

Administrative Information Services Annual Report July 2007 – June 2008

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

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Administrative Information services (AIS) serves as the central University resource responsible for supporting Penn State's 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 enterprise applications using centralized student, business, and alumni databases.

Administrative Information Services
Senior Management Team

Senior Director and Director, Strategic Initiative & Consulting, Ron Rash

Deputy Director and Director, Infrastructure & Operations, Scott Smith

Director, Systems Development & Maintenance, Walter Kay

Director, Project Management Office, Kathy Plavko

Snapshot

The numbers

Angel, Spring 2008

Course Sections	229,615
Faculty	5,719
Students	70,131

eCommerce (Annual)

Transactions	502,000
Amount	\$107,000,000

eDocument Distribution System (eDDS)

User Accounts.....	2,253
Reports.....	1.1 Million
Pages.....	27 Million

Data Warehouse

User Accounts.....	1,500
Records	300 Million

Enterprise Server (Annual)

Print Lines.....	34.5 Million
Batch Jobs.....	819,000

eLion Monthly Student Usage

Avg. trans.....	1,288,606
Max. trans.	2,265,987
Avg. users	74,982
Max users.....	87,421

Generalized Interface (GI)

Services.....	454
Transactions.....	87,625,088
Growth.....	187%

Annual Report 2007-2008

Administrative Information Services

Introduction

In FY 2007-2008, Administrative Information Services (AIS) achieved significant milestones in redefining the IT environment within which future administrative systems and services will be developed and deployed across the University. We have had our first deployment of PAWS (The Penn State Administrative Web Suite) which will become the hub for future Web-based administrative applications. The Penn State Workflow System and its initial form, Undergraduate Education Travel Request (UGTR), went into production. And, we have completed the first round of formal Integrated Administrative Systems community Java Training for a total of 19 developers and 15 managers. The classes were well received and the departments represented in this round included; Corporate Controller, Information Technology Services, Physical Plant, Outreach Technology Services and Student Aid. We also experienced the continued progress of many key projects and initiatives such as Disaster Recovery and Business Intelligence.

For FY 2007-2008 our IT infrastructure experienced success and growth in efficiency and services delivery capacity. Our Tape Virtualization Project has resulted in the removal of most manual tape mounts by writing tape sets to aggregated data sets managed by the automatic tape library. We upgraded both of our IBM Enterprise Server (aka Mainframe) environments which in part, allows us to better utilize our Integrated Facility of Linux (IFL) engines as we continue to drive towards our Open Standards strategy. In addition, we also replaced our "Shark" storage arrays with IBM Enterprise Storage Arrays, which has significantly improved our overall Enterprise Systems performance.

The following report highlights the progress made on the items mentioned above, as well as the many additional significant accomplishments of AIS over the past year.

AIS Production Services

A New Global Environment for Learning (ANGEL)

ANGEL is the University's central course management software. It is developed by ANGEL Learning. The application has received a number of hardware upgrades and code optimizations this year. The system continues to be increasingly critical to the delivery of resident and online instruction as well as the delivery of secure testing. Information Technology Services has made the decision to remain on ANGEL version 7.1 through Spring of 2009. At that time, we are anticipating moving to ANGEL 7.3, pending positive results from our integration efforts and load testing.

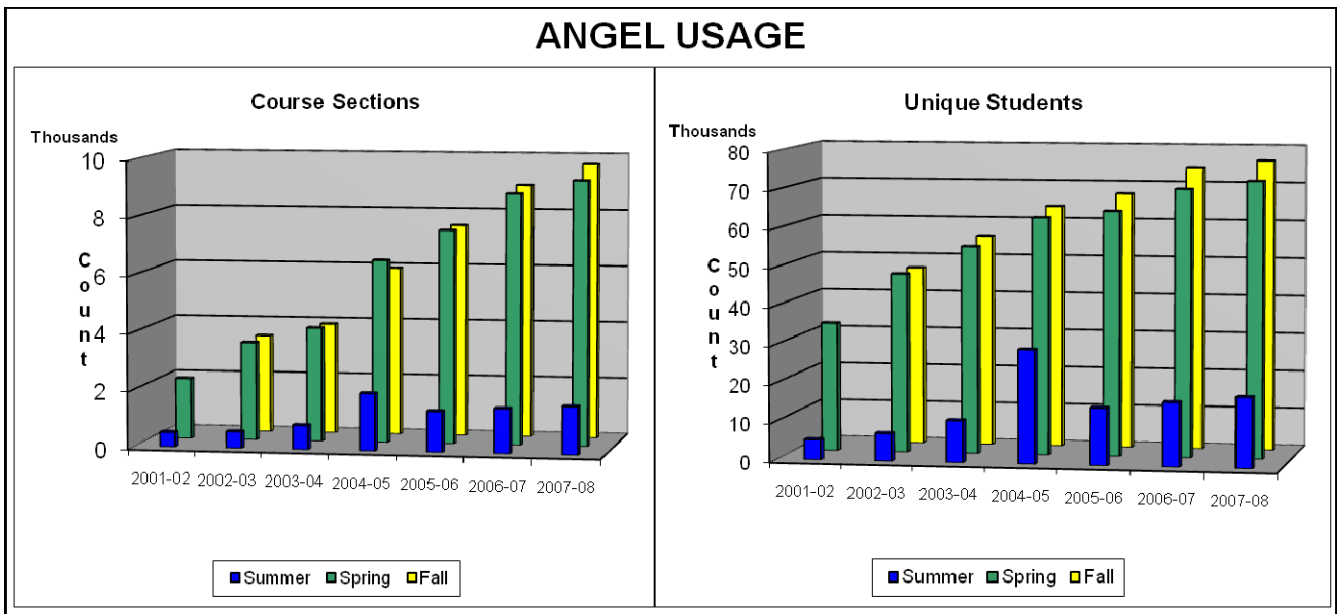
Over the past year, we've enhanced ANGEL's eTesting functionality and have established interfaces for the new Pollock Labs eTesting facility scheduling software. The scheduling application was developed by Classroom and Lab Computing, a group

within Teaching and Learning Technologies. ANGEL is the primary testing engine in the Pollock Labs eTesting Facility.

We've made numerous optimizations to the application to help improve performance and increase resiliency in order to help support our growing load. We've improved our notification process for archival of inactive groups and performed other enhancements such as providing Kerberos as an additional backup alternative to our Shibboleth authentication.

Some ANGEL Statistics for 2007-2008 include:

- For Spring 2008
 - 70,131 students had at least one course in ANGEL
 - There were 8,597 active course sections in ANGEL
 - There were 229,615 student-course-section enrollments
 - There were 5,719 distinct faculty
- At peak usage during the Fall 2007 semester, there were 74,511 students with at least one course in ANGEL
 - There were 9,186 active course sections in ANGEL
 - There were 245,050 student-course-section enrollments
 - There were 5,821 distinct faculty



Business Continuity Services

With the recent events that have been in the news regarding natural and man-made disasters, higher education institutions are realizing the need to evaluate their business continuity planning efforts to see if they are adequately prepared to recover their critical business functions in the event of such a disaster. Administrative Information Services (AIS) continues to provide services to assist Penn State departments and campuses with their recovery planning efforts.

Our services include Business Continuity Consultant, Local Server Recovery Center, Offsite Data Storage, Living Disaster Recovery Planning System (LDRPS) software, Business Impact Analysis/Risk Assessment (BIA/RA) software, and the Business Continuity Training curriculum.

During the past year, three of the departments that were a part of our original pilot program (AIS, Digital Library Technologies, and the Office of Student Aid), have moved into phase four of our five phase process and have begun to enter their recovery plans into LDRPS. We have also started working with some offices/departments that provide critical services throughout the entire university. These areas include Office of Physical Plant, Corporate Controllers Office, Office of Human Resources, Outreach, and VP for Commonwealth Campuses. Both the Corporate Controllers Office and the Office of Human Resources have completed their BIAs and will soon move into phase three to begin developing their recovery strategies. The other three areas should be complete with their BIA/RA training by the end of August.

In January, Pam Downs co-presented a session at the 2008 Educause Mid-Atlantic Regional Conference in Baltimore, MD. The title of the presentation was, "Business Continuity Planning: A Comparison of Short- and Long-Term Planning Processes". The session looked at the different strategies used for developing business continuity plans by Penn State and Prince George's Community College.

The University has recently announced the creation of a new key initiative beginning with this strategic planning cycle. The initiative entitled, "Creating a Safer and More Secure University", could have an impact on the demand for our services as one of the goals for the initiative is to insure that campuses have effective emergency management and business continuity plans.

For the upcoming year, one of our major tasks will be to upgrade the LDRPS software from its current 9.1 version to version 10. This version will provide our planners with a much more user friendly interface and will also provide for greater reporting functionality.

We are also looking to work more closely with other university offices that have a role in continuity of operations planning. These offices include Emergency Management, Risk Management, Environmental Health and Safety, and Auditing.

Business Information Systems Development

The past year was a year of transition for the Business Information Systems Development group. The manager of the Business Information Systems Development retired after a successful career with AIS, including nearly 20 years as the IBIS project manager and most recently serving as Senior Business Analyst. The retirement created a new leadership opportunity for one of our most experienced IBIS Lead Systems Analyst who was promoted to Manager of Business Information Systems Development. In addition, the position of Senior Business Analyst was filled by a former PSU financial officer, bringing an additional business perspective to AIS.

In partnership with the units in Finance & Business, the Business Information Systems Development group continues to support the on-going business operations of the University. At the same time, we are making significant improvements to the business systems. The Business Information Systems Development group has been involved with several important projects, including:

The IBIS Financial System is now the audit-able accounting system for Penn State. 2007-08 was the first year that the IBIS Financial System was used for the fiscal year-end closing process.

- **Executive Pay**

The monthly payroll process for executives was largely a manual process. The Business Information Systems Development group worked closely with staff in the Payroll Office to automate the monthly pay process for executive employees.

- **IRS Form 1099 MISC**

The Pennsylvania State University sends IRS Form 1099 MISC to vendors and individuals who have received miscellaneous income from the University. This information is also sent to the IRS. The University's current process for collecting and reporting Form 1099 MISC information is included in the Central Accounting system which has been retired. The Corporate Controller's Office and AIS's Business Information Systems Development group are collaborating to rewrite this process. Implementation is scheduled for January 2009. The new process will include the following improvements:

- Collect payment data from the new IBIS Accounts Payable system
- Use the IRS FIRE system to send an electronic 1099 file to the IRS
- Create a web application for Accounting Operations to manually adjust Form 1099 data stored in new adabas files
- Automate conversion of PSU IDs to SSNs
- Automate removal of information related to cancelled checks
- Report vendors and individuals who have an international address and who have received miscellaneous income
- Create a yearly file to be submitted to an IRS bulk TIN matching process
- Reorganize eDDS report folders associated with Form 1099 processing

- **Fellowship Stipend Letters**

Every year in January, The Pennsylvania State University sends a letter to individuals who have received fellowship stipends from the University informing them of the total amount of the stipends received in the previous calendar year. Individuals may use this letter for income tax reporting purposes when applicable. Like the University's Form 1099 MISC process, the University's fellowship stipend letter and reporting process is being rewritten. Implementation is scheduled for January 2009. The new fellowship stipend letter process will utilize the same payment data collection process, new ADABAS files, and web application that are being built for the new Form 1099 MISC process.

- **eBUY Phase 2**

Auxiliary & Business Services will be using software developed by Sci-Quest along with A&BS's eBUY system to manage the University's requisitions more efficiently and cost effectively. The new system will combine requisitions from multiple departments under certain circumstances to place orders with vendors more cost effectively. Changes to how the orders are placed required that the

IBIS Financial system encumber the purchases at a lower level of detail (requisition line item level) than currently done. Thus, the new IBIS Accounts Payable subsystem was required to receive requests for vendor payment at a lower level of detail (requisition line item level). Changes to the IBIS Accounts Payable system will begin testing in August 2008.

Course Submission and Consultation System (CSCS)

In partnership with the Faculty Senate Office and Senate Committee on Curricular Affairs, we've continued to make enhancements to the Course Submission and Consultation System (CSCS), which automates the workflow consultation and approval process for course proposals. This application was mandated for full university rollout during the fall of 2007. We are in the final stages of a project with Digital Learning Technologies to provide restricted access to CSCS archived proposals online.

During the past year, we've introduced reports to better manage proposals within the approval and consultation process. We've also provided numerous usability enhancements based on input we've received from our customers. We recently commenced a project to automate the forms, consultation and approval workflow for programs offered at the university. We're currently in the design stages and we are envisioning a flexible streamlined process for course programs, majors, minors and options.

Data Warehouse

The Data Warehouse continues to be a valuable tool for the user community, averaging approximately 1,500 individual users, running more than 1,100 queries daily. The number of records in the Data Warehouse now totals 300 million across 780 tables. New developments include:

- The Data Warehouse has been migrated to new hardware and was upgraded to SQL 2005. SQL 2005 has many features that we hope will better enable us to optimize our views and tables, allowing for faster and more efficient queries for users. SQL 2005 also allows for more enhanced security requirements, automates required password changes and enforces strong passwords.
- Data Warehouse Hosted Systems was introduced in 2008. Hosted Systems is a way to make information available to the user community through the data warehouse, keeping the responsibility of maintaining that information on the hosting department. The BI team has developed documentation to help teams get started, and provides ongoing support when needed.
- SQL Logging has been enhanced to capture log information on the data warehouse. Logging is now 24x7. Logs will be kept online for 6 months and will then be archived.
- Student Emergency Contact information has been added to the student database with restricted access; a new set of Vendor tables has been added as well as user friendly tables for the Human Resources data.

Document Imaging

Since the deployment of our Centralized Image Hosting Service back in September of 2006, the demand for this service has continued to grow throughout the entire university as departments realize the advantages that it provides. The use of imaging software cuts down on storage space needed for paper documents, allows for Web based retrieval of documents, and makes sharing of documents much easier.

There are currently 26 departments in production with over 480 users. These figures represent increases of 45% and 60% respectively over last year's numbers. There are another 25 departments in the initial setup/test phase. There continues to be a waiting list of other areas interested in this service. Departments are storing purchasing card reconciliations, personnel files, student files and also using the DocFinity Workflow module to flow documents through an approval process.

In March of 2008, AIS received Integrated Solutions magazine's I-Cubed Award for our centralized imaging hosting service. The award was presented by Ken Congdon, Editor In Chief of Integrated Solutions magazine, and ECM Michael Vereb, Senior Account Manager of ECM Connection, during a ceremony at the Boston Convention Center. The I-Cubed Award recognizes end users that have implemented outstanding document and content management technology solutions in their organizations, focusing on the solution's technology integration, innovation, and ability to inspire other end users. A panel of industry judges chose this service from more than forty nominees across the United States.

eCommerce

The AIS eCommerce service continued to experience growth in fiscal year 2007-2008. The totals were \$107 million collected on over 502,000 transactions. This represents a 16% increase in dollar amount and a 14% increase in the number of transactions.

The AIS eCommerce service has undergone considerable change during this past fiscal year. As mentioned in last year's report, the GUI interface of eCommerce was overhauled to give the user a more logical and easy-to-use application. Modifications to this interface have been ongoing as we work to meet the needs of our users.

In order to provide a Payment Card Industry (PCI) compliant solution to those units outside of AIS that have Web applications that process credit card payments, AIS has created a centralized payment process service which is called "PSU Pay". This service alleviates the need for individual units to develop strategies to segregate their credit card processing environment and restricts the storage, processing and transmission of sensitive cardholder data to one centralized, secure area within AIS.

The basic concept of the PSU Pay application is that customers are redirected to PSU Pay's secure site (hosted by AIS) whenever they reach the point of entering payment information on a Web application (i.e., a Grad School application). Once the payment information has been entered they are then redirected back to the original site. This has made our eCommerce environment a much more secure environment for processing payments and compliant with the security standards established by PCI.

Currently 11 of the 12 merchant areas that use our eCommerce service have converted their applications to use the new PSU Pay service.

AIS developed a new service called PSU Checkout which went into production during the 2007-2008 fiscal year. This service allows areas to host conferences, stores, or applications locally and then send the customer to PSU Checkout when it is time to pay. The area must reconcile transactions on both sites and manually indicate (through a GUI) which payments should be collected. This application is directed at small volume events for areas which have little or no programming support.

The eStore which is a service that allows units to sell merchandise online has added two new areas. The Children's Miracle Network and the Harrisburg Parking Office are now online and doing business.

eDocument Distribution System (eDDS)

The eDocument Distribution System (eDDS) is a Web-based system for the distribution of reports. As stated in past reports, this service continues to grow, both in the number of users and the reports it houses. There are currently a total of 2253 users (a 2.6% increase over the previous fiscal year) accessing over 1.1 million reports, and 10,326 distinct reports housed on the eDDS server. Over 27 millions pages were directed to eDDS in FY 2007-2008, which represents an increase of approximately 8% over the previous fiscal year.

Last year AIS was piloting a process to upload PDF reports into eDDS. That is now a production service and two departments (the University Budget Office and the Alumni/Development Office) are using it to upload various reports for distribution.

The Payroll eDDS was migrated to new server infrastructure during this year and a successful failover exercise was performed for eDDS to test the ability to run it from its failover location in the Computer Building.

An extensive cleanup effort was completed to remove expired reports (based on established retention periods) from the system. Through this effort, 45 GB of disk storage space were recovered for use by the system.

eLion

After replacing Hydra with the Generalized Interface (GI) in eLion, the AIS eLion Integration team continued to clean-up and delete obsolete functions. The base component for interfacing PSU Pay has been implemented for the semester bill applications (Student & Parent). The link to the Bookstore feature has been implemented to help students to buy books easily based on their course schedules. All eLion production, acceptance, and test servers have been upgraded to Windows 2003 servers with latest security settings. eLion2 servers have been rebuilt to use the standard WebAccess/Cosign filter with a service account instead of using a modified Cosign filter. Codesets downloading for eLion has been improved for performance. The AIS Web team has done usability testing for some areas in eLion and provided valuable feedback for improvements.

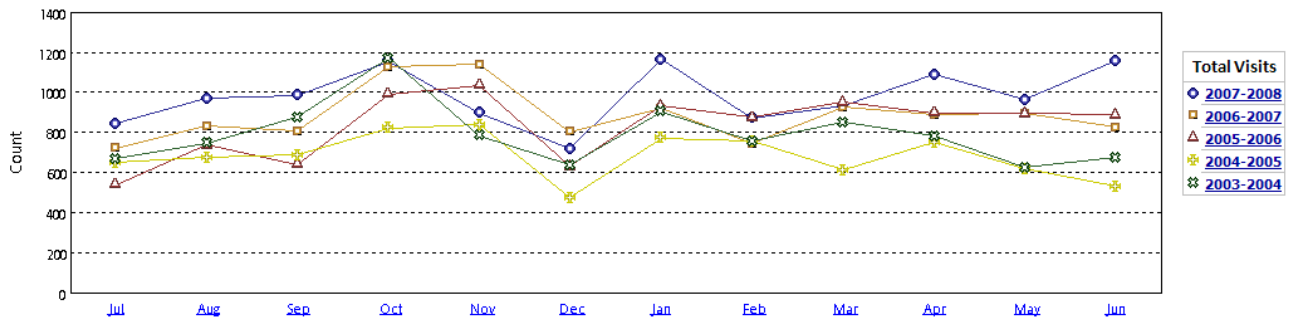
Here are some eLion Student Usage (monthly):

Avg trans	1,288,606
Max trans (Dec. 2007)	2,265,987
Avg users	74,982
Max users (Aug. 2007)	87,421

Enterprise Information System (EIS)

The Enterprise Information System (EIS) provides a Web-based information and reporting service. It continues to grow in the number of users and ease of use. During the past year, the number of authorized users went up by approximately 3%. The number of cubes/reports available increased by 30%. EIS offers 21 development units a reporting infrastructure that has five web services: 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). Customer visits to the system increased by 10% for the year.

Enterprise Information System Five-Year Comparison



Total Visits	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Month
2007-2008	844	969	986	1155	898	720	1167	873	933	1091	965	1159	11760
2006-2007	723	832	807	1126	1142	804	921	747	928	890	895	825	10640
2005-2006	541	739	641	992	1037	634	933	876	953	899	897	890	10032
2004-2005	651	678	689	824	837	475	773	756	615	753	621	531	8203
2003-2004	670	748	877	1173	786	638	904	756	853	783	625	676	9489

Single sign on continues to provide for a seamless integration between EIS and two University offices websites. The University Budget Office (UBO) Factbook Plus and the Office of Planning and Institutional Assessment (OPIA) utilize EIS by integrating reports from their websites with reports on EIS. Users of UBO and OPIA information unknowingly move between sites. The year involved maintenance upgrades to Cognos Series 7 version 4. We created a new service for our developing offices, which offers an automated model refresh procedure and created a process to gather report/model usage. Educational Equity and Auxiliary and Business Services have started new model development while the Corporate Controller's Office, UBO, and Outreach continue to be areas adding the higher number of reports to the system. Other units serving information

to the user community are the Graduate School, Office of Human Resources, the University Learning Center, OPIA, and Administrative Information Services.

Financial Information Tool (FIT)

FIT continues to be a valuable resource, used widely by the Penn State financial community. During the past year, 1243 users actively used FIT to review or generate reports on their financial data; with an average of over 600 users actively using FIT each month.

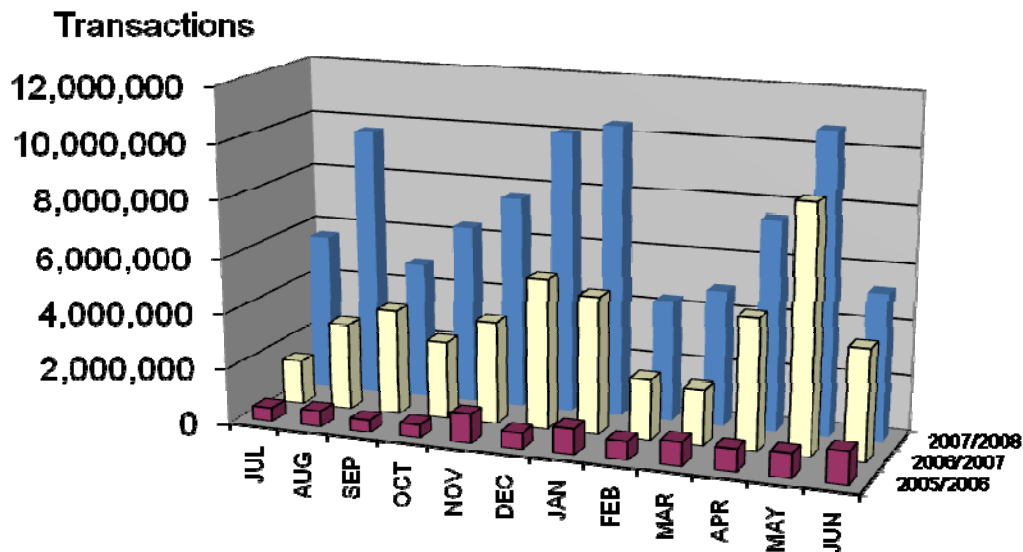
This past year, The Financial Information Tool (FIT) released 3 updates to the user community. These updates changed various reporting functionality to sync FIT up with the changes to IBIS due to the retirement of Central Accounting.

Also, this past September a new Macintosh FIT client was released. This new client is specifically designed for OS X on Intel Macintosh's.

Generalized Interface (GI)

In the 2007-2008 fiscal year growth for the Generalized Interface (GI) continued at a good pace. There were 107 new production services added, bringing the total number to 454. The most prominent GI project for the year was the use of the GI in PSU PAY. Currently there are 21 GI applications which utilize the new PSU PAY services. The GI handled 87,625,088 transactions from 127,517 unique users. Overall the GI handled 187% more traffic in the 2007-2008 fiscal year than in 2006-2007 and the largest monthly increase in traffic was 358%. Even with the growth of last year, the GI infrastructure is ready for continued additional load in the years to come.

GI Transactions for Fiscal Year by Month



Penn State Administrative Web Suite (PAWS)

The new administrative application framework and Penn State Administrative Web Suite (PAWS), to house future Web-based administrative applications, were deployed this year. The PAWS web suite is designed to be the launch point for a variety of administrative functions, saving staff time which would otherwise be spent locating these from individual web sites. The application framework saves application development time and costs by providing built in logging, search, error handling, messaging, and a consistent look and feel functions integrated within it. The application framework is now in use as is PAWS. University-wide marketing for PAWS is expected to take place once a reasonable number of applications are available to faculty and staff through this suite.

Category & Function	Description	List In Favorites
Advisor Services		
eLion Advisor	Provides secure real-time access to academic and financial records in the University's administrative database.	<input type="checkbox"/> Help About
+ AIS		
+ Contact		
Employee Services		
Attendance System	Provides secure real-time access to employee attendance records.	<input type="checkbox"/> Help About
Empl. Reimbursement	ERS is a web-based application to submit travel and group meal reimbursement requests.	<input type="checkbox"/> Help About
ESSIC	A system that enables current and new Penn State employees to gain access to and update their personal information over the Internet.	<input type="checkbox"/> Help About
Portal	The Penn State Portal is your personalized view of University and Internet resources.	<input type="checkbox"/> Help About
+ Faculty Services		

Penn State Stewardship Program (eSteward)

The Penn State Stewardship Program (eSteward) was established at the request of the Provost to improve donor stewardship and the management of endowments and gifts. This system is currently in production, with ongoing implementation at other campuses and departments. The System uses a web-based interface to integrate information from multiple data sources to offer 'one-stop shopping' functionality. The initial phase was completed in 2007. There are continued discussions to create a phase II project to further enhance this critical application.

During 2007-2008, there were numerous enhancements. These included adding additional criteria for matching students with appropriate donor awards and providing additional information on gifts and donors including information to aid with the reconciliation process. The development team also provided an enhancement to establish gift acknowledgement actions at the college level, as well as improved the accuracy and timeliness of estimated balances.

Student Information Systems Development

- **Facilities Fee**
A new university Facilities Fee was added to the students tuition and billing effective for Fall 2008. This fee was approved by the board of trustees in May and placed on the Students bills for the Fall billing that was run July 11th.
- **Senate Policy 14-10 Changes**
Senate Policy 14-10 was changed to set limitations on the enrollment of Non-degree Students. The student systems were changed to enforce these limits, thus ensuring greater course availability for degree students and encouraging non-degree students to move into degree status.
- **Early Progress Reporting**
The early progress reporting system is being developed to inform new freshman of how they are doing in their courses in time to advise them to take corrective actions. This system will go into effect for the Fall system and will be a web based system within the eLion system
- **Emergency Contact Information**
Emergency contact information for students was put onto the AIS data warehouse, to enable fast easy access to this information in case of an emergency on campus.
- **Law 903 Courses**
The Dickinson School of Law needed a way to track and give credit for students in their visiting away program. A new course schema (Law 903) was created and incorporated into the system allowing for special billing, registration and transcript options for these students.
- **Cobol/PL1/Assembler Rewrite**
The Student Area had over 100 programs that were not written in Natural for efficiency and technical reasons; however, those limitations are no longer an issue. Since our expertise in those languages is very quickly being lost, we need to re-write these programs in a language that we can maintain. So we are working on re-writing these programs in Natural. Some of the programs are simple to re-write, but as they are used in several hundred programs, it will take some time to convert the call statements to use a Natural subprogram. Most of these programs have been re-written and we are now in the process of converting the calls in our programs to use the new natural modules.

Student Rating of Teacher Effectiveness (SRTE)

Student Rating of Teacher Effectiveness (SRTE) is an application designed to administer and collect feedback from students on their learning experience. It will replace the current process of delivering and collecting bubble-sheet evaluations. We've added several enhancements for the pilot this year. We are planning a major upgrade for 2009 to allow for continued expansion of the pilot.

Web & Communication Services

- **AIS Web Site:**
 - The AIS Web site experienced growth with the addition of the new section – EASY Re-engineering.
 - Publishing to the AIS Web site has undergone procedural changes resulting in a more efficient publishing process.
 - Infrastructure improvements were made in the web server and content management server environments.
- **Usability Testing:**
 - A usability testing lab has been built and the W&CS team expanded their knowledge of this discipline by serving the Penn State Workflow, PAWS and eLion projects.

XML Processing for PELL and Direct Lending

AIS has been successful in building procedures to convert XML - both inbound and outbound for PELL and Direct Lending. For months, the implementation team, comprised of staff from the Office of Student Aid, the Office of the Bursar and Administrative Information Systems, worked to develop a new process to transmit and receive federal student loan information. The team, under an extremely short time line, was able to successfully set-up a gateway to transmit and receive data electronically with the U.S. Department of Education and also created new processes among University offices to ensure students and parents would continue to have access to their federal loan funds. It is expected that the new system will process 30,000+ Penn State students (and some parents) with total of \$200+ million through federal loan programs. Because the University has one of the largest federal student loan volumes in the country, implementing the Direct Loan program in such a short timeframe was a significant undertaking.

Special Projects

Business Intelligence Initiative

Business Intelligence is a multi-year initiative with the goal of working cooperatively with the University community to plan, design, develop, and implement an infrastructure that will transform administrative data into information. It will make the right information available to the right Penn State stakeholder at the right time and in the right delivery media.

Within the past year, with the help of the Business Intelligence Advisory Committee, we have made great strides toward achieving that goal:

- The Penn State Business Intelligence Strategy document was completed and released to the general public Fall 2007. You can find a copy of this document

here: http://ais.its.psu.edu/bus_intelligence/media/Final_Strategy_document.pdf. The strategy document provides an Implementation Roadmap, including a high-level time line and an incremental, iterative framework on how to achieve the desired BI capabilities.

- In November 2007 we presented the proposed BI Strategy to Penn State's top executives and were granted permission to proceed with implementation.
- As the first step of the BI Strategy Implementation plan, a request for proposal for the acquisition of an information access and analysis, and discovery solution has just been released to a number of vendors. These vendors include: IBM, SAS, Oracle, Microsoft, and SAP.

The key recommendation from the Business Intelligence Strategy document is that, for academic and academic-support units to continue to function effectively and efficiently, it is essential that Penn State moves toward a university-wide approach to data management. Data should be looked at as a common asset that can be made into information and knowledge to support effective decision-making. The underlying concept behind the proposed strategic vision is the concept of Penn State data as a valuable asset that are commonly owned by the university community. Penn State data should be looked at not as a collection of independent fragments but as a flow of interdependent events that provide maximum value only when viewed as a whole.

Throughout the next several years, the Business Intelligence unit will work with the university community to help Penn State move towards providing its information users (staff, faculty, researchers, and administrators, and others) with access to a unified and integrated, metadata-driven view of Penn State's core data; meaning university-wide data that are needed by a large number of Penn State constituencies and are core to the Penn State.

Penn State EASY Re-engineering – *Transforming the Way We Do Business*

This completes the first year of a multi-year EASY Re-engineering project. The purpose of this project is to improve the management of business processes by replacing the current EASY forms and approval paths with Web-based forms utilizing role-based approvals and streamlined role management used by the Workflow System.

The outcome will be to move Penn State from the current EASY Forms (which utilize a user-based routing mechanism and a mainframe 3270 screen) to Web-Based Workflow Business Processes. The ultimate goal is increased efficiency and effectiveness in the processing of financial and human resource information.

Significant accomplishments include:

- Easy Re-engineering Working group established to support decision making during the project. The group meets regularly and recently established the prioritization for the re-engineering of the EASY financial processes.
 - http://ais.its.psu.edu/easy_reengineering/media/EASY_Working_Group_Membership_And_Responsibilities.pdf

- Three processes were identified for deployment together as the first EASY forms to be re-engineered. These are listed below and work is underway by process design teams and technical resources on requirements definition and design for each. More detailed project status is available at:

http://ais.its.psu.edu/easy_reengineering/easy_re-engineering_project_status.html

Termination Process

Budget Amendment for Human Resource Processes

FANS (Financial Accounting Numbering and Encumbrance System)

For project information and status please visit the EASY Re-engineering home page:

http://ais.its.psu.edu/easy_reengineering/index.html

Penn State Workflow – *Enhancing the Way We Do Business*

This year the Penn State Workflow System and its initial form, Undergraduate Education Travel Request (UGTR), were deployed into production on March 24, 2008 for the College of Arts and Architecture, College of Engineering and New Kensington Campus. The request is used by students who are seeking supporting funds for conference attendance where they will present their research work. The form is currently submitted by the students' Faculty Mentor or Office Support Staff. However, development is also underway to make the form available in eLion.

Additional significant accomplishments include:

- The **Administrative User Guides** Web presence (<http://guides.ais.psu.edu/>) was deployed into production with the purpose of housing online user guides and tutorial videos. Workflow System and individual form User Guides are located here.
- The ITS Training Team created a **Video Tutorial for the Workflow System** (<http://guides.ais.psu.edu/workflow/index.html>).
- The Workflow **Sabbatical Leave Application** is scheduled for deployment on September 4, 2008, for the following areas: College of Agricultural Sciences, College of Earth and Mineral Sciences and the Smeal College of Business. This is the first Workflow process that will utilize attachments.
- The **Workflow Role Authorization form** (currently the paper signature form) is being developed by the ITS Applied Information Technologies (AIT) group. The WF Role Auth form is automatically activated when a role that requires authorization is assigned via the WebRAT (role authorization tool.) This is the first externally developed and hosted Workflow form and the deployment date is under discussion.
- **Digital Departmental Identity (DI) Implementation** (the capability to identify the proper department or unit to which a form should be routed, based on the attributes in that form such as: major or minor, home budget of employee, accounts being charged or academic home of principal investigator) has been

implemented for the deployment areas of the Workflow Undergraduate Education Travel Request and Sabbatical Leave forms.

System Development Modernization

The System Development Modernization project began in 2005 as a multi-year effort to rebuild the environment within which Penn State creates and delivers administrative systems and related services. In early 2007, the enterprise architecture was in place for the deployment of Workflow and Java applications. This year focused on the last two components to be completed which are the administrative application framework including the Penn State Administrative Web Suite (PAWS) and the training and retooling program for Penn State enterprise administrative system developers.

Accomplishments for this year include:

- Completion of the first round of formal Java Training for a total of 19 developers and approximately 15 managers. The classes were well received and the departments represented in this round include; Corporate Controller, Information Technology Services, Physical Plant, Outreach Technology Services and Student Aid. This is a significant milestone that took nearly a year to negotiate and plan. During the first round, trainee feedback was solicited and applied to improve the curriculum. Overall feedback from the training was very positive. The contract is a multi-year training agreement so the subsequent rounds will follow a similar curriculum schedule.

A photo of several graduates at their luncheon:



Computer Operations and Facilities

- **Production Control and Scheduling**
 - **Change Control:** Production Control and Scheduling coordinated the implementation of 273 new batch jobs and changes to over 719 existing batch jobs that execute on the Enterprise Server.
 - **Batch Job Processing:** To meet the needs of the AIS user community, Production Control monitored the processing of approximately 283,000 production batch jobs on the Enterprise Server and over 30,000 batch jobs on various open systems platforms (Windows, Oracle). 99.6% of the total production batch workload ran to completion without intervention.
- **Enterprise Server Operations**
 - **Batch Workload:** Over 819,000 batch jobs executed, of which 283,000 were information requests by or sent to students via email.
 - **Report Workload:** Over 34.5 million pages of output were produced, with 4.2 million pages printed on printers within AIS and at MPC. Another 2.8 million pages were routed to printers in user offices.

Disaster Recovery

Disaster Recovery remains a very high priority initiative within AIS. AIS continues to aggressively develop 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 including:

- Penn State selected an off-site location as the Catastrophe Recovery Center in the event of the loss of both Shields building and the Computer building at University Park. The current plan is to activate two Mobile Recovery Units contracted to arrive within 48 hours after activation. This initial plan is being superseded by the construction of a non-production IT facility in an existing building at the off-site location, providing a more permanent solution. This facility will allow the discontinuance of the Mobile Recovery Units contract. Four additional PSU units have expressed an interest in participating in the construction and/or usage of this recovery facility.
- Four satellite based communications systems have been purchased and configured for emergency use during a Catastrophe. These units will provide telecommunications and data capability regardless of the conditions on the ground. One of the major functions will be access to the Emergency Information Repository (EIR), currently being developed, which will provide information on building occupancy and emergency contact information. The EIR utilizes a disaster related version of the Data Warehouse which is currently operational in

the Server Test-Bed at our off-site recovery location. AIS is in the process of deploying the satellite systems to several sites to provide optimal utilization.

- AIS has developed additional detail for the COOP plans for each of the three major infrastructure areas, Enterprise Infrastructure, Network Infrastructure and Mid-Tier Infrastructure. A separate plan was created for Incidents, Disasters and Catastrophes for each of the three areas. These detailed plans are stored and updated monthly on biometric USB drives. Reminders for updating the plans are generated automatically.
- AIS has partnered with OPP in utilizing their existing auto-notification system to automatically contact key AIS staff during an event. Through cooperation with OPP we were able to accomplish this at no cost to AIS and minimal impact to OPP.
- AIS participated in the development of the Emergency Phone Bank system. A successful test was held January 16, 2008.
- AIS participated in the Academic Emergency Preparedness Implementation Committee which was charged to create guidelines for Academic Units to develop COOP plans. The final recommendations document is under development.

Enterprise Systems Infrastructure

- **Hardware Status and Upgrades**

The Enterprise Systems group was involved in a number of important hardware upgrades during the past year. Not only were we able to upgrade both of our mainframes, but we were also able to move to new storage arrays. These upgrades have improved our z/OS – mainframe environment and provided us with additional resources that we needed to support a growing farm of z/Linux images.

In early November of 2007, AIS upgraded both of our mainframe computers; migrating from two IBM's z/890 – R01 processors to two IBM z/9 Business Class – J01 Enterprise servers. This was a significant because we doubled the amount of memory (expanding from 16G to 32G) and we doubled the speed by which we access our primary storage arrays, going from 2 to 4 gigabit FICON connections. The additional capacity to move data has helped to reduce our I/O times by allowing us to take full advantage of our storage array upgrade. The additional memory allowed us to better utilize our Integrated Facility of Linux (IFL) engines. The z/890's were moved off the floor in early November and the new z/9's were each rolled in and recabled within 4 hour windows and the migration was done without incident.

In addition to two new mainframes, we also replaced our aging IBM 2105-F20 “Shark” disk storage arrays with two new devices. The old storage was replaced with 2 IBM 2107-932 (DS8300 Turbo) Enterprise Storage Arrays, each with 32G of cache. This purchase, moved our storage environment from technology that was 6 years old to the top of IBM's storage line and has significantly improved our overall system performance. Part of the reason for the performance

improvement is tied to the new caching algorithms within the DS8300 which have improved our read cache hits to the point where we can now see a 90% read cache hit ratio. The DS8300s are now fully in production and they provide us with a fully mirrored environment for our production environments.

- **Mainframe Data Base Projects**

The Enterprise Database group upgraded Natural to version V4.2.4. This upgrade enabled AIS to retain technical support of Natural and also was a requirement for upgrading to z/OS 1.9. They also upgraded Predict to V4.5.2. This upgrade enabled AIS to retain technical support of Predict and was a requirement for upgrading to Natural 4.2.4.

The Enterprise Database Group worked with Generation Systems Limited to do a Proof of Concept (POC) of Natural Refactoring using the Natural Engineer software from Software AG. The POC demonstrated that a current ISIS transaction can be converted into callable web services while still retaining the original 3270 functionality. A project has been initiated to investigate Natural Refactoring to isolate the EASY system's business rules and convert them into callable web services for use in the EASY Reengineering project.

The Enterprise Group is investigating a Software AG offering entitle FastPath. The product is designed the improve the efficiency and performance of our ADABAS calls.

- **Software Upgrades:**

We were able to perform our bi-annual mainframe OS migration and are now running IBM's z/OS V1.9. The migration to V1.9 started last fall and was completed in June of this year. The migration process includes creating a toleration environment, updating our vendor software and then migrating the new environment across both of our TEST and both of our Production images. During the process the following software was upgraded:

ROSCOE to v6.0 SP9	MIM to v11.6 SP0	ACF2	Natural-Connection
JSF to v4.0 w/ fix	Syncsort to v1.2.3.1	DRS	Natural Development Server
XPAF to v3.0.4 WA 8087	Easytrieve to v11	VPS	Natural RPC Server
JCLCheck to r7.1 SP2 w/ 2 PTFs	FDR to v5.4.62	Com-Plete	Predict
ShowMVS	CA-1	Natural	SPOD
NET-PASS to v6.1.0	CA-Vtape	Natural-Security	Natural Upgrade
FDR-UPSTREAM to v3.5.0	CA-Common Services	NC-PASS	

- Virtual IP Addressing:** The Enterprise Systems group implemented Virtual IP addressing on the z/OS mainframe images during February 2008. The change allows the failure or outage of either system's IP stack to be seamlessly migrated over to the other systems IP stack thereby allowing the functions on the failing system to be recovered. All services licensed for the other image can be executed on the other system transparently to the end service or user. The VIPA process was tested during the weekend of spring break and we were able to execute all of our mainframe production environment on a single mainframe.
- Tape Virtualization:** Two years ago we embarked on project to remove operator tape mounts and the project has now been completed. The concept behind the project was to virtualize our tape environment by writing tape sets to disk, where they are collected and then to write the aggregated data sets to our automatic tape library. A year ago the environment was ready for production, but during the past year we have moved almost all of our tape data sets into this environment and in the process eliminated the need to perform tens of thousands of manual tape mounts per year. We now have 7,335 virtual volumes containing 620 GB of data.
- Automated Tape Library (ATL):** On ATL1 we averaged 638 3590-K tape mounts per month from October 2007 to May 2008. On ATL2 we averaged 1324 3590-K tape mounts per month from October 2007 to May 2008.

ATL Name	Total Slots	Private (3590-K)	Scratch (3590-K)	Reservoir (3592-JA Tapes) ^{*2}	Empty Slots (Entire ATL)
ATL1 (Shields)	1115	226 (33%)	455	30	404 ^{*1}
ATL2 (Comp Bldg)	1236	556 (60%)	363	312	0

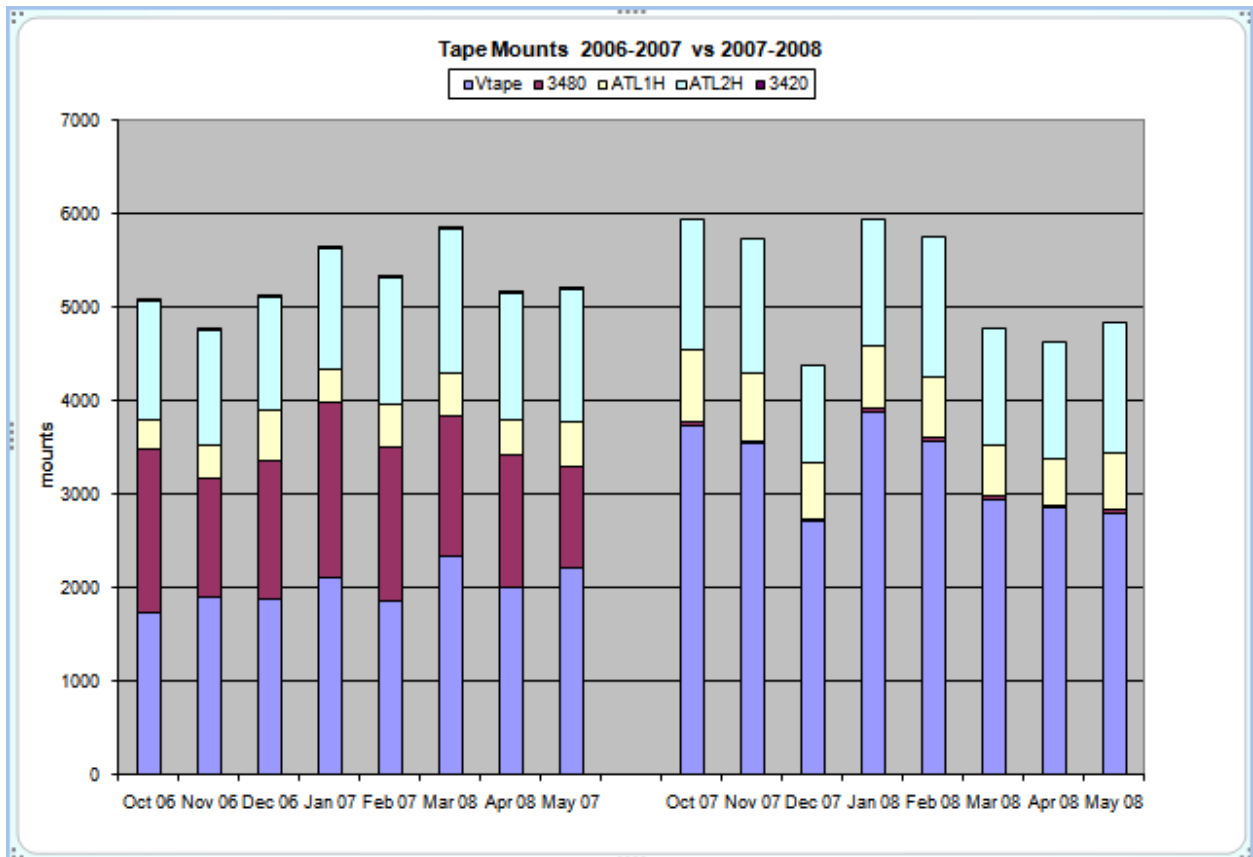
^{*1} AFTER 293 3590J tapes formerly used with 3590B drives, volser range 100xxx; and 78 volser range 503xxx are ejected

^{*2} There are 350-400 of these tapes outside of the tape library on shelves

Note: There are CE and cleaning tapes which take up a few slots on each ATL

Note: We also have several hundred scratch 3590-K tapes in boxes that have never been used by AIS

All Tape mounts by month:



Note: The missing months July-September 2007 are from the period when CA-Copycat was being used to convert 3480 cartridges to Vtape. The stats from these months would have skewed the data. From Oct 06 - June 07 there was a total of 13,696 and an average of 1,521 mounts.

- 3270 Encryption:** One of the major projects completed this year was the encryption of our 3270 (sometimes referred to as “green screen”) connections. The project was complicated by the need to have our end users reconfigure their software to support the encrypted connections. Although the solution was available on our mainframes over a year ago, it became the only way to connect to our systems effective July 1, 2008.
- Mainframe Linux:** There were a number of significant improvements to our Linux environment over the last year. Our largest focus was to improve the stability of the environment and the ease in which we do maintenance. To do this we implemented a concept referred to as shared root, where all of our production images share a common root image. This allows us to make a single change to our production images and to have it picked up on all systems. We have also worked to improve the redundancy of the environment and now run multiple instances in both production and test to support our Websphere and Java environments. One other area of focus under z/Linux has been to support encrypted file transfers. In order to provide this service, we have developed production procedures to move files to our Linux environment using the product Upstream, where we implement secure file transfer protocol (SFTP) and Pretty Good Privacy (PGP) transfers.

- **System-Managed Storage (SMS):** SMS, implemented in 1997, has been an extremely valuable tool for the allocation of datasets in both production and ad-hoc batch environments. 85 count-key disk volumes are now SMS-managed. With this tool datasets can be allocated without regard to their location, from the user's point of view. Pooling DASD together also helps prevent out-of-space conditions.
- **Hierarchical Storage Manager (HSM):** HSM, also implemented in 1997, continues to be instrumental in keeping our disk storage growth under control. Although it does not manage ADABAS volumes, it manages datasets on many of our SMS-managed volumes. It also provides "user convenience" backups of changed datasets in many SMS pools. Most weekdays it backs up 900-1000 datasets overnight. We have approximately 10,000 datasets (152GB) migrated to either compressed DASD (disk) volumes or to 3590-K tape which are duplicated in both buildings' tape libraries. HSM also expires datasets based on their management class.

MidTier Infrastructure

- **ANGEL** – We took time in August to make a return trip to Austin, Texas, on this occasion to the Dell testing facility to examine VM web server architectures for possible use with ANGEL.

Following a stressful fall-finals week in December, we moved to a new SQL platform for the application, a Dell R900 with 16 processor cores and 128GB of memory. We've made improvements to our monitoring of the ANGEL database functions and efficiency and participated in an engagement with ANGEL Learning, Inc., the application vendor during the spring in anticipation of spring finals week in May.

The Web Load testing system, used to stress the application under load and to expose application problems has been redesigned and refurbished with upgraded hardware. We returned to the Dell labs in June for another round of testing and performed an upgrade to the ANGEL-dedicated SAN, all in anticipation of larger loads in the fall.

- **Advance ACS system (Alumni Development)** - The new system in use by the Alumni Development folks for the past year has undergone two application upgrades and a database upgrade from Oracle 9i to Oracle 10g. We're currently testing Oracle 10g for a move to a 64bit OS platform.
- **VM Project** – The migration of selective applications from physical hardware to virtual server platforms is progressing while conserving both our A/C and physical space resources.
- **Storage** – A new project 'Storage as a Utility' is formally underway. Discussions have been ongoing with our colleagues in Shields Building from the offices of the Registrar, Admissions, and Student Aid as well as the Bursar for access to utilitarian storage that is centrally managed by AIS.

- **Request for Service (RFS) / Change Management** – The RFS application, now in used by several AIS management groups for queuing and documenting work requests, was adapted as the basis for management and control of production changes.

This original product has fundamentally changed the way our unit conducts and documents its work while at the same time facilitates communication with those requesting services making the whole process more transparent. The work has benefited many of the customers from outside AIS as well as our own ITS colleagues.

Network Infrastructure

- **Under New Management**
In August of 2007, Mike Belinc assumed the role of Manager of the Network Infrastructure group.
- **Payment Card Industry-Data Security Standard (PCI-DSS) Compliance**
The Network Infrastructure team worked diligently together with the Mid-Tier Infrastructure team and the eCommerce Consulting Team in an effort to comply with recent legislation re the support for credit card transactions. Working closely with the ITS Information Privacy And Security (IPAS) team, we were able to successfully establish PCI-DSS compliance prior to the federally mandated deadline of December 31, 2007. As part of the effort to maintain this compliance status, SOS continually monitors our eCommerce architecture to ensure we stay in compliance—especially if and when we make any architectural changes to the environment.
- **Firewall Activity**
We spent considerable time reviewing and updating our firewall rules sets, reducing the number of contacts who have authority and cleaning up many old stale entries.

We completed the first in a series of planned firewall upgrades. New firewalls replaced the existing firewalls used by the Mid-Tier server environment. The replaced firewalls will in turn be used to replace the existing mainframe firewalls. An eventual cascading effect will ultimately replace all of our firewalls with newer models. This is being done in an effort to improve all of our firewalls' performance as well as to begin to phase out older technology that is being denoted as "end of life" by our vendor, Cisco.

- **Cisco Contract**
We worked with our 3rd-party Cisco hardware vendor, ePlus, to consolidate all of our Cisco-related hardware service contracts into a single time frame—on a calendar-year basis. This makes renewing our service contracts easier and more consistent.
- **AIS Virtual Private Network (VPN)**
We began a project (that we hope to complete by the fall of 2008) to implement our own VPN for the purpose of being able to better manage access to various areas within our production environment. We purchased the hardware and engaged various working groups within AIS in an attempt to flush out design issues.
- **Armenara Building Office Space**
We worked closely with several folks from both AIS and TNS to get telecommunications connectivity to the new office space to be occupied by AIS. This included network connectivity, wireless and voice over IP phones.
- **Network Monitoring**
We are presently engaged with two vendors, Computer Associates and IBM, looking at their various solutions for monitoring our network environment. As part of this process, we have also established some guidelines based on the Information Technology Infrastructure Library (ITIL) published set of “best practices” for IT Service Management. We are looking to integrate all of our monitoring capabilities into a “single view” concept.

Training & Education Program

AIS Training Statistics

- **External Training**

System Modernization Java Training

The System Modernization Java Training for Enterprise Application Developers began in March, 2007. The training curriculum consisted of 17 different courses over a 5 month period equaling 47 training days (or 364 training hours). 18 people from 6 different units (Administrative Information Services, Office of Physical Plant, Telecommunications & Networking Services, Controller’s Office, Office of Student Aid & Outreach) completed the first round of System Modernization Java training. Course evaluations were quite favorable and the trainees received a transcript and certificate of completion from the training vendor.

Courses included:

- Windows XP
- RAD 7 Installation
- RAD 7 Overview
- Introduction to OO Concepts

- Introduction to UML
- OO Programming Using RAD 7
- Project Overview for Phase 1 (OO Programming)
- HTML
- XML/XSLT
- RAD 7 Features/Tutorials
- Servlet & JSP Programming w/JSTL Using RAD 7
- Project Overview for Phase 2 (Servlet & JSP Programming)
- JUnit Testing
- Developing Secure Web Applications
- AIS Integration
- Final Software Development Presentations
- Mentoring

In addition to the Java programming curriculum, 3 manager overview courses were offered on Object-Oriented Development, XML and J2EE in which 23 managers participated.

- **Business Continuity Planning**

Administrative Information Services offered a total of 23 Business Continuity Planning courses equaling 56 training hours and serving 250 attendees. Courses included:

- BCP for Management Development Teams: Part 1 & 2
- BCP for Plan Development Teams: Part 1 & 2
- Business Impact Analysis (BIA)
- Risk Assessment (RA)
- Information Gathering for Building BC Plans
- LDRPS 9.1

- **ITS Training Services Administrative Computing Offerings**

A total of 66 courses were offered through a partnership between ITS Training Services and Administrative Information Services, of which, 66 (100%) ran serving 534 attendees and totaling 414 instructor hours. Courses included:

- Unlocking the Data: EIS & the Data Warehouse
- Enterprise Information System: Introduction
- Enterprise Information System: Advanced (*NEW!*)
- Data Warehouse 1: Introduction to Queries
- Data Warehouse 2: Advanced Queries
- Data Warehouse 3: Introduction to Reports
- Introduction to Electronic Forms Processing (IBIS)
- IBIS Financial on the Mainframe (CCOM)
- Financial Information Tool (FIT)
- Introduction to eDDs

- **Data Warehouse Data Training Sessions**

Monthly data warehouse data training sessions continued to be offered at University Park serving 65 attendees at UP and another 29 at non-UP locations.

10 different campuses participated via videoconferencing throughout the year. Topics included:

- Official
- Cert
- Student
- Undergraduate Applicant
- Graduate Applicant
- IBISFIN

- **Training On Demand Offerings**

A total of 4 courses were offered through the Training On Demand service, of which, 4 (100%) ran serving 134 attendees and totaling 30 instructor hours. 3 different campuses utilized the Training On Demand Service in 2007-2008.

Courses included:

- Data Warehouse 1 (Shenango)
- eSteward and Beginning Excel (UP)
- CCOM (Berks)
- EIS: Introduction (UP)

- **Internal AIS Training**

Organization-wide training focused on AIS' migration to Oracle Calendar and Office 2007 as well as our customer service initiatives and a trend toward more teleworking in the future. A series of new employee information sessions were also added to our internal training offerings. A total of 5 different courses (spread over 11 different sections) were offered equaling 26.5 training hours and serving 178 attendees.

Courses included:

- Oracle Calendar Overview
- MS Office 2007 Overview
- IT As A Service Organization
- How To Supervise Off-Site Employees

- **Training Room Materials**

Training room materials and equipment continue to be heavily used/borrowed in 2007-2008. There were 52 unique instances of used/borrowed items including books, videos, laptops, training manuals, DVDs, CDs, projectors, digital cameras/webcams, TV, other equipment and web-based training.