

Administrative Information Services Annual Report July 2005 – June 2006

<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, Ron Rash

**Director, Infrastructure & Operations
and Deputy Director, Scott Smith**

Director, Solutions & Services, Karen Schultz

Snapshot

The numbers

Angel, Spring 2006

Course Sections	7238
Faculty	4669
Students	62,395

eCommerce (Annual)

Transactions.....	400,000
Amount	\$76 million

eDocument Distribution System (eDDS)

User Accounts.....	1571
Reports.....	1,078,730
Pages.....	24 million

Data Warehouse

User Accounts.....	1530
Records	210 million

Enterprise Server (Annual)

Print Lines.....	1.3 billion
Batch Jobs.....	959,000

eLion Student Usage (Monthly)

Avg. trans.....	1,180,948
Max. trans (Dec 2005).....	2,197,600
Avg. users	65,905
Max users (Aug 2005)	76,557

Hardware

Disk Storage	40 TB
Prod. Servers.....	170

Annual Report 2005 -- 2006

Administrative Information Services

Introduction

In FY 2005-2006, Administrative Information Services (AIS) made significant progress in redefining the IT environment within which future administrative systems and services will be developed and deployed across the University. A paper was prepared in late 2005 titled "The Future Direction of Administrative Information Systems at Penn State." This paper was endorsed by the University Provost and Senior Vice President for Finance and Business, and discussed within the President's Council. As a result of these activities, AIS has been charged with the development of a Master Plan for Penn State's administrative information systems in FY 2006-2007.

FY 2005-2006 also experienced the continued progress of many key projects and initiatives such as Disaster Recovery, Workflow, Systems Development Modernization, and Business Intelligence.

The following report serves to highlight the progress made on those items mentioned above and the many additional significant accomplishments of AIS over the past year.

AIS Production Services

AIS Web Site

AIS views our Web site as a marketing and communications tool regarding our services and, therefore, continues to improve both the content and usability of the site. "What's Coming" news boxes were incorporated into the home pages of all AIS systems and services. These news boxes serve as an alert to new information or features planned for the near future for that system or service.

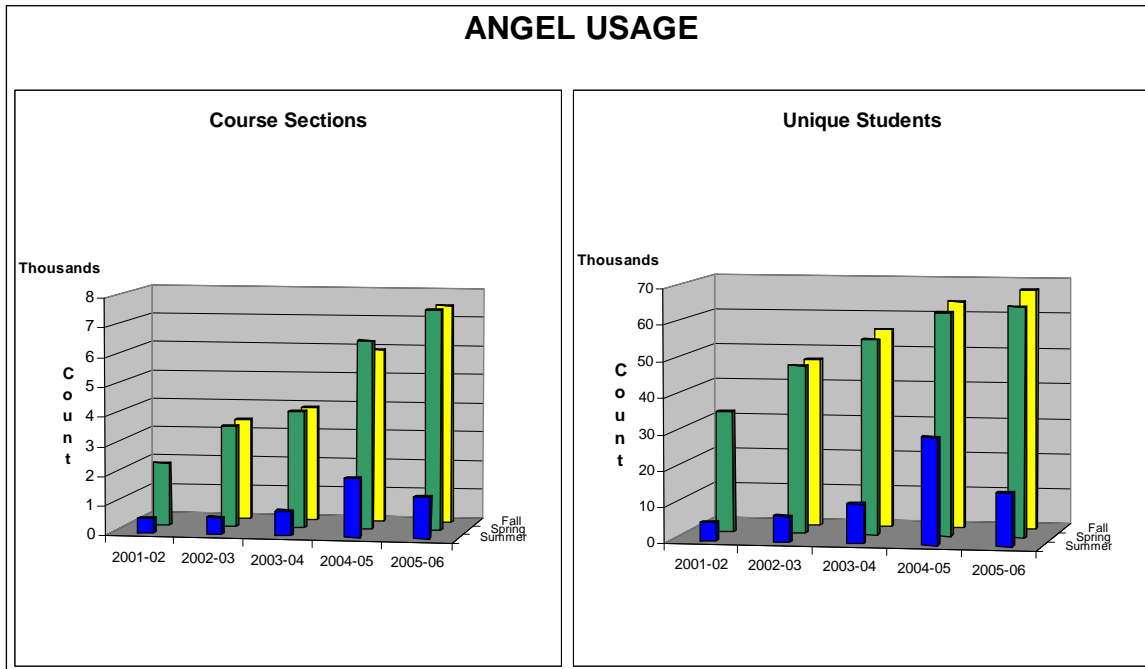
The AIS Web site was brought into compliance with the 2005 revisions to Penn State policy AD54 – Web Page Design and Image.

The RedDot Solutions Web Content Management System has become an important product for AIS. This tool and process continues to enable and empower staff to add, manage, and maintain AIS Web site content. In a two-year review, feedback received from the content providers suggests that we should continue to expand our content management capabilities.

A New Global Environment for Learning (ANGEL)

Version 6.3 of ANGEL was implemented in May 2006. It continues to improve on an already robust course management system. New additions include ANGEL's grade book, implementation of discussion forums, and various other new features.

Beyond our 6.3 implementation, Penn State has successfully implemented ANGEL's secure testing environment for low stakes quizzing in the Smeal College of Business. In cooperation with the Schreyer Institute, we've begun to pilot functionality for student rating of teaching effectiveness (online course evaluations), and interfaces between ANGEL and various Schreyer Institute testing tools. We are, in partnership with the Faculty Senate Office and Senate Committee on Curricular Affairs, in the midst of implementing the Curriculum Consultation and Submission System to automate the course proposal process. Finally, ANGEL became part of the World-wide University Network using Shibboleth for authentication both within the University and externally in partnership with Leeds University.



Data Warehouse

Improvements continue to make the data warehouse a better tool for its over 1500 users. "User friendly" field names were added to both the IBISfin and Student data bases. Using these new names, several new tables were created in both data bases that combine current and historical information into one table. This has made it much easier for users who need to query multiple semesters or fiscal years. Documentation changes were made to allow users to see both the new user friendly field names and the original field names. User friendly field names continue to be added to more data bases with Noncredit, OHR, and Official next on the list.

Several new data bases were added to the data warehouse:

- Certificates, containing information on all currently available certificates and students enrolled in certificate programs
- Employee Reimbursement System
- Degree Audit allows users to review degree audit program definitions for majors, minors, and entrance to major

Security was changed on the IBISfin data base to allow access to the lowest level mnemonic. Many users, who were formerly unable to access the IBISfin data base because security couldn't restrict to the lowest level, are now able to use this data base.

Some data warehouse statistics:

- Average number of queries a month: 25,759
- Student data base accounts for 54% of all queries

Document Imaging

Document Imaging technology is being used in many areas of Penn State to improve efficiency and reduce the volume of paper that is processed and stored. In all cases, the use of imaging software cuts down on storage space (i.e. eliminating rooms full of filing cabinets), makes the retrieval of documents a much quicker process, and makes sharing of documents possible.

Penn State is committed to making excellent use of its site-licensed imaging software from Optical Image Technology, Inc. (OIT). In December 2005, the site license was expanded to include the Email Manager module to provide email archiving and retrieval capabilities. This purchase will increase available options and enhance abilities with current imaging systems to provide an automated way to store and log critical email information.

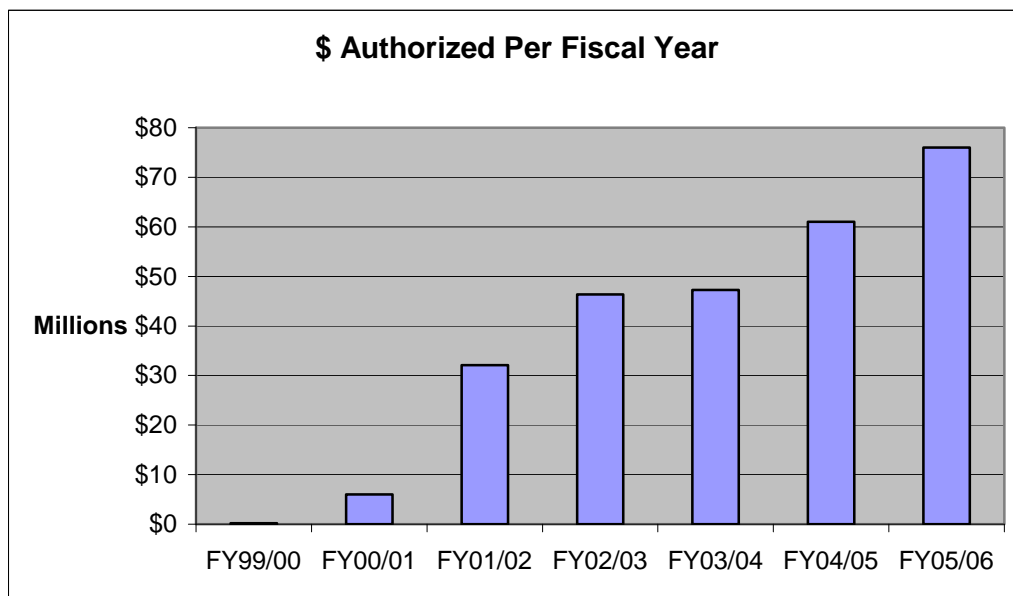
In July of 2005, AIS began piloting a centralized image hosting service. This service allows departments to locally scan and index documents which can then be retrieved via the Web. AIS is responsible for providing and maintaining the infrastructure and storage space required to support this service. Currently, four departments are participating in the pilot: Undergraduate Programs in the Smeal College of Business, Information Technology at Penn State Altoona, Student Services in the College of Health & Human Development, and the AIS Support Center. Four additional departments are currently in test with the intention of joining the pilot in the near future: the University Budget Office, the Department of Mechanical and Nuclear Engineering, Dickinson School of Law, and the Division of Undergraduate Studies at Penn State Altoona.

The service allows areas to take advantage of and implement an imaging solution, which may not have been feasible in the past with limited resources, and has provided great benefits to the initial pilot groups. Michael J. Gilpatrick, Director of Academic Information Reporting Records and Analysis Systems in the Smeal College of Business, comments, "From our perspective in the Smeal College, this pilot project has been a huge success and has surpassed our expectations. I appreciate and thank you for working with us."

eCommerce

AIS has centralized the payment processing technology necessary for a secure and stable eCommerce environment at Penn State. These services provide a fast and cost-effective approach for departments adding eCommerce capabilities to their Web applications and business processes.

eCommerce continued to grow in FY 2005-2006. We added over a dozen new departments and expanded the diversity of use by a number of existing areas. We spent the year refining and strengthening our infrastructure. As a result, our environment is faster, more stable, and now has the ability to switch to a backup bank processor (Vital) if we experience problems with our primary bank processor (Paradata). We continue to receive suggestions for improvement from our users and implement these ideas when appropriate. Overall, our dollars and transactions grew by 20% over the previous fiscal year. We processed over \$76 million on just over 400,000 transactions.



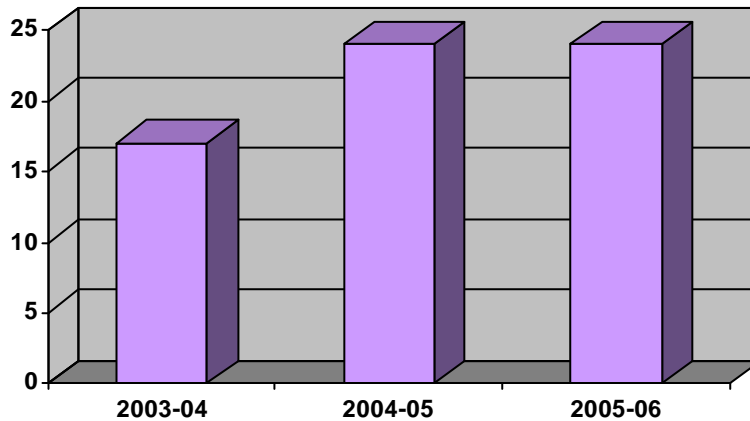
eDocument Distribution System (eDDS)

The eDocument Distribution System (eDDS) is a Web-based system used for the distribution of administrative reports. It continues to grow in users and the number of reports it houses. There are currently a total of 1571 users, a 6% increase over the previous fiscal year, accessing over 1 million reports. Over 24 millions pages were directed to eDDS in FY 2005-2006, comprising 70% of the AIS Enterprise Server "print" output. This remains about the same as the previous fiscal year.

A new eDDS production server was built and the latest version of the software was installed. Single sign-on via WebAccess was implemented in April 2006. The last of the RMDS reports were moved to eDDS during the first quarter of 2006. The Office of Human Resources was added as a new report steward during this past year.

Report Pages Produced

Millions



eLion

eLion is an award winning Web-based service for students, advisers and faculty. eLion provides secure, real-time access to academic and student financial records in the University's administrative data base.

A new Windows-based degree audit system (DARwin) was implemented in fall 2005 and the eLion Degree Audit function was modified to use this system. This was an extensive change to eLion and allows student course data to be retrieved real-time from the Enterprise Server and sent to the Windows-based degree audit server for processing. After the processing is complete, the resulting report can be viewed on the Web through eLion. This change has been very positively received by students and advisers, giving them more timely access to degree audit reports.

A major re-design of the eLion interface is also underway. The more user friendly design is complete and is being implemented using cascading style sheets. This technology will ensure consistency among all pages and make future changes significantly quicker and easier than in the past. The plan is to debut the "new look" prior to the start of fall semester 2006.

In addition, the following new features were added to eLion during FY 2005-2006:

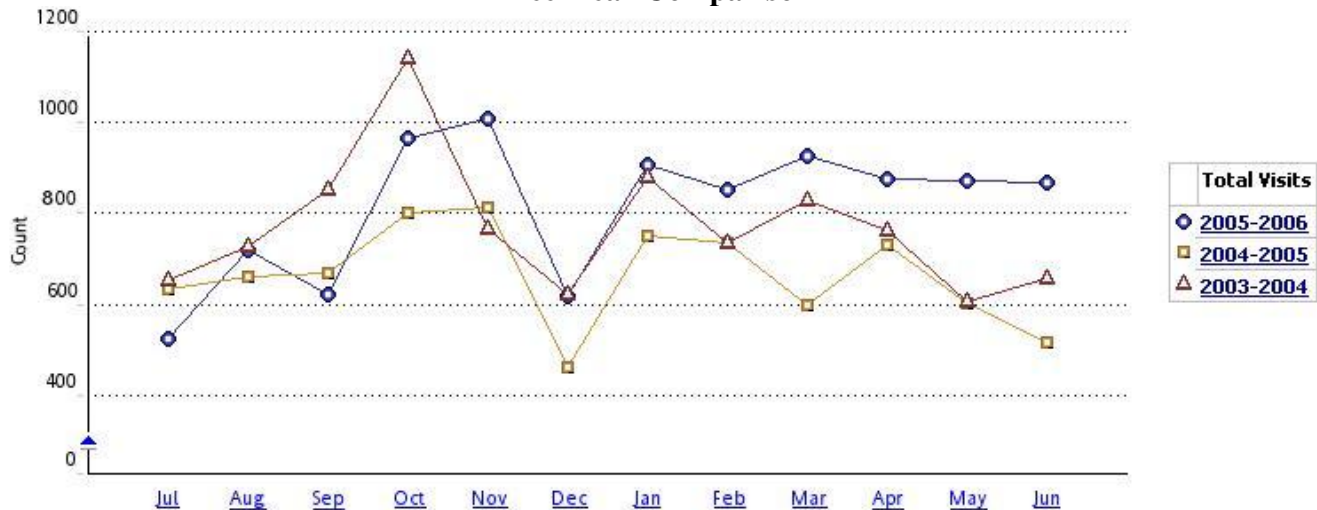
- Parent/Other access to allow parents/guardians to view student accounts and pay bills on-line. The latter function has eliminated the printing and mailing of paper semester bills. Access must be granted by the student.
- Science/Math majors application helps students identify Penn State majors that match their interests and abilities in science- and math-related courses. By specifying the number of courses they would like to take in biology, chemistry, mathematics, and physics, students can design their "ideal major" and compare it to existing majors at Penn State.

Enterprise Information System (EIS)

The Enterprise Information System (EIS) provides a Web-based information and reporting service. EIS offers a reporting infrastructure that has five Web services: compressed cubes with slicing and dicing capabilities presented in a cross tab format, standard reporting via the Web, Web ad-hoc query tool, advanced graphics tool, and an alert detection service enabling information to be delivered to the customer based on a predefined event.

The EIS continues to grow in the number of users and ease of use. During the past year, the number of authorized users increased by approximately 23%. The number of cubes/reports available increased by 148%. Unique IP addresses reached 1,253, up by 3%, and customer visits to the system exceeded 10,000 for the year.

Enterprise Information System Three-Year Comparison



Count as values		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Month
Total Visits	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

The early part of the year involved the configuration of new servers, implementation of single sign-on via WebAccess, and an upgrade to Cognos Series 7 version 3. The upgrade to version 3 added enhanced browser capability for our Macintosh users along with other advanced features for all users, such as custom subset creation and the ability to edit titles within cubes.

The University Budget Office Fact Book Plus initiative utilized EIS security along with reporting, and the Office of Planning and Institutional Assessment moved many reports to EIS. The Corporate Controller's Office is building the new Employee Reimbursement System reporting using the EIS. In addition, Outreach is making great strides in their centralized EIS reporting efforts, and the Graduate School and the University Learning Center expanded their reporting to include new cubes with drill-through to detail from the data warehouse. Finally, two EIS Users Group meetings were well attended with many campuses joining through video conferencing.

eSteward

The Penn State Stewardship (eSteward) project was established at the request of the Provost and Associate Vice President for Development to improve donor stewardship and the management of endowments and gifts. This University-wide system, based on a system developed in the College of Engineering, went into pilot in July 2006, with enhancements scheduled to continue through Spring 2007. Drawing from various systems currently being used throughout the University, a single system was created. The eSteward system uses a Web-based interface to integrate information from multiple data sources to offer "one-stop shopping" functionality. Final system completion is scheduled for Summer 2007, to coincide with the start of the next University fund-raising campaign.

Financial Information Tool (FIT)

The Financial Information Tool (FIT) continues to be a valuable resource used by the Penn State financial community to monitor the status of their accounts. An average of just over 600 users access FIT on a monthly basis, retrieving financial data from IBIS via 62,000+ calls to the Enterprise Server. The "top 3" FIT functions based on monthly usage are:

1. Detail extract used to view financial details.

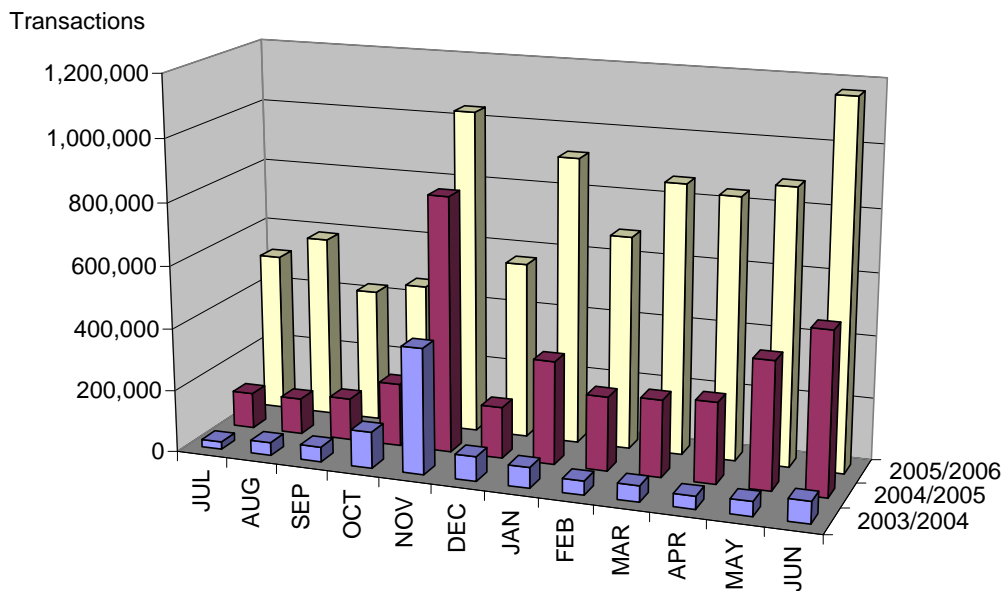
2. Account extract used to display a detailed view of an account.
3. Summary object extract used to view summary totals for a mnemonic or account.

Generalized Interface (GI)

The Generalized Interface (GI) enables developers throughout the University to use a variety of programming languages to design Web applications that perform business functions using enterprise data. The GI facilitates the exchange of information between departmental systems and central data bases, using the Interface as a “bridge” to enterprise data, and a “repository” for Web services. As the University continues to migrate functionality to the Web, the use of the Generalized Interface (GI) continues to grow. During the 2005-2006 fiscal year, thirty-nine new services were added, bringing the total number of GI services to 186.

The GI handled slightly under 9 million transactions from 102,495 unique users during the 2005-2006 fiscal year. These numbers represent a 152% increase in transactions and a 78% increase in unique users over the 2004-2005 fiscal year. While there remain peak periods in GI usage, the load is trending towards a more even distribution thanks to the increasing variety of applications calling it.

GI Transactions for Fiscal Year by Month



Integrated Business Information System (IBIS)

As directed by the IBIS Steering Committee, a major project was launched during 2005-2006 to eliminate the aging Central Accounting System. Much analysis and design work has been completed to further define the steps necessary to accomplish this task. The elimination of the current Central Accounting System consists of many processes: vendor processing, Accounts Payable, replacing manual inputs, financial closings, and the "pushing out" of financial data from IBIS instead of Central Accounting. The current estimated completion for this project is the end of fiscal year 2006/2007.

- Vendor Processing -- A single University Vendor data base, containing both "pay to" and "order from" vendors, will be maintained within the IBIS Financial System. It will be linked to and kept in sync with the various vendor data bases that have been developed across the University. By creating a single vendor repository, which includes vendor characteristics and classifications from Austin-Tetra Corporation, the University's ability to report on its vendors will be improved and simplified. This process is scheduled to go into full production in late summer/early fall 2006.
- Accounts Payable -- The new Accounts Payable System will be a modernized design that is less labor intensive for the users to input and retrieve data. The new process will eliminate duplicate data entry of payment data and will streamline the processing for authorizing payment. The payment input and authorization portions of this project are scheduled to be implemented in fall 2006.

- Accounting Controls -- The accounting controls portion of this project will give the Central Accounting Office the ability, on a daily basis, to determine if the accounting system is in balance. This includes both general ledger and trial balance reporting. This process is scheduled to go into full production in fall 2006.

In addition, two enhancements were implemented to the Payroll System during 2005-2006:

- The payroll process now has an option of not printing an employee's deposit slip. This "no print" option can be selected by an employee via the Employee Self Service Information Center (ESSIC), where the deposit slip can be viewed.
- The payroll process is now providing additional data to Mellon Bank that will aid in verifying that a Penn State check was actually written by Penn State.

Integrated Student Information System (ISIS)

Enhancements to the Integrated Student Information System (ISIS) during 2005-2006 include:

- allow 800-level courses to be used for graduate level course work
- automation of the collection agency process
- conversion to letter grading (i.e. A through F) for Dickinson Law students
- adding LP (low pass) grade for Hershey students
- the addition of several new non-credit course locations
- streamlined the process that produces the data for the Web Bulletin
- developed a new Web-based Degree Audit Academic Exceptions function to allow staff in colleges and departments to enter degree audit exceptions for students using a Web interface.

There has also been intensive research and in-depth analysis in support of several projects that will be implemented during fiscal year 2006-2007. These projects include:

- changes to tuition billing to better accommodate World Campus courses and students
- implementation of the University Park campus of the Dickinson School of Law
- changes to the budget/fund/object format in ISIS in support of the eSteward system
- replacement of our mainframe-based letter generation software ETC.

Special Projects

Business Intelligence

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 and 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, the Business Intelligence team has interviewed over 130 Penn State information users in an effort to better understand Penn State's information needs. A twenty-five member Business Intelligence Advisory Committee has also been created. The goal of the committee is to ensure alignment between the Business Intelligence Strategy and Implementation Plan and Penn State's administrative information needs, as well as advise AIS throughout the requirements analysis, strategy definition, and implementation planning phases of the Business Intelligence Initiative.

The first phase of the Business Intelligence Initiative is the evaluation and selection of an Information Access and Analysis tool. Various vendors have been invited to demonstrate their tools to the Business Intelligence Advisory Committee as well as other key stakeholders. The next step is to use the key user requirements defined by the committee to select a small number (2 - 3) of tools for a proof of concept to be conducted during the fall of 2006.

System Development Modernization

The System Development Modernization project began in 2005 and is a multi-year effort to rebuild the environment within which Penn State creates and delivers administrative systems and related services.

The goal is to create a new architecture in AIS that will enable more efficient and rapid delivery of modernized administrative services to support the changing business requirements at Penn State. The project also includes retraining and retooling the work force responsible for this type of application development. This University-wide effort is endorsed and supported by the AIS Strategic Planning Committee and is required for keeping Penn State competitive, embracing open standards, and minimizing our reliance on proprietary technologies. The three areas of focus include:

Enterprise Server

- Designing and implementing a Java enterprise environment on the IBM zSeries mainframes in AIS. The architecture will be based on open standards such as the eXtensible Markup Language (XML), Simple Object Access Protocol (SOAP), and Web Services. The use of these open standards permits applications written in different languages or frameworks like Java and .NET to communicate with each other and access shared programming (objects).
- Coordinating an organization-wide effort to evaluate vendor-supplied tools to monitor and support the new infrastructure required to host a Java-based application development framework.

Enterprise Application Services

- Adopting the Java programming language as AIS' standard for future application development in the new architecture.
- Providing a general application framework and Web presence to house future Web-based administrative transactions. This includes developing new standards and procedures for using the framework.

Training & Re-tooling Developers

- Providing training and desktop tools to prepare University developers for enterprise application development in the new environment. In 2003, there were approximately 170 full time enterprise application developers using a variety of software tools (Natural, Smalltalk, ColdFusion, Active Server Pages, Visual Basic, etc.). Some of these developers will continue to use current tools but will also use Java to develop back end services. Training is currently slated to begin in fall 2007.

This year, progress was made on all fronts of the project. For monitoring and supporting the Enterprise Server infrastructure, we have defined functional evaluation criteria, established a prioritized list of management needs, and identified an inventory of vendor products by functional area. This work will help us readily manage the resources required to carry out the evaluations, which is the next step.

Technical teams also spent time creating the initial design of a test enterprise application environment on the zSeries and mapping the new architectural requirements against existing and prospective tools. In June 2006, a limited test environment was made available for testing the Workflow application, which is the earliest deployment in this architecture.

A university-wide survey was conducted to create more awareness of our planned move to Java and fine tune the numbers of enterprise application developers who will participate in training. Survey results indicated that 175 programmers would need training to migrate to Java. Early Java training was also provided to 15 AIS staff including those in the Open Standards Development Team who are responsible for Workflow application development. The training helped to provide a consistent, base level of understanding of Java development within our organization and is similar to the full training track that will be offered later in the project.

A technical team was convened to specify requirements and implement the new application framework, and significant progress was made in designing and developing the first prototype. The framework prototype is expected to be demonstrated in fall 2006.

Workflow

The Penn State Workflow project officially began in February 2005, with the primary goal of improving 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.

The project organizational structure was defined and working committees were activated. A summary of the high-level accomplishments from the committees during FY 2005-2006 timeframe is provided below:

- **A baseline infrastructure for the Workflow system has been achieved.** Workflow is running on a zLinux platform which is hosted by an Enterprise Server and will utilize WebAccess and 2-factor authentication. Financial roles and attributes have been created and stored in Penn State's central directory. In collaboration with ASET (Academic Services and Emerging Technologies), the Web-based application, WebRAT (Role Assignment Tool), has been developed to assign and manage roles and attributes.
- **The Open Standards Development Team**, a dedicated resource to the Workflow project, completed three intensive weeks of Java programming training, developed the first Workflow prototype (Undergraduate Education Travel Request process), completed the functional design for four additional Workflow prototypes, and participated in the design and development of the PAWS (Penn State Administrative Web Site) prototype for the

System Development Modernization project. This team continues to be actively involved in all Workflow process design teams.

- **The Workflow Policy and Roles Management Committee** has addressed its dual charge by (1) creating a draft Workflow Policy that defines the unique business elements introduced by a workflow system and associated policy, and (2) taking initial steps to identify roles and attributes that will be used for financial, human resource, academic, administrative, and research Workflow processes.
- **The EASY Re-engineering Planning Committee** submitted a report outlining a strategy for re-engineering the existing EASY forms for migration from IBIS to Workflow, grouping them by functional process and suggesting the priority in which they would be re-engineered. The report also describes a proposed long-standing Workflow organization structure.
- **Workflow Process Design Teams** are established for each Workflow process. There is approximately 50 staff participating in six active teams charged with identifying user requirements and creating functional detail and design. The initial six processes include: Undergraduate Education Travel Request, Sabbatical, Workflow Role Authorization, Purchasing Card Authorization (APCA/UPCA), Supplemental Compensation (SUPP), and the HR Termination form (TRMN).
- **The Workflow Standards Committee** has been formed. This Committee will focus on the visual elements and components associated with the Web-based interface of Workflow.
- **A Workflow Web Site** has been created and can be accessed at <http://ais.its.psu.edu/workflow>.

Disaster Recovery

Disaster Recovery (DR) remains a very high priority initiative within AIS. AIS continues to aggressively develop a strategic Disaster Recovery plan and implement specific actions to provide continuity of business operations in the event of incidents, disasters, and catastrophes including:

- Disaster Recovery planning within AIS has seen some changes in the last year due to a rededicated focus of resources. Progress has been made with our internal emergency planning initiative and we actively participate in building-wide emergency planning. In AIS, our evacuation planning efforts included the development and posting of evacuation diagrams in each suite, as well as the development and distribution of evacuation quick reference cards for every member of the staff including management.
- Work continues at the Penn State Remote Recovery Center (RRC) to improve the Center's ability to provide operations in the event of a catastrophe -- the loss of both Shields and the Computer buildings at University Park. A successful test of the Enterprise Server mobile recovery unit was conducted at the RRC, verifying the network, physical and electrical requirements and procedures required to recover the Enterprise Server and associated data that is backed up at the RRC. A Server Test-Bed was created in the telecommunications room at the RRC to enable testing of recovery of AIS server-based applications from University Park to the RRC.
- An Emergency Information Repository (EIR) data base has been developed to facilitate quick response to questions resulting from a disaster, such as building occupation and emergency contact information. The EIR utilizes a disaster related version of the Data Warehouse which is operational in the Server Test-Bed at the RRC.
- AIS continues to require all major AIS services to undergo Recovery Readiness Reviews (RRR's), detailing the procedure to recover the services in the event of a disaster.

AIS also continues to provide leadership and support to other Penn State entities in their development of disaster recovery plans including:

- AIS has developed a five-phase process and provides a suite of tools and services to assist other University IT units in developing an individualized Disaster Recovery plan to keep their organizations operational during and after a disaster. Below are the five phases as well as the training sessions that are offered throughout the process:

Phases:

- Project Planning
- Business Impact Analysis (BIA)/Risk Assessment (RA)
- DR Strategy
- Plan Development
- Exercise Plans

Training:

- Business Continuity Planning (BCP) for Managers and Planners
- Business Impact Analysis (BIA)
- Risk Assessment (RA)
- Living Disaster Recovery Planning System (LDRPS)
- Disaster Recovery Team Facilitation
- Plan Exercise Training

There are currently two groups consisting of nine individual units going through our five-phase approach. We also have another eight units that will be starting the process in fall 2006. It is estimated that the entire process will take each unit approximately one year to complete.

- The development of an Administrative IT Services Recovery Center is progressing. This service is available to the University community for quickly recovering administrative servers in the event of a disaster by utilizing AIS server assets for short periods of time.
- The Disaster Recovery Awareness Program reached a major milestone. All Penn State Commonwealth Campus Chancellors have been visited at their campuses and received a detailed Disaster Recovery awareness briefing explaining the need for a Disaster Recovery plan and the AIS services available to assist them in the development of that plan. A large percentage of the College Deans and administrative unit senior managers at University Park have also received the Disaster Recovery awareness briefing.
- AIS conducted a Disaster Recovery Awareness Day event to explain the need for Disaster Recovery planning and to publicize the AIS Disaster Recovery services available. The event was targeted to high-level University management and was very well attended, with over 60 attendees.

Operational Support

Batch Production Processing

During fiscal year 2005-2006, over 959,000 batch jobs executed on the Enterprise Servers; 157,000 of these were degree audit requests. An additional 354,000 jobs were information requests submitted by or sent to students via email. Over 6,300 jobs were executed to satisfy customers requesting labels or general reports. The number of batch jobs executed decreased over the previous fiscal year by 450,000 jobs, due primarily to the transfer of the degree audit system from the Enterprise Server to a Windows-based server in November 2005.

During the past year, AIS scheduled and closely monitored the processing of approximately 292,000 production batch jobs on the Enterprise Server. Approximately 99% of the total production batch workload ran to completion without intervention.

AIS coordinated the implementation of over 164 new batch jobs and changes to over 590 existing batch jobs that execute on the Enterprise Server.

AIS physically distributed over 6.2 million pages of output. Over 5.7 million pages printed on laser paper output and over 500,000 pages printed on labels. This represents a decrease in printed output of 1.3 million pages over the previous fiscal year. An additional 24 million pages of output was sent to the eDDS system during fiscal year 2005-2006, an increase of 300,000 pages over the previous fiscal year.

The manual mounting of physical tapes continues to be an important aspect of the operational support that AIS provides to its customers. This past year, AIS manually mounted 46,500 tapes, while the automated tape libraries handled 24,500 tape mounts without manual intervention. Through a combination of a recent acquisition of additional automated tape library components, the migration of more data to the automated tape libraries, and the use of recently-acquired Virtual Tape software, AIS plans to reduce its dependence on manual tape mounts.

Change Management

Recognizing the need to better manage changes to our production environment, ensure all production changes are properly authorized, and tie any production problems back to changes that might have been introduced, AIS completed the first phase of a large Change Management project. The deliverable from this first phase was a detailed report that summarized the findings, itemized a set of recommendations, and provided a road map for implementing an effective Change Management system.

One of the primary objectives of the first phase of this Change Management project was to investigate existing change processes to determine how these might be better utilized. As a result, we have been able to develop a strong set of specifications and recommend an implementation strategy that will help us build a fully integrated change management system. Some of the recommendations include: develop a change policy to enforce adherence to principles; classify changes to ease the burden associated with frequency; build a repository to centrally locate valuable change-related information; establish approval paths to guarantee all changes are managed; provide a change request application to streamline the process; and create Change Teams to help speed the process of implementing a change.

Expanded Hours of Availability

AIS is committed to expanding the hours of availability of our ISIS, IBIS and ADIS systems to near 24x7. Production procedures are being converted and other tasks have been identified and work begun on them to implement improved hours of availability in early fall 2006.

Support for Partner Office Applications

AIS provided assistance and support to Enrollment Management during the migration of the old Degree Audit system (DARS) from the Enterprise Server to a new client/server-based Degree Audit system (DARwin) running on a mid-tier, Windows server. DARwin, an application that “audits” a student’s progress toward a degree by tracking academic requirements, was piloted and then moved to its current Windows platform in fall 2005. AIS provides ongoing operational support for the DARwin server and application.

Student Aid migrated one of its data bases to the AIS infrastructure and realized significant performance improvements as well as relief from the daily care and data recovery responsibilities.

The Office of Undergraduate Admissions presented AIS with a unique and especially demanding service level requirement for running its MyAdmissions application. MyAdmissions is critical to the Admissions office for initial contact and application to Penn State and can not be down for more than one hour – a more stringent requirement than even ANGEL has. The requirement was met through the use of real-time replication software that enables a true failover to the redundant system in the Computer Building.

Infrastructure

ANGEL Infrastructure

ANGEL will be receiving a facelift prior to the beginning of fall semester 2006 as a new infrastructure is moved into place. During spring 2006, a team from AIS worked with both Microsoft and Dell engineers in the Microsoft Testing Center in Austin, Texas to test, tune and develop the new configuration. Faster servers, faster storage and better load balancing will be installed and promise to address the growing needs of the University’s course management system. ANGEL now typically services in excess of 62,000 students in more than 7,000 course sections during a semester. Peak usage now exceeds over 600,000 web transactions an hour. Identical hardware will be housed in Shields and the Computer Building. A new recovery procedure used previously in pilots with the Office of Undergraduate Admissions and more recently with our own Data Warehouse will be employed with ANGEL to ensure better availability of this critical service.

Backups

Our effort to implement an alternative to backing up data to TSM for our Intel-based systems is nearly complete. Utilizing a software package called FDR/Upstream, we have successfully run full and incremental backups of the ANGEL SQL and file system to our own tape robot and then successfully restored from those backups. Very shortly we should be able to cease writing ANGEL backups to TSM and then slowly begin pulling existing TSM backups back to our own tape system. This effort will greatly reduce the monthly TSM charges to AIS, as well as provide improved recovery time should the need arise.

Enterprise Server Enhancements

AIS completed fiscal year 2005-2006 poised to implement an Operating System upgrade on the Enterprise Servers from zOS Version 1.5 to zOS Version 1.7. In preparation for this major upgrade, AIS added toleration maintenance to most of the Enterprise Server software environment. In addition, the following software products were replaced by more current versions during the year in preparation for the Operating System upgrade:

Netpass	CA/ACF2
Syncsort	CA/CA1
MIM	Predict 4.3.2,
MXI	Com-plete 6.4.1
SAS	Network 5.9.1
FDR	EntireX Communicator 7.2.1
XPAF	Adareorg 2.3.1.A

In addition to the zOS Operating System, AIS also runs two other operating systems on the Enterprise Servers – zVM and zLinux -- where we intend to deploy applications that used to be targeted for a Windows server environment. During the past year, AIS moved its first zLinux application into production. Although the first service was relatively basic, it required

a number of prerequisites that will be used in the future by other applications. The new environment will allow us to develop and implement future applications such as Workflow under zLinux. The steps completed to create this environment include installing and customizing a zVM environment, constructing a Hypersocket virtual LAN, interfacing the environment to our SAN Storage environment and creating production procedures and schedules for backing up the environment. In preparation for our Workflow implementation under zLinux, we have also installed IBM's HTTP Server, WebSphere and DB2; Software AG's Mediator and Tamino data base; and Fujitsu's iBPM workflow engine.

Load Testing

AIS now uses a new method of load testing Windows-based applications based upon the Open Source product, OpenSTA. Used extensively in developing the new ANGEL platform in which 16,500 simultaneous users were simulated, OpenSTA has proved useful for testing the new ANGEL release version 6.3 as well as in helping to debug a critical issue within the eDDS system.

Network Infrastructure

Over the past several months, AIS has been busy with a number of improvements and expansions to the sixteen networks being supported. The improvements include expansion of the production network to support additional IP addresses, incorporating new hardware switches, adding support for the Enterprise Systems "control" network, adding support for new virtual machine and disaster recovery networks, and completing a cable rewire project in our production Windows Server facility.

Last summer, an intrusion detection system was added to supplement protection of our production network. ITS' Security Operations and Services (SOS) unit works in conjunction with AIS to monitor the network for anomalies that might indicate a potential compromise or attack. A similar system had already been in place on the user-side network and has proven to be useful.

Single Point of Development (SPoD)

Following the planned upgrade to Natural 4.1.4, AIS will distribute the Software AG Single Point of Development (SPoD) Natural coding environment to Natural developers in AIS and ultimately to all Natural developers in the university community. SPoD offers the Natural developer an upgrade from the traditional character-based Natural coding environment to a more modern, Windows-based GUI platform. Programmers that tested SPoD earlier this year reported a high level of satisfaction working in the SPoD framework. Software AG also offers a SPoD plug-in to the open systems Eclipse development platform, reflecting SAG's, as well as AIS', commitment to open systems and standards.

Tape Environment Enhancements

During FY 2005-2006, AIS has taken a number of steps to improve our tape environment. The first step was to expand each of our automated tape library environments from two tape drives to six faster tape drives and to move from our older "Bus and Tag" and ESCON connections to faster FICON (IBM proprietary Fiber Connectivity) connections. The additional new drives will both increase our capacity and improve our throughput to tape. The tape library upgrades were made in conjunction with the installation of a software product from Computer Associates known as Virtual Tape (V-Tape). Our plans are to use this product to migrate our manually mounted tape cartridges into our automatic tape libraries, reducing our manual tape mounts significantly.

Virtualization

Using a product called VMWare, AIS is piloting the migration of physical servers to virtual machines (VM). The technology has the potential to consolidate server hardware, as a single 8-way machine is capable of hosting dozens of applications that today require separate physical machines. Once a physical machine is "imaged," a new VM can be built in minutes. For high availability and recovery, working applications can be quickly and easily migrated from one VM to another, including between buildings. AIS is currently working with the Office of Student Aid and two AIS services in a pilot that is expected to be complete by year's end.

Training & Education Program

Training for Penn State Community on AIS Systems

A total of 57 AIS-related courses were offered to the University community through the Human Resource Development Center, of which 52 (91%) ran serving 651 attendees and totaling 326 instructor hours. Courses included IBIS, FIT, Data Warehouse, EIS, eDDS and eCommerce.

Monthly no-fee Data Warehouse data training sessions continued to be offered at University Park serving 124 attendees at UP and another 28 at eleven different non-UP locations.

A total of nine courses were offered at five different campuses through the Training On Demand service, serving 194 attendees and totaling 48 instructor hours.

A new Disaster Recovery curriculum was launched in FY 2005-2006. Eleven courses were offered serving 91 UP and twelve non-UP attendees from five different campuses.

Training for AIS Staff

A total of 20 different courses in IT, project management, team building, communication, succession planning, and disaster recovery skills equaling 217 training hours and serving 201 attendees were offered internally to AIS staff.

The AIS training room was used 92% of its available hours for web-based training, hands-on training, equipment use, vendor presentations, training meetings and testing.

Training room materials and equipment were heavily used/borrowed in FY 2005-2006. There were 199 unique instances of used/borrowed items including books, videos, laptops, training manuals, DVDs, projectors, furniture, digital camera, TV, CDs, books, and Web-based training.