the University. The students demonstrated the strong demand for smart boards, class recordings, and other technological enhancements to the

classrooms. In the survey results, there was much attention paid to the need to improve the Blackboard system, increasing its use and making it more effective. While the members of the Task Force agreed that it is important to have a centralized learning management system, they encouraged the University to continue to seek a system that allows greater flexibility and customization.

The Task Force engaged in significant discussion of other classroom technologies, and considered a University-wide initiative to make online instructional materials available at no fee in the public domain, such as MIT's Open Courseware service. It was concluded that, at this time, a similar venture should not be a priority for NYU or ITS, given the many other high priority needs in a context of limited resources. The Task Force recognizes, however, that there are already instances around the University in which it is desirable for individual faculty members or groups to publish their instructional materials online in the public domain at no fee. These include personal webpages as well as the Faculty Digital Archive. The Task Force encourages faculty to explore using such services.

Over the past few years the role of the general purpose computing lab has changed significantly. Students today are well outfitted with computers as the cost to own a machine with the latest technology has declined radically. While the traditional computer lab of cubicles and PC's may no longer be relevant, a gathering place for students to work together on projects is still critical to the academic mission of NYU. The Task Force determined that by transforming existing computer labs into collaborative work rooms with improved wireless capabilities, students will be better served while at the same time lowering administrative operating expenditures. While specialty labs will still be needed, the general purpose labs could be reconfigured for more effective and collaborative use.

### **Recommendations:**

It is important to leverage technology to enhance the classroom experience, promote innovation in the curriculum, and create opportunities for students to interact in collaborative learning environments.

**Common Learning Management System.** The Task Force endorses the continued use of a common learning management system provided by ITS, currently Blackboard, for widespread use throughout the University, while also allowing individual faculty and academic units to experiment at their own units' expense with other instructional technologies.

*The Task Force recommends that:*

- *NYU's primary University-wide learning management system be kept well integrated with other University systems, including the student information system and the NYUHome University portal; and be kept up-to-date with supported versions of software and sufficient hardware capacity. . Implement ALEX as a collaboration tool for academic and research projects.*
- *ITS continue to evaluate other viable candidates for the common learning management system. In evaluating potential providers of the underlying software and hardware for the learning management system and related instructional technologies, the University should consider the integrity of the provider and the compatibility of the provider with the University's academic values.*
- *The Faculty Working Group on IT Direction and Services, which advises ITS and includes faculty from each of the schools, explicitly take on governance*

*responsibilities for guiding the evolution of the university-wide learning management system and for overseeing the process by which individual innovations may be accepted as ITS-supported pilot projects and ultimately incorporated into the learning management system for everyone to use.*

- *Schools increase the support they provide their faculty in introducing and using technology in teaching and learning. The University should consider expanding the objectives of the Curriculum Challenge Fund and the resources available to faculty through it, in order to encompass development of online materials, to promote best practices in online curriculum design and use, and to showcase transformative uses of instructional technologies in teaching and learning.*
- *The Task Force also encourages interested faculty to explore the value of publishing their instructional materials online in the public domain at no fee and to seek external resources to support such initiatives.*

**Technology in the Classroom.** *The University should consider launching efforts to:*

- *Where appropriate, augment or replace chalkboards with smart boards that capture and transmit contents to files that students and faculty can subsequently access online.*
- *Make video recording of class sessions a standard service, subject to the policies of schools and the instructors, who can then make recordings of class sessions available online to students registered in the course.*

**Student computer labs.** Recognizing that most, if not all, NYU students have their own personal computers and that physical space is a scarce, costly resource, the Task Force concluded it is time for the University to revise its approach to configuring student computer labs. The revised approach should:

- Leverage the NYU network to maximize the usefulness of students' personal computers and minimize the demand on physical space;
- Leverage common spaces throughout campus for personal computer use by incorporating additional power outlets as part of future renovations as required;
- Enable students, wherever possible, to use specialized software products available today in the Labs from their own computers in other spaces of their choice;
- Provide a printing service that accepts print requests over the network from students' personal computers and offers document pickup at one or more distribution centers;
- Implement consistent print charges/quotas for students across ITS, the Libraries, and the schools; and
- Restrict the service offerings in the Labs to those that cannot be delivered over the network and/or run on individual laptops, with an emphasis on the pedagogical value of innovative instructional and research technologies.

The Task Force recommended that successful development and adoption of this revised approach requires participation not only from ITS, but also from the schools, the Libraries, and Student Affairs, taking into account, for example:

- Improving the availability and viability of student residence common spaces and other student gathering spaces as potential venues for students to work in groups using their own computers;
- The lab seats, computers and software offerings in the specialized school-based labs, as well as in the four ITS Labs;

- The variability that exists across the schools and programs in requiring (or not) students to own a computer of designated (or not) specifications.

Any revised approach that is not coordinated across these dimensions among these participants is likely to have unintended consequences that may inadvertently create unfunded mandates for some, while seeking efficiencies and more effective services overall.

*Specifically, the Task Force, in accepting the Administrative Efficiencies Subcommittee's proposal (see page 19 for details), recommends that:*

- *Existing general purpose labs be transformed and reconfigured into collaborative work rooms with improved wireless capabilities where students can use their own computers;*
- *Special purpose computer labs remain intact to serve their specific and growing academic purposes;*
- *Access to specialized software once available only onsite in computing labs, as well as to collaboration tools, be made broadly available to students for use on their own computers wherever they may be;*
- *ITS explore adding print kiosks/stations around the campus that will operate with the NYU OneCard system to support a quota- and fee-based service offering.*

## **C. RESEARCH COMPUTING**

One of NYU's goals is to achieve vigorous research collaboration among faculty, students, and researchers across NYU's multiple sites and with academic partners across the globe. In recent years, the infrastructure and related support requirements for research-related IT in numerous disciplines have been evolving toward reliance on resources of a larger scale than can readily be housed or managed in individual office spaces and laboratories. These resources include such services as: Electronic library materials; Scholar's Portal for accessing library and personal research materials; Data curation; Tools for and assistance with data manipulation and analysis; Large amounts of storage for research data sets; Licensed software; Backup services for individual servers, desktop and laptop computers used in research; High performance computing cycles and tools, as well as regular server computing cycles and tools; Specialized software; Very high bandwidth network connections among researchers; Publication tools; Tools for creating and participating in subject-specific collaborations; and, Conditioned data center space for research computers.

NYU Libraries and Information Technology Services have become partners in jointly implementing and delivering such large-scale services with and for NYU faculty, researchers, and students. The Task Force endorses the continuation of their partnership.

Availability and levels of investment in research technology services by the University, through ITS and the Libraries, as well as by the schools and by individual principal investigators, have thus far evolved largely in reaction to specific research projects, after they have become funded. This just-in-time provisioning occurs in a context of the University's practice for allocating all sponsored research overhead funding to the schools. Task Force members imagine that there could be economies of scale and other advantages to leveraging some University-wide resources for centrally arranged and/or provisioned research-related IT services, including, but not limited to the potential of recent advances in 'cloud computing.' It also concurs with the Finances Task Force that the University's current processes and systems for grants administration are cumbersome and time-consuming. As NYU succeeds in maintaining and expanding its volume of sponsored research, including a focus on cross-disciplinary initiatives, it will be essential to

invest in improving the grants administration processes for financial management, pre- and post-award, since the current methods are unsustainable at higher volumes.

### **Recommendations:**

Task Force members believe that decisions about such opportunities should be data-driven, not speculative. Thus, as a follow-on activity to its work, the Task Force recommends that the Provost and the deans, supported by ITS, the Libraries, the CIO Council, and interested faculty advisory groups, develop a University-wide approach to exploring research-related IT services.

*In support of research-related IT services, the Task Force recommends that ongoing mechanisms be developed to:*

- *Maintain a University-wide inventory of current and projected demand for all research-related IT services;*
- *Coordinate communications across schools and with principal investigators about existing and prospective University- and school-based research-related IT services;*
- *Assess strategic opportunities for revising how key research-related IT services are obtained and managed: in the schools, at the University level, as well as beyond NYU in consortia and other external collaborative or commercial arrangements.*

*In conjunction with these efforts, the Provost and the deans should:*

- *Determine the research-related IT services that NYU will provide as part of the commonweal, in contrast to and/or as subsidies of fee-based services.*
- *Consider what, if any, related revisions to make in current University practices for allocating sponsored research overhead funding wholly to the schools.*

*The Task Force recommends that the University's current processes and systems for **grants administration** be made more efficient. It is essential to invest in improving the grants administration processes for financial management, pre- and post-award, especially as NYU seeks to expand the volume of sponsored research. There should be a streamlined mechanism for managing cross-disciplinary research, and reduce the overall number of departmental steps necessary to maintain fiscal compliance.*

## **D. ADMINISTRATIVE SYSTEMS AND SERVICES**

The Task Force also evaluated the administrative systems and underlying infrastructure that support the research, teaching, and management of NYU. This is an area where IT, leveraged successfully to provide integrated, consistent high-quality services across the University, is crucial to meeting our institutional goals, and especially to fulfilling the vision of the GNU. Most of these systems are enterprise-wide in scope, including Finance Services; Student Information System; Human Resource Information System; Decision Support/Business Intelligence/Data Warehouse; Workflow; Advance fundraising system; Facilities systems; and, Administrative Systems Infrastructure Architecture.

ITS, in partnership and at the direction of the central University offices, provides all enterprise-wide administrative, and virtually all other administrative systems and services for the NYU community. Individual schools and departments have systems that feed data into the centrally provided systems, as well as local systems for unique local needs. A few central offices, such as Facilities and Construction Management and Housing, run their own enterprise systems.

In conjunction with the University's efforts to upgrade its core administrative systems, the Task Force considered the need to upgrade the current University Data Warehouse and provide a centralized data warehouse of administrative information, with associated analysis and reporting tools, for decision support in schools, departments and University offices. This was considered an important priority, and there was significant discussion of the quality and integrity of the data. While the upgraded University Data Warehouse must capture information from various University systems, it should be designed around the core analytic entities and attributes of individuals affiliated with NYU, and that data should be maintained centrally over time. The data warehouse should provide the flexibility to allow schools and other units to add and manage unit-specific sets of data that, together with centrally managed information, can provide the basis for school- and unit-based analyses.

### **Recommendations:**

*The Task Force recommends that the University continue its efforts to upgrade the core administrative systems, and the current **University Data Warehouse** by:*

- *Providing a centralized **data warehouse** of administrative information, with associated analysis and reporting tools, for decision support in schools, departments and University offices. The information in the data warehouse should be maintained at high levels of integrity, quality and timeliness, so that it can serve as an authoritative source. The information should be presented in a fashion that is clear and readily understandable.*
- *Designing the upgraded University **Data Warehouse** to address questions that require combining and manipulating information from multiple University systems, as well as from other sources. The data warehouse should utilize core analytic entities and attributes in storing and maintaining data centrally over time, in order to facilitate, for example, understanding the engagement of individuals in all their affiliations with NYU throughout their lives. The data warehouse should provide the flexibility to allow schools and other units to add and manage unit-specific sets of data that, together with centrally managed information, can provide the basis for school- and unit-based analyses.*
- *Supporting the continued emphasis on upgrading the University's **enterprise administrative systems** and increasing the usefulness of data from and functionality of these systems to central and School units.*

## **E. GLOBAL IT STRATEGY**

As one of its first orders of business, the Task Force convened a subcommittee to oversee the process of creating an implementable IT strategy to support NYU's goal to establish a new campus in Abu Dhabi by 2010 and its aspiration to become a Global Network University (GNU).

The members of the Global IT Strategy subcommittee were chosen to represent the academic and research goals of the University, NYU's campus plans for Abu Dhabi and other study-abroad programs, the Library goals and ITS (see Appendix B for full list of committee members). An RFP was issued by NYU to several vendors, and the subcommittee entered a planning engagement with IBM and Cisco as a junior partner. The consultancy team's task was to describe the technological framework for the network and services to connect NYU-New York (NYUNY) and NYU-Abu Dhabi (NYUAD),

as well as the additional investment that would be required to expand that network and services to be the backbone for the envisioned GNU, establishing a strong primary connection between NYU's campuses in New York and Abu Dhabi, while also connecting NYU's study abroad sites in Africa, Asia, Europe and South America.

One of the Task Force's guiding principles was to be mindful of the broader goals of the University in ensuring that the investments in AD are integrated into the planning that happens in New York. While IT is crucial to realizing the campus vision in AD, the global infrastructure should also support the broader NYU mission. In developing the IT infrastructure for the Abu Dhabi campus, NYU should be looking at the needs of its other campuses around the globe to decide what services to pursue, how to structure those services, and how to allocate resources across the broader University. The subcommittee also looked at ways to cast the library as an incubator for creating a digital experimentation center that will serve as an informational hub for a more flexible campus. NYU's global aspirations include collaborative teaching and inter-connectedness among classrooms, which will be achieved through various streaming activities and digital project spaces that take advantage of technology without calling attention to it.

For each area of technological infrastructure and service, the subcommittee had requested the proposed level of investment that would be needed to (a) launch a fully operational NYUAD campus by 2010-2012, (b) lay the technical foundation for becoming a Global Network University, and (c) elevate the overall quality of the GNU. In the Fall, the subcommittee issued a report to the Task Force laying out the programmatic recommendations that would be used by IBM in developing a Global IT strategic plan and an executable blueprint for building the infrastructure to support a truly global academic curriculum and providing integrated, uniform academic and administrative systems of the highest quality across the GNU.

The Subcommittee made the following recommendations for the development of a Global IT strategy to include:

- A plan for a Global Network Infrastructure that will establish the network requirements for NYUAD and connect the majority of existing sites; has the bandwidth to expand over time, since our aspiration is to integrate the whole University for high-quality and uniform connectivity across the system, and includes an Identity Management system that spans IT applications and services and enables a single sign-on access to services, files, and shared data. This meshed network should provide the underpinning to achieve the desired connectedness for creating a truly global community.
- A plan for investment in Classroom Technologies and Videoconferencing infrastructure that will meet the academic curriculum and programmatic requirements and aspirations for NYUAD as well as the GNU, with the capacity to upgrade additional classrooms across multiple sites in the near future as programs mature and require additional capacity.
- A plan for a Digital Library that includes enterprise Scholar's Portal software and services as an integrated entry point for academic content and materials critical to the programmatic requirements of NYUAD, as well as sufficient digital content caching servers and digital storage to meet the existing needs for the GNU and the anticipated increase in demand that these new applications will generate. The Global IT strategic plan should also provide a phased rollout plan for an

Academic Collaboratory that makes available a wide range of interactive Internet tools, such as blogs, wikis, conference sites, social networking, shared archives, etc. to the GNU.

- A proposal for basic investments for High-Performance Research Computing is viewed as a potential differentiator for NYUAD and a way to expand the capacity of NYU. While it is clear that to be a top-tier research university a significant upgrade of all our computing resources would be necessary, decisions about that upgrade are beyond the scope of the Task Force's charge.
- A multi-pronged approach for investing in the Academic and Administrative Applications needed to launch NYUAD on schedule, and to phase in similar services at NYUNY and throughout the GNU. The goal is to have integrated, high-quality systems throughout the network for seamless, uniform access by all NYU students, faculty and staff. The core academic and administrative applications include: Student Information Systems, Human Resource Systems, Financial Systems, Administrative Reporting Services, Public Safety Applications, NYU Email & Calendar, Learning Management System, and the NYUHome Portal.

The resulting vision comprises three primary goals: to connect the GNU Community; to connect the GNU to Its Content; and to connect people to services.

#### **Recommendations:**

*Based on the Subcommittee's findings, the Task Force recommends that NYU:*

- *Implement a private NYU network that guarantees unfettered, unfiltered, and unmonitored access to NYU's worldwide sites.*
- *Develop a robust technological infrastructure to enable seamless mobility of faculty, student, research, teaching and learning between branch campuses (New York and Abu Dhabi) and across international study sites.*
- *Provision most systems University-wide from NYC with organic linkages attained by partnering resources at both "hub" branch campuses (New York and Abu Dhabi) and deploying a shared services approach for academic and administrative applications across all sites in the GNU.*
- *Develop a "follow the sun" service model, with Abu Dhabi as the source of operations support during certain times of day and week.*
- *Formulate a high quality service model to train, assist and support the GNU community.*

See the Report of the Subcommittee in Appendix E and the Vision presentation in Appendix F.

## **F. ADMINISTRATIVE EFFICIENCIES**

There is always a tension between resource constraints and aspirational plans. This tension is manifested in the Task Force's charge, which is to think aspirationally and globally about how technology could distinguish NYU as an institution, while remaining prudent about how it expends resources. IT is a strategic component of NYU's mission, but given limited resources, it is important to determine the IT investments that will distinguish NYU competitively.

The Task Force was specifically charged with focusing on ways that technology can make us more efficient overall as an institution, and in an uncertain economy, to balance the pursuit of our academic goals with fiscal responsibility. To fulfill this charge, the Task Force Chair formed an ITTF Subcommittee on IT Administrative Efficiencies. The charge was to recommend ways to achieve efficiencies in ITS, to achieve efficiencies in University practices in IT, and to adjust the allocation of central use of IT resources. The goal is to ensure that ITS at NYU is as efficient as can be prudently achieved, and that it is integrated into the planning of all academic and business practices at the University. The subcommittee was further asked to coordinate its work with that of the other University Committees considering administrative efficiencies in the areas of Finance Systems, Construction & Facilities Management, HR Policies, and Revenue Programs. The Subcommittee investigated ways to achieve efficiencies in ITS operations; to use IT products and services to achieve efficiencies; and to encourage effective acquisition, use and operation of IT-related products and services across the University. In approaching its charge, the subcommittee performed a literature search to identify new opportunities and trends in the industry that could potentially yield operating efficiencies and savings; met with the Executive Directors of ITS and the School CIOs to discuss strengths, weaknesses, future directions, and potential efficiency opportunities; identified areas of redundancy and overlap where consolidation may yield efficiencies; compared NYU's common IT functions to industry "best practices"; evaluated outsourcing opportunities; and considered "master or licensing agreements" for software and consulting services that could yield financial savings.

The ITTF Subcommittee on Administrative Efficiency proposed that NYU pursue a policy of outsourcing the NYU email system to a third party vendor, but did not endorse a specific vendor. It suggested that significant savings can be realized by transitioning to an outsourced web mail platform. A universal web mail system that meets or exceeds the requirements of all the different email user groups on campus would allow NYU to standardize and unify the campus on a single email platform. These schools and various departments would directly realize savings in licensing fees, hardware maintenance and personnel by having the burden of maintaining a separate system removed.

It found that universities and private organizations are extracting significant value and savings from the deployment of collaboration type applications. These tool sets allows users to work apart from each other but yet interact in a manner only possible before in a face to face environment. It recommended that ITS investigate and plan to transform existing computer labs into collaborative work rooms with improved wireless capabilities, noting that while the traditional computer lab of cubicles and PCs may no longer be relevant, a gathering place for students to work together on projects is still critical to the academic mission of NYU. To assist students who do not own or can't afford a laptop, the subcommittee recommends the establishment of a student laptop loaner program. It further proposed that ITS make available to the student population a collaborative software application to encourage students to work together on their PCs and Laptops.

As many students use the NYU computer labs as places to print documents, the Subcommittee proposed that it would be a more efficient use of space to assign dedicated printing areas that take up less space. The committee recommends that ITS explore adding print kiosks or print stations around the campus that will operate with the NYU One Card system. In making printing more accessible around campus, the University will reduce the demand and need for computer labs on campus.

The Subcommittee concluded from an initial analysis of purchasing trends indicates that NYU rarely uses its large size to secure lower rates. The economy of scale that NYU has across departments needing the same software or IT service is a powerful tool that must be leveraged. It recommended that a team from ITS and Purchasing be formed and empowered to proactively examine purchasing trends to determine if similar applications are being bought around the school and then attempt to negotiate more favorable rates with the vendor.

### **Recommendations:**

In reviewing the proposals put forward in the subcommittee's final report and with an overall goal of reducing the costs of information technology for the University and the schools, the Task Force recommends that,:

*ITS and NYU Schools investigate the option of outsourcing NYU **Email** services to a third party vendor, with the goal of identifying a service that could:*

- *Be adopted across all the schools and for all the University's constituencies;*
- *Achieve cost savings for ITS and the schools;*
- *Satisfy the University's requirements for confidentiality, privacy, regulatory compliance, appropriate protections of intellectual property, and other related considerations.*

*Consistent with the principle articulated by ITTF about **Student Computer Labs**:*

- *Existing general purpose labs be transformed into collaborative work rooms with improved wireless capabilities where students can use their own computers;*
- *Special purpose computer labs remain intact to serve their specific academic purposes;*
- *Access to specialized software once available only onsite in computing labs, as well as to collaboration tools, be made broadly available to students for use on their own computers wherever they may be;*
- *ITS explore adding print kiosks/stations around the campus that will operate with the NYU OneCard system to support a quota- and fee-based service offering.*

*Consistent with the principle articulated by ITTF, ITS create and adopt a strategic plan for deploying **wireless technology** in the University's academic buildings and its student residences, with appropriate and realistic benchmarks for speed and network uptime, security/data integrity, safety and costs.*

*ITS and Purchasing Services, in support of **software licensing**:*

- *Examine University-wide purchasing trends for software licensing and for IT-related consulting services;*
- *Identify and create opportunities to negotiate more favorable rates with vendors;*
- *Encourage schools and other University units to take advantage of more favorable terms.*

## Conclusion

Below is the Summary of Task Force Recommendations. Given funding constraints, it may be possible to implement some of these recommendations quickly while others may take longer to implement. The IT Leadership Council will be able to prioritize and make the case for timing of implementation.

### Overall

1. *IT must be treated as a strategic asset of NYU, and get increased attention by NYU's leadership.*

### Governance

2. *Strengthen the connection between the Chief Information Technology Officer (CITO) and the University leadership, maintain the reporting to the Provost's Office, and strengthen relationship to the Office of the Executive Vice President.*
3. *Establish a high-level IT Leadership Council, with senior representation from Schools and central IT. Encourage Schools and administrative units to include their CIO's or designees in strategic planning.*

### Strategic Planning and Standards Setting

4. *Establish NYU-wide policies, practices, and standards, and coordinate strategic planning across ITS, schools, and other units.*
5. *IT groups across NYU must develop the expertise in evaluating which services should be provided "in-house" and those that can or should be "outsourced".*

### IT Advisory Groups

6. *Articulate the charters of advisory groups to provide more regular communications about their work and about technology advances in general to the NYU leadership and more broadly to the NYU community.*
7. *Adopt a practice of periodically reviewing the relevance and effectiveness of advisory groups, instead of automatically reconstituting them.*

### Technical Infrastructure

8. *Plan for ubiquitous wireless service, leveraging new construction and renovation projects.*
9. *Continue to improve disaster recovery and business continuity capabilities.*
10. *Continue to use ITS as the optimal service provider for infrastructure services such as networking, disaster recovery, security and identity management.*
11. *Provide the adequate staffing levels needed to accommodate new and upgraded services.*

### Academic/Educational Computing

12. *Continue to provide a well-integrated, robust learning management system that can be used by all faculty and students. Implement ALEX as a collaboration tool for academic and research projects.*
13. *Foster curriculum innovation at expanded levels through curriculum challenge grants and related support for faculty.*

14. *Improve classroom technology.*
15. *Transition and reconfigure general purpose computing labs to collaboration spaces, maintain special purpose labs, implement a print management system with additional print kiosks, and ensure that computing lab software is available beyond the lab.*

### **Research Computing**

16. *Develop and maintain an inventory of current and projected demand for all research-related IT services.*
17. *Improve process and technology for grants administration.*

### **Administrative Systems and Services**

18. *Upgrade and improve the centralized data warehouse to address the needs of schools and units in reporting, trend analysis, and decision-support.*
19. *Support the continued emphasis on upgrading the University's enterprise administrative systems, and on increasing the usefulness of data from and functionality of these systems to central and School units.*

### **Global IT Strategy**

20. *Develop IT plans for the new campus at Abu Dhabi and the GNU.*
21. *Implement a private NYU network that guarantees unfettered, unfiltered, and unmonitored access to NYU's worldwide sites.*
22. *Develop a robust technological infrastructure to enable seamless mobility of faculty, student, research, teaching and learning between branch campuses (New York and Abu Dhabi) and across international study sites.*
23. *Provision most systems University-wide from NYC with organic linkages attained by partnering resources at both "hub" branch campuses (New York and Abu Dhabi) and deploying a shared services approach for academic and administrative applications across all sites in the GNU.*
24. *Develop a "follow the sun" service model, with Abu Dhabi as the source of operations support during certain times of day and week.*
25. *Formulate a high quality service model to train, assist and support the GNU community.*

### **Administrative Efficiencies**

26. *Investigate outsourcing email.*
27. *Transform some aspects of student computing labs (see recommendation 15).*
28. *Plan for ubiquitous wireless (see recommendation 8).*
29. *Examine opportunities for improving the process and saving money related to software licensing and hiring consultants.*