

Administrative Information Services Annual Report 2004-2005

<http://ais.its.psu.edu/>

Introduction.....	1
AIS Production Services.....	1
Special Projects.....	6
Operational Support.....	8
Infrastructure.....	8
Training & Education Program.....	9

AIS serves as the central University resource responsible for supporting administrative information systems. As a unit of Information Technology Services (ITS), AIS participates in the development, maintenance, and secure operation of the state-of-the-art applications using centralized student, business, and alumni databases.

Administrative Information Services *Senior Management Team*

Senior Director, Ron Rash
Deputy Director, Scott Smith
Enterprise Infrastructure, Mike Kauffman, Sr. Manager
Network Infrastructure & Data Security,
Todd Litzinger, Sr. Manager
Mid-Tier Infrastructure, Pete Dawson, Sr. Manager
Computer Operations & Facilities,
Clyde LeFevre, Director
Solutions & Services, Karen Schultz, Director

Snapshot *The numbers*

Angel, Spring 2005

Course Sections..... 6,119
 Faculty..... 3,865
 Students..... 60,423

eCommerce (Annual)

Transactions.....333,125
 Amount..... \$61,406,752

eDocument Distribution System (eDDS)

User Accounts..... 1,479
 Reports..... 826,151
 Pages..... 24,000,000

Data Warehouse

User Accounts..... 1395
 Records..... 190,117,357

Enterprise Server (Annual)

Print Lines.....1.4 billion
 Batch Jobs..... 1.41 million

eLion Monthly Student Usage

Avg. trans.1,073,506
 Max. trans.1,889,003
 Avg. users..... 64,773
 Max users.....73,323

Hardware

Disk Storage..... 14 TB
 Prod. Servers..... 130

Annual Report 2004-2005

Administrative Information Services

Introduction

In FY 2004-2005, Administrative Information Services (AIS) saw an array of initiatives begin to take shape and progress. Significant strides were made with the Disaster Recovery and Business Continuity Planning project, including the signing of a contract with Mainline to provide a replacement Enterprise Server and Shark Storage System within 72 hours to the Altoona Recovery Center in the event of a catastrophe. The Automated Process Management initiative, which will improve the management of business processes through the use of software that enables integration of electronic documents with multiple data sources, is in full gear with three core technology software products now installed. Also in the past year, Software AG's Business Consulting Group was commissioned to perform an assessment of the Penn State's Business Intelligence capabilities. This resulted in a recommendation of potential steps and solutions that will enhance the University's business intelligence capabilities.

The following report serves to highlight many of the significant accomplishments of AIS over the past year. Included are key projects that came to fruition, as well as, progress on several multi-year projects.

AIS Production Services

AIS Web Site

Growth and expansion of the RedDot Solutions Web Content Management System has been realized. This tool and process continue to enable and empower staff to add, manage and maintain AIS Web site content. The number of trained RedDot content providers has doubled over the last fiscal year. Formal training was offered as well as informal Question & Answer sessions. In addition, RedDot consultation services were provided to administrative offices external to AIS.

"Related Info" links were incorporated into the index pages of most AIS Systems and Services. These links provide quick access to information related to, but not part of, the various systems and services.

An "AIS Developer Resources" section was added to the AIS Web site. This link is for AIS developers at Penn State to share technical information and promote best practices in programming.

An initiative was begun to convert the AIS Web site from HTML to XHTML and to expand the use of CSS (cascading style sheets) in order to enhance visual design, formatting and accessibility.

ANGEL (A New Global Environment for Learning)

Version 6.2 of ANGEL was implemented in May 2005, and offers a number of new tools, as well as enhancements to existing tools, giving instructors greater flexibility and streamlining aspects of ANGEL course development. Some of these new features include randomly generated student teams, a more powerful HTML editor, enhanced quiz settings, and the ability to grade quiz submissions by each question.

Data Warehouse

The Data Warehouse continues to be a valuable tool for the user community, averaging approximately 425 individual users, running more than 15,000 queries monthly.

This year began an initiative to change the field names on the Data Warehouse to more user friendly names, and to redesign layouts of the tables, with the goal of making the information easier to use. Conversion of the student database has begun; this process will be ongoing.

The Data Warehouse was a key player in the Penn State SSN Conversion Project; within the Warehouse, all SSNs were converted to PSU IDs. In addition, the Data Warehouse was used by several Penn State units to support their own internal conversion processes.

Also this year, the Data Warehouse was moved to a new hardware platform, which greatly improved the stability, availability and performance of the Warehouse. There also was a significant reduction in the duration of the nightly updates.

Document Imaging

Penn State continues to make excellent use of its site-licensed imaging software from Optical Image Technology, Inc. (OIT). In November 2004, the site license was expanded to include the Barcode Server module to enhance and simplify indexing processes for various University departments. In addition, the University has made several recommendations to OIT to enhance their e-mail manager module in anticipation of adding that module to its site license in fall 2005.

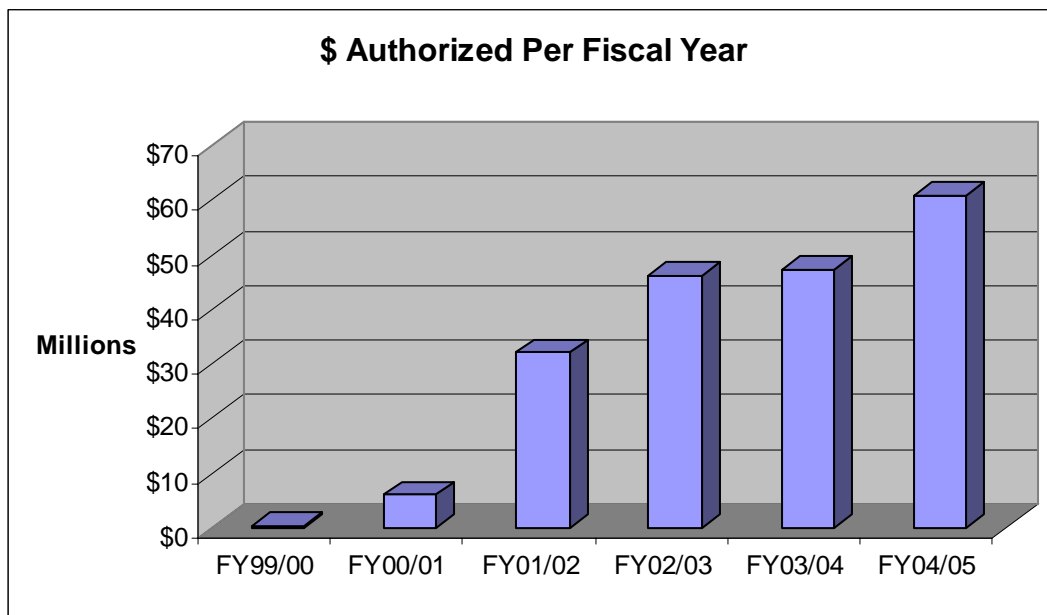
Several departments have implemented document imaging to improve their various processes. In early 2005, the Applied Research Lab (ARL) installed, tested and implemented imaging for their time sheet records. On April 1, 2005, Student Affairs went live with Career Services' eCredentials System, which allows current students and alumni, in the field of education, to manage their teaching credentials including resumes, transcripts, reference letters, teacher evaluations, PRAXIS test scores, etc. In addition, the Hershey Medical Center is expanding its current imaging system to include several additional departments.

eCommerce

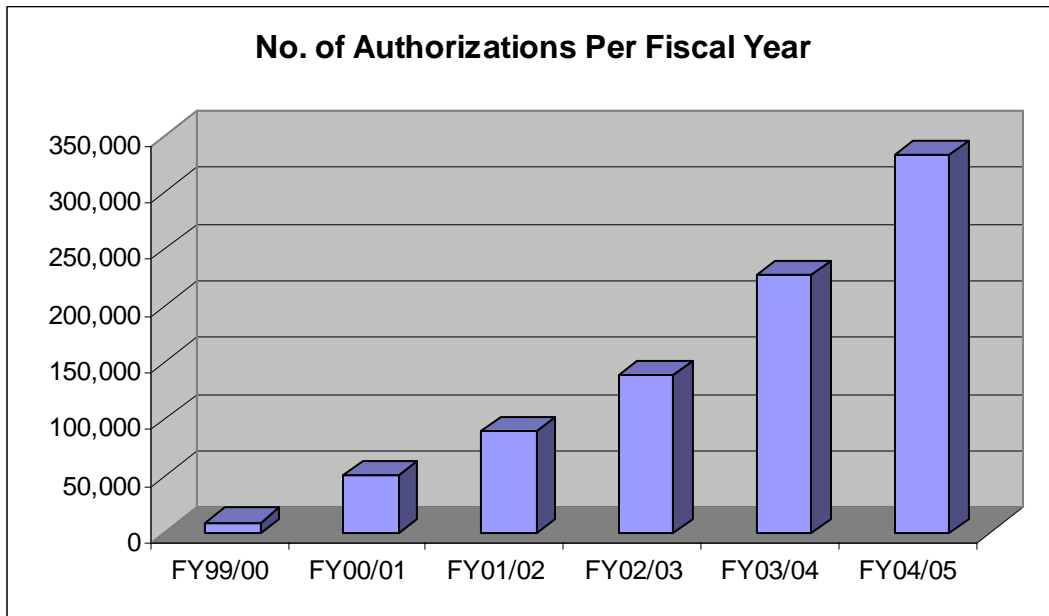
During the fall 2004 semester, eCommerce launched a new version of its payment system. This version, named 'EcomCtrl', was written in-house and is built on top of IBM WebSphere Commerce Business Edition V5.5. The new system is faster and can handle many more transactions than its predecessor, resulting in fewer user problems and a better customer experience.

In addition, EcomCtrl allows users to recreate refund receipts and e-mail them. It has improved search abilities and reporting tools, and information was added to eliminate "downgraded" transactions (those charged a higher discount fee), saving the University more than \$6000 annually.

E-Commerce experienced more growth in 2004-2005, representing a 29% increase in authorization amount, and a 45% increase in the number of authorizations.



The 29% growth in \$ authorized can be attributed to the rise in the number of authorizations. The average authorization amount dropped in 2004-2005 to \$184 from \$206 in 2003-2004.



The 45% rise in number of authorizations may be attributed to more units using eCommerce Services and the general expectation of doing business online via credit cards. The ID+ Card certainly contributed to the surge. Money may be put on the ID+ Card online via credit card, and then used for purchases at many State College businesses.

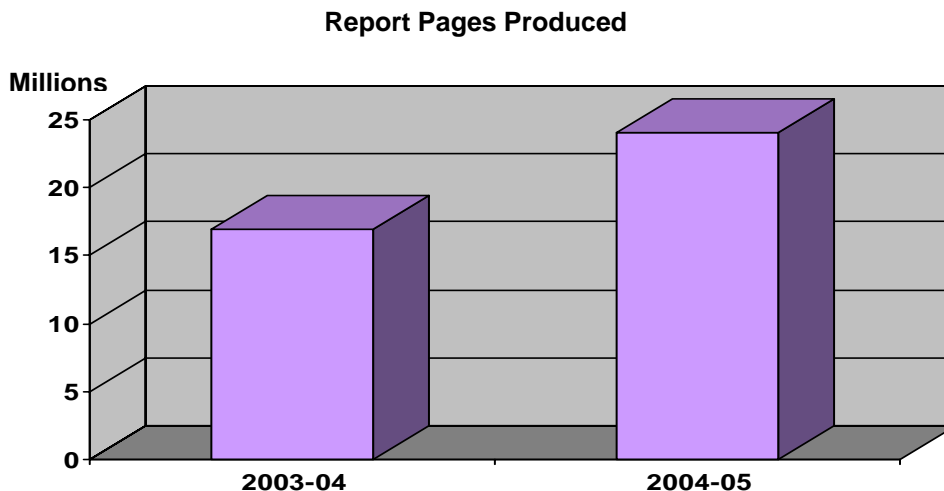
eCommerce Services are now used by 140 different units at University Park and other locations. AIS's secure virtual credit card terminal, ePay, is still the most popular eCommerce application. It is used by 90% of our departments.

The eStore service hosts stores as varied as the University Creamery to the PA State Data Center. The eStore administration pages and functions were overhauled during a redesign of the site layout. The Creamery store has become the most active store after only one year online.

eDocument Distribution System (eDDS)

The eDocument Distribution System— a Web-based system for the distribution of reports—continues to grow in users and the number of reports it houses. There are currently a total of 1479 users, a 10% increase over the previous fiscal year, accessing over 826,151 reports housed on the eDDS server. Just fewer than 24 million pages were directed to eDDS in FY 2004-2005, comprising 70% of the AIS enterprise server 'print' output. This is an increase of 38% over the previous fiscal year.

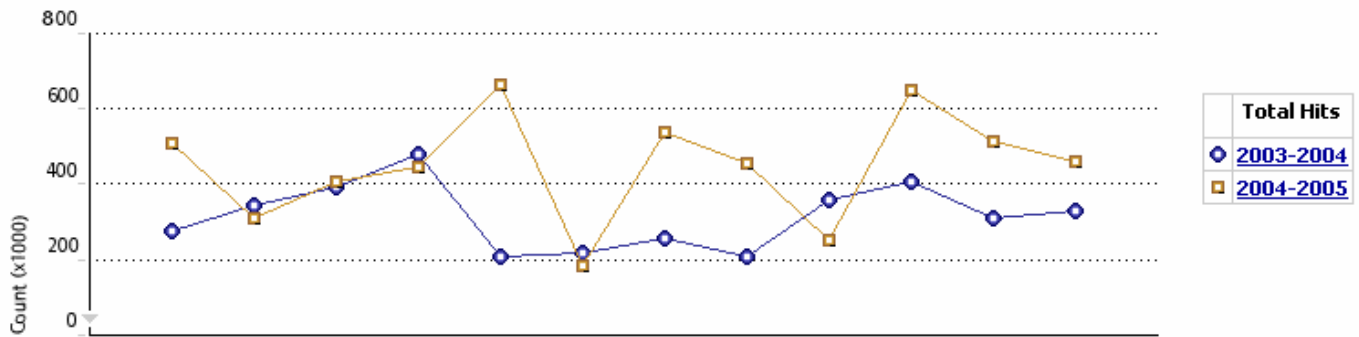
A major new eDDS customer was added this year. The Office of Physical Plant (OPP) is distributing their standing order bills through eDDS, eliminating thousands of pages of printed paper each month and resulting in significant cost savings for OPP.



Enterprise Information System (EIS)

The Enterprise Information System provides a Web-based information and reporting service, continuing to grow in number of users and improve in ease of use. During the past year, both the number of authorized users and the number of models available for reporting increased. Customers from 1212 unique IP addresses visited the system approximately 5.4 million times during the year. EIS now provides five Web services to the developers in 16 units at the University: PowerPlay Modeling (compressed cubes with slicing and dicing capabilities presented in a cross tab format), Impromptu Web Reports (standard reporting via the Web), Cognos Query (Web query tool), Visualizer (advanced graphics tool), and NoticeCast (an alert detection service enabling information to be pushed or delivered to the customer based on a predefined event).

Enterprise Information System Two-Year Comparison



Count as values		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Month
Total Hits	2003-2004	274572	345007	394203	477884	209847	218194	256630	208872	360749	408027	308690	331922	3794597
	2004-2005	511479	311219	408278	447841	664614	186455	536549	454263	250046	649469	514575	461045	5395833

The year was spent deploying the NoticeCast service and stabilizing and improving the performance of a system that was taken from a two-server (production and development/test) environment to a four-server (production, acceptance, development, and test) environment.

A Development User Group—which provides a forum for developers to share current projects along with developer tips and tricks—was established and currently meets bi-monthly.

Because EIS plays a vital role in how Penn State provides easy access to our enterprise data, the University visited the COGNOS corporate office in Ottawa to discuss ways to enhance our working relationship.

Financial Information Tool (FIT)

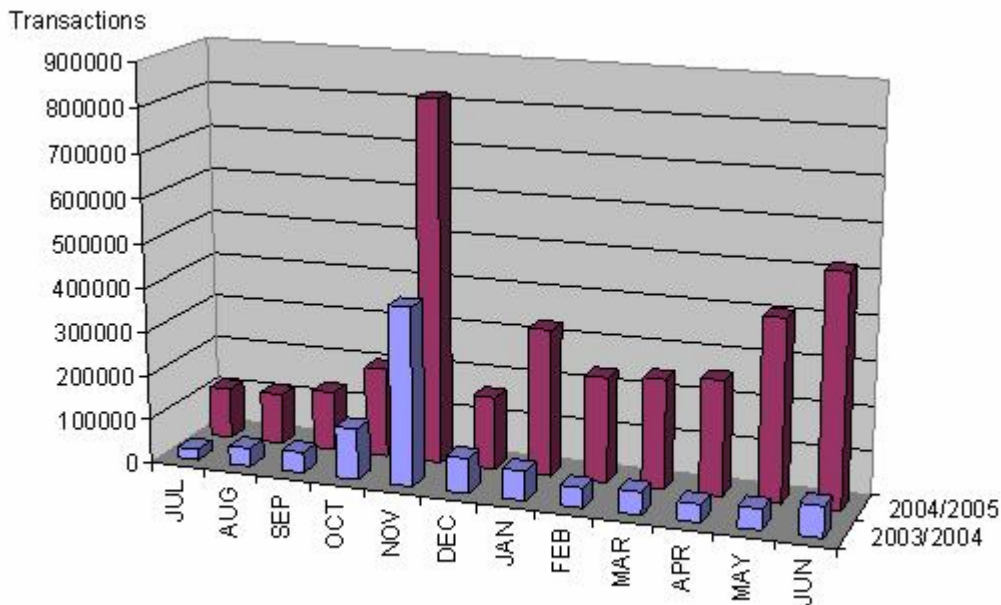
A new version of FIT was launched January 10, 2005. FIT version 3.0 offers such improvements as automatic downloads of new features and patches, elimination of the DCE and Citrix clients, remote access via dial-up, significantly improved support for the Macintosh environment, and more. As of Tuesday, April 5, 2005, all versions of FIT prior to 3.0 were decommissioned. Since the release of the new client, FIT updates have been released twice to update internal security processing and to change Fringe & Overhead calculations.

Generalized Interface

The Generalized Interface (GI) has continued its rapid growth during the 2004-2005 fiscal year. Twenty new applications have been added, bringing the total number of active applications to 31. Prominent new applications are ISSO (Integrated Student System for Outreach) and FIT (Financial Information Tool), both of which are highly reliant on the GI for their data retrieval. The GI also played a critical role in the SSN Conversion by enabling Web applications access to CIDR (Central Identification Repository).

The GI handled more than 3.5 million transactions from 57,620 unique users during the 2004-2005 fiscal year. These numbers represent a 344% increase in transactions and a 412% increase in unique users over the 2003-2004 fiscal year. While fall remains the period of heaviest use, the GI's load is starting to be distributed more evenly over the year thanks to the increasing variety of applications using it.

GI Transactions for Fiscal Year by Month



IBIS Enhancements

A new grade level for graduate assistants will be implemented in IBIS for the fall 2005 semester. Unlike the existing graduate assistant grade levels, the new grade level (21) will not have a fixed stipend amount. Instead, the hiring department will determine the stipend amount for each graduate assistant hired at this grade level. The change will provide more flexibility to those departments hiring graduate students to work on research projects containing contract funding stipulations.

Replacing the former, simpler, \$10 annual occupation privilege tax, the new Emergency & Municipal Services Tax (EMST) was implemented in IBIS at the beginning of 2005. EMST allows each municipality to decide what they would like to deduct for people working within their borough or township; choosing any deduction amount up to \$52 per year and salary base from which to be deducted, up to a maximum of \$5200.

Unified ISIS

The Unified ISIS project was successfully concluded in June 2005. This four-year effort resulted in the following improvements to the Integrated Student Information System:

1. The new Certificates process provides an ISIS tool to create and maintain the certificate programs, and to identify and track the students enrolled in or who have completed the requirements for a certificate, including adding the certificate information for completed programs to a student's official transcript.
2. The NCRS course offering screens were enhanced to automatically create a cost center in IBIS, resulting in a streamlined process and the elimination of a step.
3. ISIS now automatically applies the 75% staff educational privilege discount for World Campus credit courses, eliminating the need for Outreach staff to manually adjust numerous accounts.

4. Changes were implemented to the methods used to report University Park enrollments. This reporting involves using a combination of the student's home campus, the location of the courses they are taking, and the delivery of the course. In addition, a new report was developed to allow proper funds distribution for courses offered under the eLearning Cooperative.

Special Projects

Automated Process Management (APM)

The Automated Process Management (APM) initiative, which began in early 2005, will improve the management of business processes through the use of software that enables integration of electronic documents with multiple data sources, a consistent Web-based interface with Penn State's core systems, and a defined, role-based routing and approval process.

In support of this initiative, the Open Standards Development Team was formed in late February 2005. Through reallocation of existing AIS staff, an applications development unit was created, consisting of one manager and five programmer/analysts. This team will serve as the first AIS applications unit to be fully trained and deployed to use the JAVA programming language and JAVA-based development environment to build and support open standards-based administrative applications. Currently, the OSD Team is a dedicated resource to APM.

EntireX Mediator and Tamino from Software AG, and iBPM from Fujitsu and marketed by Software AG as a partner, were installed this past year. These products comprise the core technology for the Automated Process Management project.

Business Intelligence

Both the Penn State Data Warehouse and the Executive Information System (EIS) were created in the early 1990s with the main purpose of making institutional information more easily available to the university community. Even though both tools continue to fulfill their purposes, Penn State's needs for information have expanded to include requirements not satisfied by either of the tools. Therefore, in fall 2004, AIS launched a multi-year Business Intelligence Initiative with the purpose of re-assessing the University's current information needs and addressing them through the development of a Business Intelligence infrastructure.

The goal of the Business Intelligence Initiative is to work cooperatively with the University community to plan, design, develop and implement an infrastructure that will transform administrative data into information and will make the right information available to the right Penn State stakeholder at the right time and in the right delivery media.

As the initial step of the Business Intelligence Initiative, Penn State commissioned Software AG's Business Solution Consulting Group to perform an assessment of the University's Business Intelligence capabilities. During the assessment process, the Software AG (SAG) team evaluated Penn State's current business intelligence efficacy by conducting stakeholder interviews, surveying end users, analyzing data repositories, data usage, and user needs to recommend potential steps and solutions that will enhance Penn State's business intelligence capabilities. The report can be viewed at http://ais.its.psu.edu/bus_intelligence/bi_report.html.

Disaster Recovery and Business Continuity Planning

As defined in the 2005 AIS Strategic Plan, Disaster Recovery is cited as one of two "very high" priority funding areas. Over the past seven years there have been a number of paradigm shifts that have had a major impact on Disaster Recovery planning within AIS. What was once a fairly stable and predictable centralized environment has changed into a very complex dynamic distributed environment involving over 200 servers. To address these challenges, AIS has progressed significantly in the past year, in both the development of a strategic Disaster Recovery plan and the implementation of specific actions taken to provide continuity of business operations in the event of incidents, disasters and catastrophes.

The Disaster Recovery Subcommittee, created by the AIS Advisory Committee, continues to look at specific actions to improve AIS's ability to recover. They took a step back to review the status of our backup and recovery plans. This was a very comprehensive review of what we are currently doing to protect our data, what the current industry standards are, and an analysis of the most or the various options we should consider. The outcome of the project was to create an AIS-wide policy for data protection and to begin to implement a D2D2T2T approach to backing up our data where the "D" represent data on disk and the "T" data on tape. The approach calls for us to take our data on DISK, copy to a cached location on DISK, then to write the cached data to tape, and finally to make a copy of the primary tape for storage off site. Once the

approach was determined, we reviewed the hardware and software that we plan to use to implement our strategy and we are currently in the process of creating the appropriate environment.

All the Committee's nine-point recommendations are either implemented or in the process of implementation, along with several AIS initiated actions. The most significant activities include:

1. The AIS COOP Plan has been created and submitted on schedule.
2. A contract has been signed with IBM to provide two Mobile Recovery Units (trailers) on a 48-hour notice, to arrive at the Altoona Recovery Center (ARC) at the Altoona Campus in the event of a catastrophe. Another contract is in place with Mainline to provide a replacement Enterprise Server and Shark Storage System within 72 hours to the ARC in the event of a catastrophe. This will allow AIS to continue to provide operations requiring the Enterprise Server and applications servers remotely.
3. A permanent power and communications infrastructure (Hitching Post) has been installed at the ARC. This will allow the MRUs to be quickly connected to power, networks and telecoms via pre-constructed cables.
4. Activities are underway to install a "Server Test-Bed" to investigate hosting recovery AIS applications from Altoona. The rack has been installed and all required equipment has been received. The networking infrastructure has been installed. The servers and ancillary equipment are scheduled for installation shortly.
5. Initial plans are underway to upgrade the Port Sky Building, at the Altoona Campus, to house the Catastrophic Data Recovery Center.
6. One-on-one Disaster Recovery Awareness meetings are underway. These individual meetings will be conducted with all Campus Chancellors, College Deans and Administrative Unit Senior Managers.
7. Installation, setup and training for the Web-based version of the Living Disaster Recovery Planning Software (LDRPS) is underway.
8. In fall 2004 the position of Disaster Recovery Planning Consultant was created and filled. The Consultant's role is to be available to assist units in understanding the process of disaster recovery planning and aid units in determining which service(s) and tool(s) will be most appropriate for their needs.
9. Back-up tapes continue to be transported to an off-site location on a weekly basis.
10. AIS has instituted a requirement for all major services to undergo Recovery Readiness Reviews, with the RRR's detailing the procedure to recover the services in the event of a disaster. The use of the existing server-based Living Disaster Recovery Planning Software (LDRPS) has played a key role in developing the RRR's. LDRPS provides a structured format to insure that all issues involved in recovery are addressed i.e. dependencies on other systems, documentation, key personnel, etc.

Health Insurance Portability and Accountability Act (HIPAA)

The Health Insurance Portability and Accountability Act, or HIPAA, is designed to help protect health information stored electronically on systems. The legislation covers rules for protecting the data, securing it, tracking that has access to the data, segregating it from other systems, logging maintenance activities and tracing all flow of the data through-out its life on the system. AIS manages a database server containing records that have what HIPAA calls Electronic Protected Health Information (ePHI), and that therefore must be HIPAA-compliant. AIS has recently submitted our HIPAA-compliance paperwork to the Privacy Office, including a training plan for personnel who support this system.

Marketing

A new AIS Marketing and Communication strategy was developed, and individual initiatives completed. After close collaboration with AIS staff, additional hallway posters were created; AIS Services and Disaster Recovery brochures were printed, and a new selection of marketing trinkets were purchased for distribution throughout Penn State.

Operational Support

Enterprise Server Operations

Based on a 24 x 7 schedule, nine full-time and one part-time staff operated and monitored the workload on two enterprise servers.

More than 1.41 million batch jobs were executed, with 452,000 of these being degree audit requests. An additional 496,000 jobs were information requests by or to students, and more than 16,000 jobs were executed to satisfy customers requesting labels or general reports.

AIS Production Control coordinated the implementation of more than 153 new batch jobs and changes to more than 625 existing batch jobs that execute on the Enterprise Server.

More than 10.5 million pages of output were produced. Of these pages, 6.9 million pages were printed on paper and more than .6 million pages were printed on labels on AIS printers. In addition, three million pages were sent to printers in user offices.

Network Infrastructure and Data Security

In October 2004, Ron Rash announced the formation of the new group, Network Infrastructure and Data Security. This group consists of staff from Mid-Tier networking, Enterprise Systems networking, telecommunications, data security and LAN. The goal of forming the new eight-member group, managed by Todd Litzinger, was to help centralize common functions among IP networking, staff computing, and security.

Infrastructure

N2O

AIS purchased the N2O product from Treehouse Software. This widely-used change management product is used primarily in the Software AG Natural programming environment, but readily carries over into managing other products and processes. In the past year, AIS installed a test environment of N2O and met for two days with a Treehouse representative to discuss how N2O can be configured to meet local needs. Presently, AIS is poised to configure and test a small pilot of N2O on a subsystem of either IBIS or ISIS.

Networking

With the creation of additional Mid-Tier subnets, AIS has been very busy creating, reviewing and cleaning up firewall exceptions, as well as developing access policies and guidelines. A firewall is a device that looks at all traffic coming and going from a particular subnet and only allows "permitted" traffic to flow through. Whether or not traffic is permitted is governed by a set of rules that include Source IP, Destination IP and Port used. Each time a rule is added, the overall risk to systems behind the firewall is increased. For this reason, every effort is being made to minimize the rules to what is required and considered a low security risk.

Storage Area Network (SAN) Environment

The Storage Area Network Environment, or SAN, is part of a continuing effort of finding more efficient methods of transporting large blocks of data and the need to share storage resources in various one-to-many models.

SAN continues to grow both in terms of the raw storage requirements and in terms of the fabric technology that creates the SAN environment. From a storage perspective, by improving storage utilization, we are able to hold our annual increase to a single terabyte of storage. Part of the reason for this minimal growth, was the purchase of the SAN Volume Controller (SVC), a hardware virtualization tool designed to help manage the way storage is allocated and managed. The SVC was originally purchased to fulfill an ANGEL storage requirement to expand the maximum partition or LUN size, but we have found a number of other good uses for the product, including hosting other services such as BSR. Functions such as dynamic volume expansion and Peer-to-Peer Remote Copy are available under the SVC environment to meet special requests and to provide cross building recovery support.

IBM's SAN Volume Controller (SVC) was placed into production at the beginning of the fiscal year after being tested and

tried for a month previous. The initial purpose for purchasing the SVC was to accommodate the special, and rather large, needs of the ANGEL course management system.

The SVC is comprised of a pair of Linux engines, each with a UPS unit, plus a Windows-based Master (control) Console, with an entire duplicate set of hardware at our second location. This allows us to mirror the SVC storage and provides a recovery location. The SVC is essentially a 'virtualization' mechanism for real storage that presents 'virtual disks' to our Windows servers, which they recognize as a disk drive. Behind the SVC, our ESS (Shark) units provide the physical disk storage.

With this equipment, we can now accommodate the large storage needs of Angel and other critical services as well as having the ability to shift virtual disks from one physical location to another, grow a virtual disk to up to 2 Terabytes and delete virtual disks, all while the servers using the storage are online.

z/OS V1.5

Over the past year there have been significant changes made to the AIS Mainframe infrastructure, beginning last fall with the migration from z/OS V1.3 to z/OS V1.5, an upgrade that required significant changes to a number of subsystems and other products. In preparation for z/OS V1.5, we upgraded CA1 to Version 11; CA Common Services to Version 3.0; and migrated to new versions of our COBOL and PL/I compilers. Although the majority of the work was done by mid-November, the actual upgrade to z/OS Version 1.5 was postponed until early February to avoid any conflict with the SSN Project.

We arranged to upgrade our two z/800 mainframes to two z/890 model 2086-A04 machines that will continue to support our z/OS environment and provide both production and test environments for our z/Linux applications. Both of the machines were ordered with additional processors called Integrated Facility for Linux (IFL) engines enabled. AIS plans to continue our investigation of running z/Linux on this platform and we will be running production z/Linux images before the end of the year. This environment will consist of both IFL's running z/VM Version 5.1, which was upgraded from Version 4.4, and SUSE Linux SLES Version 9, which was upgraded from Version 8.

Training & Education Program

Training for AIS Staff

A total of 57 different courses in IT, management, work productivity, customer service, communication, presentation and disaster recovery skills—equaling 455 training hours and serving 528 attendees—were offered internally to AIS staff.

Training for PSU Community on AIS Systems

A total of 71 courses were offered through the Human Resource Development Center, covering such topics as IBIS, FIT, Data Warehouse, EIS and eDDS. Of these 71 courses, 66 (93%) ran, serving 867 attendees, and totaling 415 instructor hours.

Monthly no-fee Data Warehouse data training sessions continued to be offered at University Park, serving 181 attendees at UP and another 88 at non-UP locations. Throughout the year, a total of 15 different campuses participated via videoconferencing.

A total of 15 courses were offered through the Training-On-Demand service, of which 15 (100%) ran serving 148 attendees and totaling 86.5 instructor hours.

A number of Web-based training modules were created and/or launched in 2004-2005 including:

- EIS Drill Through
- AIS File Upload Utility
- SSN Conversion Utility