The connected campus will allow higher education to develop a technology enabled environment that consists of three components: connected learning, connected service to the community, and connected management. Enabled by the network infrastructure, higher education will be able to use technology to redesign the academic and administrative aspects of colleges and universities to further enhance the quality of the learning experience. This new approach will be based on networks, communications, and computer technology using learning-on-demand, learner centered instruction, student centered services, and digital libraries.


Preface

The Information Technology Planning Process is very difficult for a number of reasons:

The Unpredictability of Future Technology
Moore's Law, for example, states that the speed of the silicon chip will DOUBLE every 18 months, and this fact alone wreaks havoc on the planning/procurement cycles for Information Technology.

Need to Align I.T. with Business Strategy
There exists a tremendous traditional gap in the alignment of the Information Technology planning process and the business strategies of most organizations. The problem is exacerbated in the University environment, where business strategies themselves are in a state of major flux.

Cost Justification
There is a constant battle for cost justification, total cost of ownership studies, return on investment studies, especially in Information Technology investments.

Need for Consistent Standards
Variety is rampant in the I.T. business. Unfortunately, the support infrastructure can't continue to support multiple, diverse standards.

Retention of Qualified Personnel
The market for Information Technology professionals drains top talent, especially from non-profit organizations (like Higher Education). Compounding the situation for Pace is its location (Westchester County and NYC, NY).

Despite these obstacles, the staff, faculty and governing bodies at Pace University are crafting an Information Technology Plan to support the University's Strategic Agenda. This Plan will be a living document, residing on the Pace Web Site. Readers are encouraged to submit comments to: Chief Information Officer, Pace University. This version of the plan will be reviewed by the Information Technology Executive Committee, recommended to the Executive Council and the President of the University, and ultimately approved by the Board of Trustees.
The Information Technology Plan for Pace University will ultimately consist of three Documents:

**Enterprise Information Technology Strategy:**
Sets the *direction* and *philosophy* of the use of Information Technology at Pace University.

**Information Technology Strategic Plan:**
Looks ahead at Pace's targeted vision, determines the strategy to get there, and selects which I.T. initiatives are worthwhile to pursue.

**Information Technology Architecture:**
Defines the guidelines and standards to be utilized in building the new systems identified in the Strategic Plan.

For now, we are publishing the second document, the Information Technology Strategic Plan, expanded to include topics in the first document (Enterprise Information Technology Strategy) and the last document (Information Technology Architecture). A concerted effort will be made to separate this current Information Technology Strategic Plan to the three components identified above.

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**Contents**

1. Where Does the University Want to Be?
2. What is the Information Technology Vision?
   A) Vision  
   B) Major Initiatives  
   C) Outcome Goals  
3. Where are We Today?  
   A) Pace University Networks  
       1) Data Network  
       2) Voice Network  
       3) Video Conference Network  
   B) Access to Information  
   C) I.T. Services  
   D) User Support  
   E) Governance of I.T.  
   F) Organization of I.T.  
   G) I.T. Funding Models and Strategies  
   H) Information Technology Continuity of Operations Plan ("COOP")  
   I) Pace University Information Technology and Security Standards  
   J) Pace University Appropriate Use Policy  
4. What are Pace's Major I.T. Strategies?  
   A) Strategic I.T. Planning Definitions  
   B) Information Technology Support Strategy  
   C) Appropriate Use of Information Technology  
   D) General Hardware, Software, and Network Strategies  
   E) Central University Information Technology Services  
   F) Strategy for How an I.T. Requirement Gets Processed by DoIT  
   G) What Technology Advances and Changes Will Have the Most Significant Impact on I.T.
1. Where Does the University Want to Be?

Success in the Pace University Information Technology arena is inextricably intertwined with success of the Pace University Strategic Agenda. Providing the Information Technology Infrastructure for the University, the Division of Information Technology’s Departments enable the students, faculty and staff to do their day to day functions more effectively (do the right things) and more efficiently (do them economically). I.T. is an enabler and multiplier for the workplace; in addition, our graduates need to be exposed to and comfortable with Information Technology in order to succeed in the 21st Century workplace.

The University's Strategic Agenda consists of Seven Goals, with each goal consisting of multiple Objectives. The University has also identified specific themes (the Academic Plan) that are listed below each goal. Information Technology must align itself with the business processes associated with the accomplishment of these goals/themes, and we must strive to add value to the numerous explicit and implicit business processes associated with these goals/themes.

Information Technology will support the University's Strategic Agenda's goals and the associated themes by providing the necessary telecommunications infrastructure and support for the future totally connected and compatible campus.

Pace University Strategic Agenda

2. What is the Information Technology Vision?

A) Statement of Information Technology Vision.

In order to fulfill its teaching, research and service missions, Pace University will be the premier multi-campus Information Technology enhanced University for its size and unique identity:

- Pace University will develop effective and efficient academic, administrative and research Information Technology support, in that order.
- Pace University will be an Information Technology enabled premier partner with other educational institutions, as well as with governmental, cultural, legal, health care, and community agencies.


C) Outcome Goals (desired end products of the entire I.T. environment / infrastructure at Pace):

- I. T. enabled learners.
- I. T. enabled staff and faculty.
- I. T. value added educational curricula, administrative business processes, research and internal-external communications.
3. Where are We Today?

A) Pace University Network Diagrams and Information

1. Data Network
The Pace University FDDI (Fiber Distributed Data Interface) backbone connects all eight of its major locations together over a 100 Mbps token ring (IEEE 802.5) fiber optic LAN, leased from Bell Atlantic.

- Each location connects to the FDDI via a 3Com Corebuilder 3500 through a single mode fiber connection. These are labeled as \textbf{ROUTER} on the diagram below. This fiber then connects to the local Bell Atlantic Central Office to a FDDI concentrator. These are labeled \textbf{PLV}, \textbf{TTY}, \textbf{WHP}, \textbf{GC}, and \textbf{BWY} on the diagram.

- \textbf{PLV} is Pleasantville, \textbf{TTY} is Tarrytown, \textbf{WHP} is White Plains, \textbf{GC} is Grand Concourse and \textbf{BWY} is Broadway. In between these central offices are smaller central offices that the FDDI passes through. Bell Atlantic monitors our FDDI backbone 24 hours a day. If there are any potential problems with the FDDI backbone, Bell Atlantic will take the necessary steps to correct the problem BEFORE we experience any network outages.

- Any network traffic between locations has to pass over the FDDI backbone.

- Pace employs the 3COM Total Control Remote Access system with PPP and TCP/IP connectivity to the internal Pace Network. The student population is the priority user of university remote access lines.
This network diagram below, of the Pleasantville Campus is characteristic of all campus locations. Each campus incorporates one MDF (Main Distribution Facility) which houses at least one 3Com Corebuilder 7000 device. The 3Com Corebuilder 9000 is a Gigabit switch. Each 3Com Superstack Switch connects to the Corebuilder 9000 by way of multimode fiber cables connected to a fast ethernet card. Each 3Com Superstack Switch connects to the fast ethernet card 100 meg full duplex.

Also connected to the Corebuilder 9000 is the 3Com Corebuilder 3500. The Corebuilder 3500 allows each campus to connect to the Bell Atlantic FDDI backbone to communicate to other remote campuses. This connection is done through a single mode fiber connection. The Corebuilder 3500 connects to the Corebuilder 9000 by way of multimode fiber cables connected to a fast ethernet card.

There is more than one Corebuilder 9000 at certain locations. In this instance the 3Com Corebuilders are interconnected with each other by a Gigabit backbone.

Fiber cables are run between buildings and/or between floors of buildings allowing 3Com Superstack Switches to connect to the Corebuilder 9000’s. A 3Com Superstack Switch allows PC and Laptops to connect to an ethernet port at 10 megabit. This is a dedicated 10 megabit half duplex connection for each PC. Every room has network jacks installed and labeled that corresponds to a patch panel in a BDF or IDF. (BDF – Building Distribution Facility or Intermediate Distribution Facility – these are networking closets) The PC connects to the network jack on the wall by way of RJ-45 Category 5 (Category 5 cable is spec for 100 megabit throughput) cable then the patch panel is connected (by RJ45 Category 5 cable) to a 3Com Superstack Switch port. The 3Com Superstack Switch connects to the 3Com Corebuilder 9000 with multi mode fiber at 100 megabit full duplex.
2. Voice Network
The Voice Network Office, Telecommunications Dept. is responsible for voice communications on all campuses. This includes the acquisition, installation, maintenance and modifications of telephone lines, equipment, long distance services and voice mail.

Pace University's telephone system is known as Centrex Intellipath II. Operator switchboard service is provided from the Pleasantville campus for all locations.

This system allows you to dial any extension within Pace University by dialing a 4 digit extension:

- A 4 digit number starting with "1" will be directed to Pace New York (Midtown, WTI and smaller sites)
- A 4 digit number starting with "2" will be directed to Pace Briarcliff
- A 4 digit number starting with "3" will be directed to Pace Pleasantville
- A 4 digit number starting with "4" will be directed to Pace White Plains (Law School and Graduate Center)

Voice Mail System: Pace University's voice mail system enhances the voice communications with a backup for busy or unanswered calls. It allows the Pace community to receive phone messages in confidential mailboxes, which is password protected. Mailboxes can be created or customized to meet specific individual/departmental needs.

To access the campus voice mail systems, dial:

- PNY: 212-346-1313
- GC/LAW: 914-422-4400
- BC: 914-923-2727
Dormitory Systems: The Telecommunications Department also maintains the resident student services on each campus which includes a separate telephone system with voice mail, cable TV and access to the Pace data network and the Internet.

The assigned student telephone numbers are as follows:
- New York Campus: (212) 849-5000 to 5500
- Briarcliff Campus: (914) 597-6000 to 6999
- Pleasantville Campus: (914) 597-8000 to 8999
- White Plains Campus: (914) 597-5600 to 5999

3. Video Conferencing Network

see Pace Videoconferencing Network

B) Access to Information

Pace University Students, Faculty and Staff should be afforded ubiquitous access to data, voice and video constrained only by University resources and appropriate use policies. The shift in higher education is from "just-in-case" courseware, through "just-in-time" courseware, to "just-for-you" courseware (Katz, Dancing with the Devil, page 4). This shift necessitates 24 hour a day, 7 day a week, 365 days a year access to educational materials, from library / reference desk, through actual on-line courses, complete with discussion groups, chat sessions, and videoconferencing.

In order to deliver this type of access, a major shift in the way I.T. does business at Pace is underway. Mission critical servers are being relocated to Briarcliff in a conditioned (both power and HVAC) environment. Proactive
monitoring of major network components as well as these mission critical servers has begun, with pager support available during off hours. Everything possible is being done to keep mission critical servers available for users accessing Pace University data and information systems.

Paramount to delivering high availability access to Information Technology is the implicit requirement of a secure mission critical infrastructure using best-of-breed information technology security policies, procedures, and systems. In all cases, the academic use of Pace University Information Technology resources will be tempered with a realistic appraisal of the risk/reward analysis. Denial of service because of liberal security policies does not make sense!

The University understands the requirement to provide students and faculty with access to its information systems worldwide. Consequently, most systems (e.g., electronic mail, calendaring, library access, grades, course material, policies, etc.) are being designed to use only a web browser and an Internet connection for access. In addition, these systems are being proxied so that users on the Internet with proper authorization, will be able to access them.

In most cases, students and faculty that attempt access from outside of the Pace Network will have to "bring their own" Internet Service Provider (ISP) (we recommend ICE). For students and others that cannot afford to "bring their own", there will be limited University provided dial-up ports.

Departments/schools may want to use Corporate ICE accounts when employee access to the Internet is mission critical! Mission critical corporate data exists on three mainframe databases (the student system uses CA-Datacom and Total Transparency, while the Human Resources and Financial Systems use VSAM.) Real time access to these systems is currently limited to TN3270 terminal emulation, Rocket QMF software and client server/Intranet subsystems that get daily uploads from these databases.

C) I.T. Services

I.T. services provide the technological tools needed for Students, Faculty and Staff to complete assignments and communicate electronically.

D) User Support

- The user community at Pace consists of the following:
  - The Students, DoIT's customers!
  - The Faculty
  - The Staff
  - Pace Retirees
  - Pace Alumni
  - The Great American Public (GAP)
  - The Great International Public (GIP)

- Students are our top priority -- they will receive support from
  - The Computer Resource Centers on each teaching campus
  - CSIS faculty and staff, as part of the basic CSIS curriculum
  - Resident Advisors that also serve as IMOs (Information Management Officers (see Chapter 4A, 4B)
  - The User Services Department, DoIT Customer Service Center, Willcox Hall, PLV
    E-mail to: doit@pace.edu, or dial #D.O.I.T.

- Our User Support Model for Faculty and Staff is predicated on the concept of Information Management Officers (see Chapter 4A, 4B)
  - IMOs will be trained by DoIT's User Services Department
○ IMOs will request help from the DoIT Customer Service Center, Willcox Hall, PLV
  E-mail to: doit@pace.edu, or dial #D.O.I.T.
● The GAP and the GIP will be supported by:
  ○ Pace Telephone Operators
  ○ Enrollment Management Office
  ○ University Advancement
  ○ Pace's Presence on the World Wide Web
  ○ The User Services Department, DoIT Customer Service Center, Willcox Hall, PLV
  E-mail to: doit@pace.edu, or dial #D.O.I.T.

E) Governance of I.T. at Pace University
● Users -> Information Management Officers -> Information Technology Steering Group ->
  Information Technology Executive Committee -> Executive Council -> President -> Board of Trustees
● Users: See D. User Support
● IMOs: Information Management Officers (IMOs). See Direct support personnel, called Information Management Officers.

● ITSG: Information Technology Steering Group/Super IMOs: A group of technically oriented individuals ("super Information Management Officers") has been appointed by the CIO to study unsolicited proposals and do detailed research on major I.T. initiatives from the academic and administrative perspectives. This group advises the I.T. Executive Committee (ITEC) and the CIO. Send email to this group.
● ITEC: The I.T. Executive Committee works closely with the DoIT organization to help with decisions that affect the common user and which require general I.T. support. The Committee recommends to the Executive Council how and where to distribute major funding of I.T. resources; changes to I.T. strategies; and new I.T. initiatives (e.g. Distance Learning). Chaired by the University's CIO and VP of Information Technology, the ITEC committee is made up of the University VPs and their representatives (e.g. the Budget Director), as well as interested Deans. Send email to this group.
● EC: The Executive Council is composed of University Divisional Vice Presidents and chaired by the President of the University. The Council interacts with the Information Technology Executive Committee (ITEC) to analyze and modify proposals for changes to I.T. strategy and major funding of I.T. resources. The Executive Council then forwards its recommendation(s) for action to the President. Send email to this group.
● The President, on recommendation from the Executive Council to implement new I.T. strategies and fund new I.T. initiatives, makes a decision or brings the initiative to the Board of Trustees for further consideration and action. Send email to the President.
● The Board of Trustees, in its capacity as University decision making body, oversees major I.T. strategy and funding initiatives with the President.

F) Organization of I.T.

Central I.T. Organization.
G) I.T. Funding Models and Strategies

1. The Board of Trustees approves the University's annual budget. It divides approved funds into four funding streams: Operating Budget, Furniture and Fixtures, Construction, and I.T. Capital. All dollars except those for the Operating Budget are available only for the requested budget year.

2. To receive funds from the I.T. Capital reservoir, each major area and school of the University submits Additional Funding Requests, sorted by Dean/VP priority order, to the President and the Budget Office.

3. The Additional Funding Requests for I.T. Capital funding are forwarded by the Budget Office to the University CIO who reviews and collates them. The CIO places all requests in a new priority order which he feels best satisfies the intent and strategic goals of the University.

4. This prioritized listing of the Additional Funding Requests for I.T. Capital is submitted to the Information Technology Executive Committee to be reviewed, modified and sent with a recommendation to the Executive Council and, with its approval, to the President and Board of Trustees.

5. All approved requests for I.T. capital funding are communicated to area VP and Deans and funds are deposited into each area's Additional Funding Capital accounts.

H) Information Technology Continuity of Operations Plan ("COOP")

In conjunction with the University's Internal Auditor, the Division of Information Technology, along with other key members of the University's Information Technology infrastructure, are developing a detailed "COOP". This
plan addresses catastrophic natural disasters that may occur, and what precautions/contingencies we have planned to continue to provide mission critical Information Technology service to the Pace community. Components of the plan will be:

A) Backup and off site backup procedures.
B) Alternative routing for Internet access.
C) Cold sites for mission critical server farms
D) Fire suppression systems.

I) Pace University Information Technology and Security Standards
J) Pace University Appropriate Use Policy

4. What are Pace's Major I.T. Strategies?

A) Strategic I.T. Planning Definitions.

DoIT - Division of Information Technology, the Pace University organization that is led by the Chief Information Officer (CIO) / Vice President, Information Technology. Pace University.

DoIT's General Support - DoIT will be appropriately resourced for common user (vs specialized user) I.T. (e.g., telephone, institutional and enterprise wide databases, data network, etc., I.T. on everybody's desk in every classroom) and will support I.T. Initiatives in the GENERAL SUPPORT Role.

● GENERAL SUPPORT: Centralized I.T. support using University priorities and resources (not Departmental or Schools).

DoIT will work with I.T. Points-of-Contact known as Information Management Officers (IMOs). IMOs are the I.T. relationship managers who represent each department, staff element, or agency within Pace University. IMOs provide DIRECT SUPPORT.

● DIRECT SUPPORT: Decentralized I.T. support using Departmental or School priorities and resources.

Note that the entire Information Technology effort at Pace is at serious risk without the use of Information Management Officers-- especially critical is management commitment to the concept of IMOs because of the limited number of central I.T. support staff and the ratio of supporters to supported.

B) Information Technology Support Strategy.

● DoIT will function in the centralized Information Technology general support role, providing services for common user Information Technology systems (e.g., the data network, the telephone system, copiers, voice mail, Advantage, ISIS, etc.). Specialized user Information Technology systems (like a chemistry or modern languages program) will be supported by IMOs.

● Direct support personnel, called Information Management Officers (IMOs), will be Pace employees and students appointed by their Department Heads, Deans, and other supervisors (to someday include Resident Assistants/Student Life Advisors in the Dormitories), and these IMOs will be the points of contact between their organizations and the DoIT User Services Department and work centers. IMOs are subscribed to a
listserv where they receive technology update notices, timely bulletins, and meeting notification.

- The User Services Department, Division of Information Technology, will train IMOs to be aware of Pace supported I.T. systems, standards and procedures, and will help DoIT deliver I.T. services to their offices, departments, divisions, schools and dormitories. For example, users in the Budget Office will eventually seek the assistance of its IMO with an email problem; if the IMO cannot solve the problem, the IMO (and the user) would seek the assistance of the User Services Department (Phone #D.O.I.T.).

- Using IMOs helps DoIT deliver effective (doing the right thing) and efficient (doing it economically) Information Technology services. IMOs routinely meet monthly (last Tuesday of each month, 10:00-12:00 AM, Lecture Hall North, PNY, and last Thursday of each month, 10:00-12:00 AM, Woodward Hall, BC) with the DoIT leadership. Meeting minutes and associated handouts, virus software, patches and fixes are available on line. See DoIT IMO Resources.

C) Appropriate Use of Information Technology Strategy: see Pace University Appropriate Use of Information Technology Policy.

D) General Hardware, Software, and Network Strategies: Proliferating different protocols, application software suites, web tools, network operating systems and platforms, and network/PC/Server/Notebook/PDA hardware has a disintegrating effect on the limited University I.T. support structure. Consequently, standards have been established in all applicable areas, and enforcement of these standards becomes a management priority in order to preserve the delicate balance of supporters to supported systems. For capital investments, the purchasing office requires I.T. products and services to be approved by the CIO (in order to help enforce promulgated standards). For the latest University Standards for Information Technology, see Pace University Information Technology Standards. Questions about these standards should be directed to your Information Management Officer.

For the latest recommended supported models/version numbers of University supported Information Technology products, contact #DoIT or email doit@pace.edu.

E) Central University Information Technology Services: The following services will be provided at the University level and should not be duplicated by any school/department/division, as such duplication would result in wasted effort and resources. If I.T. requirements are submitted to DoIT to set up or procure duplicate servers/clients for any of these capabilities, such requests will not be approved:

1. Authentication to Windows NT Domains
2. Hardware: DoIT technicians have been certified in the repair of Hewlett Packard Servers and PCs/Peripherals. DoIT is also an authorized IBM PC/Notebook Reseller/Repair facility and is in the process of working with Dell Computer. Consequently, we recommend procuring hardware from these vendors before we approve other hardware.
3. Software configuration recommendations to central Purchasing based on user requirements and University Standards (see D above).
4. Electronic Mail Servers and Accounts
5. Electronic Calendar Servers and Accounts
7. World Wide Web Servers (External and Intra-Pace Network)
8. Proxy, Cache, SMTP, WINS, DNS, Firewall services
9. Course Management/Course Development Distance Education Software
11. Dial-up/Terminal Server Access
12. Network Drops (Voice, Data, Video)
13. Anti-virus software
14. CHAT/IRC, Discussion List, and Listserver Services
15. Video Conferencing
16. Robotel
17. Unified Inbox (Fax, E-mail, Voice Mail)
18. Up-to-date software distribution (part of Enterprise Resource Management system)

F) Strategy for How I.T. Requirements Get Processed:

![Diagram]

This diagram summarizes the overall procedure for non-standard Information Technology requests.

G) What Technology Advances and Changes will have the Most Significant impact on I.T. 1999-2003?

<table>
<thead>
<tr>
<th>Technology</th>
<th>Management</th>
</tr>
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<tbody>
<tr>
<td>What technology advances and changes will have the most significant impact on I.T.?</td>
<td>How can organizations harness and exploit I.T. despite ever-increasing complexity and volatility?</td>
</tr>
<tr>
<td>2. NT Deployment/Integration</td>
<td>2. Demonstrating Bus. Value</td>
</tr>
<tr>
<td>3. Packaged Application Transitions</td>
<td>3. I.T. Skills (Recruit, Retain, Re-skill)</td>
</tr>
<tr>
<td>4. E-Commerce Infrastructure</td>
<td>4. Y2K Clean-up/Contingencies</td>
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</table>
H) Strategy for Corporate / Enterprise Database Access

Pace University acquired a corporate/enterprise wide "ad-hoc" capable database management system that will allow web based interactive queries from users. These queries will span data sets from candidates to graduates/donors, from budget requirements through budget execution history, and from personnel recruitment through retirement.

As part of the Year 2000 remediation efforts, our financial management MIS was upgraded from CUFS to Advantage (AMS Product), and users were given a GUI level access capability into the mainframe databases. Similarly, the same capability has been added to the Human Resources System via a product called HR Server. These upgrades add significant "ad-hoc" capability to HR/Financial System users at Pace. Nevertheless, these "upgrades" are viewed as temporary and will probably not be part of a final corporate solution because they are not integrated.

For the Student System, Pace University is upgrading its legacy Student Information System to a web-based customer focused system using a product called Clientsoft.

5. What are the Risks?

"There is no more delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful of success, than to step up as a leader in the introduction of change. For he who innovates will have for all his enemies all those who are well off under the existing order of thing, and only lukewarm support in all those who might be better off under the new" (Machiavelli)

The greatest risk Pace University faces regarding strategic Information Technology planning is the risk of not doing anything.

- Will the technologies develop as forecast?
- Will we able to secure and retain the skills required?
- Will the University Budget for Information Technology be able to respond to the increasing demands?

Recognizing these risks, the University has established an Information Technology Capital line in its budget to keep Information Technology refreshed. It has also established a Teaching and Learning Technology Roundtable (faculty and staff) to examine Asynchronous and Synchronous education issues.