Information Services Status Report & Strategic Objectives For FY 2008-2009



Sinclair Community College

Sinclair Community College Information Services Status Report & Strategic Objectives for

FY 2008-2009



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Section 1 Executive Summary



Executive Summary

The primary goals of the Information Services departments are to enhance the strategic value of information and information technology tools for teaching and learning, to mange Sinclair's information and information technology resources effectively, to fully comprehend and manage the expectations of all students, faculty, and staff, to ensure fiscal discipline regarding the acquisition and utilization of information and information technology resources, and to satisfy the strategic objectives of Sinclair Community College.

Major Accomplishments for FY 2007-2008

A wide variety of projects were in process or started during FY 2007-2008. Several were delayed due to budget constraints; some were cancelled due to the emergence of more effective technologies or alternative methods to achieve the same end result; a few will continue into FY 2008-2009.

This section includes only a few examples of these projects

★ Exploring Library 2.0

Social networking applications such as Facebook, Myspace, Flickr, YouTube, Wikipedia, LiveJournal, Digg, and del.icio.us have become popular among the students at Sinclair and other colleges and universities. Students use these applications to enhance communications with peers and build communities through blogging, podcasting, wikis, file sharing, tag clouds, and RSS syndication.

As a group, these social networking applications and technologies are often referred to as Web 2.0. The question for colleges is, as Joanne Berg wrote in the March 2007 *Educause Review*, "how can campus professionals...learn to use these technologies to think differently about communicating with students and about facilitating learning?"

Library 2.0 refers to the continuous improvement of library services through the use of technology and social networking tools to create a customer-centered, participative library environment. In part, it is the application of Web 2.0 to the Library. Librarians have always tended to work with static documents, whether web page, article, image, or book. Today's "digital natives" are much more comfortable using technologies such as IM, text messaging, and the like to actively engage with each other and accomplish tasks in a very participative manner. To be effective in the future, librarians must be able to engage new users in a manner they are comfortable with. Before this can happen, however, library staff must learn the technologies and develop the skills

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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needed to use social networking tools effectively. Exploring Library 2.0 will be a year long staff development process, modeled in part on the Learning 2.0 project originally developed by Charlotte Mecklenburg Library System.



Figure 1-1. Examples of social networking applications.

☆ Implement New Web Site Design

The college web presence has been refocused to more actively engage and attract students to Sinclair. The overall look and content of the site has been refreshed based on a cohesive web marketing strategy developed by Sinclair's marketing group. This project called for Web Systems to assist marketing initiatives by providing technical support to reshape the website to meet the changing needs of Sinclair.

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Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding





Figure 1-2. The image above shows the mockup of the new <u>www.Sinclair.edu</u> website with its emphasis on student-related information.

☆ Distance Learning Reports and Support

Using the business intelligence warehouse and data mining techniques, the following aspects of the project were completed: 1) creation of online reports related to Angel including last login, and course survey results. Additionally, a report on the success of online course sections, when compared to traditionally-delivered sections, has been developed to demonstrate the effectiveness of online learning; 2) through data mining a model was developed to determine predictors of online success.

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding



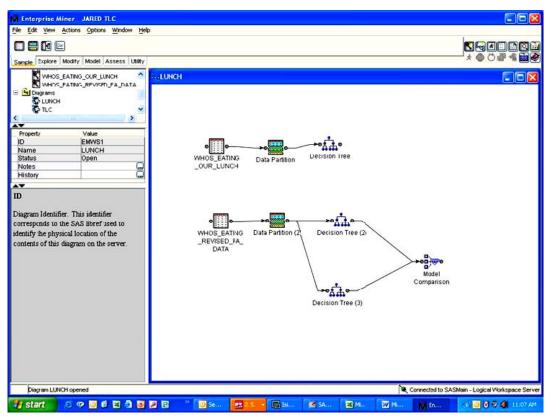


Figure 1-3. An example of a SAS predictive modeling setup.

★ Improved Recording of Student Speeches

This project was created to investigate ways to use existing Sinclair resources and/or low cost options to increase ease of use for the students and instructors while also increasing the availability of the recordings both for immediate and future use.

Several options were explored and the most user-friendly and least resource intensive method tested uses a digital camera, FireWire connection, and Windows Movie Maker software to make a next generation student presentation recording method. This method is easy for the faculty members to adopt because it uses technologies with which they are already familiar, and it creates a great way for students to be able to instantly review their presentations at any computer location on campus or from home. In addition, this method lends itself easily to import of the presentations into the digital asset management system (Digistore) for use in Distance Learning courses or for archival purposes.

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Figure 1-4. Digital video displayed with Windows Movie Maker.

Major Projects for FY 2008-2009

☆ Data Quality & the Library

The Library catalog is a specialized database that identifies information resources owned and leased by Sinclair. It serves as a finding aid for students and faculty and an inventory control system for the college. Data from this system is made available to Sinclair students and faculty, the Greater Dayton community, the OhioLINK consortium of Ohio colleges and universities, and the broader library community that includes public and school libraries in Ohio and around the world.

The Sinclair Library catalog is housed on a server on the college campus, and data records are shared with the OhioLINK system in Columbus. In addition, cataloging data and holdings information are both taken from and filed to another library system known as OCLC. OCLC is an international cataloging utility service used by over 60,000 libraries around the world with 100 million data records representing a billion items. It is an essential player in interlibrary lending and local database record creation and maintenance.

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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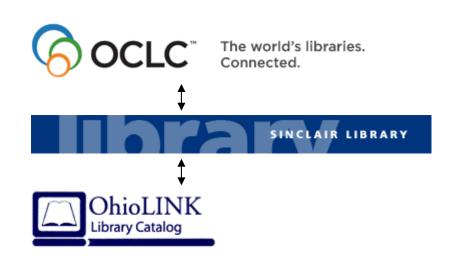


Figure 1-5. This graphic illustrates the interface between Sinclair, OhioLINK, and OCLC.

* Implement selected Angel presentation software

For several months, Distance Learning has led a committee to evaluate various modes of providing webinar features within the Angel learning management system. After reviewing these options, the committee expects to make a specific vendor recommendation by the end of summer 2008. This project involves providing the technical support to implement the committee's selection. Specifically, the project includes making the necessary procedural and coding changes to Angel to allow the webinar software to appear as an integral part of the student's Angel experience. Even though the software will be provided by a company completely separate from Angel, the goal will be to make this separation invisible to students as they interact with the Angel system.

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding



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Figure 1-6. The screen above is an example of software that allows students in widely separated locations to share what each is seeing on their computer monitors. Software such as this is specifically designed to support collaborative learning.

Accommodating Reporting Needs of the University System and Other Federal and State Agencies

In spring,2008, the Chancellor of the state published the *Strategic Plan for Higher Education*, which is a 10-year plan to reform higher education so that the state can more efficiently and effectively raise the educational attainment of Ohio citizens by offering a "wide range of educational options while driving down the average amount that students pay to among the lowest in the nation." ¹ To accomplish this task, the Governor via the Chancellor has created a University System, comprised of the state's 13 public university campuses, one medical college, 24 regional branch campuses, and 23 community colleges, as well as adult literacy and adult workforce centers which would work together to accomplish the vision. Central to the development of this system is a set of accountability measures which serve to measure progress against the goals of access, quality, affordability and efficiency, and economic leadership.

¹ Strategic Plan for Higher Education 2008-2017, submitted by Eric D. Fingerhut, Chancellor, Ohio Board of Regents

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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The department of Research, Analytics and Reporting will be a major player in positioning the institution to respond to these data demands and providing the feedback as needed.

Additionally, the amount of, and nature of, other state and federal reporting requests have changed substantially, creating the need to provide data either previously not collected or radically changed in format. This will require notable effort by the department in FY 2009.

Historically, the majority of state reporting happened outside of the data warehouse environment. In FY 2009 the department will actualize the full-reporting needs of the state through the data warehouse, thereby eliminating the need to utilize other IT resources and processes to accommodate state reporting.



Figure 1-7. Ohio's Strategic Plan for Higher Education.

★ Email archival and search capability

Email is extensively used for communication, creation, and transmission of documents and other official records throughout the College. Various legal requirements, such as public records law and e-discovery rules, apply to preservation, retention, and production of email records. In addition to these legal issues, the growth of email use and data storage is challenging from a technical and administration perspective. As part of the routine business continuity and disaster recovery processes, ITS routinely backs-up email to magnetic tape. However, finding and retrieving an individual email message or group of messages from tape is extremely difficult and labor intensive.

Student Success Work Force Development Development Development	Regional Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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Currently, nearly all email message retrieval must be performed by individual users on individual machines. The ability to retrieve a specific message or group of messages is dependent on the individual user saving, filing, protecting, and producing the message. This decentralized approach is inconsistent, ineffective, and inefficient. This project involves implementing an email search and recovery solution that will permit ITS to centrally search and retrieve email content from backup tape libraries. A secondary goal is to explore email archival/management solutions that offer a centralized approach for email management without compromising the user experience.

The ideal solutions will be relatively easy to deploy, interface seamlessly with existing systems, provide automated retention and storage management capabilities, and will feature robust search and retrieval capabilities. In addition to implementing/exploring software solutions, the project will require development of policies and procedures addressing what, when, and how email messages are archived, records retention capabilities, user communication and responsibilities, and usage of the search and retrieve functionality.

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Student Success Work Fo	Campus	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding

Section 2 Introduction



Introduction

The major tenets of the Information Services functions at Sinclair Community College have been, and will continue to be "creating information-centered services and using technology as a resource for serving students, as well as offering students the technology resources they want and need to be successful." An effective, efficient technology environment requires:

- good management and a skilled staff;
- good understanding of teaching and learning;
- a customer-centered attitude; and
- understanding and participation at all levels of the organization.

This Information Services planning document is predicated on those principles. Additionally, the projects presented herein are oriented around and associated with Strategic Priorities adopted by the Sinclair Community College Board of Trustees. These strategic priorities are as follows:

1. Student success: increased focus on at-risk and underserved students Though this has long been an integral, driving force in Sinclair's mission, increased focus should be given to aligning all of Sinclair's activities with the goal of defining and improving student success. Recent successes with the College's Student Success Plan show that a student-centered focus can pay dividends for students, and by extension, the community.

2. Workforce development for emerging and growing professions

In support of regional and state economic development strategies, the College should continue to expand workforce development capacity in high-demand and emerging professions such as nursing, biotechnology and nanotechnology and education in STEM (Science, Technology, Engineering and Mathematics). More faculty and teaching facilities will be necessary to accomplish this.

3. Downtown campus development and maintenance

To accommodate current and future enrollment at the Dayton campus, the College should continue to maintain and renovate the current Dayton campus as well as to make cost-effective and strategic purchases of properties within a block or two of the existing Dayton campus without compromising the campus' user-friendly "human scale." More faculty and staff will be needed to accomplish this.



4. Increased regional access

Future opportunities to expand the college-going rate, increase access to higher education and protect the enrollment of the College may be presented within new geographical areas in addition to the Dayton campus. Satellite locations should complement and blend with Dayton campus assets.

5. Expanded high school linkages

To improve the regional college-going rate, the College should continue to build upon existing high school linkages such as increasing participation in the TechPrep and Out of School Youth programs as well as the number of highprofile, College-branded, community-based academic resource centers in strategic, highly-accessible locations.

6. Partnerships for efficiency and effectiveness

To remain cost-effective and to leverage the relationships of partners, Sinclair should continue to seek and optimize opportunities with other schools, colleges, universities, and businesses to the extent that such partnerships are demonstrably effective and efficient.

7. Alternative sources of funding

Diminishing public resources require publicly-supported institutions to seek and develop additional revenue sources for future growth and development. These sources may require true "out-of-the-box" approaches.

The Information Services departments and their respective areas of responsibility are:

Information Technology Services Department (ITS): manages and directs the development and production activities for all hardware, software, information security, and telecommunication service and support components, which facilitate the effective distribution and operation of Information Technology functions. ITS is composed of the Help Desk & IT Labs, Information Processing & Technical Services, Information Security, Media Services, Policies & Procedures, Systems & Network Administration, and Voice Telecommunications.

Systems Development & Maintenance Department (SD&M): responsible for directing the creative design, development, and execution for all business and web systems, which support the academic and administrative processes of the institution. The Systems Development & Maintenance Department is made up of the Administrative Systems and Web Systems units. Administrative Systems is responsible for maintaining the enterprise software that is used to support the student services and business offices of the college. Web Systems manages Sinclair's web



sites, which include the Internet, Intranet, and Portal, plus the Angel online learning management system. In addition, Web Systems develops web-based, custom applications to support essential college processes. Examples of these custom applications include the Curriculum Management Tool and the Student Success Plan.

Library: responsible for administering and developing an effective program of library services and learning support activities in concert with the mission, goals, and objectives of the college. This includes management and leadership and fiscal responsibilities for the staff, the resources, and the facilities.

Research, Analytics & Reporting Department (RAR): the official source of all institutional data related to enrollment matters. In that capacity, the department handles the majority of external reports required by regulatory bodies as well as approved information requests from a wide variety of other organizations. RAR provides information for curricula and program review processes; conducts numerous surveys; and manages an annual Research Agenda comprised of over 100 widely varying projects.

Section 3 Major Accomplishments

FY 2007-2008

for



Major Accomplishments for FY 2007-2008

A wide variety of projects were in process or started during FY 2007-2008. Several were delayed due to budget constraints; some were cancelled due to the emergence of more effective technologies or alternative methods to achieve the same end result; a few will continue into FY 2008-2009. Many of those completed provide innovative processes for students, faculty, and staff. This section describes many of the more significant project accomplishments. Each project title has associated with it a color coded object to reflect the Sinclair Strategic Priority supported. These priorities are shown at the bottom of each page.

Library

Following are the major accomplishments for FY 2007-2008 for the Library:

☆ Exploring Library 2.0
 ☆ Fair Access to Information Project
 ☆ Measuring Student Response Project (Clickers)

★ Exploring Library 2.0

Social networking applications such as Facebook, Myspace, Flickr, YouTube, Wikipedia, LiveJournal, Digg, and del.icio.us have become popular among the students at Sinclair and other colleges and universities. Students use these applications to enhance communications with peers and build communities through blogging, podcasting, wikis, file sharing, tag clouds, and RSS syndication.

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Library 2.0 refers to the continuous improvement of library services through the use of technology and social networking tools to create a customer-centered, participative library environment. In part, it is the application of Web 2.0 to the Library. Librarians have always tended to work with static documents, whether web page, article, image, or book. Today's "digital natives" are much more comfortable using technologies such as IM, text messaging, and the like to actively engage with each other and accomplish tasks in a very participative manner. To be effective in the future, librarians must be able to engage new users in a manner they are comfortable with. Before this can happen, however, library staff must learn the technologies and develop the skills needed to use social networking tools effectively. Exploring Library 2.0 will be a year

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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long staff development process, modeled in part on the Learning 2.0 project originally developed by Charlotte Mecklenburg Library System.



Figure 3-1. Examples of social networking applications.

Qualitative/Quantitative Return on Investment: As the staff learn how to use these Web 2.0 technologies, it will be possible to reassess library services in the context of social networking. It will also be possible to better assess new library products that use these technologies. Thus, there are potential improvements in choice and delivery of library services, more acceptance of library resources by students, and better decisions made by library staff about the purchase of new products.

Actual Completion Date or Current Status: This project was completed on schedule. Librarians learned about a variety of popular and professional Web 2.0 technologies such as Myspace, Instant Messenger, digg, RSS, Facebook, and the like. After experimenting with various resources, the Library established a Library Facebook page, a Flickr photo sharing collection, and an interactive chat service with the KnowITNow project. The Facebook page attracted a Sinclair student who submitted photographs of the Library. Sharing photos is an example of web 2.0 participation. The Library's Flickr page has drawn attention from libraries and library school students across the country. We have had comments on photos and requests to use pictures of the redesigned library by several colleges and universities.

Student Success Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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☆ Fair Access to Information Project

While the new Library expanded the number of computers available to students, it also produced an increased demand for access to the technology. This demand often exceeds the supply of available computers and students end up circling the floor watching and waiting for a free computer. In many cases, the Library can loan a laptop to meet this demand. However, there are also times when all laptops are in use or students prefer – for legitimate reasons – to use a desktop unit.

The goal of the Fair Access Project is to find and implement a technological solution that will manage the waiting cycle and assure that all students have equal and timely access to information technology. Software has been identified to accomplish this task, and it will be tested and installed on the library's public desktop computers.

Thursday, February 20, 2003 Jun Mon Tue Wed Thu Fri Sat	п	ME	PC-1	PC-2	PC-3
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Figure 3-2. Sample computer reservation screen.

Qualitative/Quantitative Return on Investment: The software for this project cost \$4600, paid for by an information literacy grant. The goal with installation is to improve student and staff access to information technology by assuring that everyone has fair and equal access. If students have to wait for a computer, they will do so knowing that there is a fair process in place for assigning access. This will reduce the potential for frustration and anger. It will also improve the efficiency of operations by allowing staff to monitor use and assure that all available resources are used effectively.

Actual Completion Date or Current Status: The original target date was August 2007, but problems integrating it into the Sinclair network postponed its installation. After significant technical challenges, the ITS department and the vendor developed a working product in May 2008. Staff training is scheduled for May and installation will take place in the Library in June 2008.

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☆ Measuring Student Response Project (Clickers)

Audience response systems where students use a "clicker" to select an answer or vote on a question have been available for many years. In recent years, these systems have become more portable and user friendly. Advocates claim that use of such systems improves student learning and assists faculty in gathering meaningful data to measure learning. The Library looked at audience response systems last year with the intent of purchasing a system for use with information literacy instruction.

After review and discussion, it seems likely that other faculty might find such a system useful in classroom instruction. The Library therefore purchased a system for use in information literacy instruction and to share with interested faculty who wish to learn the technology and experiment with it in their classes.



Figure 3-3. Student using "clicker" to answer questions in class.

Qualitative/Quantitative Return on Investment: The TurningPoint hardware and software for this project cost about \$1265, over \$500 less than originally estimated, and which was paid for with revenue earned by the Library for teaching NYACK University students basic information literacy skills in a series of workshops.

Other measures of library information literacy instruction effectiveness are generally indirect - after the fact questions and comments made to faculty and the appearance of good sources in student papers and projects - neither of which can be directly measured or attributed to library instruction. Library instruction is expensive when faculty and librarian time are considered in addition to the dedication of an actual class period to the activity. Use of a response system provides librarians with direct measures of in-class engagement and short term learning.

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Further, by allowing faculty to use the clicker set, the benefits of the purchase can be expanded.

Actual Completion Date or Current Status: The Library purchased the TurningPoint package in September 2007, and began letting faculty use it beginning in December 2007 for staff development demonstrations and course preparation. Librarians began using it in English composition classes in Spring Quarter 2008. We will continue to expand its use in additional classes as appropriate.

Systems Development & Maintenance

Following are the major accomplishments for FY 2007-2008 for Systems Development and Maintenance (SD&M):

- \bigstar Convert to Colleague Release 18
- Minimum Implement Colleague "Wait-listing" Feature
- ☆ Implement Faculty Payload System
- ☆ Implement the E-Transcript Process
- Timplement Recommendations of AQIP Online Services to Students Project
- Timplement Financial Aid Changes
- Rewrite the Accuplacer/Colleague Upload Process
- ☆ Write Programs to Automatically Check for Degree Completion
- Automate and Streamline HR, Corporate, & Business Services Processes
- ☆ Implement Enhancements to Angel LMS
- ☆ Support Strategic Enrollment Management Initiative
- Combine our.Sinclair.edu with my.Sinclair.edu
- ☆ Create an Online Workflow System for Forms Processing
- Create Next Version of Curriculum Management Tool
- \bigstar Implement New Web Site Design

★ Convert to Colleague Release 18

This project included taking all of the necessary steps to assure that the next release of the Colleague software was installed without disruption to business operations. The new version, Release 18, constitutes a complete change in the underlying architecture supporting the student information system. This architectural change required that every program ever written by Sinclair staff needed to be upgraded. In addition, every user of the student information system needed to become proficient in using a graphical-user-interface as the access mode for Colleague. It is estimated that almost 20,000 hours of staff time has been devoted to this project over the three years of its life.

Student Success Work Force Development Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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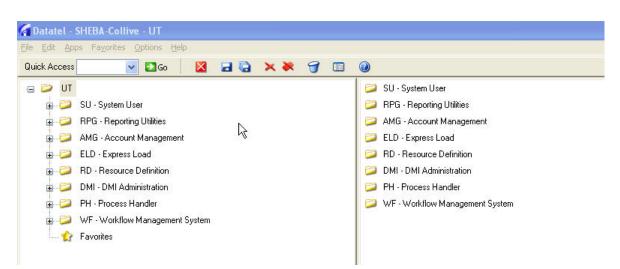


Figure 3-4. Converting the user experience to a graphical user interface (GUI – shown above) is one of the major features of going to Colleague Release 18.

Qualitative/Quantitative Return on Investment: The transition to release 18 was required, even though the change did not represent functionality enhancements for the end users. Without the change, Sinclair would have been in the position of operating an enterprise software system without benefit of support from the software vendor. In addition, there were back-office benefits from the new release. For the first time the software has a change tracking system that will improve management of software modifications. The release also positions Sinclair to transition to an SQL database in the not-too-distant future.

Cost savings/Cost avoidance: The transition has allowed the college to identify all instances of software customization that have accumulated over the years, and this knowledge positions Sinclair to continue the task of removing dependence upon this customization. Each removal of custom software translates into lower long-term maintenance costs.

Target Completion Date: February 2008

Actual Completion Date: April 2008

Implement Colleague "Wait-listing" Feature

Over the years interest has been expressed to implement the wait-listing feature of Colleague, but the ability to follow through on this interest has always been hindered by the high levels of labor associated with maintaining a wait-listing system. With recent changes to Colleague, this labor cost is now less of a problem. Under the previous version, when a student encountered a course that was full and requested to be put on the waitlist, it fell to the registration office to manually maintain records of

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what contacts had been made to a student once a seat in the section opened up. This labor intensive activity came at the same time as the hectic beginning-of-term activity. Under the new version, the Colleague program takes on the responsibility of managing the student notification, expiring eligibility, etc. This project involved making the necessary changes to the Colleague setup to allow the wait-listing feature to be turned on. These changes were accomplished as part of the conversion to Colleague Release 18.

Qualitative/Quantitative Return on Investment: The primary benefit of wait listing is the increased service provided to students. By implementing wait listing, students are much more likely to be able to enroll in their first-choice classes.

Cost savings/Cost avoidance: Larger class size should be a direct result of wait listing. By matching a history of those who have an interest in a class with timely information on seat availability, seats that would otherwise have gone empty are now more likely to be filled.

Target Completion Date: June 2008

Actual Completion Date: May 2008

☆ Implement Faculty Payload System

This project had as its goal to replace a paper-based faculty payload system with Colleague screens that update the course load/pay database in real-time. During plan year 2006-2007, the software change and pilot testing phases of this project were completed. This project involved rolling these features out to all academic chairs that have responsibility for making faculty instructional assignments. Use of this system allows Sinclair, for the first time, the ability to have a comprehensive view in one centralized database of all instructional resources used to deliver courses.

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Start/End Date 🛄 📃	9			
Instructional Workload				
Course	Start Date	End Date	Load	
CIS-238-50 INSTALLATION MGMT	09/13/00	12/03/00	0.00	^
CIS-238-50 INSTALLATION MGMT	03/27/00	06/11/00	0.00	
CIS-238-50 INSTALLATION MGMT	01/03/00	03/19/00	0.00	
CIS-238-50 INSTALLATION MGMT	09/17/01	12/09/01	0.00	
CIS-238-50 INSTALLATION MGMT	04/02/01	06/17/01	0.00	~
Non-Instructional Workload		Load	25.50	
		E 15 /	Land	
Activity	Start Date	End Date	Load	
	Start Date	End Date	Load	
	Start Date	End Date	Load	X
2	Start Date	End Date	Load	×
	Start Date	End Date		~
2	Start Date	End Date		S 2
2 3 4	Start Date	Load	0.00	< 2

Figure 3-5. The data entry screen above shows an example of how faculty payload information is entered into the Colleague ERP by academic chairs.

Qualitative/Quantitative Return on Investment: A consolidated, centralized database has allowed analysis of faculty pay that was not previously available without a significant amount of labor-intensive data input. This improved analysis has led to a more consistent application of work load across all faculty.

Cost savings/Cost avoidance: Approximately 80% of Sinclair's operating budget goes for personnel expenses. Accurate faculty payload information allows for more efficient use of a major component of this budgetary expense.

Target Completion Date: September 2007

Actual Completion Date: September 2007

★ Implement the E-Transcript Process

Ohio Board of Regents (OBOR) mandated that all public funded higher education institutions develop software to transmit academic transcripts according to Postsecondary Electronic Standards Council (PESC) XML standards. OBOR also mandated that 40 courses will be 100% transferable to any public funded higher education institution in Ohio and that communication of this transferability will be

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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accomplished via PESC XML standards. This project involved writing the necessary computer programs to facilitate compliance with these mandates. Sinclair was the first higher-education institution in the state to satisfy both the send and receive mandate from the Ohio Board of Regents, and the college's efforts were recognized and awarded by PESC as best practices.



Figure 3-6. The image above shows the transcript exchange standards developed by the Postsecondary Electronic Standards Council.

Qualitative/Quantitative Return on Investment: Electronic interchange of transcript information is a significant service improvement for students. Under a paper intensive process, it is not uncommon for transcript requests to take several weeks to move through both the originating and receiving institutions. Electronic exchange can reduce this time to seconds.

Cost savings/Cost avoidance: It is estimated that the registrar's office has been able to forego replacement of one clerical position as a result of having this e-transcript service in place.

Target Completion Date: OBOR did not set a mandated compliance date; however, Sinclair set an internal target for a functioning system by October 2007.

Actual Completion Date: September 2007

Implement Recommendations of AQIP Online Services to Students Project

There were no recommendations identified during this reporting period; therefore, the project was cancelled.

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Implement Financial Aid Changes

In Summer, 2007, the Financial Aid office underwent an extensive audit conducted by experienced financial aid leaders from other community colleges. The results of this audit indicated that the office could significantly benefit by using features that are built into the base Colleague financial aid module. This project involved providing support to the Financial Aid office as they implemented these previously unused features. The most significant feature implemented was financial aid packaging, which is the practice of using a computer algorithm to award "packages" of financial aid. This implementation removed the labor-intensive practices associated with manual packaging.

Qualitative/Quantitative Return on Investment: Auto packaging has significantly improved service to students. Once a student has completed all of the state and/or federally required submissions of financial aid information, Sinclair can immediately run the packaging algorithm and can offer students a program of aid.

Cost savings/Cost avoidance: Auto packaging is critical to students making an early decision to enroll at Sinclair. By having aid information immediately available, students know what their financial obligations for college will be and can therefore move directly to a decision to enroll.

Target Completion Date: August 2007

Actual Completion Date: August 2007

* <u>Rewrite the Accuplacer/Colleague Upload Process</u>

Accuplacer is a series of placement tests that degree-seeking students are required to take. The test results are used to correctly advise students into appropriate entry level coursework. Until academic year 2007-08, these tests were used almost exclusively for placement into remedial courses. During the current year, the use of the tests has been expanded to include placement into several college-credit math courses. This project involved rewriting the programs that transfer the information from the Accuplacer testing system into the Colleague database. In addition, the project involved adding the necessary logic in the Colleague system to allow the creation of associated equivalencies for college-credit math.

Student Success Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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Figure 3-7. Accuplacer from the College Board is one of the standard placement tools for beginning math and English coursework.

Qualitative/Quantitative Return on Investment: The primary qualitative benefit of this project is improved math placement for students and therefore an expected increase in math course work success.

Cost savings/Cost avoidance: There is no direct cost savings/cost avoidance associated with this project.

Target Completion Date: June 2008

Actual Completion Date: March 2008

Write Programs to Automatically Check for Degree Completion

In fall 2008, the Registration and Student Records office put new practices in place that eliminated the need for students to apply for graduation. Instead, degrees and certificates are to be awarded when students meet requirements for degrees, not when they apply to receive the degree. This project called for developing Colleague programs to assist in implementing this practice. The programs search for students who are within 10 hours of completing an academic program or certification. The programs also identify students who have already met the requirements for certificates or degree, regardless of whether or not the student has applied for graduation.

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Qualitative/Quantitative Return on Investment: Not depending upon student reporting to calculation the number of degrees completed should result in a more accurate assessment of Sinclair's performance on this major performance indicator.

Cost savings/Cost avoidance: This project has the potential to have a very significant impact on the amount of support Sinclair receives from the Ohio Board of Regents. In recent years, OBOR has placed increased importance on degree completion as a metric for an institution's success.

Target Completion Date: May 2008

Actual Completion Date: November 2007

Automate and Streamline HR, Corporate, & Business Services <u>Processes</u>

Systems Development & Maintenance has assisted several offices to implement technology changes that have increased efficiencies and decreased costs. The following are examples of two items completed during 2007-2008.

- Web Systems created course shells in the learning management system to assist faculty and students in mastering the use of this technology.
- Web Systems created a self-reporting update feature to the campus directory that increased the accuracy and timeliness of published directory information.

Qualitative/Quantitative Return on Investment: The learning management system course shells will allow the Distance Learning division to make successful completion of the online tutorial a prerequisite for students before they can enroll in online courses. The self-reporting campus directory relieves the human resources office of the maintenance work previously devoted to this effort.

Cost savings/Cost avoidance: The direct benefit of the online tutorial is an increase in student success for online courses. The direct savings of the self-reported directory is approximately 100 staff hours per year.

Target Completion Date: June 2008

Actual Completion Date: June 2008

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* Implement Enhancements to Angel Learning Management System

Angel, the college's Learning Management System (LMS) and portal solution, came out with a new release in late winter of 2007. This project involved assessment of this new release and planning for the implementation of the release. The assessment revealed that the release did not have the desired stability of features that would justify Sinclair becoming an early adopter. Consequently, plans for full implementation of the release were pushed out to Fall 2008. During this year, the project involved the preparation of a test instance of the new release of Angle that is being used to support a pilot adoption project run by Distance Learning. This pilot will be completed by the end of the Summer 2008 quarter.



Figure 3-8. Some of the instructional tools faculty can use with the Angel LMS

Qualitative/Quantitative Return on Investment: The new version of the Angel LMS contains enhanced assessment features that allow faculty a broader range of tools with which to measure student success.

Cost savings/Cost avoidance: Converting to the new version of Angel allows Sinclair to remain current with the software's most recent release, and therefore, will avoid the cost of operating software that is outside of the vendor's maintenance commitment.

Target Completion Date: February 2008

Actual Completion Date: March 2008

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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Support Strategic Enrollment Management Initiative

Strategic Enrollment Management (SEM) and Customer Relationship Management (CRM) are strategies Sinclair is using to increase enrollment. These efforts are supported by a major technical system that enables the tracking and management of large amounts of recruitment and prospect data. Systems Development and Maintenance assured that the selected software was installed and configured correctly, and that systems were in place, such as web portal technology, that permitted full use and exploitation of the software features.

Qualitative/Quantitative Return on Investment: Successful SEM and CRM efforts directly influence Sinclair's enrollment growth.

Cost savings/Cost avoidance: It is not possible to assert a direct causal relationship, but it is can be noted that within two quarters of actively using the CRM software, Sinclair's Spring quarter 2008 enrollment was the second highest on record.

Target Completion Date: October 2007

Actual Completion Date: October 2007

☆ Combine our.Sinclair.edu with my.Sinclair.edu

The long term strategy for Sinclair's portal systems has been to have a single unified system that supports all of the college's user groups. This project supported this goal by combining the our.Sinclair and my.Sinclair sites into a single web presence. When completed in June 2008, this project will consolidate information and resources into a single tool for Sinclair users.

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Figure 3-9. When the project is complete, my.sinclair.edu and our.sinclair.edu would be combined into one site with a common entry point.

Qualitative/Quantitative Return on Investment: This project combines two information systems into one and simplifies the user's access to these information sources.

Cost savings/Cost avoidance: The project will eliminate the need for approximately 100 hours of staff time a year to provide administrative support for both information systems.

Target Completion Date: May 2008

Actual Completion Date: June 2008

☆ Create an Online Workflow System for Forms Processing

The need for routing forms for approval in an electronic format is well recognized. This project focused on creating a web-based system to meet this need. The created tool manages the routing and tracking of the approvals of selected electronic forms, thereby eliminating the labor-intensive efforts required to manage a paper-based system.

Qualitative/Quantitative Return on Investment: The architecture of the tool is independent of the forms which are routed. Consequently, the tool is adaptable for use within multiple work flows.

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Cost savings/Cost avoidance: Significant cost savings/cost avoidance are expected to accrue as forms are added to the system and manual processes are eliminated.

Target Completion Date: February 2008

Actual Completion Date: May 2008

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eaveRequest				one above)			Y
gradeReport	Initiator	Y	Y	Y	description	1	Y
Budget Transfer request	R						Y
test233	Individual	Y	Y	Y	description	1	Y
test5							Y
Russ Test Workflow	Purchasing	Y	Y	Y	description	1	Y
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							-
Name test_m	ike						
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IsActive Yes							

Figure 3-10. The image above shows the way the workflow engine can be used to create an ad-hoc approval tree for a college form.

* Create Next Version of Curriculum Management Tool

Curriculum Management Tool (CMT) 2.0 is the continuation of the highly successful CMT 1.0. This project upgraded the technology used in the application to leading edge standards and incorporated new features to increase the systems value to the college. Implementation of CMT 2.0 continues to support the goal of making the process of creating, approving and disseminating curriculum easier and more efficient.

Qualitative/Quantitative Return on Investment: The CMT tool has allowed Sinclair's 170+ programs and 3000+ course offerings to be managed in a coordinated, centralized manner that promotes consistency and accuracy of curricular information disseminated to students, faculty, OBOR, and the public.

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Cost savings/Cost avoidance: CMT is one of the software products that Sinclair expects to sell commercially. The product has been promoted at the NISOD annual conference, and efforts are underway to establish a partnership with a for-profit firm to provide marketing and support for the product.

Target Completion Date: August 2007

Actual Completion Date: November 2007

☆ Implement New Web Site Design

The college web presence has been refocused to more actively engage and attract students to Sinclair. The overall look and content of the site has been refreshed based on a cohesive web marketing strategy developed by Sinclair's marketing group. This project called for Web Systems to assist marketing initiatives by providing technical support to reshape the website to meet the changing needs of Sinclair.

Qualitative/Quantitative Return on Investment: The <u>www.sinclair.edu</u> website is the front door and the initial impression for the majority of prospective students visiting the campus. This first impression is essential to promoting a student's enrollment decision.

Cost savings/Cost avoidance: There is no direct cost savings/cost avoidance associated with this project.

Target Completion Date: June 2008

Actual Completion Date: June 2008

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Figure 3-11. The image above shows the mockup of the new <u>www.Sinclair.edu</u> website with its emphasis on student-related information

Research, Analytics and Reporting

Following are the major accomplishments for FY 2007-2008 for Research, Analytics and Reporting (RAR):

- Tota Access and Reporting through the DAWN Portal
- Distance Learning Reports and Support
- \bigstar Centralization of Data via the Data Warehouse
- Add Reports on Web Usage to the DAWN Portal
- Support Allied Health's Selective Admissions Processes

Data Access and Reporting through the DAWN Portal

The purpose of this project was to facilitate the movement of existing Colleague reports (that are not reliant on up-to-the minute data) to the DAWN portal as part of the migration to Colleague's Release 18. Numerous reports have been moved or developed within the portal environment, minimizing the need to run reports in the more cumbersome Colleague environment. Those most recently deployed include:

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Enrollment Comparison Maps, Course Roster Reports, and an identification capability for sections with low enrollments. Stored processes now allow departments to select cohorts and track them through a series of courses, providing insight on student retention and success in course series. Customized to their specifications, cubes have been built for instruction and other service departments which can be accessed through web report studio. They include such items as: access to 14th and 30th day census data; a cube customized for chairs to provide data on graduates; and data cubes for the budget office. In fact, this is the first year that three major components of the budget development process for FY 2008-09 were performed via the portal.

The development of personalized dashboards to inform end users was initiated as new applications, that would be better aligned with institutional needs, were identified. This software and will be used to accommodate dashboards for a number of services and departments (see Continued Maturation of the DAWN Environment under projects for FY 2009).

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Figure 3-12. Web Report Studio.

Qualitative/Quantitative Return on Investment: More information was made available to end users in the budget development process, creating greater opportunities to appropriately align budget dollars based on actual departmental needs. Additionally, as a result of the increased use of the data warehouse, new opportunities to increase effectiveness and efficiencies are becoming evident, as users are uncovering new views of data that are better informing decision making.

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Information Services Status Report & Strategic Objectives



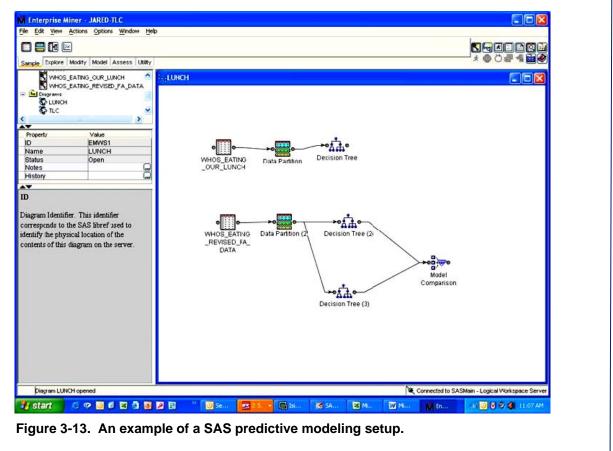
Cost Savings/Cost Avoidance: These products primarily have lent themselves to reducing opportunity cost for the institution. Course cancellation decisions can be made readily on a daily basis; faculty can evaluate curriculum based on student cohort tracking; chairs can now do outreach to their graduates to promote new courses of interest; and more realistic budget decisions can be made by departments using the trend information provided through the portal.

Target Completion date: April 2008

Actual Completion date: April 2008 with the exception of dashboards, which will extend into FY 2009.

☆ Distance Learning Reports and Support

Using the business intelligence warehouse and data mining techniques, the following aspects of the project were completed: 1) creation of online reports related to Angel including last login, and course survey results. Additionally, a report on the success of online course sections, when compared to traditionally-delivered sections, has been developed to demonstrate the effectiveness of online learning; 2) through data mining a model was developed to determine predictors of online success.



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Qualitative/Quantitative Return on Investment: Faculty have direct feedback on how well they are teaching their online classes. Some are incorporating this information as part of their faculty review. Additionally, the institution has a better understanding of the strengths and weaknesses of the on-line learning environment.

Cost Savings/Cost Avoidance: Enrollments in online courses need to continue to grow as the institution grows. By being able to collect and analyze student feedback regarding their on-line experiences, online faculty can make adjustments to their course delivery to maximize satisfaction, and potentially influence students to return to the online environment for other courses. By identifying predictors of on-line success, the college is better positioned to target their expansion efforts to best serve the needs of the college and the community.

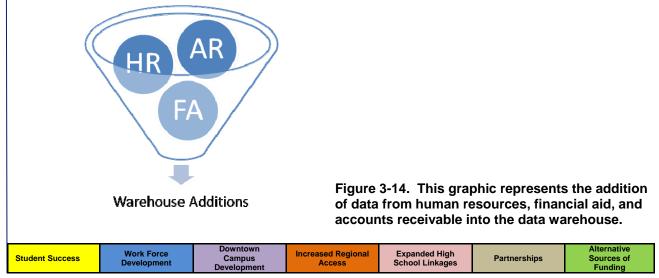
Fiscal savings of \$10,000 were realized by eliminating the need of an Angel consultant in the development of the above-mentioned Angel Reports.

Target Completion date: March, 2008

Actual Completion date: March, 2008

☆ Centralization of Data via the Data Warehouse

In order to increase the institution's ability to inform decision making through the centralization of data, more aspects of the Colleague database needed to be integrated into the data warehouse. This year the department was successful in migrating human resource (HR) data into the system, including the online application database. Reports were generated to provide end users the quarterly faculty payload report, which integrates human resource data with instructional information. A faculty load analysis report was produced by department to help instruction make decisions about needs for new faculty resources; opportunities to share resources; and where there were underutilized human resources.





The department also was able to map financial aid (FA) information into the data warehouse. This includes information about specific awards, award transactions, and student FAFSA data.

Accounts Receivable (AR) data has been added to the data warehouse as well. This data will be used to report student payment activity. Finally, several small sources of data have been added, including Student Bus Pass purchasing activity, a snapshot of OneCard from parking lots A through K and repeated class enrollment data.

Qualitative/Quantitative Return on Investment: As more databases migrate into the warehouse, the capability to view data from new perspectives, (for example, by combining faculty, course and human resource information together) increases the college's efficiencies. Request for new human resources within instructional departments can now be evaluated against existing institutional, rather than just departmental resources. This should lead to fewer new positions, and increased reallocation of existing resources.

Cost Savings/Cost Avoidance: For every new full-time instructional position avoided, an estimated savings of \$80,000 is realized.

Target Completion date: May 2008

Actual Completion date: April 2008

Add Reports on Web Usage to the DAWN Portal

Analysis of web traffic patterns, such as hits, navigation paths followed, when paths are abandoned, etc., has the potential to provide information as to how website visitors are currently using this source of information.

While initially, developing reports on web usage was chosen as a master plan project for FY 2008, the college thereafter acquired resources to revamp its web presence. This has been a substantial undertaking, and is still in progress. As a result, this aspect of the web redesign project has been reassigned to Sinclair's eMarketing Manager to accomplish after the web redesign.

As a result, no Research, Analytics and Reporting resources were employed in this effort.

Qualitative/Quantitative Return on Investment: NA

Cost Savings/Cost Avoidance: NA

Target Completion date: June, 2008

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Actual Completion date: Not Applicable – responsibility transferred to eMarketing Manager.

★ Support Allied Health's Selective Admissions Processes

At the request of the Systems Development and Maintenance Department, and the Allied Health Division (now known as the Life & Health Sciences Division), the employment of the data warehouse to facilitate the collection and analysis of information used in student selection was requested. This project has been delayed, and may be pursued in FY 2009.

Qualitative/Quantitative Return on Investment: NA

Cost Savings/Cost Avoidance: NA

Target Completion date: June, 2008

Actual Completion date: Project delayed

Information Technology Services

Following are the major accomplishments for FY 2007-2008 for Information Technology Services (ITS):

☆ SAN Firmware Upgrade ☆ Develop Systems Vulnerability Assessment Plan ☆ Internal Process Security Review Timproved Software Deployment Process ★★ Off-Campus Access to On-Campus Lab Applications Windows Vista Planning/Testing \star Encryption of Personal and Other Sensitive Information \bigstar Evaluate SMS as a Lower Cost Alternative to Altiris Redesign TCP/IP Network for VoIP Devices X Evaluate Alternatives to Student Email System ☆ Internet Usage Optimization 🛠 Expand Use of SharePoint Portal Server 🛠 Improved SPAM Filtering E-Discovery Law Compliance Capability ★ Voice over IP System Expansion The Implement Gigaman Circuit for Internet Access ☆ Implement Veritas Vaulting Application

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LCD Replacement
 Elimination of printing in the NOC
 Microsoft Office 2007
 Extended Help Desk Hours
 Courseview Campus Center
 IS Management Controls Audit
 Improved Recording of Student Speeches
 Eliminate Academic Media Delivery

- Television System Signal Improvement
- Replace Laptops on Multi-media Carts with Desktops
- \star VMWare Infrastructure Implementation

★ SAN Firmware Upgrade

In December 2007, Information Technology Services experienced a failure in its Storage Area Network (SAN) resulting in many systems and services critical to the function of Sinclair becoming unavailable. After all systems were brought on-line, ITS started investigating the cause of this failure. The investigation confirmed that a hard drive in the disk array had failed causing the whole array to degrade to the point where no disk resources were available. HP advised that this phenomenon, although rare, could occur again due to the version of firmware installed, which was not properly handling certain types of disk failures. HP recommended that we upgrade the firmware on the disk array to the latest version to prevent this from happening again.

Upgrading firmware on the SAN requires extensive research and planning due to the number of interconnected systems and devices. Additionally, keeping downtime to a minimum and as unobtrusive as possible was of utmost importance. "The SAN" actually consists of a number of interconnected devices. Starting at the server, it contains special interface cards known as HBA (host bus adapter) cards that provide fiber channel connectivity to the HP EVA 5000 disk storage system, or EVA, through fiber channel switches. For redundancy purposes, each server has two connections to the SAN and there are approximately 36 servers connected to the SAN as well as tape devices and a management server. The firmware on all these HBA's, switches and the EVA was upgraded as part of this project to prevent compatibility issues from arising. The SAN management software, Command View EVA (Figure 3-15), had to be upgraded as well due to the new firmware.

The upgrade of Command View EVA necessitated a change in the way Colleague backups are performed. Prior to the firmware upgrade, a product called Business Copy was used to take a snapshot of the Colleague data; then the backups ran against that snapshot. This is necessary because the Colleague database is always open and a snapshot is needed in order to successfully backup the open files. The new version of Command View EVA does not support Business Copy and a replacement product, Remote Storage Manager (RSM) was installed/configured to perform the snapshot operation of the Colleague application for backup purposes.

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Storage Systems EVA Storage Network SCCEVA01 Virtual Disks Disk Groups Data Replication Rack 1 Controller Enclosure 17 Disk Enclosure 11 Disk Enclosure 11 Disk Enclosure 1 Disk Enclosure 8 Disk Enclosure 8 Disk Enclosure 3 Disk Enclosure 3 Disk Enclosure 1 Unmappable Hardware		
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Figure 3-15. SAN Management software - Command View EVA.

Qualitative/Quantitative Return on Investment: This project was completed in order to prevent the SAN failure that was experienced in December 2007 from reoccurring.

Cost savings/Cost avoidance: The cost for this project was \$7,400. This was paid to HP in consulting fees to assist ITS personnel with planning and the actual firmware upgrade.

Target Completion Date: June 2008

Actual Completion Date: April 2008

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☆ Develop Systems Vulnerability Assessment Plan

The increasing scope and span of Internet-based information security attacks, coupled with the increased use of targeted, low-profile attack vectors and zero-day exploits, mean today's Internet-connected network is under continuous attack. New system vulnerabilities are discovered and exploited frequently, and the patches released to fix an identified vulnerability can sometimes create additional ones. One of the most effective ways the College can assess the security of its systems is to test them.

The objective of this project was originally to conduct a systems vulnerability test in FY 2007-2008. However, in scoping and scaling the project, it was determined that the size and complexity of Sinclair's systems infrastructure, coupled with changes in the threat landscape and updates to effective penetration test/vulnerability assessment methodology, would result in an unaffordable project cost. The vulnerability assessment plan has been divided into a cycle of three annual phases:

Phase 1: An external technical vulnerability evaluation Phase 2: An internal technical vulnerability evaluation Phase 3: A minimally technical, social engineering vulnerability evaluation

A Request for Proposal (RFP) was developed detailing the requirements (scope, approach, methodology), statement of work, and deliverables for conducting the external vulnerability assessment (Phase 1). The RFP was based on effective practices derived from multiple sources, including the NSA IAM/IEM, NIST standards, and CEH recommended practices. The assessment utilizes a "black-box" approach, (i.e. the assessor is provided minimal details and must assess the vulnerabilities using the same methodology a cyber attacker would use to compromise and access the systems). The RFP was submitted to 18 Vendors in April 2008; the majority have indicated intent to bid. The actual test is scheduled for completion in 1st qtr of FY 2008 -2009.

Qualitative/Quantitative Return on Investment: Systems vulnerability testing is a 'best practice' method of finding weaknesses. Proactive self-discovery of vulnerabilities is considerably less costly than recovering from a breach resulting from an attacker successfully discovering and exploiting a vulnerability that results in compromise of personal information.

Cost savings/cost avoidance: Systems Vulnerability tests cost between \$1,000 and \$100,000 based on the size and complexity of the network and on the scope of the test. Based on the size and scale of Sinclair's network block, an estimated cost of the external test is approximately \$20,000. Implementing effective security as a preventive measure is less costly—in dollars and public image—than the loss of production and recovery costs associated with a breach.

Target Completion Date: June 2008.

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Current status: An RFP was distributed in April 2008. The selected vendor will be asked to complete the assessment by the end of July 2008.

☆ Internal Process Security Review

The distributed nature of today's information systems environment, and the increasing expectation of 24/7, global access to information resources, results in an everincreasing number of internal processes to 'endeavor to meet the need,' and an everincreasing demand for rapid deployment. The distributed responsibilities throughout the IT functions for design, development, implementation, administration, and management of these processes and projects sometimes leads to 'stovepipes' that can result in reducing the effectiveness of an existing control, or rendering such controls obsolete or redundant due to technological improvements. The rapid pace of technology changes and the increasing complexity of information systems infrastructure further influence these processes.

The overall goal of the review is to ensure effective and efficient controls are in place to certify the confidentiality, integrity, and availability of Sinclair's information assets. This project involves identifying internal IT processes that are most susceptible to security-related issues, prioritizing the processes for review, reviewing selected processes with stakeholders, comparing Sinclair practices with generally accepted 'effective practices', and recommending improvements as warranted.

During the process identification phase, 36 processes were identified as candidates for review. Based on risk, complexity, ROI, and other variables, for FY 2007-2008, processes selected for review include:

- PC Disposal process
- Employee provisioning
- IT Employee orientation

Qualitative/Quantitative Return on Investment: Periodic review of internal IT processes serves as an internal audit control. Reviewing processes helps identify vulnerabilities that could lead to exploits, and very often identifies redundant processes or controls that add minimal or no value to protection of the asset. Ensuring security controls are effective and efficient maximizes the College investment in security resources.

Cost savings/cost avoidance: The project has minimal direct cost other than staff time and administrative resources. Cost savings may result from elimination of obsolete or redundant controls, but these savings may also be offset by safeguards required to patch identified vulnerabilities. Cost avoidance is the most likely result. Implementing effective security as a preventive measure is less costly—in dollars and

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public image—than the loss of production and recovery costs associated with a breach.

Target Completion Date: June 2008.

Current Status: Due to the number of potential processes identified during the identification/prioritization phase, this project has been extended to a multi-year project. Processes that have been completely reviewed in FY 2007-2008 include the ITS Inventory control process and the surplus equipment disposal process. Processes under review are the IT employee provisioning and orientation processes.

☆ Improved Software Deployment Process

Information Technology Services creates and maintains the software "image" on over 4000 computers that are used by Sinclair faculty, staff and students throughout the campus as well as at the Learning Centers, Miami Valley Research Park and the Courseview Campus Center. While the base image that is used on all of these computers is the same, the applications that are available within classrooms and labs differ depending on the requirements of the academic program taught within each individual classroom or lab. The result of the custom-building of images is that there are 67 different combinations of the over 700 individual applications available in the college's 203 computer labs and classrooms.

While the ability to custom-build and maintain images provides great benefits in the standardization and stability of the software provided to the college, the work involved in maintaining this number of different computer images is a challenge. When you add the following issues into the mix it becomes much more complex:

- Many applications overwrite settings that other applications use or install different versions of components.
- Some versions of applications cannot be run on a computer while other versions of the same application are running.
- Due to the issues stated above, it is very time consuming to add an application to an image. Many times the order that applications are installed must be changed due to conflicts, and these conflicts can only be found through spending lots of time testing.

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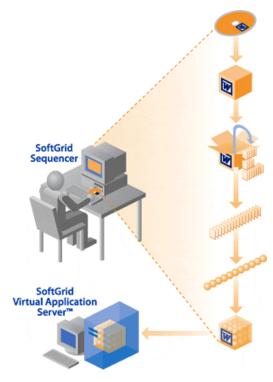


Figure 3-16. A representation of how an application is sequenced using SoftGrid.

ITS has begun using an "application virtualization" program from Microsoft called SoftGrid, which will drastically reduce the time involved in building and updating images. This is possible because of the revolutionary way that the programs are installed and run on the computer. Rather than requiring the installation of the full application, the administrator assigns a program to a user causing a shortcut to be created on the user's computer. The first time the shortcut is run only the part of the program necessary to start is loaded to the computer. In the background the program continues to install while it is being used.

There is only a small delay experienced by the user as the application installs and also when the application is run. However, the flexibility that SoftGrid will provide in quickly deploying applications more than makes up for the delay. Application installation modules will be able to be created once and re-used without the current testing for conflicts because each application runs within its own virtualized environment. This will also allow completely new combinations of applications to be created dynamically.

Because of the way that SoftGrid allows applications to be assigned to users and dynamically installed when they are used, the possibility of using applications in any space on campus becomes possible. This has great benefits over the way that full

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application installs are done within physical spaces. ITS is already using SoftGrid to deploy applications to campus computers and is re-building whole images that are used in academic classrooms and labs. The eventual goal is to allow a student to login with their own ID and access the applications that are used within the specific classes that they are registered for. Additionally, ITS is investigating technologies that will allow this same access to be available remotely, via the Internet.

Qualitative/Quantitative Return on Investment: The previous process for providing applications in academic classrooms and labs was not responsive to limitations in the college's course and room scheduling processes. This is due to the time involved in adding new applications into computer images and installing those changes in spaces. The new process will allow much faster turnaround as well as resolve issues caused by application conflicts.

Cost savings/Cost avoidance: ITS had evaluated SoftGrid several years ago when it was owned by Softricity. While excited about the possibilities that it offered, the cost of nearly \$250,000 with 20% annual maintenance was too high to be realistically considered. When Microsoft purchased the company to fill a gap in their software deployment capabilities, they offered the software at a annual subscription cost of around \$4200.

Target Completion Date: September 2007

Current status: August 2007

★★ Off-Campus Access to On-Campus Lab Applications

Two of the Strategic initiatives for Sinclair Community College are increased regional access and workforce training. One way to increase regional access is through the promotion of on-line learning and off-campus instruction. This project supports each of those objectives as follows:

 Increased Regional Access - Off-campus access to applications used in instruction will give more flexibility in designing courses and determining on-line offerings. In addition, the ability to access applications from remote locations may give more flexibility in scheduling classes and determining what classes are offered at these locations.

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• Workforce Training – These types of learners may not have the time, flexibility or budget to attend formal classroom training so the ability to provide the training and applications needed for the training, accessible outside the formal classroom, may be beneficial.

In addition, as technology progresses and people become more familiar with technology, the roles and expectations of teachers and learners are changing. New opportunities exist to provide education using technology to assist in these "informal" learning methods that will also provide immediacy and relevancy to the educational experience.

This project evaluated remote access technologies from Citrix and Microsoft. Sinclair currently uses Citrix to provide remote file access for off-campus use through the web site ctx.sinclair.edu. Also, the capability of Citrix was recently expanded for some faculty/staff with the addition of the Datatel UI application to enable remote users to access R18. While accessing ctx.sinclair.edu only requires a web browser and the Citrix client, there are some instances where downloading the Citrix client may not be practical, such as when using public PC's or kiosks. ITS found Citrix a workable solution for certain applications and functions but did not feel it would meet all of the needs due to the licensing costs of Citrix software and the work involved in porting all of the student applications to the Citrix environment.

Microsoft Intelligent Application Gateway (IAG) appears to meet more of the needs and is still being evaluated. IAG is a VPN solution that was originally developed by the Israeli army as a solution to provide remote access based on VPN technology without requiring direct network access from the remote client. In other words, applications can be securely provided for remote users, whether they are using Windows, Pocket PC, Linux or Macintosh clients without actually giving them access to the Sinclair network. In addition, IAG also provides endpoint detection, where IAG can examine the client computer for the presence of anti-virus, patches, etc., further protecting the Sinclair network.

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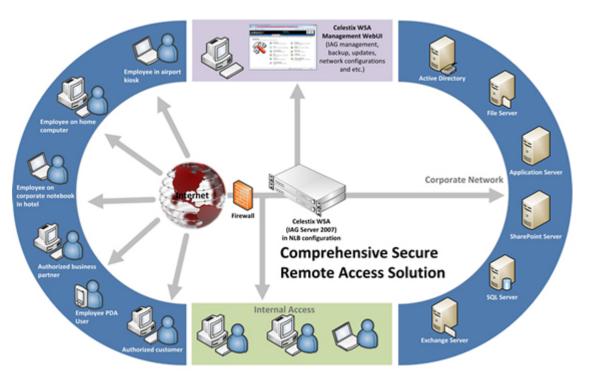


Figure 3-17. A representation of the functions provided by Microsoft's IAG.

Not only does IAG provide the security ITS was looking for, it also works with Terminal Services and SoftGrid to provide the application access. With ITS already using SoftGrid, and currently porting all student applications to SoftGrid, IAG can take advantage of the work already performed while making these applications remotely accessible. Educational pricing for Terminal Services and SoftGrid are also considerably less that an equivalent Citrix solution due to Microsoft Educational Licensing agreements.

While still in evaluation now, IAG appears to have the capability of providing secure and scalable remote application access to faculty, staff and students.

Qualitative/Quantitative Return on Investment: There are numerous qualitative benefits to providing access to applications originally only available on Sinclair's campus to users wherever they happen to be, using whatever operating system they prefer to use.

Cost savings/Cost avoidance: The cost of IAG is lower than the cost of continuing with the current Citrix system.

Target Completion Date: June 2008

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Current Status: The evaluation of IAG will be completed by June 2008.

★ Windows Vista Planning/Testing

In early 2007, Microsoft released Vista, the long-awaited successor to its Windows XP operating system. This operating system is a significant upgrade that has much greater hardware requirements than the previous version of Windows due to its enhanced user interface. Vista is not only a significant change for the end user; it also operates much differently in the way it communicates with servers and other network devices.

A base Vista image was developed to test the enhanced functionality of this software. The base image included the following core software applications:

- Roxio CinePlayer 2.2
- McAfee VirusScan 8.5i
- Microsoft MSXML4.0 SP2
- McAfee ePO Agent 3.6
- SCC Proteus
- Microsoft Softgrid Client
- Citrix ICA Client
- Microsoft Office System 2007 w/ SP1

The way in which images are built changed from Windows XP to Windows Vista. For Vista, images are assembled using Microsoft's Deployment Workbench (Figure 3-18) which differs from our normal scripted installation. Deployment Workbench was installed on a server for use in Vista image creation. Besides automating image creation and deployment, Microsoft Deployment Workbench also aids in the customization, packaging and deployment of applications, and can create hardware/ software inventory to assist in deployment planning. This latter function may prove useful if Vista is installed on existing workstations. Windows Vista has increased hardware requirements, namely memory and video card requirements, and may not run efficiently on some older workstations. The current plan is to install Vista only on new PC's during the normal R&R replacement process.

Application compatibility has not been tested at this time due to the use of SoftGrid for application deployment. Since SoftGrid applications run virtually, application compatibility problems associated with a different Operating System are minimal and are not being tested at this time.

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Figure 3-18. Microsoft Deployment Workbench showing the applications that will be incorporated into the core image.

Qualitative/Quantitative Return on Investment: Qualitatively, the benefits of using a Vista image in labs will benefit the students because they will be familiar with the latest Operating System that may be used in businesses where they are seeking employment. In fact, some departments are already planning on using Vista in their images. However, industry experts are reporting slow adoption of Vista in the business community due to application incompatibility, increased hardware requirements and costs associated with end user training, to name a few. Therefore, it is difficult to determine an ROI for this project. Microsoft plans to continue to support Windows XP until 2012, so all workstations will have to be migrated to Vista by that date.

Cost savings/Cost avoidance: Existing hardware replacement procedures and software contracts will allow this project to move forward with no additional costs.

Target Completion Date: June 2008

Current Status: This project is on schedule to be completed by June 2008. Since efficient deployment requires the use of Microsoft Server 2008 and Microsoft System Center Configuration Manager 2007, a server has been provisioned and the required software is being installed.

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★ Encryption of Personal and Other Sensitive Information

Theft of personal information has become the primary goal of today's cyber criminal. Colleges and Universities are prime targets for a number of reasons, the primary ones being the sheer volume of personal information stored in systems and the "open to the public" nature of campuses. According to *The ESI Year in Review*, the year 2007 marked a significant change for information security incidents reported in the news:

- Total Number of Incidents: 139, a 67.5% increase over 2006
- Total Number of Institutions Affected: 112, a 72.3% increase over 2006
- Total Number of Incidents by Type
 - ♦ Employee Fraud: 1
 - Impersonation: 3
 - ◊ Loss: 12
 - o Penetration: 30
 - ◊ Theft: 39
 - Unauthorized Disclosure: 53" (<u>http://adamdodge.com/esi</u>)

The current most effective technical solution for protecting personal data is using data encryption. Encryption also provides a 'safe haven' exemption from reporting requirements in the event of personal information loss or theft. The objectives of this project were to research, test, and implement encryption solutions, and to develop guidelines, policies, and procedures for these solutions, to protect personal information on campus systems and media.

The initial approach was to explore enterprise-wide, centrally managed solutions that provided flexibility and a user-friendly interface to encryption with minimal risk of data loss due to lost encryption keys. Three key features desired were seamless full-disk encryption for portable devices, ability to selectively encrypt files and folders, and central or redundant key management to provide recovery of data in the event the user lost (or was unable/unwilling to provide) the encryption key.

Four enterprise-level solutions were evaluated. None of the affordable solutions offered an effective centralized/redundant key management solution for full disk encryption. It was determined the risk of data loss outweighed the increase in protection offered by encryption over the currently implemented DriveLock solution. This will likely change as the encryption market matures. The introduction of the native "Bitlocker" feature in Windows Vista Enterprise and Ultimate editions may also be a viable solution as migration increases.

An alternative (to enterprise-managed) solution, was researched, tested, selected, and implemented. Four freeware/open source solutions were tested for ease of use while

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still offering acceptable protection. All of the tested solutions worked well, but a product from Axantum Software slightly outperformed the others and was selected. This software permits users to encrypt files and folders, and is completely managed by the users. Procedures and guidelines for use were developed and published.

Qualitative/Quantitative Return on Investment: Utilizing encryption to protect personal information is currently becoming a De Facto standard, and is a mandatory requirement for transmitting and storing some specific types of data (e. g., credit card information). Encryption is also considered a 'safe-haven' under Ohio's and other states' personal data breach disclosure laws.

Cost savings/cost avoidance: The average cost of commercial enterprise encryption solutions offering centralized/redundant key management was \$250 per license at time of evaluation. The WinZip encryption solution is part of the administrative PC image and is no additional cost. The AxCrypt software is 'freeware' and also is no cost to the college. However, the WinZip and AxCrypt solutions are completely controlled by the individuals using them, so there is a potential cost to the College if the keys are lost or otherwise unavailable.

As with most security measures, cost avoidance is the most likely result. Implementing effective encryption solutions as a preventive measure is less costly—in dollars and public image—than the loss of production and recovery costs associated with a breach.

Target Completion Date: June 2008.

Actual Completion Date: January 2008.

☆ Evaluate SMS as a Lower Cost Alternative to Altiris

Microsoft Systems Management Server (SMS) is an application that assesses, deploys and updates servers and workstations. In Fiscal 2007-2008, Information Technology Services (ITS) created a project to evaluate Microsoft SMS against Altiris. Altiris is the software application ITS uses primarily to deploy software images to workstations and servers. There were two primary reasons for this project. One was the drastically lower cost of SMS compared to Altiris due to Microsoft's favorable educational licensing structure. The second reason was the maturity of SMS and features and improvements made to the application since it was last tested, over 6 years ago.

For the evaluation, ITS documented the features of Altiris that were the most important and compared those features against SMS. One of the most important capabilities Altiris possessed was multicasting. Multicasting is a technology that enables a single sender to send data to multiple receivers at the same time, using a single data stream. This is similar to a person speaking to a group where the speaker only has to state

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something once and all members of the group can hear it. The speaker does not have to say the same thing to all members of the group individually. Multicasting enables the deployment of software images to occur efficiently using minimal bandwidth.

Initially, SMS did not support multicasting; however, in October 2007, Microsoft introduced Systems Center Configuration Manager 2007 (SCCM) as a replacement for SMS. After this product was released, its multicast capability was unclear. Some literature said that it was available, some said that it wasn't, and some said that it was available with some constraints. Due to this inconsistency, the project was closed because the preponderance of evidence seemed to lean toward multicasting not being available. In February 2008, Microsoft released Windows Server 2008. Soon after the release of this software, it was discovered that Systems Center Configuration Manager 2007 installed on Windows Server 2008 does support multicasting.

Based on this information, a new project was created to install and evaluate SCCM against Altiris. The scope of this project is as follows:

- Install/Configure Windows Server 2008
- Install/configure SCCM
- Test the image deployment capabilities of SCCM by deploying a Windows Vista image to a single workstation.
- Test the image deployment capabilities of SCCM by deploying Windows Server 2003/2008 to a server.
- Test the multicast capabilities of SCCM by deploying a Windows Vista Image to a group of Workstations.
- If these tests are successful, SCCM will be tested against the other Altiris features documented in the earlier project.

Qualitative/Quantitative Return on Investment: Altiris is not a very stable application and migrating to SCCM may free up staff resources to be used on other projects.

Cost savings/Cost avoidance: Migrating to System Center Configuration Manager from Altiris will save approximately \$37,000 annually in maintenance and licensing fees. No additional hardware costs are anticipated because the servers used for Altiris are scheduled to be replaced in 2008 per the R&R schedule.

Target Completion Date: September 2007

Actual Completion Date: October 2007.

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★ <u>Redesign TCP/IP Network for VoIP Devices</u>

TCP/IP stands for Transmission Control Protocol/Internet Protocol, a suite of protocols that is used by computers and other devices to communicate over the global Internet. In essence, it is the "language" and underlying rules whereby network devices communicate with each other. At Sinclair, all devices connected to the network use TCP/IP to communicate. For this communication to occur, each device on the network must have a unique IP address.

As Voice over IP (VoIP) is implemented, each of the approximately 2,000 telephones across campus will also require their own unique IP address. In some cases, the increase in the number of VoIP devices is larger than the number of unique addresses currently available for an area. This project evaluated alternative IP schemes to use for these IP phones so the solution will be scalable, secure, provide high availability and not affect the other network devices on campus.

Non-routable IP addresses were selected for the phone network. A non-routable IP address belongs to a specific group of addresses designated by RFC 1597 to only be used internally and that will never go through the Internet. The IP scheme was designed so that each switch chassis is a separate network, the same way the data network is designed. In fact, the IP scheme actually parallels the data network scheme. For example, if a building uses a data network IP addressing scheme of 140.106.68.x, the phone network will use an IP scheme of 10.4.68.x, with the third set of numbers being the same. This IP scheme can scale to 510 phones per building and since this network is separate from the data network, neither will affect the other. This scheme was documented and all switches and routers across campus are now being configured according to this document.

Qualitative/Quantitative Return on Investment: Having the phone network separate from the data network will improve the quality of voice traffic. The scalability designed into the plan will accommodate future expansion, and by using existing infrastructure, additional capital costs are avoided.

Cost savings/Cost avoidance: This redesign project was completed using internal ITS resources rather than contracting with an external vendor thereby minimizing the cost.

Target Completion Date: June 2008

Actual Completion Date: December 2007.

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★ Evaluate Alternatives to Student Email System

In 2002, Sinclair Community College began evaluating various email packages for the soon to be released my.Sinclair portal. Requirements were developed for this email system to help in the evaluation of various products available at that time. No single product met all of the requirements, but a product called iMail from IpSwitch met the majority of the requirements and was selected as the student email system.

Five years later, technology has changed along with some of the requirements. Based on current system performance and Help Desk reports, there are some scalability concerns, which bring into question the viability of the current student email system as Sinclair continues to grow.

Microsoft live@edu and Google Gmail hosted email solutions were tested and compared. Both offerings are free to educational institutions. Of the two, we chose Google (Figure 3-19) to recommend as the replacement for iMail. The Google offering appeared to be a more mature product, had a more complete feature set and had the tools necessary to automate account creation and maintenance.

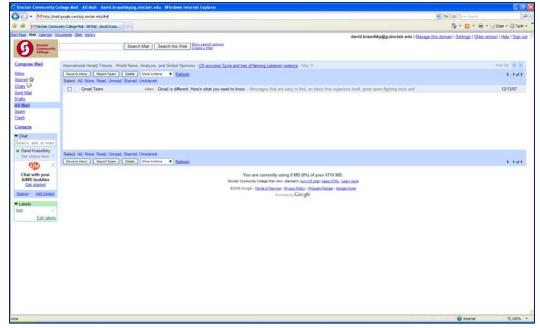


Figure 3-19. Primary mail interface for Google mail portal.

The Google mail offering is feature rich and will provide the students with additional functionality over the current iMail based email system. Some of these benefits are:

 Email storage capacity: Sinclair currently provide students with 10MB of email storage whereas Google provides 6710 MB of storage for both email and files.

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- A calendaring function is provided with Google not available with iMail.
- Google provides Document, Spreadsheet and Presentation software applications that are compatible with Microsoft Office applications so students can create/edit these types of files using an internet browser from anywhere they have an internet connection.
- File sharing and collaboration capabilities.
- The ability to customize the Google portal with other Google applications and plug-ins that Google provides.

Google provides Application Programming Interfaces (API's) to help institutional systems integrate with the Google systems. ITS successfully tested the automated account creation process API. Google also provides API's that could potentially integrate their email portal into Sinclair's Single Sign-On and Angel portal, although this functionality has not been tested. Testing of these functions will be included in the scope for the actual migration project next fiscal year.

Qualitative/Quantitative Return on Investment: Using the free offering from Google will save approximately \$8,000 annually in software maintenance costs. The Google offering should also result in increased user satisfaction due to better performance and usability. Account management/maintenance costs are projected to be unchanged since those functions have to be performed regardless of the solution chosen.

Cost savings/Cost avoidance: There were no costs associated with this project as ITS only evaluated technologies.

Target Completion Date: June 2008

Current Status: The project is scheduled to be completed by June 2008 and is on schedule. Formal documentation of the findings is the only part of this project remaining.

☆ Internet Usage Optimization

The College's dependence on Internet connectivity continues to increase. While ITS has addressed this issue by increasing the capacity of Internet connections, this is not the only strategy that should be pursued. In FY 2006-2007, ITS reported on a project to install/configure a PacketShaper device (shown in Figure 3-20). The purpose of this device is to categorize network traffic and allow the manipulation of that traffic in order to improve network performance.

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The primary way that traffic is manipulated is by defining the priority of traffic and by assigning limits to the amount of bandwidth that applications can use. This gives the most critical traffic the highest priority and gives other less critical and non-business-related traffic lower priorities so that the quality of service for business critical functions can be assured. When this project was initially reported, it was still analyzing network traffic to determine what traffic should be manipulated. After this analysis, it was determined that the majority of bandwidth was being consumed by HTTP (hyper text transfer protocol), or internet browsing traffic coming from sites such as youtube, myspace and facebook, among others. In fact, it was determined that some users were consuming up to 45 mb of bandwidth. Due to this, each PC was limited to 1 MB of Internet bandwidth. External video conferencing traffic was likewise limited to 1 MB of bandwidth during testing. Video conferencing has the potential to use a substantial amount of bandwidth, and by controlling this usage, adequate internet bandwidth for the rest of the College can be maximized.

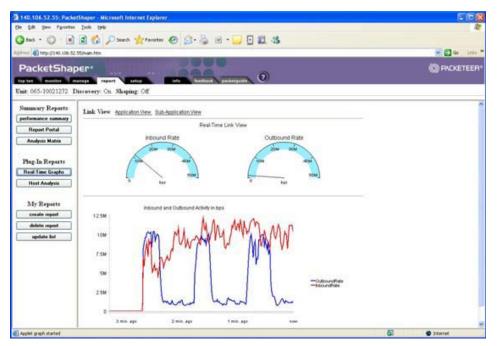


Figure 3-20. PacketShaper real-time utilization statistics.

Qualitative/Quantitative Return on Investment: More efficient use of the Internet connection, will delay the need to increase the capacity of the connection.

Cost savings/Cost avoidance anticipated for the project: Utilization of the PacketShaper allows the amount of bandwidth purchased to be optimized.

Target Completion Date: July 2007

Actual Completion Date: August 2007

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★ Expand Use of SharePoint Portal Server

In 2005, Information Technology Services created a documentation repository using Microsoft Sharepoint 2.0 technology with the objective of eventually listing all official ITS procedures. The repository, named the ITS Procedures Manual, is shown in Figure 3-21 below:

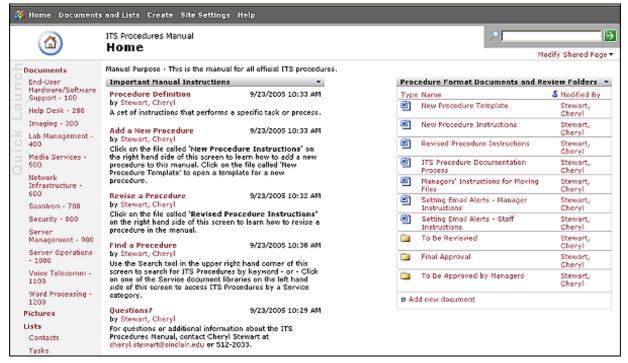


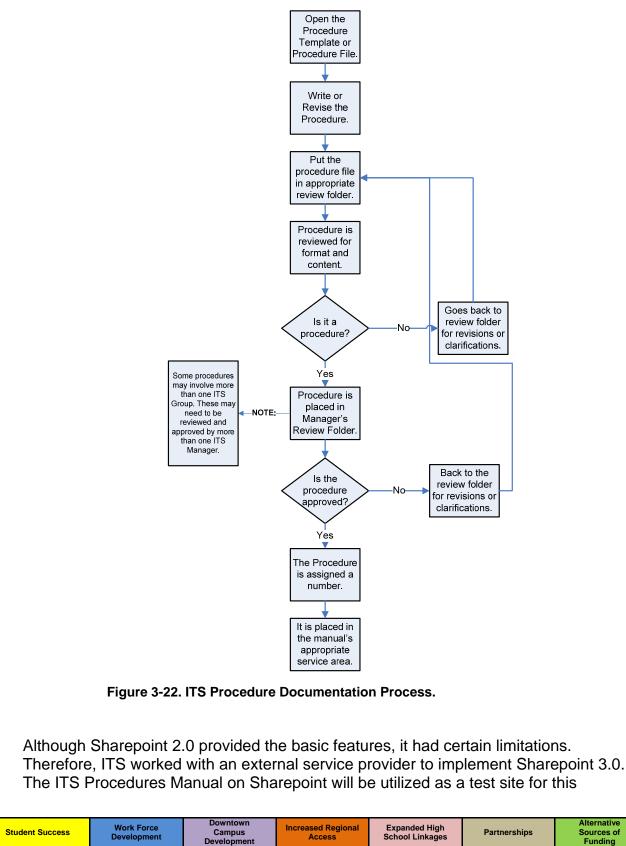
Figure 3-21. ITS Procedures Manual.

ITS staff have been drafting procedures and adding them to the manual. The added procedures undergo an extensive review process before being added to the manual, as illustrated in Figure 3-22.

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ITS Procedure Documentation Process



Information Services Status Report & Strategic Objectives



implementation. Sharepoint 3.0 includes workflow capabilities, Web 2.0 features, and Wiki capabilities. With these capabilities, ITS will be able to create a more flexible and useful procedures manual on Sharepoint and will be able to apply what is learned to other areas in the department and possibly to other areas of the College.

Some Sharepoint 3.0 features are shown in Figure 3-23.



Figure 3-23. Application templates Sample site.

Qualitative/Quantitative Return on Investment: The current manual will be improved with more convenient workflows and additional features. The Sharepoint 3.0 features can be applied to other uses and needs.

Cost savings/Cost avoidance: Staff time/effort will be saved by implementing workflows and new features.

Target Completion Date: June 2008

Current Status: Sharepoint has been upgraded and the ITS Procedures Manual site has been migrated. This project will carryover into the next fiscal year, and perhaps beyond, as new methods and procedures are incorporated.

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★ Improved SPAM Filtering

Sinclair's mail relay servers create a buffer between the internal mail systems of the college and other mail servers throughout the Internet. In addition to handling the workload involved in sending and receiving mail, the servers scan all inbound email for viruses and SPAM. The continual increase in the amount of legitimate email, as well as the increase in the amount of SPAM that is received creates a tremendous load on these systems.

For several years ITS has maintained mail relay servers that are built on public domain software. This means that the software is available to the public at no charge. However, the work involved in maintaining the software shifts the cost from paying for the software to the cost of using college personnel to provide a higher level of support for the systems. The combination of the opportunity cost of the internal resources that are tied up maintaining the mail relay system, and the lack of functionality of the previous SPAM filtering system dictated the evaluation of other alternatives.

Several products were evaluated and CanIT Pro from Roaring Penguin Software was chosen due to the similarity in the way that SPAM is filtered. While the scoring of SPAM and the setting of thresholds for rejecting and tagging of SPAM works the same way that Sinclair users have grown accustomed to, it adds additional capabilities as well. Some of the new features are user definable white-list and black-list creation and quarantining and release of SPAM that is held in a "trap".

🚖 🕸 📳 My Filter - Canit	-Domain-PRO		💁 • 🖾 · 🖶 • 🔂 8
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The E-mail Filtering i		edu 🛩 View This Stream	
ome · Trap Contents	s · Rules · Reports · Preferences		
My Filter			
Accept and Reje	ect List		
Always accept mail f			
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AII: 🥐 🖌 🗙			
Submit Changes	Subject	Sender 💐	factor.
2008-05-12	Fwd: Find a debt	smccollum@	Status Pending
15:26 Mon	relief company fast	woh.rr.com	Do Nothing
2008-05-12 09:20 Mon	You have 17 pending message(s) in stream base:scot	digest@ sinclair.edu	Do Nothing
2008-05-12 08:11 Mon	Fwd: Eliminate debt without loans or bankruptcy	smccollum@ woh.m.com	Pending Do Nothing
2008-05-12 08:04 Mon	Fwd: Scott, 20.0 Dollars Paid Surveys from Panda	smccollum@ woh.rr.com	Pending Do Nothing
2008-05-11 21:31 Sun	FW: There are very few outlets left to people who	smccollum@ woh.rr.com	Pending Do Nothing
2008-05-06 16:56 Tue	Fwd: Scott, What do YOU watch on TV???	smccollum@ woh.rr.com	Pending Do Nothing
2008-05-06	Fwd: Does Scott Have It Too???	smccollum@ woh.rr.com	Pending Do Nothing
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Qualitative/Quantitative Return on Investment: ITS estimates a two year payback for the purchase of this system, based on the cost of the new system being roughly equivalent to the annual salary of a Systems Engineer and the fact that the previous system required about 50 percent of a Systems Engineer's time.

Cost savings/Cost avoidance: While the new system will cost more from a hardware and software perspective, it will have a reduced cost of administration.

Target Completion Date: December 2008

Current Status: The CanIT servers have been placed in production in front of the student email system, which has helped to reduce the load on the older mail relay system. Making all faculty/staff mail go through the new system is being tested currently and should be in production by the end of August 2008.

<u>E-Discovery Law Compliance Capability</u>

On December 1, 2006, the US Supreme Court amended the Federal Rules of Civil Procedure dealing with preservation and production of electronically stored information in the event of litigation. These rules apply to virtually anything that can be stored in an electronic format, including electronic documents (and drafts), databases, spreadsheets, e-mail, system logs, cache and temporary Internet files, digital recordings, voice mails stored in an electronic format or accessible via a computer, and telephone logs.

The focus of this project was to (1) determine the capability of Sinclair, particularly IT, to efficiently and appropriately comply with e-Discovery orders resulting from litigation and other types of legal action, (2) identify shortfalls, and (3) develop/recommend solutions to ensure efficient and effective compliance.

Events occurring mid-project reinforced preliminary findings that ITS is capable of complying with large scale *preserve* orders via "freezing" of back-up tapes, but has no capability to search for, identify, and *produce* documentation specifically targeted by these orders. The College has some capability to comply with "preserve and produce" orders for mid-level (a few PCs, shared folders, email accounts) requests, providing the specific identity, time frame, and location of files is known. However, there is some question as to how forensically sound or acceptable to the courts these methods are. The college has a fairly robust capability of compliance with narrow requests such as involving a single individual, PC, and/or mailbox. The ability to search for specific information types, documents, etc. across the enterprise is non-existent.

Preservation via freezing of back-up tapes is overly-broad, cumbersome, expensive, and not efficient. Individual open source solutions are sufficient for single-event, small-scale response, but these solutions are not scalable. To effectively and efficiently

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comply with e-discovery requests, some type of data identifying, archiving, and indexing solution must be used.

Ideally, the College must develop or purchase a solution with the capability to address, find, categorize, and index all data across the network. This will permit ITS to assist legal counsel to identify, preserve and process data from desktops, servers, data repositories (such as shares), databases and email. However, these solutions are not inexpensive, and implementation in an academic environment raises numerous cultural and political issues. At a minimum, since the vast majority of e-discovery requests focus on email, an email archival/search solution should be deployed.

Qualitative/Quantitative Return on Investment: The Supreme Court ruling makes this a Federal mandate; compliance is mandatory. Failure to comply, or at least make reasonable efforts to comply, could subject the College to significant sanctions and costs in the event of future litigation. In one recent case, a court fined a company \$15 million for failing to properly identify electronically stored information. Complying with preservation orders via "freezing" back-up tapes is not an acceptable solution and is expensive. A single request can require freezing \$5400 worth of tapes indefinitely, and the cost to restore, search, and produce requested documentation from them easily exceeds 10 times the cost of the tapes...if the capability to do so is in-house.

Cost savings/cost avoidance: The purpose of this project is primarily cost avoidance. Proactively developing policies and procedures, and otherwise planning for preservation, retention, and production of electronic information 'on demand' is significantly less expensive than forensically retrieving and restoring this information from backup tapes and other archival media.

Target Completion Date: May 2008.

Completion Date: Assessment and general recommendations completed by May, 2008. Evaluation of possible solutions and implementation is planned for next year.

* Voice over IP System Expansion

Over the past 2 years, Sinclair has been using the ShoreTel communications system as a primary phone system for the Englewood Learning Center and Huber Heights Learning Center and in September, 2007, another system was successfully deployed for the Courseview Campus Center in Mason. During this last year, four-digit dialing between the main campus and Englewood, Huber Heights, and Courseview was implemented to increase productivity and further integrate the systems to provide a more seamless operation between locations and gain administrative and operational efficiencies between locations.

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The phasing of the implementation of VoIP for this expansion of the original pilot has continued to now include over 200 phones across the Dayton campus. The phasing of the expansion began in April 2008 and it is anticipated that it will continue until it is completed in July or August 2008. This expansion will include the ITS department, the Help Desk, and other selected groups of users throughout the main campus in order to have a planned approach that will be carefully monitored and controlled.



Figure 3-25. VOIP communications companies.

Qualitative/Quantitative Return on Investment: As a result of this expansion, many network and phone system issues have been identified and resolved. On-going support issues are being identified since this system will also involve the use of Sinclair technicians in the future. Throughout this planned expansion, considerable experience has been gained, issues have been resolved, and the careful planning will result in future operational efficiencies. As this project has progressed, Sinclair has negotiated a favorable discount on all ShoreTel hardware and software through Accent Communications Services.

Cost savings/Cost avoidance: The overall cost of this project will be less than \$200,000. The age of the existing system and the fact that the manufacturer is no longer in business causes a level of risk that could be very costly.

Target Completion Date: June 2008

Current Status: Contract negotiation delays caused the project completion to be extended. This phase of the phone system's implementation will be completed by August 2008.

★ Implement Gigaman Circuit for Internet Access

With the rising costs of transport access to the Internet caused by increased usage, Sinclair was able to obtain a grant, with the help of OSCnet, to negotiate a larger

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capacity circuit at a low ongoing monthly cost. Although this project was started over a year ago and was in danger of being cancelled, it is now nearing completion. The service itself is a fiber-based service provided by AT&T to connect Sinclair to OSCnet's network at a potential rate of 1 gigabit per second. At this time, Sinclair will not be using the full potential, but it will provide significant capability to grow into that capability without incurring additional physical connection costs.



Figure 3-26. Map of OSCnet, Ohio's education and research network backbone.

Estimated Cost of Project: A \$120,000 grant from the Ohio Board of Regents is funding the installation of the circuit.

Cost savings/Cost avoidance anticipated for the project: The new circuit will lower Sinclair's recurring costs by over \$12,000 annually.

Target Completion Date: November 2007

Current Status: This project was delayed by AT&T's inability to connect in the Dayton Central Office. They are now planning on making the connection in Springfield with a completion date of May 23, 2008. Transferring Sinclair's service to this connection and elimination of the old link will be complete by June 2008.

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★ Implement Veritas Vaulting Application

ITS has purchased a product from Veritas known as NetBackup Vault. NetBackup is the software that ITS uses to perform all of the backups of the data on the College's servers, and Vault is an additional component of NetBackup. Vaulting software decreases the ongoing cost of purchasing backup tapes and provides improved file restore response to users.

Implementing the Veritas NetBackup Vault option reduces the number of tapes sent offsite for storage and provides a full copy backup in the tape library in the computer room. When tapes are due to be sent offsite, the offsite option is executed in the Vault software; vaulting then takes the set of 25 tapes in the library, writes only the data to tape without each tape's blank space; and creates an offsite copy that uses approximately half the amount of tapes as the original backups.

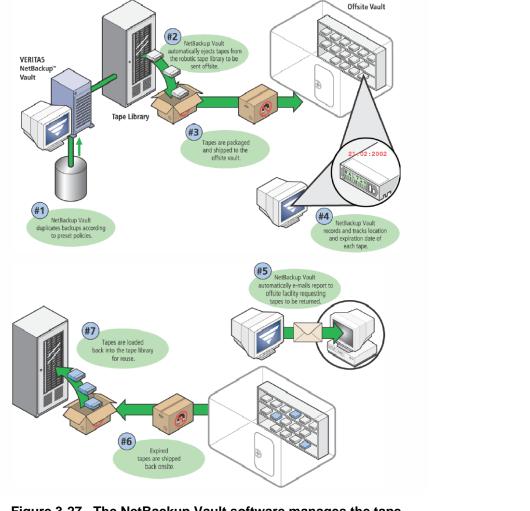


Figure 3-27. The NetBackup Vault software manages the tape duplication and vaulting function.

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Qualitative/Quantitative Return on Investment: The Veritas Vault software cost \$12,490. Using Vault, ITS can reduce the number of tapes required to complete a monthly backup by 48 tapes. Since the retention schedule for monthly backups is 12 months, annual tape usage will be reduced by 576 tapes. Based on a tape price of approximately \$27.00, the breakeven point is less than ten months.

Cost savings/Cost avoidance: With the new state discovery requirements, Sinclair will need tapes which can be held indefinitely and the Veritas Vault feature will free up existing tapes that can be used for this. In addition, Vault will enable ITS to restore user files faster.

Target Completion Date: December 2008

Current Status: This project will carryover into the next fiscal year to ensure that all functions are adequately tested.

★ LCD Replacement

Several years ago ITS performed an analysis of the cost of LCD monitors compared to the cost of CRTs that had previously been part of the standard PC configuration and determined that over the life of the monitor it would be more economical to purchase LCDs based on their increased useful life and reduced energy consumption. Since that time ITS has received even better pricing than was used in the original analysis.

In addition to the financial benefits, ITS identified the following qualitative advantages with the LCD implementation: reduced footprint (space saver); low radiation emissions; and extreme image clarity (150 pixels per inch on LCD compared to 80 pixels per inch on CRT). With these advantages in mind, ITS began purchasing and deploying LCD monitors across campus with the replacement of the system unit. This year the four year project to replace all CRT monitors with LCD's was completed.



Figure 3-28. LCD Monitor.

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Qualitative/Quantitative Return on Investment: Upgrading the monitors saves the college energy costs. The extended useful life of the monitor also reduces the average yearly cost for replacing monitors.

Cost Savings/Cost Avoidance: The cost of upgrading all CRTs to LCDs is built into the replacement cost of the PCs in the Renewal & Replacement model. The annual budget for PC replacement has been reduced due to the ability to use the LCD beyond the life of the PC.

Target Completion date: May 2008

Actual Completion date: February 2008

★ Elimination of printing in the NOC

ITS has provided Colleague users with the ability to print reports and labels in the computer room or NOC (Network Operations Center) for many years. In the interest of cost savings, a task force was created to eliminate the printers in the computer room and provide users with other options. Some of the options identified included using departmental laser and generating PDF files which can be saved to electronic or optical media. While PDF printing from Colleague was previously available, it is made easier using the Datatel UI product. All users were contacted regarding the change and the options available and a web scheduling system was created for the users to sign up for training sessions.



Figure 3-29. One of the two high speed Printronix printers located in the NOC.

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Qualitative/Quantitative Return on Investment: PDF file creation allows the users to keep the report in electronic format and create a hardcopy report at a later date if needed. The PDF file can be kept an indefinite length of time and used for future reference and can be easily shared by emailing the PDF file to other departments on campus.

Cost savings/Cost avoidance: Eliminating the printers in the computer room allows savings of the monthly maintenance fee as well as removal from the Renewal and Replacement schedule. Reduction in paper costs will also be possible because laser jet paper is cheaper to purchase than the green bar paper used on the replaced printers.

Target Completion Date: June 2008

Current Status: This project is on target to be completed in June 2008

★ Microsoft Office 2007

Beginning in the summer of 2007, ITS began upgrading to Microsoft Office 2007. This was accomplished in three phases.

The first phase was to install the Office Compatibility Pack which allows users to exchange files between previous releases of Microsoft Office and the 2007 Microsoft Office release.

The second phase was to install Office 2007 on the BIS faculty, classrooms and lab PCs for Fall 2007. The Office 2007 update included the software listed below, deleting the previous version of Office with the exception of Outlook 2003:

- Microsoft Office Word 2007
- Microsoft Office Excel 2007
- Microsoft Office PowerPoint 2007
- Microsoft Office Access 2007

ITS found that the labs/classrooms needed both Office 2003 and Office 2007 and was able to install Office 2007 locally and Office 2003 on the lab/classroom computers using SoftGrid.

During the initial review process of Office 2007, ITS recognized how much of a difference there is in using Office 2007 compared to Office 2003. To help faculty and staff prepare for Office 2007, users were required to take a quiz and pass it by at least 70% before having Office 2007 installed on their office computer.

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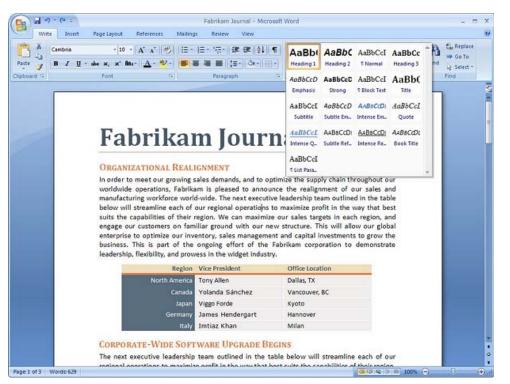


Figure 3-30. Word 2007 application window.

The third phase was to update to Outlook 2007 on the computers that have Office 2007 installed during the second phase and continue to roll out Office 2007 including Outlook 2007. The Office 2007 update now includes the software listed below, deleting the previous version of Office:

- Microsoft Office Outlook 2007
- Microsoft Office Word 2007
- Microsoft Office Excel 2007
- Microsoft Office PowerPoint 2007
- Microsoft Office Access 2007

Qualitative/Quantitative Return on Investment: Maintaining obsolete technology can be costly because of the lack of vendor support. Upgrading additional functionality will allow processes to be more efficient.

Cost savings/Cost avoidance: There is no additional cost to rollout Office 2007 due to the annual contracts that ITS maintains with Microsoft which allow the upgrading of Microsoft Office.

Target Completion Date: September 2007

Actual Completion Date: December 2007

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★ Extended Help Desk Hours

The purpose of this project was to expand the hours of the Help Desk. The Information Technology Help Desk's main objective is to be the key contact point to assist students, faculty and staff with inquiries on policies and procedures and diagnose, resolve or escalate problems concerning IT services. Requests for this service come from both on-campus and off-campus.

In August 2007 the Help Desk increased their hours of service from 84 hours a week to 126 hours a week to make it an 18 x 7 shop. The Help Desk's hours are currently 6 am - 12 am Monday - Sunday.

It is projected that more and more off-campus customers will request assistance after hours. This goes hand in hand with the expansion of Distance Learning classes, faculty and staff working later hours and an increase the reliance on technology that is available from off campus.

Help Desk will continue to look at data to make its decision to expand into a 24 X 7 shop, keep the 18 X 7 shop or reduce the hours.

Qualitative/Quantitative Return on Investment: The Help Desk's success is measured by how efficiently and effectively it can satisfy the inquiries on policies and procedures and diagnose, resolve or escalate problems concerning IT services. If the Help Desk is not available when needed, customers could fail to exploit the features, advantages and benefits of Sinclair systems and the cost of productivity and/or support will be increased. Sinclair could also fail to retain students because of the lack of support to assist students with their learning objectives.

Cost savings/Cost avoidance: There was no additional cost to implement the increased hours due to the reallocation of a vacant Technician position and the shifting of staff to cover the additional hours. It is estimated that this saved the college approximately \$150,000 per year.

Target Completion Date: May 2008

Actual Completion date: August 2007

★ Courseview Campus Center

The new Courseview Campus Center in Mason, Ohio opened for classes on September 4, 2007. To prepare for the opening of the facility, ITS worked with the Courseview campus leadership to understand the needs and design an appropriate

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infrastructure and support structure. Many of the needs of this site were similar to the needs of the Learning Centers that began service last year.

To fully utilize the lab space provided in the library at Courseview, ITS utilized the lower cost small form factor PC which mounts to a stand with the LCD monitor. This provides a smaller footprint on the desk. This provided the number of workstations needed but still provide workspace for the students. ITS installed standard podiums at Courseview and utilized the same vendor to ensure the cost would be within budget and the podiums would be completed to specifications. All of the lab, library, podiums, testing center and administrative PCs were operational the week of August 27, 2007, which enabled staff at Courseview to assist students with registration and testing prior to the first day of classes on September 4, 2007.



Figure 3-31. Courseview Campus Center.

Qualitative/Quantitative Return on Investment: The infrastructure components that were selected for implementation were based on the needs of the academic programs and administrative functions provided at the Courseview site.

Cost savings/Cost avoidance: ITS uses a remote technical support model for Courseview rather than providing a User Support Technician on-site, and added no additional technical support staff to support the site. ITS utilized remote access to PCs and digital pictures to isolate and troubleshoot the problem before sending a technician on site to resolve, and leveraged technologies that have been proven at other campus locations to keep costs down.

Target Completion date: September 2007

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Actual Completion date: September 2007

★ IT Management Controls Audit

The State of Ohio requires all publicly funded institutions to undergo an annual financial audit conducted by an objective third party auditing firm. A subset of this audit is an audit of Information Technology controls as they relate to the security of financial information. In 2007, this audit was conducted by the consulting firm Crowe-Chizek.

Prior to the on-site visit on June 11, 2007, the IT controls auditor submitted an extensive list of policies, procedures, and other documentation to be reviewed during the audit. The auditor reviewed all documentation for compliance with information security 'effective practices'. During the on-site visit, the auditor randomly selected processes and procedures to test and verify.

The auditor found no discrepancies in Sinclair's IT controls. No Management Letter comments were generated. The auditor did not offer any formal suggestions for modifying or changing controls.

Qualitative/Quantitative Return on Investment: Audits conducted by objective third parties who specialize in specific areas provide valuable insight to current effective practices. Audits also validate that the controls and processes used within the institution meet or exceed 'due diligence' requirements practiced by other similar institutions.

Cost savings/cost avoidance: Audits verify appropriate controls are in place and reduce the risk of fines, sanctions, and poor public reputation associated with security leaks and noncompliance with statutes.

Target Completion Date: November 2007

Actual Completion Date: August 2007

Improved Recording of Student Speeches

This project was created to investigate ways to use existing Sinclair resources and/or low cost options to increase ease of use for the students and instructors while also increasing the availability of the recordings both for immediate and future use.

Several options were explored and the most user-friendly and least resource intensive method tested uses a digital camera, FireWire connection, and Windows Movie Maker software to make a next generation student presentation recording method. This

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method is easy for the faculty members to adopt because it uses technologies with which they are already familiar, and it creates a great way for students to be able to instantly review their presentations at any computer location on campus or from home. In addition, this method lends itself easily to import of the presentations into the digital asset management system (Digistore) for use in Distance Learning courses or for archival purposes.

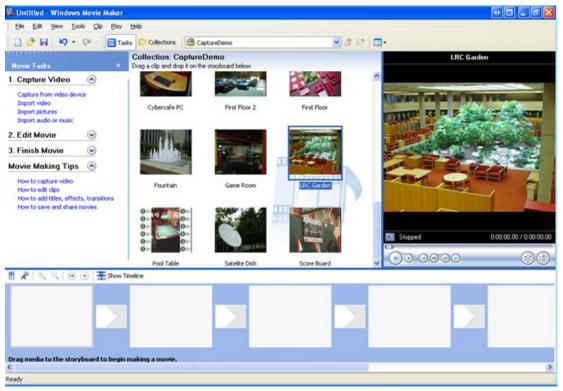


Figure 3-32. Digital video displayed with Windows Movie Maker.

Qualitative/Quantitative Return on Investment: This project uses equipment currently owned by Sinclair and is not associated with any direct investment. However, migrating to this method of recording will increase the ability for faculty and staff to be able to capture and distribute video easily. As more faculty begin to use the Angel course management system even in their on-campus classes, this could enable instant posting of speeches for retrieval by the student at home or within a student work group for critique between class meetings.

Cost Savings/Cost avoidance: Continuing to support aging and outdated technologies is costly. This project allows the College to take one more step towards the retirement of VHS technology in the classroom without sacrificing functionality or service.

Target completion date: June 2008

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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Actual completion date: January 2008

☆ Eliminate Academic Media Delivery

This project proposed to take advantage of the increased availability of multimedia equipment in Sinclair classrooms and labs in order to provide enhanced support for new technologies and initiatives for the college while eliminating staff positions and ensuring no loss in service quality to the College.

The Multimedia equipment (such as data projectors and laptops), which was previously used for deliveries, was permanently installed in classrooms and labs throughout campus in which a majority of deliveries were historically requested. These installations increased the Registration office's ability to schedule classes which require the use of this technology into multimedia equipped rooms.

Video tapes, which also were formerly delivered to classrooms, were made available for checkout by faculty members from the Library. For convenience, drop off locations were added in the Teleports in addition to the Library.

Finally, information was gathered regarding short-term flexibly scheduled multimedia classrooms and made available to faculty members through the Registration office. These classrooms are furnished with multimedia equipment but are made available to schedule on per-use basis for those faculty members who do not use equipment for every class but who need it one or two times per quarter. This ensures that equipped rooms are used in the most efficient way by instructors who need the equipment for most of their instruction while making equipped rooms available for those who use the equipment on a less frequent basis.



Figure 3-33. The podium in the CIL's Forum.

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Qualitative/Quantitative Return on Investment: Equipment delivery requests for academic events were reduced by nearly 70% from last year.

Cost Savings/Cost avoidance: By reallocating resources no longer needed in one area into developing areas of technical support, the college eliminated the need to hire more staff in order to support new technologies. In addition, one full-time, one part-time, and 12 student positions were eliminated reducing the Multimedia Services staffing budget by approximately \$160,000 annually.

Target completion date: September 2007

Actual completion date: September 2007

☆ Television System Signal Improvement

The purpose of this project was to perform an assessment of signal-generating and distribution equipment in the cable television head end, Room 12-261. The assessment results were used to devise a plan for repair, replacement, and recalibration of equipment located in Sinclair's cable television head end.



Figure 3-34. Racks of equipment in the campus' cable television head-end.

Qualitative/Quantitative Return on Investment: This project resulted in the reduction or elimination of static in the television signal throughout campus with the exclusion of the Student Activities Center, which has its own dedicated distribution equipment.

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Cost Savings/Cost avoidance: Currently owned equipment was installed and configured as a back up to the system. This equipment will provide immediate backup service capabilities and avoid the need for emergency response and excessive cost during any future equipment failure.

Target completion date: August 2007

Actual completion date: February 2008

★ <u>Replace Laptops on Multi-media Carts with Desktops</u>

Desktop computers have been installed in place of laptop computers on all portable or semi-portable multimedia carts. This change to a more permanent piece of equipment in the multimedia systems has served to improve user-friendliness and supportability as well as reduce cost for future replacement.

The laptops formerly used on the portable carts have been distributed as upgrades for faculty or staff due for a replacement of their laptop computers.

Qualitative/Quantitative Return on Investment: Desktop computers are less complex than laptops when used in a multimedia system making them more user-friendly for faculty and staff. In addition, they are less likely to be stolen, given their size, which provided the opportunity to permanently place this equipment in classrooms greatly improving the success of the Classroom Multimedia Delivery Elimination project.

Cost Savings/Cost avoidance: Laptop computers currently cost the college \$1,050.00 whereas a desktop computer, including the monitor and peripherals, costs the college \$687.00 providing a savings of \$363.00 per computer replacement. Eight laptops were replaced with desktops creating a cost avoidance of \$2,904.00. And, by replacing aging client laptops with these eight that were removed from the portable carts, there was a cost avoidance of \$8,400.00 since new laptops were not purchased for this purpose.

Target completion date: August 2007

Actual completion date: August 2007

☆ VMWare Infrastructure Implementation

Server virtualization is a proven software technology that is rapidly transforming the IT landscape and fundamentally changing the way that computing systems are deployed.

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Normally, when a new enterprise application is needed, server hardware is purchased and the server operating system is installed on this physical server. The necessary applications are then loaded on that server. In many cases, this application requires very little server resources to run, essentially wasting the excess resources not used by the installed application(s). Server virtualization technology changes this paradigm. Server virtualization breaks that one-to-one relationship, making it possible to run multiple operating systems and multiple applications on the same physical computer at the same time, increasing the utilization and flexibility of hardware.

Virtualization as a technology is not new. It has been around for many years in the mainframe arena but has been gaining ground in recent years as the technology has matured and been made available to lower cost servers and even workstations. One of the drivers for this change has been Moore's law and the increases in computing power it has generated. Another driver has been America's increased awareness of energy consumption and the "Green" campaigns affecting all businesses. Since with server virtualization there are multiple virtual servers running on one physical server, the number of physical servers will decrease resulting in lower energy and cooling costs.

Information Technology Services (ITS) has been using server virtualization for about two years and realizing the benefits of this technology. Recent advances in virtualization software by VMware has caused ITS to develop its virtualization strategy in light of these new advances. In fiscal 2007-2008, a project was created to develop a scalable virtualization infrastructure around these new capabilities.

Information Technology Services contracted with Advizex to provide on-site VMware training to all Systems Engineers and some Operations staff. Since this technology was so new, ITS wanted to enlist the help of experts in this field to help design a scalable and robust virtual infrastructure. The training was provided on-site so Engineers could learn about the software while simultaneously building Sinclair's virtual infrastructure.

Central to utilizing these new capabilities is VMware Virtual Center. This software application was installed on one physical server and provides a graphical user interface to simplify server provisioning and management, as well as the monitoring of utilization of physical machine resources. More importantly, Virtual Center facilitates the creation of virtual server clusters which are necessary to take advantage of VMware's new capabilities around High Availability (HA), VMotion and Dynamic Resource Management (DRM). Using Virtual Center, one cluster was created called NOC-Dayton-Cluster and 4 physical servers were installed and configured into this cluster (Figure 3-35).

Placing servers in a virtual cluster creates a pool of server resources within that cluster. Any new physical servers added to the cluster increase the pool of resources across the entire cluster. ITS will be adding 3 additional physical servers to that cluster

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by June 30, 2008, and 3 physical servers to the cluster as part of next year's Virtualization project.

Within this cluster, DRM, VMotion and HA was configured on the member servers. As virtual servers within the cluster use resources on one physical server, DRM monitors this usage and can dynamically give the server more resources on that physical server or move the virtual server to another physical server in the cluster that has more available resources. This dynamic allocation of resources is done with no effect on the users using that server.

This movement of a virtual server to a different physical server is done using VMotion. VMotion can also be invoked manually in case maintenance is needed on a physical server. VMotion is also used with HA in case of a hardware failure. If a physical server is having a problem that prevents it from communicating with other cluster members, HA will invoke VMotion to automatically move the virtual servers to a physical server that is available on the network.

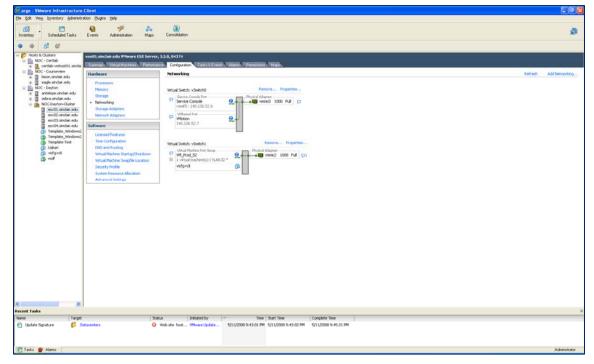


Figure 3-35. VMware Virtual Center showing physical servers, virtual servers and the virtual network connecting the virtual server cluster.

The virtual infrastructure also has disaster recovery implications and is central to the disaster recovery strategy as Sinclair's disaster recovery site is shifted from Sunguard to Courseview. Along with adding additional servers to the cluster, disaster recovery will be the main focus of the VMware Infrastructure Implementation project next year.

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Qualitative/Quantitative Return on Investment: Server virtualization shows both a quantitative and qualitative ROI both Industry wide and here at Sinclair. Quantitatively, there are cost savings arising from less hardware, which also lowers energy consumption. Qualitatively, there should be higher availability, lower maintenance costs and fewer personnel resources required when provisioning servers.

Cost savings/Cost avoidancet: Since training was necessary for the successful completion of this project, moving the training on-site saved approximately \$10,000 in course costs alone, not factoring in travel costs. For servers, virtualization saved approximately \$27,600 in hardware costs from the Renewal & Replacement budget.

Target completion date: June 2008

Current Status: Five of eight servers were installed into the virtual cluster with the others to be installed by June 2008.

Student Success Work Force Campus Increased Regional Expanded High			
Development Development Access School Linkages	Expanded High School Linkages	Partnerships	Alternative Sources of Funding

Section 4 Major Projects for

FY 2008-2009



Major Projects for FY 2008-2009

A variety of innovative projects are in process or are planned to start during FY 2008-2009. This section describes many of these major projects. Each project title has associated with it a color coded object to reflect the Sinclair Strategic Priority supported. These priorities are shown at the bottom of each page.

Library

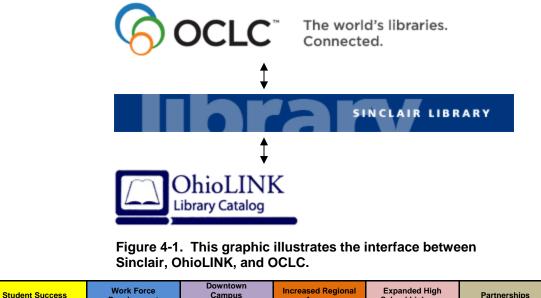
Following are the major projects for FY 2008-2009 for the Library:

☆ Data Quality Project

☆ Data Quality & the Library

The Library catalog is a specialized database that identifies information resources owned and leased by Sinclair. It serves as a finding aid for students and faculty and an inventory control system for the college. Data from this system is made available to Sinclair students and faculty, the Greater Dayton community, the OhioLINK consortium of Ohio colleges and universities, and the broader library community that includes public and school libraries in Ohio and around the world.

The Sinclair Library catalog is housed on a server on the college campus, and data records are shared with the OhioLINK system in Columbus. In addition, cataloging data and holdings information are both taken from and filed to another library system known as OCLC. OCLC is an international cataloging utility service used by over 60,000 libraries around the world with 100 million data records representing a billion items. It is an essential player in interlibrary lending and local database record creation and maintenance.



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As the Sinclair Library conducts a comprehensive review of its book, media, and journal collections this year, adding new materials as appropriate and eliminating outdated and out-of-scope materials when necessary, one significant activity librarians must perform is to reconcile the library catalog with our actual physical collections. This is a time consuming process, involving three database systems, and demands staff accuracy and diligence. The Librarians and faculty consult on what materials should be kept in the Library collection. Once that decision is made, the Sinclair catalog records are corrected. Finally, this information must be shared with OhioLINK and OCLC.

Qualitative/Quantitative Return on Investment: Sinclair realizes significant benefits from being able to find and borrow books, videos, and journals from OhioLINK and other libraries. From an academic perspective, the correct information is placed in the hands of the student or faculty member in a timely manner in order to facilitate learning. From the college perspective, resource sharing of expensive scholarly books saves money. We do not have to purchase, for example, the 6000 plus books borrowed from OhioLINK each year. However, in order for this system to function efficiently information about what Sinclair and other libraries own and make available must be accurate.

Target Date for Completion: The data quality project will follow the same timeline as the Library's collection review. It will begin with Summer Quarter and run until faculty from across the college complete their review the Library's books, journals, and audiovisual media in their fields of expertise. With proper cooperation, the project will be completed by June 2009.

Systems Development & Maintenance

Following are the major projects for FY 2008-2009 for Systems Development & Maintenance (SD&M):

イ	Prepare for transition to SQL database for ERP system
7	Requirements, RFP, and warranted implementation of Corporate software

- \star Feasibility study and warranted implementation of document imaging
- Add refinements to faculty payload process
- rovide ERP support for conversion of financial aid year
- Feasibility study and warranted implementation of HS transcript exchange
- \bigstar Continued implementation of Colleague enhancements
- \star Feasibility study and warranted implementation of classroom podcasting
- Continued implementation of web site enhancements
- Feasibility study and warranted implementation of check in processes
- \bigstar Incorporate Colleague update capability into workflow tool
- Market Market Angel presentation software
- Reassess Angel technical procedures

Student Success Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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- \bigstar Feasibility study and warranted implementation of Archibus software
- \bigstar Feasibility study and warranted implementation of Tech-Prep database
- ★ Support for the University System of Ohio

★ Prepare for transition to SQL database for ERP system

Sinclair has adopted Microsoft software for most of its information technology needs. One major exception to this software uniformity is the Unidata database and UNIX operating system used by the college's Colleague ERP system. With the move to Colleague's most recent release, the Colleague vendor has made it possible to adopt an SQL database strategy. This project involves making the necessary programmatic changes required to accomplish this transition.

In order to use Colleague with an SQL database, all programs, subroutines, screens, and user defined fields must be written in Colleague's Envision programming language. Most of this rewriting has already been accomplished as part of Sinclair's preparation for the current Colleague release. However, all processes that do not directly interact with users, such as batch processes and behind-the-scenes programs, will need to be converted.

Another activity that will be leveraged as part of this project is a reexamination of remaining custom Colleague programming with an eye to eliminating those custom programs, screens, etc. that no longer provide value. Elimination of custom programming would allow use of the Colleague baseline product and thus would reduce long-term costs of ownership for the product.

A third activity associated with this project is to use the knowledge gained from a review of custom programming as the base for evaluating alternative ERP vendors. Within the next several years it is likely that Sinclair will need to move to a new ERP provider. The current provider has served the college for over seventeen years, and the possibility exists that there are other vendors who have kept better pace with the technological transformations that have occurred over this time. Sinclair's custom programming gives an accurate barometer of what features would be needed in the college's next generation of an ERP, and the project this year will be to use this barometer to assess the features of an alternative vendor.

Estimated Cost of Project: All of the staff in the Administrative Systems department will be heavily involved in this project. It is projected that each of the eight staff members will devote 400 hours to this project for an estimated cost of approximately \$120,000

Cost Savings/Cost Avoidance Anticipated for the Project: Each of the components of this project, when implemented, will improve the student's experience when using Sinclair's technology resources. While it is not possible to put a quantitative value on this improvement, it is clear that technological sophistication and

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currency are prerequisites for interacting with today's technologically savvy students.

Target Completion date: June 2009

★ <u>Requirements, RFP, and warranted implementation of Corporate</u> <u>software</u>

During fiscal year 2007-2008, Sinclair's Corporate Services division has gone through a fundamental transformation of mission. The division has taken on the challenge of becoming the leading corporate training provider for the Miami Valley region. These efforts have led to the realization that the software required to support credit coursework and programs is not sufficient to support an organization that is a combination of on-demand training, continuing education provider, and conference center. The software needed to support such efforts must be able to track revenues and expenses by project, schedule meeting space that is not associated with creditcoursework, register participants without having prior-knowledge of the participants' academic interests or goals, and maintain and communicate with groups of prospects long before any individual is admitted to the system. This project involves those efforts needed to identify software that has the potential to satisfy the above listed needs. It is recognized that no one software product is likely to satisfy all of these needs, and therefore, the project will involve evaluation and analysis of multiple products. The first step in this project will be the definition of requirements. This step will be followed with the creation and issuing of a Request for Proposal (RFP). Responses will be evaluated and a software vendor, or vendors, will be selected.



Online Registration & Online Event Management Software

Figure 4-2. Event management software allows conference center managers to see at a glance the resource needs for any event.

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Estimated Cost of Project: It is anticipated that the requirements gathering part of the project will consume approximately 80 hours of staff time. The RFP can be accomplished within 40 hours, and the analysis of the software will take about 200 hours. At an average hourly cost of \$35, the total project cost should be \$11,200. If the project moves to implementation then these costs will increase.

Cost Savings/Cost Avoidance Anticipated for the Project: Corporate Services is anticipated to be a significant income producing unit of the college. The software identified as part of this project will be an important component of Corporate Services' success.

Target Completion date: December 2008

★ Feasibility study and warranted implementation of document imaging

During fiscal year 2006-2007, an evaluation was conducted to determine if there was a cost justification to implementing a document imaging solution for Sinclair. The results of that effort confirmed the potential cost benefit. This document imaging study builds on these earlier efforts and has the goal of identifying the specific business processes that should be included in a document imaging implementation. Document imaging is more than the electronic storage and retrieval of business forms. Its greatest potential lies in the improvement of processes that can be realized when forms can be received, routed, and processed electronically. These improvements often take the form of improved service and increased response time. When completed, this feasibility study will identify those processes most likely to generate the greatest gain and will provide a roadmap for which processes warrant implementation.

Estimated Cost of Project: Most of the analysis work of this project will be accomplished by an external consultant hired for this purpose. It is anticipated the consultant will need approximately 200 hours of Sinclair staff time for information gathering. Therefore, at \$35 per hour, the Sinclair staff time cost for the project would be \$7,000. The estimated consulting cost is \$32,000.

Cost Savings/Cost Avoidance Anticipated for the Project: One of the important outcomes of this project is to identify actual cost savings anticipated from changes to process flows within offices. This specific cost savings information will guide the decision on next steps for the implementation of document imaging.

Target Completion date: June 2009

Current Status: This project builds upon the previous study that identified document imaging as a potential enhancement to productivity.

Student Success	Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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★ Add refinements to faculty payload process

An automated faculty payload system was put in place during fiscal year 2007-2008. That project provided academic chairs with a uniform system of data input for faculty payload information, and it allowed for this information to be stored in a centrally accessible data base that supports analysis of faculty payload information. This project builds on these initial efforts by providing user requested enhancements. Specifically, the project will add an enhanced set of codes for more specific identification of the type of payload work performed; it will enhance the "banked hours" section of the tool to allow for automatic addition and subtraction, and it will add additional year-to-date reporting features to the output.

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Figure 4-3. The faculty payload screen, shown above, will be enhanced to add information on "banked" hours and will be improved to allow for more in-depth analysis of work load.

Estimated Cost of Project: It is expected that the enhancements identified for this project can be completed with approximately 100 hours of programmer/ analyst effort. At an average programmer/analyst hourly rate of \$38, this project will cost \$3,800.

Cost Savings/Cost Avoidance Anticipated for the Project: Approximately 80% of Sinclair's operating budget goes toward personnel expenses. An automated payload process that allows for detailed analysis of faculty work assignments will have a direct positive influence on managing this major budget component.

Student Success Work Fo	Campus	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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Target Completion date: September 2008

Current Status: This project builds upon the faculty payload project that was completed in FY 2007-2008 .

★ Provide ERP support for conversion of financial aid year

The leadership of Sinclair's student services area has determined that changing the financial aid year will increase opportunities for students. As currently configured, the federal financial aid year begins with the Summer quarter and ends with the Spring quarter in the next calendar year. It is proposed that the financial aid year be changed to begin in the Fall quarter and end with the Summer quarter in the following calendar year. This change would allow students to first draw against their annual financial aid allocation in a quarter where more classes are offered and where it is easier to reach the full-time student designation required for most federal aid programs.

This project involves providing the programming and ERP configuration support required to make this transition. The Colleague ERP system is designed to support only one financial aid year designation. However, during the transition quarter, some students will be on the previous financial aid year, and others will be on the new designation. This mixed configuration will require rewriting of most programs, rules, and subroutines of the Colleague financial aid system to accommodate this mixed calendar.

Estimated Cost of Project: It is expected that this project will consume approximately two months of programmer/analyst time. This equates into an estimated project cost of approximately \$12,000.

Cost Savings/Cost Avoidance Anticipated for the Project: The primary intangible benefit of this project is the increased flexibility that the change in financial aid year will give to students. Financial aid will be more likely to be available to students at the time that the students have the greatest course selection choices.

Target Completion date: March 2009

★ Feasibility study and warranted implementation of HS transcript exchange

One of the hallmarks of the University System of Ohio plan, released by the Chancellor of the Ohio Board of Regents (OBOR) in late March 2008, is to establish strong systems of linkages between educational institutions. Of particular interest to the Chancellor is development of information exchange between high-schools and

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colleges so that student progress can be tracked across the spectrum of their educational experiences. This project calls for a study to explore the feasibility of Sinclair establishing an electronic transcript exchange with one or more of the feeder high-schools in Sinclair's service district. It is expected that the project will include close coordination and consultation with OBOR in order to meet their expectations for electronic information exchange. If study results warrant, the project will also include the actual pilot implementation of an electronic information exchange with one of Sinclair's feeder high schools.

Estimated Cost of Project: It is expected that this project will consume approximately two months of programmer/analyst time. This equates into an estimated project cost of approximately \$12,000.

Cost Savings/Cost Avoidance Anticipated for the Project: Successful completion of this project will position Sinclair as one of the leaders in the state in support of the Chancellor's goal of increasing linkages between educational units.

Target Completion date: May 2009

<u>☆ Continued implementation of Colleague enhancements</u>

Currently, Sinclair uses a two-character course section code that contains many pieces of disparate information about the section. Building "intelligence" into the section codes has some advantages, but the extent of the intelligence conveyed in the section code has become so complex that the utility of this approach to information dissemination is now problematic. This project will involve identifying all locations within the Colleague system that rely upon the existing section code logic, so that the logic can be removed and relocated to more appropriate data fields within the Colleague system. In addition, the project will involve rewriting all programs and subroutines using the course section code to point to the relocated information.

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Student Success	Work Force Development	Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Sources of Funding



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Figure 4-4. The above image shows one of thousands of Colleague screens that must be researched to identify areas where the change of section code logic could impact processes.

A second component of this project involves studying several features of Colleague to determine if implementation of these features would be of value to the Bursar's office. The first feature to be examined will be the Automated Clearing House (ACH) functionality that allows for checks to be accepted, cancelled and returned in one step at the time that a check is presented at the Bursar's office. The second feature examined will be the use of the Sinclair Tartan Card as a means of making tuition payments. Students can currently deposit money on their Tartan Cards to cover expenses such as parking and food; this study will examine the pros and cons of adding tuition to this list. And the last feature to be studied will be the process of making direct deposits to student checking accounts for refund transactions.

Estimated Cost of Project: To accomplish all of the items identified in this project, it is estimated that it will take four months of programmer/analyst time. At an average hourly cost of \$38, this project will cost \$24,000.

Cost Savings/Cost Avoidance Anticipated for the Project: The Bursar's office will experience direct personnel cost savings if all of the features identified for this project

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are implemented. The annual personnel costs for one clerical support position are close to \$32,000.

Target Completion date: March 2009

☆ Feasibility study and warranted implementation of classroom podcasting

A podcast is a series of digital-media files which are distributed over the Internet for playback on portable media players or computers. A podcast is distinguished from other digital media formats by its ability to be syndicated, subscribed to, and downloaded automatically when new content is added. Several commercial vendors offer products that allow for the podcasting of classroom presentations. This project calls for the examination of these services to determine their feasibility for implementation at Sinclair. If podcasting is feasible for Sinclair then this project will also include implementation efforts.



Figure 4-5. Podcasts allow students to carry their course lectures wherever they can use a headphone.

Estimated Cost of Project: Most of the work for this project will be completed by a committee. The members of the committee will likely spend a total of 200 hours on the project. At an average hourly rate of \$40, the cost of the project would be \$8,000.

Cost Savings/Cost Avoidance Anticipated for the Project: It is very difficult to quantify the benefit of offering podcasting services. It is clear that this technology is

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rapidly becoming part of the baseline technology expectations of today's student, and if the services are not provided, Sinclair will be perceived as falling behind in meeting these expectations.

Target Completion date: December 2008

★ Continued implementation of web site enhancements

During fiscal year 2007-2008, Web Systems provided assistance to Marketing for the redesign of the <u>www.sinclair.edu</u> website. This was the first step in an ongoing process of completely refocusing the website to emphasize student information needs. This project calls for the continuation of this support. The specific items within the project will evolve throughout the coming year, but it is expected that the support will include implementation of features such as on-line chat and content specific responses based upon student-supplied interests and demographics. This project will also include a feasibility study to determine the implementation issues associated with establishing an online store.

Estimated Cost of Project: It is expected that the project will take approximately 25% of a web developer's time over the course of the year. At an average hourly rate of \$32, the project cost will be \$16,600.

Cost Savings/Cost Avoidance Anticipated for the Project: No tangible savings can be associated with this project but it is clear that the efforts will maximize the utility of Sinclair's website for students.

Target Completion date: June 2009

Current Status: This project is a continuation of the website redesign project identified in FY 2007-2008.

★ Feasibility study and warranted implementation of check-in processes

The Sinclair testing center administered approximately 22,500 academic tests during academic year 2005-2006. The system that the center uses to match students with tests was developed in 1999 and has now become obsolete. The company that developed the software has gone out of business and therefore ongoing support for the system is not available.

The Sinclair teleports and other offices on campus employ a swipe-card system to authenticate individuals as they enter the facilities to confirm that they are currently

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enrolled students or active employees. These swipe card devices are connected to the campus "One-Card" system and use that system's database to authenticate users. During 2008-2009, the "One-Card" system will be upgraded to a later version, and as a result of this upgrade, the swipe card devices will no longer work with "One-Card"

This project involves the examination of alternative software solutions for each of these check-in processes, with the goal of identifying whether software should be developed internally or purchased from an external vendor. Once a build-or-buy decision has been made, the project will also include the necessary steps to implement the solution.

Estimated Cost of Project: It is expected that the project will consume three weeks of a web developer's time. This would put the cost of the project at approximately \$3,800.

Cost Savings/Cost Avoidance Anticipated for the Project: By undertaking this project with internal staff, Sinclair will avoid the costs of purchasing commercial software. In addition, the product produced will be tailored to meet the specific software needs of Sinclair users.

Target Completion date: October 2008

☆ Incorporate Colleague update capability into workflow tool

During fiscal year 2007-2008, Web Systems developed a tool that allowed for the electronic transmission and approval of college forms. This project builds upon that work by adding additional features and functionality. Specifically, the project will add steps after the approval process to allow the approved data to be automatically uploaded into the college's Colleague information system. It is expected that the college's leave request steps will be one of the first processes to be included in the automation efforts. When fully operational, employees will be able to initiate their leave requests online, supervisors will be able to approve the requests online, and Human Resources will be able to transfer the approved requests directly into the Colleague database without anyone ever having to touch a piece of paper.

A second candidate for automation attention is the process used for the annual open enrollment period for employee benefits. All of the information entered on the current paper form eventually makes its way into the Colleague database; thus, this process is ripe for automation.

Estimated Cost of Project: It is estimated that the project will use approximately six weeks of one individual's time. At an average hourly rate of \$36, the project will cost about \$8,600.

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Cost Savings/Cost Avoidance Anticipated for the Project: The annual personnel costs for one clerical support position are close to \$32,000. This project has the potential to reduce clerical hours spent in handling paperwork in excess of one full-time position.

Target Completion date: December 2008

★ Implement selected Angel presentation software

For several months, Distance Learning has led a committee to evaluate various modes of providing webinar features within the Angel learning management system. After reviewing these options, the committee expects to make a specific vendor recommendation by the end of summer 2008. This project involves providing the technical support to implement the committee's selection. Specifically, the project includes making the necessary procedural and coding changes to Angel to allow the webinar software to appear as an integral part of the student's Angel experience. Even though the software will be provided by a company completely separate from Angel, the goal will be to make this separation invisible to students as they interact with the Angel system.

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Estimated Cost of Project: The implementation of the presentation software will take approximately 80 hours of staff time. At an hourly rate of \$32, the project will cost \$2,560.

Cost Savings/Cost Avoidance Anticipated for the Project: The presentation component within Angel will increase the tools available for students to work collaboratively on class assignments. Research indicates that group interaction increases a student's likelihood of course completion and success.

Target Completion date: April 2009

🛠 <u>Reassess Angel technical procedures</u>

Sinclair adopted Angel as its learning management system approximately two years ago. On the software adoption continuum, Sinclair is moving into the mature user stage of Angel adoption. This stage is an appropriate point at which to reevaluate operational procedures and practices and to put systems in place that guide future uses of the software. One item within this project calls for the evaluation of Angel information retention practices with the goal of removing unused data so that overall performance can be improved. Another item is to develop an Angel update schedule that forecasts future system downtime for items such as software patches and database maintenance.

Estimated Cost of Project: Most of the work for this project will be completed by a committee. The members of the committee will likely spend a total of 200 hours on the project. At an average hourly rate of \$40, the cost of the project would be \$8,000.

Cost Savings/Cost Avoidance Anticipated for the Project: Angel is the foundation upon which Sinclair's distance learning and technology-enhanced courses are based. The policies and practices to be identified in this project will improve both Angel reliability and responsiveness.

Target Completion date: October 2008

★ <u>Feasibility study and warranted implementation of Archibus</u> software

Archibus is the product name of a suite of facilities management software. The suite includes a central database of all facilities information, including building drawings, that can be used to improve space allocation decisions, and it includes a work order process for handling facilities repair and maintenance requests. This project calls for the establishment of a committee to evaluate this product for Sinclair. The committee will, of course, be made up of representatives from the facilities area, but

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representatives will also be included from information technology, corporate services, student services and academic areas. Representatives from the other areas will be asked to evaluate the product with respect to the unique facility needs of those areas, such as conference center scheduling and classroom utilization reporting. If the feasibility study warrants, then the project will also include implementation efforts.

Estimated Cost of Project: Most of the work for this project will be completed by a committee. The members of the committee will likely spend a total of 400 hours on the project. At an average hourly rate of \$40, the cost of the project would be \$16,000.

Cost Savings/Cost Avoidance Anticipated for the Project: The Facilities Management department has building drawings going back to the beginning of the campus in 1973. These files must be manually processed in order to support the ongoing maintenance of the campus. If the Archibus software is implemented, these drawings can be stored electronically, which will increase accessibility and accuracy of this information for all future capital projects.

Target Completion date: June 2009

T Feasibility study and warranted implementation of Tech Prep database

The Tech Prep office currently maintains a separate database within their office for information about high school participants in the tech prep program. This database is separate from the college's Colleague ERP system because the Colleague system requires that the student apply for and be admitted to Sinclair before their information is permanently stored in the Colleague system. Most tech prep participants are not at a stage to apply to Sinclair. This project calls for the evaluation of alternative ways to maintain the tech prep database that are more secure, flexible, and expandable than the current single-office solution. Several avenues of investigation will be pursued, e.g. third-party software, use of Sinclair's data warehouse functionality, internal development of software, etc. Once a course of action has been agreed upon, the project will include necessary actions to implement the decision.

Estimated Cost of Project: This project will take approximately 120 hours of staff time. At an hourly rate of \$32, the project will cost about \$3,800.

Cost Savings/Cost Avoidance Anticipated for the Project: This project will improve service to Tech Prep students and will eliminate the redundancy and duplication of effort that is inherent in an office-maintained database.

Target Completion date: December 2008 Downtown Alternative Work Force **Increased Regional** Expanded High Student Success Partnerships Campus Sources of Development School Linkages Access Development



* Support for the University System of Ohio

The success of the technology portion of the strategic plan depends upon institutions being willing and able to share electronic information. Specifically, the plan mentions that higher education institutions should move toward a common application system, common registration, an agreed upon process for transfer of credit, and a common online financial transaction system.

The following list demonstrates that Sinclair is capable of accomplishing these electronic data exchanges. This experience positions Sinclair to be a leader in this area of the strategic plan.

- Sinclair was the first institution in the state to implement the electronic transfer of transcript information.
- Sinclair successfully developed programs and processes to integrate its Colleague-based course inventory and program plans into the state's CAS information system.
- Sinclair has developed a web-based application that is seamlessly integrated with its enterprise student information system.
- Sinclair has developed interfaces between the enterprise student information system and web-based products such as Curriculum Management Tool and Student Success Plan.
- Sinclair has developed ETL processes required to populate its data warehouse.
- Sinclair has developed a remote-method-invocation (RMI) process to dynamically extract information from the enterprise information system.

It is the goal of this project to continue Sinclair's commitment to developing technology linkages with other higher education institutions in the state and to demonstrate to the Ohio Board of Regents Sinclair's willingness to take the lead in evolving new linkages.

Estimated Cost of Project: Since the specifics of the project will only be known as the strategic plan for the State takes form, it is not possible to identify a specific cost for the project at this time.

Cost Savings/Cost Avoidance Anticipated for the Project: State leadership has made it abundantly clear that they see the future of Ohio resting on an integrated system of higher-education. This project is one opportunity for Sinclair to demonstrate its commitment to be a full participant in the creation of this system.

Target Completion date: June 2009

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Research, Analytics and Reporting

Following are the major projects for FY 2008-2009 for Research, Analytics and Reporting (RAR):

- Continued Maturation of the DAWN Environment
- Accommodating Reporting Needs of the University System and Other Federal and State Agencies
- Analysis of Academic Programs from a Demand Perspective
- A Development of a Data Governance Board

* Continued Maturing of the DAWN Environment

Now in its fourth year of implementation, the DAWN Portal and the associated business intelligence data warehouse has developed notably in its ability to provide the institution easy access to information both through RAR-developed customized reports and through user-developed tables and charts using Web Report Studio.

While much work has been accomplished, many on-going opportunities need to be further exploited in order for the data warehouse to reach full maturity. It is the intent of the department to further the value of the system to the institution through the following actions in the coming year: 1) the installation of the latest version of the software so the college might take advantage of newly-developed enhancements (once software is available and stable); 2) the development of dashboards to facilitate the management of enrollment, marketing efforts, and course registration; 3) the increased development of information maps, cubes and datasets available for knowledgeable end-users for reporting and analysis; 4) the integration of new internal and external data sources into the data warehousing platform.

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Figure 4-7. The DAWN Portal Report Studio.

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Estimated Cost of Project: \$9500 in software/consulting costs and approximately 2000 hours of staff time for dashboard, cube development and importation of databases. Estimated total cost is \$99,500.

Cost Savings/Cost Avoidance Anticipated for the Project: Notable on-going efficiency and effectiveness for end users will result with this project, as will the increased usefulness of the database as it expands to include more external and internal data sources. Dashboards will provide management daily information on the progress toward institutional goals, whether it is on descriptions of prospects, conversions to registrants, etc. As a result of the anticipated increased amount of data in the data warehouse, notable data mining opportunities can inform what actions are most valuable in maximizing the institution's return on investment. Increasing the number of information maps, cubes and datasets available for reporting will also markedly increase end-user access to data while eliminating substantial ad hoc requests.

Target Completion date: June 2009

★ <u>Accommodating Reporting Needs of the University System and</u> <u>Other Federal and State Agencies</u>

In spring,2008, the Chancellor of the state published the *Strategic Plan for Higher Education*, which is a 10-year plan to reform higher education so that the state can more efficiently and effectively raise the educational attainment of Ohio citizens by offering a "wide range of educational options while driving down the average amount that students pay to among the lowest in the nation." ¹ To accomplish this task, the Governor via the Chancellor has created a University System, comprised of the state's 13 public university campuses, one medical college, 24 regional branch campuses, and 23 community colleges, as well as adult literacy and adult workforce centers which would work together to accomplish the vision. Central to the development of this system is a set of accountability measures which serve to measure progress against the goals of access, quality, affordability and efficiency, and economic leadership. The department of Research, Analytics and Reporting will be a major player in positioning the institution to respond to these data demands and providing the feedback as needed.

Additionally, the amount of, and nature of, other state and federal reporting requests have changed substantially, creating the need to provide data either previously not collected or radically changed in format. This will require notable effort by the department in FY 2009.

¹ Strategic Plan for Higher Education 2008-2017, submitted by Eric D. Fingerhut, Chancellor, Ohio Board of Regents

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Historically, the majority of state reporting happened outside of the data warehouse environment. In FY 2009 the department will actualize the full-reporting needs of the state through the data warehouse, thereby eliminating the need to utilize other IT resources and processes to accommodate state reporting.



Figure 4-8. Ohio's Strategic Plan for Higher Education.

Estimated Cost of Project: It is expected that these efforts will require 1200 hours of staff time for an estimated cost of \$42,000.

Cost Savings/Cost Avoidance Anticipated for the Project: By migrating the process of state reporting to the data warehouse, other IT resources currently employed can be freed for other efforts.

There are no direct cost savings or avoidance associated with the development of the University System Accountability Measures or the anticipated changes in other state and federal reporting requirements. However, the production of these accountability reports are critical to the institution's well being and its ability to offer financial aid to students (failure to report or inaccurate reporting on federal reports, for example, can jeopardize the institution's access to student financial aid). State reports are critical to subsidy acquisition.

Target Completion date: June, 2009

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* Analysis of Academic Programs from a Demand Perspective

This project involves the use of environmental scanning, labor market data analysis, competitive analysis, and curricular review to determine programs of high or low demand. The value of this project will not only inform instructional curriculum (which programs should grow or change, which should be retired), but will help the college determine where to invest marketing dollars, whether to move programs online, workforce development needs and where reallocation of resources need to occur.

Estimated Cost of Project: It is expected that these efforts will require 1500 hours of staff time at a cost of \$52,500.

Cost Savings/Cost Avoidance Anticipated for the Project: This project will substantially impact the institution's understanding of the return on investment associated with program offerings. Additionally, through the exploration of the demand for existing programs, new program opportunities may arise. It is anticipated that increased efficiencies and appropriate resource allocation can be gained as a result of aligning programs with the needs of our local community, the goals of the state (e.g., increased education in STEM fields), business and industry.

Target Completion date: May 2009

★ Development of a Data Governance Board

As the institution matures in its use of data, and as more end users develop their own reports, it becomes critical that those engaged in these activities understand what the data represents and when it is appropriate to use it for their analyses. In order to facilitate that understanding, the institution would benefit from agreed upon definitions and a glossary mechanism which will house the metadata and interface with the data warehouse.

The department of Research, Analytics and Reporting will form a cross-functional team of end users to develop common definitions, and determine the feasibility of using a Wiki Engine to develop and maintain the metadata repository.

Estimated Cost of Project: It is expected that this project would take approximately 240 hours of staff effort for an estimated cost of \$8,400.

Cost Savings/Cost Avoidance Anticipated for the Project: Increasing appropriate use of data and minimizing the frustration on the part of the external user is invaluable to the institution as it attempts to serve numerous constituents through this essential standardization and communication channel.

Target Completion date: March, 2009

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Information Technology Services

Following are the major projects for FY 2008-2009 for Information Technology Services (ITS):

- \bigstar Email archival and search capability
- Security Information Event Management
- Improved Remote Password Reset Procedures
- \bigstar Implement SAN within the Certification Lab
- 🛠 System Insight Manager
- X Evaluate Network Monitoring Tools
- Timplement Voice over IP phone system
- Provide Improved Data Archival Capability
- ★ Expand Wireless Network Access throughout Campus
- Create a Pilot Classroom for Demonstrating Improvements in Technology Furniture
- Timplement Disaster Recovery Facilities at Courseview Campus Center
- ☆ Improve the Usability of the Network for Non-College Owned Devices
- Provide Expanded Access to the Internet
- ☆ Provide Improved Multimedia Capabilities in the Tartan Marketplace and Tartan Terrace
- Treate Additional Computer Classroom in Sinclair Center
- Room and Equipment Scheduling Assessment
- Remote Application Access
- ☆ Implement Student Services Queuing System
- ☆ VMware Infrastructure Implementation

\star Email archival and search capability

Email is extensively used for communication, creation, and transmission of documents and other official records throughout the College. Various legal requirements, such as public records law and e-discovery rules, apply to preservation, retention, and production of email records. In addition to these legal issues, the growth of email use and data storage is challenging from a technical and administration perspective. As part of the routine business continuity and disaster recovery processes, ITS routinely backs-up email to magnetic tape. However, finding and retrieving an individual email message or group of messages from tape is extremely difficult and labor intensive.

Currently, nearly all email message retrieval must be performed by individual users on individual machines. The ability to retrieve a specific message or group of messages is dependent on the individual user saving, filing, protecting, and producing the message. This decentralized approach is inconsistent, ineffective, and inefficient. This project involves implementing an email search and recovery solution that will

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permit ITS to centrally search and retrieve email content from backup tape libraries. A secondary goal is to explore email archival/management solutions that offer a centralized approach for email management without compromising the user experience.

The ideal solutions will be relatively easy to deploy, interface seamlessly with existing systems, provide automated retention and storage management capabilities, and will feature robust search and retrieval capabilities. In addition to implementing/exploring software solutions, the project will require development of policies and procedures addressing what, when, and how email messages are archived, records retention capabilities, user communication and responsibilities, and usage of the search and retrieve functionality.

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Figure 4-9. The Quest Recovery Manager for Exchange search screen.

Estimated Cost of Project: The tape search and recovery solution, is \$16,000 for the Quest Recovery Manager for Exchange software to support the current College Exchange infrastructure. There may be some additional cost for vendor/consultant services to assist with implementation. The result of the exploration of archiving requirements may result in the need for additional components to the solution. Employee time and resources to support the implementation, administer the system, and develop policies and procedures for use are also resource considerations.

Development Development Funding

Information Services Status Report & Strategic Objectives



Cost savings/cost avoidance anticipated for the project: A primary cost avoidance is the College's increased capability to comply with e-discovery requests, reduces both the time and resources required to respond, and also reduces the likelihood of fines or sanctions associated with non-compliance.

Target Completion Date: January 2009

★ <u>Security Information Event Management</u>

The infrastructure that the college requires to be able to provide the types of electronic services that are made available to faculty, staff and students is very complex and made up of many disparate systems. Many of these systems have the ability to record activity in a log which can be helpful when trying to diagnose a problem. However, the ability to routinely monitor logs for problems is something that simply takes too much time to be effective.

With the rise in attempts to gain inappropriate access and to ensure the protection of systems and the data that they hold, it becomes extremely important to have a system that can make sense of multiple and separate event logs and identify problems. This project will investigate products that aggregate event logs for the purpose of:

- Automating the collection and consolidation of log data;
- Automating event log data analysis and report generation;
- Performing basic event management;
- Monitoring login attempts and reporting discrepancies; and
- Identifying and responding to privacy and security incidents.

Estimated Cost of Project: \$100,000

Cost savings/Cost avoidance anticipated for the project: The cost of a data breach or a compromise of a critical business system can run into the millions of dollars.

Target Completion Date: June 2009

Improved Remote Password Reset Procedures

User account passwords are the primary keys used to provide authorized individuals access to and protect the College from unauthorized access to information systems. Effective password security dictates that passwords should not be written down; this

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results in people forgetting their passwords and being unable to access the information resources they need. When a user forgets his/her password, there must be a mechanism for resetting the password to regain access. A critical component of the reset process is authenticating the user—verifying the user is who he/she claims to be. The most secure method for authenticating the user before password reset is to require the user to physically appear and produce proof of identity documentation. However, this is neither user-friendly nor practical in a distributed systems environment, so a method of remote authentication is required.

The College currently offers a Web-based self-service password reset tool, as well as telephone reset via the help desk. However, the authentication processes for both of these systems rely on identifying the individual using personal information in conjunction with either a Student ID or Social Security number. This information is fairly easy to obtain by some third parties, thus the risk of fraudulent password reset is unacceptably high—the current processes have been abused. An additional driver for this project is legislation/regulation; there are pending proposed changes to federal and state regulations that will strictly prohibit the use of Social Security numbers and Student ID numbers as authenticators.

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Figure 4-10. The current password reset tool.

The objective of this project is to replace existing remote password reset processes with more secure, user-managed processes. The overall goal is to offer a completely self-service password reset process that minimizes Help Desk calls. This may involve

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Information Services Status Report & Strategic Objectives



simply modifying existing processes, or may involve development or acquisition of a complete password management solution. Current and pending legislative/regulatory requirements will be reviewed, other higher education institution 'best practices' will be researched, in-house development capabilities will be explored, and commercial solutions will be evaluated. A remote password reset process will be recommended based on the most acceptable, effective, and efficient solutions available.

Estimated Cost of Project: The primary cost of the evaluation and recommendation phase is employee time. The cost of the solution will depend largely on whether the recommendation involves procedure change, in-house development, commercial solution, or a combination.

Cost savings/cost avoidance anticipated for the project: A major benefit of remote/ self-service password management systems is reduction in operating costs. Approximately 20% of all Sinclair Help Desk requests are for password reset. Gartner estimates costs of password reset calls range from \$10-\$35 per call. Based on Help Desk password reset volume of 7500 per year, and the low estimate of \$10 per call, password reset is costing Sinclair a minimum of \$75,000 per year.

Target Completion Date: June 2009

* Implement SAN within the Certification Lab

In Fiscal 2003, ITS received capital funds to build a certification lab that is used for building/testing new servers and software and services prior to placing in a production environment. This separate environment is necessary to ensure the security and reliability of production services. As testing needs grew, the need for a Storage Area Network (SAN) in the certification lab was realized. When replacing the production SAN in Fiscal 2004, it was decided to use the old SAN in the cert lab since it still had some useful life outside of a production environment. This SAN is now 6 years old and in need of repairs that are too costly based on the age of the equipment. Therefore, a new SAN for the cert lab is necessary.

This project will have the following scope:

- Determine the make/model of SAN to purchase;
- Purchase SAN;
- Install/configure SAN in the cert lab;
- Install SAN management software on a server in the cert lab;

Student Success Work Force Development Downtown Campus Development Increased Regional Access Expanded High School Linkages Partnerships Alterna Source Fund
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- Install/configure hardware on cert lab servers to enable them to have SAN connectivity; and
- Document process for attaching cert lab servers to the SAN.



Figure 4-11. HP MSA1000 SAN Storage Array.

Estimated Cost of Project: \$33,000

Cost savings/Cost avoidance anticipated for the project: This project will allow ITS to test hardware, software and services outside of the production environment without impacting users.

Target Completion Date: December 2008

☆ System Insight Manager

Over the past five years the Network Operations Center has made great strides in server and network monitoring. The next step in improving hardware monitoring capabilities is to integrate Hewlett Packard Systems Insight Manager software with the current infrastructure.

Hewlett Packard Systems Insight Manager (HP SIM) will allow ITS to proactively manage system faults, assets, and hardware configurations on servers and other HP devices from a single application.

Integrating HP SIM with HP Openview has the following advantages: simplified management operations; more efficient use of Network Operations staff; increased systems and services availability; and reduction in time needed to analyze and resolve problems.

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HP OpenView

- Multi-vendor systems management
- Network topology discovery and monitoring
- OS and application events and performance
- Service-level availability
- Heterogeneous platform support



- · In-depth hardware lifecycle management
- Hardware status and fault management
- Systems configuration information
- System software version control
- Inventory data collection
- Hosted on Windows, HP-UX, and Linux



Better Together: Complementary management delivering the best RoIT

- OpenView provides a common enterprise platform for hardware and service-level management
- Systems Insight Manager integration with OpenView via embedded policies and plug-in components

Business Benefits

- Synchronize IT resources with changing business needs
- Maximize existing IT investments
- Simplify enterprise management
- Create more efficient, agile and available business operations

Figure 4-12. Systems Insight Manager complements HP Openview.

Estimated Cost of Project: \$8,000

Cost savings/Cost avoidance anticipated for the project: The software is free, but it may require the purchase of a physical server. This cost may be negated if the software can be installed on a virtual server.

Target Completion Date: June 2009

<u>Evaluate Network Monitoring Tools</u>

With the convergence of voice, video, and data on a single communications structure, it will be more important and essential to have the capability to monitor, measure, and evaluate the data network. With applications such as IP Telephony running on the network, processes need to be developed to establish service levels to assure maximum optimization of the network. Second, proactive monitoring to baseline current operational levels will be necessary to evaluate the effect of networking changes. Finally, problem resolution will become more effective when network and hardware utilization can be measured and recorded so that issues can be properly analyzed and root causes and dependencies can be determined.

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Network tools can also reduce downtime and outages through the use of proactive monitoring and alerts indicating issues as they are occurring. This will enhance the current operations to maintain and improve service levels to all users on the Sinclair data network.

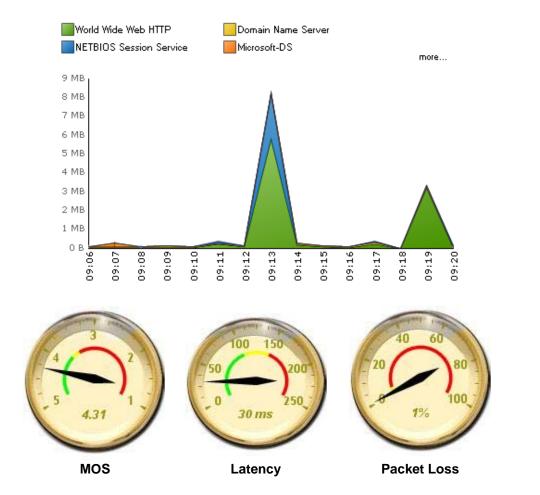


Figure 4-13. Network monitoring tools.

Estimated Cost of Project: \$100,000

Cost savings/Cost avoidance anticipated for the project: Effective network monitoring and management will help to reduce operational costs and gain efficiencies in network optimization.

Target Completion Date: November 2008

Current Status: Trials with some products have begun and further research is planned.

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Information Services Status Report & Strategic Objectives



☆ Implement Voice over IP phone system

Sinclair will begin the final phase of the phone system conversion that began two years ago with the installations at Englewood, Huber Heights and Courseview. With the completion of this project, the present Fujistu system will be completely replaced with the ShoreTel VoIP system. This phase of the overall project will involve over 1700 phone lines across the entire campus. With one system in place and working for all locations, transparency for the users will be complete with all features interacting within and between all locations with a common platform.

The ShoreTel system will feature a distributed architecture running across the Sinclair data network using the latest communication technology. It will feature a new voice mail system with integrated auto attendant functionality. It will be deployed with caller ID for all staff and administration phones and have the capability of newer phone features such as Call Manager (PC controls the phone) and unified communications, with the capability of voice mail accessible from Outlook. The ShoreTel system will also feature a new ACD (automatic call distribution) system for use in the Call Center and IT Help Desk, which will enhance those operations.



Figure 4-14. ShorTel Voice over IP phone system.

Estimated Cost of Project: \$1,400,000

Cost savings/Cost avoidance anticipated for the project: Operational and administrative costs of the new system will be lower than the aging Fujitsu phone system. The risk of a phone system failure will be reduced significantly.

Target Completion Date: January 2009

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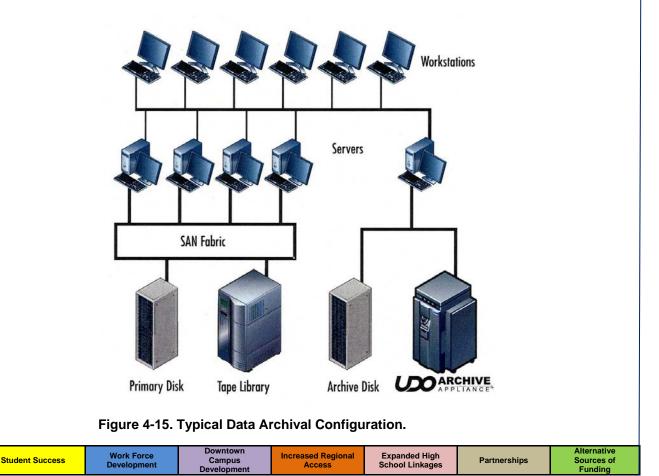


Current Status: This is the final phase of the implementation of the new phone system which has been installed at the Learning Centers and Courseview and has also been in pilot testing on the Dayton campus for 2 years.

Provide Improved Data Archival Capability

ITS has been researching options available to store records in a media other than paper. In order to identify the type of media that would be an acceptable long-term solution, the services of Gartner Group, an IT industry research firm were realized. It was determined that UDO (ultra density optical) media is the best repository for records retention storage. UDO media is designed for a 50+ year life, withstands the rigors of continuous, long-term use, and is recommended in place of hardcopy, CDs or DVDs to store records.

The focus of this project is to ensure Sinclair has the ability to efficiently and appropriately comply with records retention requirements, conserve storage space, and be able to retrieve the needed information in a timely manner. Policies and procedures will be developed, resource requirements identified and acquired, and personnel expertise will be developed to ensure the College can effectively respond to the increasing need for an efficient records retention storage process.





Estimated Cost of Project: ITS has identified Plasmon as being the vendor to purchase the UDO system from. A capital budget request was submitted for \$ 17,000 to cover the expense for the equipment, storage media, personnel training, and other related items.

Cost savings/cost avoidance anticipated for the project: Changing the current process to eliminate printing reams of paper quarterly to be stored indefinitely will reduce paper costs and storage costs incurred by the College. Proactively developing policies and procedures, and otherwise planning for, preservation, retention, and production of records retention storage with a media that requires little shelf space and has a long shelf life is implementing the first step in converting the college hard copy records retention storage to a state of the art methodology.

Target Completion Date: May 2009

★ Expand Wireless Network Access throughout Campus

Wireless networking is becoming a very important technology for organizations. There are many innovative capabilities that wireless connectivity can enable. Beyond this, more and more computing devices are being delivered with built-in wireless capability. Information Technology Services has created a strategy for providing role-based access to the wireless network and access to the network via wireless connectivity is available in every campus building.

While wireless networking has not progressed to the point where it is suitable for the replacement of wired networking, it provides great productivity benefits. Allowing individuals to be connected to network resources while away from their office provides a great return on the investment in the necessary infrastructure. This project will identify areas where access to the campus wireless network is not available, prioritize where wireless expansion will provide the greatest benefit, and implement the capability where it is justified.



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Estimated Cost of Project: \$30,000

Cost savings/Cost avoidance anticipated for the project: Expansion of the wireless network can be done fairly inexpensively because of the type of wireless infrastructure that the college has implemented. ITS will also investigate having Harborlink cover the cost of any equipment installed in areas that may be of interest to them.

Target Completion Date: June 2009

☆ Create a Pilot Classroom for Demonstrating Improvements in Technology Furniture

The purpose of this project is to create a pilot classroom for demonstrating improvements in technology furniture. With this furniture faculty will no longer need a dedicated computer lab and a dedicated lecture room for one class.

With all the technology thrust upon faculty and the limited number of classrooms, there is a growing need for multipurpose classrooms. Some of the class offerings require computer equipment at some point, and other times they do not. In fact, in some cases faculty believe the computers interfere with the learning objectives.

In 2007, a committee was formed from ITS, faculty and Facilities to look at furniture that could help resolve this challenge. After looking at many different types of desks, the committee found a table that can be converted to a computer station quickly and easily. This is the furniture that will be used for the pilot classroom.



Figure 4-17. Monitors positioned "up" for computer class.

Figure 4-18. Monitors hidden away for traditional class .

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Estimated Cost of Project: \$48,892

Cost savings/Cost avoidance: Equipping some rooms with this type of furniture could save the expense and/or scheduling issues with making a computer classroom and non-computer classroom available to a single class.

Target Completion Date: January 2009

Implement Disaster Recovery Facilities at Courseview Campus <u>Center</u>

Information Technology Services manages a contract with Sungard, a provider of disaster recovery services. This contract would provide temporary replacement hardware for any systems that are covered under the contract in the event of a disaster. Also, the contract allows for annual testing of the ability to recover those systems. This type of service is very expensive, but has been used for many years due to the risk of a disaster rendering the college unable to continue to do business.

During the planning for the Courseview Campus Center, Information Technology Services performed an analysis of the cost of building and equipping a disaster recovery facility at the new site. It was determined that the college would achieve payback of the investment to build the facility in the fourth year of operation. In addition to saving money, the new facility will allow added benefits as well. For instance, systems that are meant to provide for disaster recovery may be continuously mirrored images of production systems. Another benefit of using the Courseview site is the ability to use a disaster recovery system as a test system, rather than having to purchase another system.

The contract with Sungard expires in December 2008. To be ready for the elimination of Sungard's services, Information Technology Services will begin purchasing and installing systems in the Courseview computer room in September 2008.

Estimated Cost of Project: \$275,000

Cost Savings/Cost avoidance anticipated for the project: Sinclair currently pays Sungard approximately \$72,000 annually to provide disaster recovery capability for less than 20 servers. Information Technology Services will implement the disaster recovery site with a 4 year payback and will also make it possible to recover a larger number of systems.

Target Completion Date: December 31, 2008

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☆ Improve the Usability of the Network for Non-College Owned Devices

The ability for college faculty and staff to use personally-owned network devices to connect to the campus network is provided by the Information Technology Services' Secure LAN Strategy. These devices do not receive the same level of access as college-owned devices, but are allowed to get the type of access that most people are used to experiencing in wireless "hot spots".

The current system that is used to authenticate employees that want to connect their own device is difficult to use. We will evaluate alternative technologies to provide the same functionality, but with a better user interface.

Estimated Cost of Project: \$30,000

Cost Savings/Cost avoidance anticipated for the project: Making use of the existing infrastructure that was put in place as part of the Secure LAN project will make this project cost less than if those capabilities needed to be created or modified as part of this project.

Target Completion Date: June 30, 2009

Provide Expanded Access to the Internet

The college's use of Internet bandwidth continues to grow as more and more resources are made available via the network. Adding bandwidth is not as easy as just increasing the size of the Internet connection. There are devices that exist within the network that have limitations that could prevent the full use of added bandwidth if they are not also upgraded.

This project will provide a plan to increase the capabilities of all necessary equipment to allow for the college's Internet bandwidth to be increased.

Estimated Cost of Project: \$75,000

Cost Savings/Cost avoidance identified with the project: Increases in bandwidth will be possible at decreased cost due to existing contracts with Internet Service Providers and a possible partnership with the city of Dayton.

Target completion date: June 2009

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☆ Provide Improved Multimedia Capabilities in the Tartan Marketplace and Tartan Terrace

The Tartan Marketplace and Tartan Terrace are focal points of Sinclair's downtown campus. Meetings and public announcements, both internal and external, are often held in both locations. These venues are spacious and often require the use of portable audio systems including wireless microphones and portable mixers and speakers. In addition, most meetings today require the use of a projected computer or DVD player image for video or Internet content delivery. However, the spaces were not originally designed with these multimedia needs in mind.

This project proposes to furnish the Tartan Terrace and Tartan Marketplace with multimedia equipment including but not limited to projectors, projection screens, computers, and DVD/VCR players as well as speaker reinforcement equipment such as permanent microphones and amplification equipment.



Figure 4-19. Tartan Terrace.

Estimated Cost of Project: \$120,000.00

Cost Savings/Cost avoidance anticipated for the project: Permanently installing equipment in these spaces will greatly reduce the amount of time spent by Multimedia Services staff setting up and tearing down temporary multimedia systems. In addition, wear and tear from constant moving and repositioning of equipment will be greatly reduced.

Target Completion Date: June 30, 2009

Student Success Work Force Development	Downtown Campus Development	Increased Regional Access	Expanded High School Linkages	Partnerships	Alternative Sources of Funding
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* Create Additional Computer Classroom in Sinclair Center

Demonstrated ability over the past year to sell the temporary computer classroom located in the Sinclair Center led to the creation of this project to create an additional permanent computer classroom in the Sinclair Center. Furnished with up-to-date technology, this new computer classroom will provide increased stability and supportability for the College as well act as an additional selling point for the Sinclair Center.



Figure 4-20. Before and possible after pictures of new classroom.

Estimated Cost of Project: \$63,000

Cost Savings/Cost avoidance anticipated for the project: Because of the temporary nature of this current space, technicians are often called upon to make configuration changes and to provide just in time training. A permanent classroom will be more user-friendly and should not require frequent reconfiguration or training which will allow resources to be used elsewhere in the College.

Target Completion Date: June 30, 2009

Room and Equipment Scheduling Assessment

Effective classroom or conference center scheduling can make the difference between being able to grow enrollment and take on additional clients or not. Sinclair currently owns and uses the Resource25 software which is a space utilization package intended to provide efficient scheduling of spaces and web-based access to view classroom/

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conference room schedules and reserve space, food, and equipment. Benchmarking within the industry has indicated that this package no longer holds a large percentage of the market share. Similar informal benchmarking studies have indicated that multimedia systems permanently installed in classroom and meeting spaces is becoming commonplace.

The goal of this project is to determine the advantages and feasibility of implementing a different, industry-leading package to replace Resource25. In addition, this project will include a study of equipment needs for campus classrooms and conference rooms and will provide a plan and cost analysis for implementation.

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Figure 4-21. An example of a room and equipment scheduling system.

Estimated Cost of Project: This project has no associated costs.

Cost Savings/Cost avoidance anticipated for the project: This project is a feasibility study and will not include cost savings or avoidances in this Phase.

Target Completion Date: December 2008

★ <u>Remote Application Access</u>

In fiscal 2007-2008, ITS had a project called "Off-Campus Access to On-Campus Lab Applications" where technologies to provide remote application access were researched and evaluated. In that project, Microsoft Intelligent Application Gateway (IAG) showed the most promise and will be evaluated further in fiscal 2008-2009.

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This project has the following high level scope:

- Install/configure Microsoft Server 2003 with terminal services;
- Install/configure SoftGrid for Terminal Services;
- Configure application already in SoftGrid to run the Windows Server 2003 terminal services environment;
- Install/configure Microsoft IAG appliance; and
- Create portal in Microsoft IAG to present SoftGrid applications to users.

Once the initial testing is complete, more thorough tuning of the remote application access environment will be necessary before this solution is widely deployed. If IAG performs as expected, it will replace the current Citrix application, VPN solution and possibly Cisco CCA. In addition, the ability to securely provide applications remotely will benefit faculty, staff and students.

Estimated Cost of Project: \$20,000

Cost savings/Cost avoidance anticipated for the project: By itself, the costs associated with Microsoft IAG are lower than with the current Citrix solution. When CCA is factored into the replacement strategy, the cost of IAG is significantly lower.

Target Completion Date: June 2009

☆ Implement Student Services Queuing System

This project has been created to coordinate the installation and implementation of the ACF Technologies Advanced Student Flow and Queuing Management System. Chosen by the Student Services and Marketing division for its value and robust capabilities, this system promises to assist with the long wait lines in financial aid and the counselors' offices by queuing students when it is their turn rather than requiring that they stand in time-consuming lines. Queue numbers will display on currently installed and strategically positioned 42" monitors located in buildings 10 and 11 so that students may wait in comfort while grabbing a snack at the Main Street Café or studying in the waiting area.

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Figure 4-22. A representation of the ACF Technologies Queuing System.

Estimated Cost of Project: \$150,000.00

Cost Savings/Cost avoidance anticipated for the project: No cost savings or avoidances are directly associated with this project. However, eliminating student frustration and enhancing student service should have a substantial impact on enrollment and retention.

Target Completion Date: July 2008

☆ VMware Infrastructure Implementation

Continuing with the VMware Infrastructure implementation project completed in fiscal 2007-2008, this project will involve the addition of 3 physical servers to the VMware virtual cluster. In addition, it will involve creating a separate disaster recovery cluster at the Courseview campus. To create this cluster, a separate storage area network (SAN) will be purchased and installed at Courseview as well as a complete backup environment.

Once the SAN and backup infrastructure has been installed, and the VMware cluster built, a process to replicate the virtual servers from the Dayton campus to the Courseview campus will be developed. The scope of this DR effort will be to duplicate the services purchased through Sunguard. As such, the servers/services that were designated as disaster recovery candidates with Sunguard will be the same server/ services replicated at Courseview.

Estimated Cost of Project: There is a budget for the Disaster Recovery System project of \$275,000. Some of this budget will go for the servers, SAN and tape backup devices that are described in this project.

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Cost Savings/Cost avoidance anticipated for the project: Through virtualization of servers replaced through R&R in fiscal 2008-2009, ITS estimates that it will save \$38,000.

Target Completion Date: June 2009

Student Success Work Force Development Downtown Campus Development Increased Regional Access Expanded High School Linkages Partnerships Alternative Sources of Funding

Section 5 Future Technologies



Future Technologies

Predicting what future technologies will emerge is a difficult task. There have been many major (and comical) blunders in the past.

Examples include:

"This telephone has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." 1876 Western Union internal memo

"Who the hell wants to hear actors talk?" 1927 H.M. Warner, Co-Founder and President of Warner Brothers

"I think there is a world market for maybe five computers." 1943 Thomas J. Watson, President of IBM

"I have traveled the length and breadth of this country and talked with the best people, and I can assure you that data processing is a fad that won't last out the year."

1957 Editor in charge of business books for Prentice Hall

"There is no reason why anyone would want a computer in the home." 1977 Ken Olson, President, Chairman and Founder of Digital Equipment Corporation (DEC)

Therefore, the following are presented as possibilities rather than definite realities.

Virtualization

Information Technology Departments have been experimenting with, and in some cases utilizing virtualization technologies for the past few years. Virtualization is defined as making a single physical resource appear to function as multiple virtual resources. The benefits are increased hardware utilization, flexibility, energy conservation, and reduced costs.

Much of the virtualization efforts to date have focused on servers and storage devices; however, most IT industry pundits believe that virtualization will expand into other facets of the IT infrastructure in the coming years.



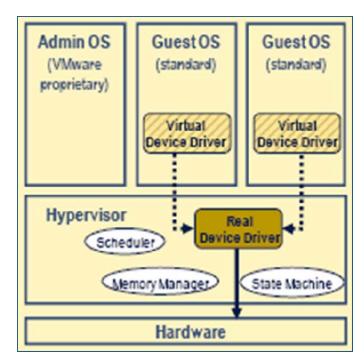


Figure 5-1. Virtualization.

Unified Communications

Most organizations are planning to implement unified communication systems over the next three years, according to Gartner Research. Unified communications is typically thought of in terms of email, voicemail, instant messaging, and text messaging, but industry analysts believe it will go far beyond that into desktop video conferencing, customer (student) relationship management systems, and various other applications in an attempt to improve the efficiency of electronic processes.



Figure 5-2. Unified Communications.



Service-oriented Architecture (SOA)

Service-oriented Architecture (SOA) is defined as a computer systems methodology for developing and using organizational processes which have been packaged as services. That is, SOA separates functions into distinct units (services), which can be distributed over a network and can be combined and reused to create applications. Services are intrinsically unassociated units of functionality, such as filling out an online application regardless of the college or university being considered, viewing an online statement of a student's account, or registering for a class, which may or may not be at the student's home institution.

Underlying and enabling all of this is metadata which describes not only the characteristics of the services, but also the data requirements.

SOA systems may consist of third-party services combined with the services created in-house. This has the potential to spread development costs over many organizations and to promote standardization throughout the post-secondary education sector.

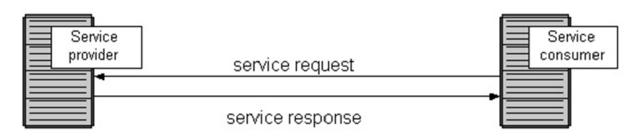


Figure 5-3. Service-oriented Architecture.

Web 2.0

Web 2.0 is more of a collection of social-networking functions such as wikis, blogs, folksonomies, etc. rather than a defined methodology. These functions provide a second generation of web-based communities and hosted services which are intended to facilitate collaboration, innovation, and sharing of ideas. According to Tim O'Reilly, founder and CEO of O'Reilly Media, Inc., thought by many to be the best computer book publisher in the world:

"Web 2.0 is the business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform."



Dario de Judicibus, an IBM social-networking analyst suggests a different definition:

"Web 2.0 is a knowledge-oriented environment where human interactions generate content that is published, managed, and used through network applications in a services-oriented architecture."

Regardless of the definition Web 2.0 is a phenomenon that is starting to touch all components and users of the Internet. The primary reason is that Web 2.0 websites allow users to do much more than merely retrieve information. Users are permitted to build on the interactive facilities of Web 1.0 to provided "network as a platform" computing, allowing users to execute software applications through a browser. In fact, users own the data on a Web 2.0 website and have full control over that data. This is a significant contrast to the traditional Web 1.0 websites, which limited visitors to viewing and only the website owner could modify the data. Web 2.0 websites typically feature a rich, user-friendly interface and have a high degree of social-networking aspects.



Figure 5-4. Web 2.0.



Enterprise Mashups

According to International Data Corporation (2006), organizations which employ one thousand knowledge workers lose \$5.7 million annually just in time wasted by employees having to reformat information as they move among applications. Additionally, the complexity associated with accessing and presenting data is complicated because of the large number of disparate internal and external sources, which are often required to make informed decisions. Enterprise Mashups are the next generation of information services that embrace the user-oriented, collaborative style of Web 2.0 technologies. Enterprise Mashups allow users to share, collaborate, and rapidly gain new insights that help to drive innovation and organizational growth.

Mashups hold real promise for any organization because they use technology that most organizations already have – there is no need for a huge investment. Organizations can easily integrate components and sources of data without developing custom applications.

A good example of a mashup that has been a major technological disruption is "Google Maps," which is now used by a variety of industries to provide information to customers. Many industry analysts believe that Enterprise Mashup solutions will become commonplace in the not too distant future.

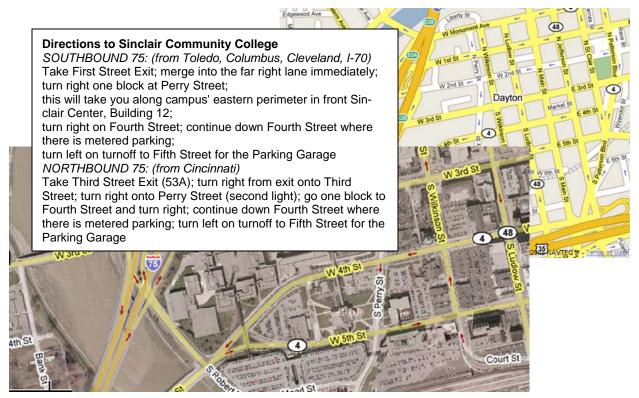


Figure 5-5. Enterprise Mashups.

Appendix A Glossary



Glossary

Acceptable Use Policy: also known as TOS (Terms of Service); a contract specifying what a subscriber can and cannot do while using an ISP's service. Policy contains things like liability disclaimers, lists of actions or behavior that will result in the termination of a customer's account, definition of terms such as "unlimited use," billing policies, SPAM clauses, etc.

Access: The technology choices available by which users can connect to the public data network at the level they demand or need (dial-up, cable, DSL, ISDN, wireless, etc.)

ACS: Automated Cartridge System is a storage and retrieval system, often used for library management.

Anti-virus Software: Programs to detect and remove computer viruses. The simplest kind scans executable files and boot blocks for a list of known viruses. Others are constantly active, attempting to detect the actions of general classes of viruses. Anti-virus software must be regularly updated to be effective against the latest viruses as they are released and discovered.

Authentication: The process of verifying that an electronic identifier is correctly mapped to the person using it. Authentication may take a variety of forms and typically relies on one or more of the following:

- Something you know, such as a password;
- Something you have, such as a smartcard with a public-key certificate;
- Some personal attribute, evidenced by a retinal scan, fingerprint, or photo.

B2B (business-to-business): The exchange of products, services, or information between two or more businesses using networked technologies.

B2C (business-to-consumer): The exchange of products, services, or information between businesses and consumers over the Internet.

Bandwidth: The amount of data that can be transmitted in a given amount of time over a particular connection.

Blog: Web-based content consisting primarily of periodic articles or essays listed with the latest entry and visitor comments at the top. Blogs topics can range from personal diaries to political issues, media programs and industry analysis. Blogs are also known as "weblogs" or "web logs."

bps: Measurement of transmission speed - bits per second.



Broadband: High speed data transmission over which a single medium can carry several channels at once. DSL and cable modem service are broadband services.

Business Intelligence (BI): A broad category of applications and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support systems, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining.

Byte: A byte is a series of 8 bits - also called a character. Computer storage space is measured in bytes. A kilobyte (1 KB) represents 1024 bytes. A megabyte (1 MB) represents 1024 KB. A gigabyte (1 GB) represents 1024 MB. A terabyte (1 TB) represents 1024 GB.

Cable modem: A device that enables a personal computer to be connected to a local cable TV line and receive and send data.

Chat Room: An online forum where people can broadcast messages to people connected to the same forum in real-time. Sometimes, these forums support audio and video communications allowing people to chat in audio and watch each other.

CIO: Chief Information Officer

CISO: Chief Information Security Officer

CMT: Curriculum Management Tool – Software written by Sinclair's Web Systems unit. The software manages all phases of curricular additions and changes.

Colleague Application/Database: The application (developed by Datatel, Inc.) used by the College for Enterprise Resource Planning (ERP). It is a collection of software programs that tie all of the various diverse functions (student services, business operations, finance, HR, etc.) into a cohesive database.

Common Address Redundancy Protocol (CARP): Its primary purpose is to allow multiple hosts on the same network segment to share an IP address. CARP works by allowing a group of hosts on the same network segment to share an IP address. This group of hosts is referred to as a redundancy group. The redundancy group is assigned an IP address that is shared among the group members.

Course Management System (CMS): See Learning Management System.

Customer Relationship Management (CRM) software: CRM entails all aspects of interaction a company has with its customer, whether it be sales or service related using tools such as help-desk software, e-mail organizers and Web development apps to personalize online experience.



Data Base Management System (DBMS): A complex set of programs that control the organization, storage and retrieval of data for many users; extensively used in business environments. Data is organized in fields, records and files. A database management system must also control the security of the database.

Data Cleansing: The act of detecting and removing and/or correcting a database's dirty data (i.e., data that is incorrect, out-of-date, redundant, incomplete, or formatted incorrectly).

Data Warehouse: A database designed specifically to support decision-making (Business Intelligence). It is a data repository which may be populated from multiple sources, including multiple transaction-oriented databases.

Dial-up access (modem): Refers to connecting to the Internet via a modem and standard telephone line. Maximum speed is 56 Kbps.

Digital Subscriber Line (DSL): A technology which enables the ordinary copper component of telephone lines to carry data at rates much higher than ISDN. Maximum speed is 8 Mbps.

Distributed computing: An industry-standard software technology for setting up and managing computing and data exchange in a system of networked computers.

Domain name: The unique name that identifies an Internet site and its address.

Domain Name System (DNS): An internet service that translates domain names into IP addresses.

DriveLock: Software that is installed on laptops that prevents the hard drive being used without knowing the password to the drive. This software protects against loss of sensitive data in the event a laptop is stolen.

Dynamic Host Configuration Protocol (DHCP): A set of rules used by communications devices such as a computer, router or network adapter to allow the device to request and obtain an IP address from a server which has a list of addresses available for assignment.

Electronic Advising: A Colleague module designed to allow students to design and review a program completion plan which can be shared with and receive approval from an academic advisor.

Electronic Business (e-Business): The transformation of key business processes through the use of Internet technologies.



Electronic Commerce (e-Commerce): Commercial and noncommercial transactions facilitated through the use of networked technologies, such as over the Worldwide Web.

Electronic Data Interchange (EDI): The transfer of data between companies using computer networks, such as the Internet.

Electronic Mail Services/System (E-mail): Any messaging system that depends on computing facilities to create, send, forward, reply to, transmit, store, hold, copy, download, display, view, read, or print computer records for purposes of asynchronous communication across computer network systems between or among individuals or groups, that is either explicitly denoted as a system for electronic mail; or is implicitly used for such purposes, including services such as electronic bulletin boards, listserves, and newsgroups.

Electronic Mailbox: A file (or folder) designated to a particular user on a particular computer in which received electronic mail messages are stored ready for the user to read them. Using the example firstname.lastname@sinclair.edu, "firstname.lastname" is the name of the user's mailbox file on the mail server.

Email Address: The string used to specify the source or destination of an electronic mail message. A typical college e-mail address format is firstname.lastname@sinclair.edu.

Email Distribution List: A distribution list is a group of recipients, all gathered under one name, or address. A distribution list allows you to send a message to all of the recipients by entering just that one address. There are two common kinds of distribution lists: Personal Distribution Lists (stored on an individual's PC) and Public Distribution Lists (server-based). See their individual definitions.

Email Record/Email Message: Any or several electronic computer records or messages created, sent, forwarded, replied to, transmitted, stored, held, copied, downloaded, displayed, viewed, read, or printed by one or several email systems or services. This definition of email records applies equally to the contents of such records and to transactional information associated with such records, such as headers, summaries, addresses, and addressees.

Email Users: Individuals who create, send, forward, reply to, transmit, store, hold, copy, download, display, view, read, or print email (with the aid of College email services). A (College) Email User is an individual who makes use of (College) email services. Receipt of email prior to actual viewing is excluded from this definition of "use" to the extent that the recipient does not have advance knowledge of the contents of the email record.



Encrypted/Encryption: Procedures using algorithms to encode or convert plain text into cipher-text to prevent any but the intended recipient from reading that data. There are many types of data encryption; they are the basis of network security.

Enterprise Resource Plan (ERP): A system that supports the planning and management of all the resources in an enterprise - a multi-module software system that supports enterprise resource planning. An ERP system typically includes a relational database and applications for managing purchasing, inventory, personnel, customer service, shipping, financial planning, and other important aspects of the business.

File Transfer Protocol (FTP): Used to transfer data from one computer to another over the Internet, or through a network. FTP is a commonly used protocol for exchanging files over any network that supports the TCP/IP protocol (such as the Internet or an intranet).

Frame Relay: Used for connecting local and wide area networks - can support data transfer at T-1 and T-3 speeds.

Gigabits per second (Gbps): A measurement of the rate of speed at which data is transferred (e.g., 1 Gbps equals 1 billion bits per second).

Graphical User Interface (GUI): A computer terminal interface, such as Windows, that is based on graphics instead of text.

Information Delivery Portal (IDP): Web-based interface that enables users to view and organize analytical content such as reports prepared by using SAS statistical software.

Information Map: A grouping of data warehouse elements that have been joined and linked in a conceptually related manner that is meaningful to end users.

Information Technology (IT): The broad subject concerned with all forms of technology used to manage and process information electronically.

Infrastructure: The communication networks that connect users to a networked environment such as the Internet.

Instant Messaging (IM): A software tool that allows real-time electronic messaging or chatting. Instant messaging services use "presence awareness" indicating whether people on one's list of contacts are currently online and available to chat. Examples of IM services are AOL Instant Messenger, Yahoo! Messenger and MSN Messenger.



Integrated Services Digital Network (ISDN): A service that allows for higher data transmission speeds over telephone lines and is capable of handling at least two services over one line simultaneously (i.e., voice and fax or voice and data). Maximum speed is 128 Kbps.

Internet Authentication Service (IAS): Microsoft's implementation of a Remote Authentication Dial-in User Service (RADIUS) server and proxy with Microsoft Windows Server 2003. As a RADIUS server, IAS performs centralized connection authentication, authorization, and accounting for many types of network access including wireless and wired connectivity. IAS stores its authentication data in Active Directory.

Internet Service Provider (ISP): A company or organization that provides users with connectivity to the Internet.

Kilobits per second (Kbps): The rate of speed at which data is transferred (e.g., 1 Kbps equals 1,000 bits per second).

Learning Management System (LMS): A software application or Web-based technology used to plan, implement, and assess a specific learning process. Typically, a learning management system provides an instructor with a way to create and deliver content, monitor student participation, and assess student performance. A learning management system may also provide students with the ability to use interactive features such as threaded discussions, video conferencing, and discussion forums. The Advanced Distributed Learning group, sponsored by the United States Department of Defense, has created a set of specifications called Shareable Content Object Reference Model (SCORM) to encourage the standardization of learning management systems.

Letter or Mail Bomb: An email message containing malicious code intended to do nefarious things to the recipient's computer or network. Also, to send, or urge others to send, massive amounts of electronic mail to a single system or person, with intent to crash or spam the recipient's system. Letter or Mail bombing is a serious offense and is not tolerated.

Lightweight Directory Access Protocol (LDAP): An online directory service protocol defined by the Internet Engineering Task Force (IETF) which is a simplification of Directory Access Protocol (DAP). An LDAP directory entry is a collection of attributes with a unique identifier, called a distinguished name (DN). The directory system is in a hierarchical structure.

List Owner: Individual(s) who establish the scope and distribution of and perform the maintenance of email distribution lists.



Listserv: An electronic mailing list software application that was originally developed in the 1980's and also known as "discussion lists." A listserv subscriber uses the listserv to send messages to all the other subscribers, who may answer in a similar fashion.

Local Area Network (LAN): A network of interconnected workstations that share the resources of a single processor or server within a relatively small geographic area, such as an office.

Mail relay server: Often referred to as an e-mail server, a device and/or program that routes an e-mail to the correct destination. Mail relays are typically used within local networks to transmit e-mail among local users.

Malicious Code: Code is a common term used to describe a set of instructions to a computer, also called program or software. Malicious code in general can be defined as "software which interferes with the normal operation of a computer system." Another general definition might be "software which executes without the express consent of the user." Common types of malicious code include viruses, Trojans, and worms.

Megabits per second (Mbps): A measurement of the rate of speed at which data is transferred (e.g., 1 Mbps equals 1 million bits per second).

Megabyte (MB): A measurement of capacity (e.g., 1 MB equals 1 million bytes).

Microsoft Outlook: The Microsoft "groupware" information management and communication software used by the college for email communication, group planning and scheduling, and contact/task management.

Mobile e-Commerce (m-Commerce): Commercial and noncommercial transactions facilitated through the use of wireless networked devices.

Online Analytical Processing (OLAP): A method of database indexing that enhances quick access to data, especially in queries calling for large quantities of data or viewing the data from many different aspects.

Online Forum: A web application where people post messages on specific topics. Forums are also known as web forums, message boards, discussion boards and discussion groups. They were predated by newsgroups and bulletin boards in the 1980's and 1990's.

Peer-to-Peer (P2P) File-Sharing: Directly sharing content like audio, video, data, software or anything in digital format between any two computers connected to the network without the need for a central server. Examples of P2P networks are Kazaa, OpenNap, Grokster, Gnutella, eDonkey and Freenet.



Personal Distribution Lists: These lists are created by individuals for their own use. Personal distribution list files are stored in the individual's Personal Address Book. Personal Address Books usually reside on the individual's hard drive (or a drive of their choice). These lists are called "Personal" as they should be created for personal (one person) use. Sinclair users are permitted to create and share the lists to facilitate group communication.

Point Of Sale (POS): The time and place in which a transaction is made. Point of sale computer systems include cash registers, optical scanners, magnetic card readers, and special terminals. Reading product tags, updating inventory, and checking credit are some of the operations performed at the point of sale.

Portlet: A portlet is a Web-based component that will process requests and generate dynamic content. The end-user would essentially see a portlet as being a specialized content area within a Web page that occupies a small window in the portal page.

Privacy policy: A statement by an organization describing the ways in which it collects, stores, and uses personal information gathered from citizens and consumers.

Project DAWN: Data Analysis Warehousing and iNtelligenge (DAWN) initiative that is deploying business intelligence services to the Sinclair decision makers

Public Distribution Lists: These are created by IT staff for use by all Sinclair users. The distribution list files are stored on the Exchange Mail server. These lists are called "Public" as they are designed to be available to all users. Use of these lists is for academic and administrative purposes only as misuse wastes system resources and can affect the entire College network.

Remote Authentication Dial-in User Service (RADIUS): Multi-user client-server security protocol used in computer networks to provide remote user authentication and accounting. The RADIUS software can read several kinds of password databases and use several kinds of authentication schemes.

Return on Investment (ROI): A quantitative analysis of investment in budgets and the resulting return on the investment.

Role-based Access: After official authentication, access to Information Technology resources is granted based on the individual's role at the institution. As an example, a faculty member would have access to a totally different set of resources than a student, and a Dean might have access to a greater set of resources than an individual faculty member.

SAN: Storage Area Network is a high-speed subnetwork of shared storage devices. A storage device is a machine that contains nothing but a disk or disks for storing data.



Secure Sockets Layer (SSL): A protocol developed by Netscape for transmitting private documents via the Internet. SSL works by using a private key to encrypt data that's transferred over the SSL connection. Both Netscape Navigator and Internet Explorer support SSL, and many Web sites use the protocol to obtain confidential user information, such as credit card numbers.

Sender Policy Framework (SPF): An extension Simple Mail Transfer Protocol that stops e-mail spammers from forging the "From" fields in an e-mail. SPF is one method that can be used to stop spam from being sent using unauthorized domain names.

Server: A computer that provides some service for other computers connected to it via a network. A mail server has a drive that hosts user electronic mailboxes and receives, stores, and sends email messages via the network.

Single Sign On (SSO): A software program that accepts a single authentication transaction and brokers this transaction to provide authenticated access to multiple web or computer based services.

Social Networks: Websites promoting a "circle of friends" or "virtual communities" where participants are connected based on various social familiarities such as familial bonds, hobbies or dating interests. Examples include eHarmony, Facebook, Friendster, Linkedin, Match.com, MySpace, Plaxo and Yahoo!Groups.

Spam or Spamming: Electronic junk mail or junk newsgroup postings. Spam is generally email advertising for some product sent to a mailing list or newsgroup. Spamming is sending or transmitting these junk messages. Receipt of Spam is virtually impossible to control; Spamming to or from college email systems is strictly prohibited.

SQL Server: A relational Database Management System (DBMS) supplied by Microsoft.

SSP: Student Success Plan – Software written by Sinclair's Web Systems unit designed to serve as a customer relationship management system for "at risk" students.

Staff Person Month: A metric of cost that equates to the average of all nonmanagement or system maintenance staff within Systems Development & Maintenance multiplied by a 1.30 weight to account for fringe benefits and divided by the total number of staff month available to perform work.

Structured Query Language (SQL - *pronounced SQL or Sequel***):** A language used to create, maintain, and query relational databases. It is an ISO and ANSI standard. SQL uses regular English words for many of its commands, which makes it easy to use. It is often embedded within other programming languages.



T-1: Point-to-point dedicated phone line connection. Maximum speed is 1.544 Mbps.

T-3: Point-to-point dedicated phone line connection. Maximum speed is 44.7 Mbps.

Telecommunications: Refers to all types of data transmission, from voice to video.

Terabits per second (Tbps): A measurement of the rate of speed at which data is transferred (e.g., 1 Tbps equals 1 trillion bits per second).

Terabyte (TB): A measurement of capacity (e.g., 1 TB equals 1 trillion bytes).

Unidata: The database management system used for Colleague.

United States Postal Service (USPS): Commonly referred to as snail mail.

Usage: The extent to which business, government and household users utilize the Internet access and infrastructure available to them.

User Interface (UI): The means by which a user interacts with a computer. The interface includes input devices such as a keyboard, mouse, stylus, or microphone; the computer screen and what appears on it; the way commands are given, etc. With a command-line interface, only text appears on the screen, and the user must type in commands; with a graphical user interface, windows, mice, menus, and icons are used to communicate with the computer.

User Login/Logon ID: The string that, in conjunction with the password, identifies a user to the network. A typical college user ID consists of the user's first and last name separated by a period. As in "firstname.lastname".

Virtual LAN (VLAN): Method of creating independent logical networks within a physical network. Several VLANs can co-exist within such a network. This aids in network administration by separating logical segments of a LAN (like company departments) that should not exchange data using a LAN.

Virtual Private Network (VPN): A private data network using the public telecommunication infrastructure with security procedures that maintain privacy.

Virus: A program or piece of code that generally executes without the user's knowledge and runs against their wishes. Most viruses are malicious in nature and can also replicate themselves. All computer viruses are man-made and vary in degree of danger. Even a simple virus that replicates itself without actually harming system files is dangerous because it quickly uses available memory and other resources. A more dangerous type of virus is one capable of transmitting across networks and mutating to bypass security systems.



Web Content Management System (WCMS): A system or set of tools used to manage the content of a Website. Typically, a WCMS consists of two elements: the content management application and the content delivery application. The content management application allows the content manager or author, who may not know Hypertext Markup Language (HTML), to manage the creation, modification, and removal of content from a Website (via an intermediate database) without needing the expertise of a Web Developer. The delivery element uses and compiles that information along with predefined templates to generate web pages. The features of a WCMS system vary, but most include a data repository, format management, revision control, indexing, search, and retrieval.

Wide Area Network (WAN): A geographically dispersed telecommunication network.

Wiki: A web application that allows one user to add content and any other user to edit the content. The popular software used to implement this type of web collaboration is known as "Wiki." A well-known implementation is Wikipedia, an online encyclopedia.

Wireless access: A communications system in which radio-frequency or infrared waves carry a signal through the air, rather than along a wire.

World Wide Web (WWW): The system of Internet servers and users that support documents formatted in the HTML language.