University of North Alabama Department of Computer and Telecommunications Services

Five Year Program Review

Name and Signature of Department Head:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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UNA made considerable progress in several key areas of emerging technology during the past five years:

**Cloud storage and collaboration** (also called cloud computing): Leading edge compared to other mid-sized Universities. UNA is following the national trend by enrolling every student and employee on Microsoft Live@edu. This program provides free email services, cloud document storage and cloud collaboration.

**Connectivity to the desktop**: Middle of the pack. UNA currently provides 100 megabit per second (Mbps) to the desktop. Some schools have moved to 1 gigabit per second (Gbps) desktop connectivity but most are at 100 Mbps. UNA has maintained a connectivity rate of 100 mbps to the desktop and 1 Gbps to each building since 2001. There are no connectivity issues caused by the 100Mbps limit although that will probably change over the next five years. In order to increase desktop connectivity to 1Gbps each building connection will have to be increased to 10Gbps. At this time the only 10Gbps connection is between the Computer Center building and Floyd Science Building. Newly constructed buildings will be added to the UNA network at 10Gbps.

**Connectivity to the Internet**: About at the middle of the pack for medium sized Universities. Our current bandwidth speed is 55 Mbps. UNA’s Internet service provider (ISP) is the Alabama Supercomputer Network located in Huntsville. UNA’s connection is balanced, stable, and somewhat protected from spam and malware. Within the next five years UNA’s bandwidth will almost certainly have to increase to meet rising demand. The eight UNA residence halls share a separate 20 Mbps connection to the Alabama Supercomputer Network.

**Disaster recovery**: Middle of the pack but getting better. UNA is vulnerable to several types of disasters and it would be very difficult to continue business operations if something happened to make the Computer Center uninhabitable. UNA is in the middle of the pack because most Universities are in the same situation or worse. The good news is that UNA made several key decisions this year significantly improving the overall IT Disaster Recovery profile. The decision to move essential systems such as Email and the Angel Learning Management System to remote hosts provides Enterprise level disaster recovery for those systems. The capability to use Live@edu as a collaborative document storage and editing area provides tremendous disaster recovery and business continuity potential. However, until the Banner system is fully redundant and the backup is geographically separated from the Main Campus, UNA’s business continuity will be at risk. The CTS Virtualization project has also improved the UNA disaster recovery profile. Because 55 of UNA’s servers are now virtual, they can be electronically moved to an alternate location many times faster than when the servers were physical.

**Email to the cloud**: Leading edge. As early as November 2007 the Technology Advisory Committee discussed and investigated the possibility of moving UNA Student email to Microsoft or Google. In May 2010 the President and the Executive Council approved a migration from the UNA SunOne email system to the “free” remotely hosted Microsoft Live@edu system for student and employee email accounts. This follows a trend by many universities to remove the administrative burden of maintaining and expanding a University mail system and significantly reduces the cost of providing email to all University users. The national trend has been primarily toward moving student email to the cloud but UNA’s decision to include employee email puts UNA on the leading edge of this trend.

**Green Initiative**: Middle of the pack for mid-sized Universities. So far the CTS Green Initiative is closely linked to virtualization. In 2008 the Computer Center Server Room was completely full. Cooling capacity and electrical capacity were once again reaching maximums. CTS considered several physical expansion alternatives but the cost to expand was beyond our available budget. CTS decided to purchase virtualization software and hardware instead. Although no effort was made to measure cost reductions because of this project it is safe to say that electrical use is drastically lower in 2010 because the number of heat-producing/electricity-consuming physical servers has been reduced from 40 to 15 since 2008. Fifteen new severs were added to the UNA system over the last two years. Adding these severs virtually rather than physically avoided increased electrical and cooling costs.

**Mainframe to client sever environment**: Middle of the pack. In 2010 some Universities still use mainframe environments to handle administrative computing but starting in 2000 most turned to client-server environments. In 2006, following the national trend toward client-server operations UNA decided to host the new Banner Enterprise Resource Planning (ERP) system on servers and discontinue the use of the IBM Multiprise 3000 mainframe once the Banner system became operational. One comparison between the two computer systems is availability to users. Due mainly to human resource constraints, the University mainframe system was available to users from 8am until 11pm each weekday except when the University was officially closed. Since the Banner server-based system does not require operators to be on duty constantly, the system is available to students and employees virtually around the clock/365 days a year.

**Mass storage**: Middle of the pack for medium sized Universities. Another major trend was toward mass data storage attached to a Local Area Network. UNA joined this trend by purchasing a NetApp FAS device in Jan 2006. The NetApp continues to provide campus-wide data storage and backup for servers. The UNA NetApp currently has a 24 Terabyte (TB) storage capacity. Of that 24 TB, 70% is in use. Since no storage device works well above the 85% level UNA actually has about 3.6 TB left for growth.

**Mobile computing**: Middle of the pack. UNA had few laptops or cellphones in 2005 but number is steadily increasing each year. As of 2010 UNA owns over 300 laptops and nearly 100 cellphones/calling plans.

**Network security, administration and policy control**: Behind the national trend but getting better. In 2000 Microsoft released its Active Directory Domain product. Active Directory allowed much greater administrative control of networks. Among other things Active Directory improves security, makes administration of users more efficient, and allows policy enforcement across the entire network. Most Universities and businesses quickly moved to Active Directory and by 2005 nearly all had done so. CTS decided to transition to Active Directory in 2006 but because of the Banner project human resources were not available for Active Directory until 2008. One reason behind the 2006 decision to implement Active Directory was a project known as BDMS, which enables campus-wide imaging and interfaces with Banner. BDMS had to connect to Active Directory in order for the vendor maintenance agreement to be valid.

**PII, PCI compliance and the Red Flag Rule**: Ahead of the pack. In 2007 CTS began an Information Security Awareness Training campaign that resulted in documented training for every UNA employee. The main purpose of the campaign was to change lax security habits that had been ignored over the years and to change the UNA security culture. The training included sections on PII (personally identifiable information), PCI (Payment Card Industry) information, and the Red Flag Rule. PCI information has not been stored at UNA since 2006.  This includes any PCI credit card information taken via the web for tuition payments, etc. During the transition to the new Banner ERP system the implementation team did not want to complicate the Banner project even further with staff/technical/ financial PCI compliance issues. So in 2006 UNA contracted with Touchnet to process all UNA credit card transactions. Currently when a user logs into the UNAPortal system, which uses SSL encryption, and goes to the Student Account Section, there is a link for bill payments.  When a student clicks on this link, they are redirected to epay.una.edu (198.187.196.177).  While this site appears to be housed at UNA because of the name, it actually resides remotely at Touchnet.  The Fair and Accurate Credit Transactions Act of 2003 led to the Red Flag Rule whose initial compliance date was August 2009. The Red Flag Rule requires financial institutions and creditors to develop and implement written identity theft prevention programs. UNA’s policy is dated 9 March 2009 and requires annual retraining.

**Virtualization**: Slightly above middle of the pack. This project resulted in savings of at least $290,000 over the first two years of operation! Virtualization also allowed CTS to avoid an expensive expansion program. The Network Control Center was at maximum capacity in FY2008, but because of the Virtualization Project CTS was able to continue using the current workspace saving thousands of dollars. For an initial investment of less than $50,000 starting in Dec 2008 and an annual maintenance fee of $18,000 CTS replaced or avoided purchasing 55 Intel/windows servers. Servers vary in price but an average price is $5,000 so the CTS Virtualization project has saved about $275,000 in initial server costs and more than $50,000 per year in maintenance costs.

**VOIP**: Behind the national trend. CTS started a VOIP pilot project in 2005. Nearly $60,000 was invested on a major software and hardware upgrade to the campus telephone switch which now allows UNA to field voice-over-IP (VOIP) telephones. The VOIP project was delayed by the Banner project but is being revived in 2010.

**Wireless networking**: Middle of the pack. The UNA wireless network in called LionAir. It now covers all major buildings on campus and the central open Amphitheater area. The UNA residence halls have separate wireless network, which was activated in June 2010.

3. Program

Brief overview of department/area:

Mission statement for the department/area: Reference its relationship to institutional mission, as well as state priorities where appropriate:

The CTS mission is to provide technical resources and expertise to the university community.

Goals and objectives of the department/area, and assessment of department/area performance:

The CTS Goals are:

-To provide technological expertise to support the academic, administrative, and service needs of the university community.

-To maintain ongoing constructive communication between the CTS department and the university community.

-To provide computer software, computer hardware, network, telephone, and Internet for the university community.

-To implement software, hardware, and infrastructure upgrades to keep UNA up-to-date with the latest technology trends.

Governance structure of the department/area:

-The Director of CTS reports directly to the Vice President of Academic Affairs.

-The Systems Architect/Assistant Director, and departmental Secretary report to the Director.

-Four branches reporting to the Director are the: ERP Systems branch, Network Administrator branch, PC Support Technician branch, and Telecommunications branch.

-The ERP Systems branch consists of: one supervisor, two ERP Systems Engineers, one ERP Systems Technician, and two Database Administrators.

-The Network Administrator branch consists of: one supervisor, three Network Administrators, and one Helpdesk Support Technician.

-The PC Support Technician branch consists of: five PC Support Technicians.

-The Telecommunications branch consists of: one Telecommunications Coordinator and one PBX Console Operator.

4. Department/Area Evaluation

Describe briefly the means of assessment, and recent improvements based on the results of such assessment. Means of assessing outcomes should be based on standard assessment measures within the department/area

In October 2005 Computer Services completed an Organizational Assessment with the help of consultants from Sungard SCT Learning Solutions. Twenty-two recommendations ranged from personnel recognition programs to suggestions on how to improve the helpdesk.

In January and again in March 2005, Computer Services completed a Network Assessment with the help of consultants from Sungard SCT, Inc. The purpose of the survey was to determine if the UNA network infrastructure needed any enhancements prior to the start of Banner implementation. Forty-eight recommendations ranged from increased bandwidth to increased security measures across campus.

In April 2009 CTS experienced its first State of Alabama IT Audit, which focused on Banner security, PCI compliance and Red Flag Rule compliance.

CTS regularly received email and telephone calls from individual users with praise, concerns or complaints. These opinions and concerns were discussed with the CTS staff weekly. Conclusions were drawn, research suggested, policies changed or actions taken as seemed appropriate at the time.

Describe briefly the department/area’s continuous improvement plan utilized to assess and improve the department/area on an on-going basis. Summarize improvements made as a result of the continuous improvement plan

CTS had no formal continuous improvement plan unless this refers to our on-going commitment to increase our knowledge of new hardware and software systems. As CTS procures new products personnel are constantly forced to perform intense research in order to make these products fit into the UNA LAN infrastructure. In addition CTS periodically sought 3rd party assessments, which resulted in recommendations for improvement. CTS conducted daily meetings with the purpose of improving communications between staff members, setting operational standards, and improving service to the end user.

Provided a brief analysis of those areas in need of improvement and delineate an action plan for improvement in these areas

CTS had no formal continuous improvement plan. If that is a requirement then it is also the area most in need of improvement. CTS can have a continuous improvement plan written and implementation started within three months.

5. Facilities and Resources

Address the adequacy of resources and support services to address the goals and objectives of the department/area.

**Cooling and Electrical Problems**

The Computer Center’s long-term problems with cooling and electricity were finally addressed in 2006-7. Electricity in Network Control Center was converted to 220VAC circuits. Each circuit was dedicated to a single equipment rack. For the first time each circuit was clearly identified with the equipment it serviced. New server racks were installed that had dual circuit failover capability and clearly identified the equipment on each circuit. A dual unit air conditioning system with fail-over capability was installed within the Mainframe Computer Center to provide cool air to the Network Control Center.

**Revenue**

CTS used revenue from the CTS budgets and the $12/Course Hour Technology Fee to purchase software and equipment, to renew licenses on existing software and equipment, and to repair equipment. The total CTS and Technology Fee revenue varied somewhat each year but increased each of the last five years.

FY2009 revenue = $1,938,373

FY2008 revenue = $1,835,593

FY2007 revenue = $1,875,373

FY2006 revenue = $1,550,051

FY2005 revenue = $1,548,600

**Space**

Space was a critical issue in 2005 but by 2009 it was less of an issue.

In 2005 the Computer Teaching Lab on the ground floor of CTS was moved to the Stone Lodge to become a Writing Center Lab. The former lab space was converted into six office spaces for Network Administrators. In April 2009 the University mainframe and all associated equipment was disconnected and sold making more space available. The former mainframe area was converted into a PC Support Technician office and work area. For the first time ever the PC Technicians have a common area that allows them to collaborate on projects and space to have offices. The former mainframe paper room was converted into a used PC and printer storage area. The former PC Technician work area (the Mezzanine) was converted into a network switch and wireless equipment storage area. In 2009 the small storage closet in the main hallway was converted to a new computer and new printer storage area.

**Support personnel**

The CTS organization was restructured but it did not grow during the last five years. Due to the decision to discontinue the mainframe, eight mainframe-dedicated positions were converted to other duties. As of 2010 CTS needed one Technical Documentation Specialist and one Information Security Specialist. In 2008 UNA hired a Chief, Information Security Officer (CISO) who worked one year. Based on that experience the duties of the position and the position title were changed. The replacement for this open CISO position should not have to have all the certifications required in the first hiring process.

6. Areas of Achievement:

ACTIVE DIRECTORY: In 2005 UNA’s LAN architecture was a Microsoft Workgroup. This LAN architecture served UNA well for many years but it was difficult to manage and not very flexible. In 2006 the Banner project’s implementation of BDMS forced a move to AD, but beyond the fact that the BDMS project required AD, CTS took advantage of AD to promote a more secure information technology infrastructure that will enable continued LAN growth.

The Active Directory (AD) project was divided into two major phases. The first phase consisted of creating the UNA Active Directory and Domain architecture. Starting in Fall2009 CTS moved the University Local Area Network (LAN) from a Microsoft Workgroup architecture to a Microsoft Active Directory architecture. This phase was completed in May 2010.

The second phase (not started yet) consists of manually reconfiguring every server and computer on UNA Main and East campuses so they are connected to the Active Directory structure. All users will be brought into AD from Banner through the UNAPortal.

BANDWIDTH: Bandwidth growth

In March 2006 the University’s increased its Internet bandwidth from 13 to 22 megabits per second (Mbps) to cover expanding needs. Within hours of the increase the University’s usage peaked at 22 Mbps. During the last five years our ability to supply bandwidth has seldom met the ever-growing demand. In general this same story was true for all Universities.

In Oct 2006 the Alabama Supercomputer Authority (ASA) increased UNA’s bandwidth from 22 Mbps to 35 Mbps at no extra cost. At the same time UNA agreed to purchase 10 more Mbps to bring our total bandwidth from ASA to 45Mbps.

In August 2006, the residence hall Internet service began its migration from the UNA LAN to Comcast broadband service but numerous problems plagued the project and only four of eight residence halls were migrated as of April 2007. By August 2007 all eight residence halls were using Comcast as their Internet service provider (ISP) but the Comcast equipment was never designed to handle such a large demand and residents became very frustrated. Comcast made several significant changes to their system to accommodate the residence hall demand but the total positive benefit for the residents was negligible. In 2009 Student Affairs decided to move the residence halls to the Alabama Supercomputer Network but on a separate bandwidth from the main campus. The move greatly improved the stability of the Internet connectivity and greatly improved the end-user experience.

As part of the Banner project disaster recovery strategy CTS moved the UNA automatic backup tape system from the Main Campus Network Control Center to the East Campus Network Control Center. The bandwidth connection between the two campuses was a 100 Mbps MetroE BellSouth link. Attempts to run backups between 3-4 am repeatedly failed due to insufficient bandwidth. An engineering study indicated that a 1 Gbps link was needed for the data transfer to work. Disk backups for Banner are being performed nightly on the Main Campus but the data remains in the Network Control Center making it a single point of failure. This was not an acceptable situation. So in February 2008 the BellSouth Metro E-link fiber optic connection between the Main Campus and the East Campus was increased from 100 Mbps to 1 Gbps. Tape backups were resumed as soon as the 1 Gbps link was established.

The monthly payment went from $1600 per month for the 100 MBPS link to $2500 per month for the 1 GBPS link.

BANNER ERP (Enterprise Resource Planning) SYSTEM : UNA decided in October 2005 to migrate our administrative software (the SCT PLUS system) to newer administrative software (the Sungard Banner system). The major difference between the two systems was that the newer Banner system used a “relational” database structure while the older PLUS system used a “flat” database structure. Two IT staff members were identified and began year long Oracle certification training to become Oracle Database Administrators as part of the Banner project implementation.

The University allocated $7.9 million for the project over 30 months. The project was accomplished in five overlapping phases. Phase I was hardware and software setup, which began with installation of a Banner TEST system. Phase II was Finance table validation and user training. Phase III was Human Resources (HR) data conversion, table validation and user training. Phase IV was Student data conversion, table validation and user training. Phase V was Financial Aid data conversion, table validation and user training. All phases began on or about January 2007.

A three-person Banner Project Lead (BPL) team was created to oversee the strategic progress of the project and a Banner Project team of approximately 35 functional users and technical staff was identified to execute the project.

The BPL decided very early not to allow software customization (changes to the Banner software baseline).

Advancement support was put on hold in April 2008 by decision of the President.

Three offices were created within Computer Services for the Banner Finance, Student and HR on-site Sungard consultants. CTS purchased 20 laptops for Banner Functional User training. These resources were used almost continuously for two-years.

CTS dedicated hundreds of hours to successfully complete the conversion of 1994-2007 SCT PLUS data into the Banner system for all modules. A huge issue for CTS was insufficient manpower to allow individuals to concentrate on a single area of responsibility. This situation made certain individuals far too critical to the success of the project and created slow downs when those individuals become overwhelmed with a combination of daily work and Banner implementation. On the whole, the CTS staff did a tremendous job of supporting not only the Banner implementation but also a variety of other implementations during this hectic period.

Phase I completion: The Banner Test system was installed in January 2007.

Phase II completion: Finance – Go-live was 1 October 2007. Finance was the first module to experience the new and improved security standards approved by the Banner Steering committee. The Banner Database Administrators (DBAs) worked with the Finance team lead and the Sungard Higher Education Finance consultant to establish security classes for various groups of users. The new process tightened access to employee and student records both at the server level and the individual PC level by using more difficult passwords, a second firewall (Identity Management software) and new Banner security classes. CTS and the Finance functional team worked closely as the Go-Live date approached to resolve issues with APO and PO mail boxes, accounts receivable codes, check printers, crosswalk tables, positive pay, single sign-on, and individual access to ensure a successful transition to Banner. Of course some issues did not surface until after Go-live. In every case CTS supported and worked with the Finance team and Sungard HE to resolve the issues.

Phase III completion: Human Resources – Go-live was 15 December 2007. The first conversion of HR data to Banner began in July 2007 and continued through September 2007. Along the way CTS supported HR to solve issues with conversion schemas, general person data, printers, payrolls, security class construction and new faculty.

Phase IV completion: Student Registration – Go-live was fall 2008 pre-registration (April 2008). Data mapping began as early as June 2007. There were many problems with the Sungard HE supplied student data extraction programs. Those problems took dozens of hours for CTS to solve and caused considerable delays during the data conversion. No other module had so many issues with vendor-supplied conversion code. The final student data conversion occurred just after summer grades are released in early August 2008. The first student mock registration was held 31 January 2008 and was very successful. Another mock registration held in March 2008 was successful and a live fall preregistration in April was an outstanding success. Two final mock registrations were held in May 2008 to further test student fee assessment and student aid.

Phase V completion: Financial Aid (FA) – Go-live was April 2008. The final FA data conversion occurred in July 2008. FA data conversion from SCT PLUS to Banner and the FA data mapping began in October 2007. FA experienced early problems with imported PLUS data creating duplicate records in Banner but CTS created a process to avoid that issue. The CTS Banner database administrators (DBAs) worked closely with the FA functional team to create automatic job submission scripts to increase efficiency and speed up certain FA processes. By Feb 2008 all fall 2008 student data was loaded into Banner. FA was able to successfully use Banner to process award packages for fall students beginning in March 2008.

As of 2009 the total annual software costs for the Banner system was approximately $493,000 per year; i.e. $153,000 per year for Oracle database licenses and $340,000 per year for Banner licenses.

Several software applications were purchased along with Banner to increase productivity.

The **Workflow** system for Banner was installed in May 2007. It was designed to make business processes transparent to all users by sending email notifications automatically to individuals at each step in a process. This virtually eliminated the possibility of an action being forgotten or confusion over who needed to take the next action in a series. The UNA Functional Users, CTS staff, and 3rd party consultants designed several Workflows in 2009 and 2010. The general consensus was that these Workflows made a significant and positive difference to the University. As of June 2010 UNA was one of the leaders among Alabama Universities in this area of development.

The **Banner Document Management System (BDMS)** previously known as the Xtender Document Management System was implemented in April 2008. BDMS interfaced directly with Banner and the Operational Data Store (ODS). The BDMS required a domain and directory structure to function properly. CTS chose Microsoft’s Active Directory and began the implementation project in 2007. Even though the BDMS system was functional in April 2008 it was not fully functional until the Active Directory system went live in January 2010. CTS implemented Microsoft Active Directory throughout the University to support the Xtender project.

**Argos** reporting software for Banner and ODS reporting was implemented in 2007.

The **AppWorx** job scheduling application was implemented in 2009.

BUILDING REFURBISHMENT: Throughout 2006 CTS consulted with the Physical Plant Department to ensure adequate technology infrastructure for the Powers Hall Refurbishment project. CTS installed all new telephone and LAN cabling to the offices and, in the basement, created a 22 PC laboratory for the English as a Second Language (ESL) program.

2007 Rogers Hall: Throughout the year Computer Services consulted with the Physical Plant Dept to ensure adequate technology infrastructure for the Rogers Hall 2007 Refurbishment project. CTS installed all new telephone and LAN cabling to the second floor offices and moved both fiber and telephone connections from the basement to the outside of the building.

2007 Housing Office and HR: CTS consulted with the Physical Plant Department to ensure adequate technology infrastructure for the Housing Office move to the GUC and for the Human Resources Office move within Bibb Graves Hall.

2007 East Campus: Computer Services consulted with the Physical Plant Dept to ensure adequate technology infrastructure for the UNA East Campus (formerly Powell Elementary School). The UNA East Campus Local Area Network (LAN) wiring project involved about 50 hours of overtime work by CTS staff since the East Campus refurbishment project did not allow dollars for outside contractors to do the work.

Willingham

Keller Hall

COMPUTER LAB SUPPORT: The number of computer labs grew from xx in 2005 to xx in 2010. The total number of computers within computer labs grew from xxx in 2005 to xxx in 2010.

ELECTRONIC DOOR LOCKS: June 2007 CBORD installed a CS Gold door lock system for Student Housing.

ELECTRONIC CLASSROOM SUPPORT: CTS supported UNA’s electronic classroom (eClassroom) project by setting up PCs and UNA LAN connections in 25 designated classrooms.

2006 - eClassrooms: At various times during the year Computer Services supported UNA’s eClassroom project by setting up PCs and UNA LAN connections in designated classrooms.

EMAIL TO THE CLOUD: In May 2010 the President and the Executive Council approved a migration from the UNA SunOne email system to the “free” remotely hosted Microsoft Live@edu email system. The Student Government Association was a prominent stakeholder in this project. The SGA approved the plan in late April 2010.

This transition will help resolve the long-standing issue of restricted email box size for employees. By moving student email boxes to a remotely hosted service CTS will be able to greatly increase the size of employee email boxes without purchasing more, very expensive, mass storage.

There are many advantages to the move:

-All UNA email will continue to be branded as @una.edu.

-Employees will have 125 times more email space and students will have 500 times more email space than they currently have.

-Live@edu will provide protection from malware such as viruses, spam, and phishing attacks

-Email can be sent automatically sent as text messages to phones.

-UNA email for life: Alumni can continue to use the UNA branded email account after leaving UNA.

-The 25GB document storage space is accessible online from anywhere.

-Within the 25GB storage space, users can create private, shared or public folders.

-Within the 25GB storage space, users can edit Word, Excel, PowerPoint, and OneNote documents without the software installed on a computer.

-Social networking is offered as collaboration option.

-Calendars can be shared without additional software.

-Instant Messaging, voice and video chat.

-Mobile access to Email, Instant Messaging, text, calendar, and campus directory.

-There are no yearly maintenance costs for product enhancements or system updates.

-Live@edu has an Enterprise-grade infrastructure with disaster recovery and off-site backups.

-Live@edu fully integrates with existing UNA Microsoft investments and programs.

-Students are provided access to free Microsoft development tools and discounts on other Microsoft products.

FIBER OPTICS: In January 2006 a continuing problem with the fiber connection between Floyd Hall and Public Safety/Flowers Hall Annex became critical. Consultants were hired to determine the exact location of the fiber problem. When the site was unearthed we discovered that a steam plant pipe leak had melted about 100ft of fiber conduit and damaged the 72-strand fiber optic cable inside. New conduit was spliced into the existing conduit by inserting two new manholes at either end of the damage. A new fiber optic cable was pulled between Floyd Hall and Public Safety. The new fiber optic cable was 24-pair multimode fiber and 24-pair single mode fiber. Four other fiber optic cables were in the damaged conduit. Because these cables were still providing connectivity to four buildings the damaged conduit was not removed.

In December 2006 UNA Network Core switches in Floyd Hall and the Computer Center were replaced with Foundry SX800 switches because they were at the end of their life expectancy and the vendor would no longer maintain them. This allowed us to upgrade the data link between Floyd Hall and Computer Center from 1Gbps to 10Gbps

LEARNING MANAGEMENT SYSTEMS: Angel and WebCT

2007 WebCT - CST began the migration from Blackboard’s WebCT Campus Edition to WebCT Vista in May 2007. The project was completed in August 2007 in time for the beginning of fall semester classes.

2007 A Netscaler appliance was installed which allowed load balancing between the WebCT Vista servers.

2007 Tegrity video capture software was purchased and installed in August 2007. Tegrity allowed professors to record their lectures and post the videos to a server so that students could view the lecture at a later date.

2009 Angel – After several months of research the Shared Governance Distance Learning Committee recommended moving from Blackboard’s WebCT Learning Management System to Blackboard’s Angel system. One factor was that Angel was somewhat less expensive than WebCT (about $15,000 per year). Other factor was that Angel was remotely hosted while the WebCT system was locally hosted. The Distance Learning committee believed remote hosting would result in a significant improvement in system stability and a possible reduction in CTS human resources dedicated to this system. Since Angel was remotely hosted, it had no yearly cost associated with server maintenance and replacement (several thousand dollars per year). In July 2009 Angel was installed as a stand-alone system. The purchase and installation of an Angel-Banner interface was completed in August 2009. Angel-Banner interface testing occurred during Fall 2009. An Angel pilot program using volunteer faculty and real UNA courses conducted during Fall 2009 to identify and solve problem areas was a success. The last critical step was redirecting the UNAPortal toward the Angel remote server and away from the WebCT server. This step occurred during the Christmas 2009 break. Angel was the only Learning Management System available for active courses in Spring 2010. CTS continued to support WebCT in a stand-alone mode through Spring 2010 to meet the requirement of a one-semester grace period to close a course. In June 2010 CTS took WebCT off-line.

LUMINIS/UNAPORTAL: The major events affecting the UNAPortal almost always involved some system downtime. As UNA became more dependent on the Portal system the impact of downtime to the campus increased proportionately.

In parallel with the Banner project CTS decided to switch the Luminis portal system from Intel to Sun servers, switch from Microsoft Windows OS to Sun Solaris OS, and switch the Luminis database from SQL 2000 to Oracle 10g. The result was a faster, more reliable portal system but the project had to be broken into two phases separated by several months. The first phase involved moving to the Sun/Solaris environment; the second phase involved migrating to an Oracle 10g database and creating a Luminis TEST environment.

CTS contracted the phase 1 effort with Sungard SCT and Blackboard to minimize downtime. In August 2006 the UNA Pipeline/Luminis portal /calendar/email system was taken off-line. Email did not leave or reach campus addresses for five days. The data transfer alone took 72 hours. During this period, users did not have access to Pipeline, Email, Calendar, WebCT or Student/Faculty Services. There was no option to keep the system online while the upgrade took place.

On 18 May 2007 Pipeline/calendar/email was again taken off-line in order to complete phase 2 of the project from August 2006. Again CTS used SCT Sungard/Blackboard consultants to speed the process. The May 2007 project migrated the UNAPortal to Luminis IV software, a new version of the Solaris OS and a migration from SQL 2000 database to an Oracle 10g database. In many ways it was like migrating to an entirely new portal system. CTS spent $40,000 for new Sun servers in order to cut the downtime to a minimum. The CTS staff worked over the weekend to further minimize downtime during office hours. There were many problems during phase 2 causing the project to take seven days versus the three days that were originally planned.

The old Sun servers were used to create a fully functional Luminis/Portal test system, greatly enhancing our ability to test software patches before placing them on the Luminis production servers.

MAINFRAME: The cost of operating the IBM mainframe included, salaries for four operators and four programmers, $206,000 per year for the IBM zVM/VSE operating system license, and $32,500 per year for equipment maintenance.

Prior to the Banner project CTS had committed to upgrade the mainframe application software from zVM/VSE to zVM/zVSE. Going into the Banner project in 2006, CTS realized the normal job of keeping the mainframe updated and operational while simultaneously implementing the Banner project would overwhelm our personnel. With the agreement of the Mainframe Operations user group CTS decided discontinue efforts to upgrade to zVM/ZVSE. So the mainframe and zVM/VSE operating system was stabilized in 2007.

The mainframe was removed from daily operations and placed in off-line status in August 2008. . In April 2009, one year after the last Banner module came on-line, the University mainframe and all associated equipment was officially disconnected and sold.

MAINFRAME TO SERVERS: At the beginning of the Banner project Sun servers were chosen as the host hardware and Solaris was chosen as the best operating system for UNA. In order to set up and maintain the Banner servers, two IT staff members began a year-long Solaris certification training to become Solaris Administrators before the Banner data conversion phase could begin. Switching to server hardware resulted in a significant yearly cost savings. The total cost of operating the Banner system included one full-time equivalent (FTE) Network Administrator, two Oracle DBA’s, and five Banner ERP Engineers,

MALWARE: In 2005 the UNA MacAfee Webshield anti-virus appliance averaged blocking over 19,000 SPAM messages each week. Unfortunately SPAM became so sophisticated that the Webshield was no longer adequate to handle the threat and needed to be replaced. CTS searched for a device designed specifically to block spam. The search for a spam appliance involved month-long live tests of various products. After a successful bidding process the Proofpoint anti-spam appliance was selected and installed in Jan 2006.

Although the world Internet experienced several serious virus attacks during 2005, UNA was almost unscathed by the ever changing virus attacks. The Network Administrators and the anti-virus products used to protect UNA’s network averaged blocking 4,500 emails containing known viruses each week.

Spyware became the biggest new Internet problem of 2005 but UNA was not affected to any great extent. WebRoot Spysweeper software provided protection for campus PCs and servers. The worldwide spyware problem grew significantly but was under control within the UNA network.

SPAM 2007: The Proofpoint spam blocker eliminated approximately 20,000 SPAM messages each day. This was more than 90% of all messages sent to una.edu addresses.

Hackers: In March 2007 UNA purchased Identity solution by Trusted Network Technology to better protect the UNA servers and LAN from hackers and other malicious activities.

Virus attacks 2007: UNA was almost unscathed by the ever-changing worldwide virus attacks. On average UNA blocked more than 5,000 emails each week containing known viruses.

In 2007 CTS purchased a third CISCO PIX “Firewall” to protect the UNA internal network from potential hackers inside the university LAN.

MASS STORAGE: A NetApps network area storage device was installed in July 2006. It needed an expansion in 2008 due to the Banner implementation so an additional 2.4 Terabytes of disk space was purchased for $63,000.

ODS AND EDW: The Operational Data Store (ODS) was installed on Sun servers in May 2007. Operational Data Store (ODS) to support the Banner project was implemented in April 2008. ODS was refreshed nightly by the Banner system and contains a snapshot of the previous day’s Banner information. ODS was the main database from which UNA reports were drawn.

PANIC BUTTON: In 2006, the University installed a panic button system consistent with campus-wide support as expressed through Shared Governance to ensure a safer workplace.  This panic button system was computer based and consisted of either an icon or hot key on a computer.  When the hotkey or icon was activated in an emergency Public Safety was notified and took appropriate follow-up actions.

REMOTELY HOSTED APPLICATIONS: Since 2005 UNA has chosen to remotely host several stand-alone applications. A big reason for this was accessibility. Remote hosting allows employees more and easier access to web-based applications from off-campus. Another reason was business continuity.

UNA business continuity depended on the continuity of our information technology (IT) infrastructure. An uncontrolled degradation of IT services would cause the University to stop functioning as an organization until services could be restored. Business Continuity in the event the CTS Building on Main Campus became unusable remained the biggest vulnerability in the UNA IT infrastructure.

PeopleAdmin sponsored by Human Resources was implemented as a remotely hosted application in October 2007. This project allowed on-line processing of job applications for the first time at UNA.

The Angel Learning Management System was implemented as a remotely hosted application in January 2010.

REORGANIZATION: In 2007 CTS reorganized and documented job responsibilities for Computer Services personnel to reflect shift away from mainframe operations. Six mainframe personnel converted to Banner support, one to Helpdesk support and one to PC Technical Support.

SELF HELP: In October 2005 Computer Services completed an Organizational Assessment with the help of consultants from Sungard SCT Learning Solutions. Twenty-two recommendations ranged from personnel recognition programs to suggestions on how to improve the helpdesk.

In January and again in March 2005, Computer Services completed a Network Assessment with the help of consultants from Sungard SCT, Inc. The purpose of the survey was to determine if the UNA network infrastructure needed any enhancements prior to the start of Banner implementation. Forty-eight recommendations ranged from increased bandwidth to increased security measures across campus.

Five to seven IT staff members attended the SCT Summit user conference in April 2006, March 2007 and again in March 2008. The emphasis was on continuing to learn as much as possible about transitioning to Banner. Each staff member was assigned a variety of seminars to attend in order to cover as many topics as possible. Post-Summit debriefings allowed attendees to disseminate their findings among the entire Banner team.

Created a program for all ERP Systems Engineers to study Banner Basics courses in order to achieve and maintain a baseline knowledge of Banner.

Sent various CTS personnel to off-site training as needed to increase our level of support for current systems, to prepare for this year’s technology initiatives, and to ensure backup support for each critical position.

TECHNOLOGY CURRENCY: In an ongoing effort to offer high quality programs and to maintain a student-centered university CTS replaced aging technology. Every year new hardware and software was purchased to meet new or emerging technology requirements and to improve reliability and performance. At the beginning of each fall semester requests for new technology were collected from administrative and faculty departments and generally followed an approval chain through the appropriate Vice President before reaching CTS. In November of each year the Shared Governance Technology Advisory Committee approved a dynamic list of technology requirements for the entire University. The list was adjusted as needed during the course of the year to allow for unanticipated events and requirements.

2006 - From February through March 2006 Computer Services distributed 154 Gateway PCs with flat panel monitors, 110 deskjet printers and 26 laserjet printers to computer labs, staff and faculty. The flat panel monitors were a new item in 2006 and very popular.

2007 - From January through March 2007 Computer Services distributed 184 PCs, 23 Intel laptops, 33 iMac computers, 96 HP deskjet printers and 14 HP laserjet printers to computer labs, staff and faculty. Twenty-seven new servers were purchased: seven for Banner, six for Luminis, two for WebCT, one for ePrint, four for WebCT Vista, two for UNA’s main webpages, one for the Collier Library, one for Kilby School, one for the Communications Dept, two for Banner Workflow.

UNIFIED DIGITAL CAMPUS: UNA is one of the nation’s leaders in total campus software integration. As of 2010 CTS had interfaced 19 separate applications to the Banner system and two more to the UNAPortal system. In the UNA system a single sign-on has the potential of giving a user access to 19 different systems, which, in the past, would have required 19 different passwords. The Unified Digital Campus includes Banner, ODS (Operational Data Store), EDW (Enterprise Data Warehouse), BDMS (Banner Document Management System), UC4 (Banner job scheduling), ePrint (electronic printing versus paper printing), RMS (Residence Management System), Judicial (student affairs judicial actions), CBORD (manecard, door locks, video surveillance systems), Post Office, TMS (Physical Plant work order system), EMAS (recruiting), fsaAtlas (SEVIS enrollment and tracking), Workflow (electronic business processes), TouchNet (creditcard payment gateway), Angel (Blackboard Learning Management System), Luminis (UNAPortal), Argos (Banner, ODS, and EDW reporting software), FormFusion (electronic forms development), Intellecheck (electronic check generation), email and calendar.

VIRTUALIZATION: In July 2008 purchased two Sunfire servers and an enterprise VMWare license for $27,000. As of June 2010 there were 55 Windows servers running virtually.

WIRELESS LOCAL AREA NETWORK: The UNA wireless network was started in 2003. By 2005 the wireless network was being completely redone due to advances in wireless access point technology.

2005 Growth. The UNA wireless network (LionAir) added Collier Library, Stevens Hall, Kilby School, Powers Hall, the GUC, the Student Rec Center, and the outside Amphitheater as wireless hotspots. LionAir wireless was synchronized to the Campus Pipeline portal system so that both required the same authentication. Because of the UNAPortal synchronization UNA wireless was only available to individuals who had a UNA portal account (students and employees).

2006 Scholarship Night. Thirty Gateway laptops were set up in the GUC Loft to handle overflow from the ARC. The thirty laptops were used continuously during the evening event without any problems. This was the first time the wireless system was officially used to register students.

2007 Residence Halls. The UNA wireless network (LionAir) replaced older network switches with new power over Ethernet switches all over campus. The Campus Wireless Local Area Net (LAN) was expanded to include all major buildings on the main campus and all locations at UNA East campus

2009 Residence Halls. In July the Housing Office confirmed that LaGrange Hall had been advertised as a wireless dorm to incoming Fall2010 students. LaGrange was not wireless at the time nor did CTS have it scheduled to become wireless. CTS scrambled to respond to this unexpected requirement. Since there was not time to order and receive equipment CTS decided to use older access points that had just been removed from other buildings. LaGrange was wireless capable on the day students moved in for fall classes but the coverage was less than desirable due to the older equipment. Discussions immediately began with the Housing Office to correct this problem and to expand capability to all residence halls. In December the VP for Student Affairs authorized a plan for all residence halls to become wireless only.

2010 Residence Halls. The wireless network in LaGrange Hall was completely redone in January. The initial cost for the access points for all eight residence halls was $91,605. The cost for the wireless controller was $69,012. The cost of wiring and conduit was $3,312. On July 1, 2010 all dorms were cutover to a wireless only environment.

**Priority Initiatives for Next Five Year’s**

Some departmental priority initiatives require planning and initiation that goes beyond the current fiscal year. The following priority initiatives for CTS are central to longer range goals and objectives.

**Statement of Priority Initiative 1: Implement the UNA CTS Disaster Recovery Plan at UNA’s East Campus:** UNA’s business continuity is vulnerable to any disaster that causes major damage to the CTS building. The ability to teach classes and record completion of coursework depends heavily on the continuity of UNA’s Local Area Network, which is managed from the CTS building. An uncontrolled degradation of IT services would cause the University to stop functioning as an organization until services could be restored. UNA’s critical data is protected now at the East Campus and through remote hosting agreements with Angel (for course materials) and Microsoft (for email and documents) so the vulnerability is not so much about data loss as it is about Business Continuity. At this date UNA has no official alternative if the telephone PBX is unavailable for several days. Personal or UNA-owned cellphones would continue to provide minimal Business Continuity but cellphones would only be acceptable for a day or two.

This initiative directly or indirectly supports all of UNA’s Strategic goals.

The total cost to develop a Disaster Recovery capability at the UNA East Campus will eventually cost over $1,000,000. That cost must be spread out over several years.

**Statement of Priority Initiative 2: Increase the LAN backbone speed from 1 gigabit per second to 10 gigabits per second to every major building on campus.**

This initiative will allow CTS to increase the LAN bandwidth to each desktop computer from 100 megabits per second (MB) to 1 gigabit per second (GB). Each year the individual user demand for bandwidth increases. Although we see no degradation of campus service yet, the trend toward higher bandwidth demand will eventually make this project a necessity.

The 10GB backbone project will take several years because the multi-mode optical fiber to each building will have to be replaced with single-mode optical fiber.

What is the estimated Expenditure for this Initiative?

Approximately $100,000 per year for three years.

**Statement of Priority Initiative 3: Purchase or lease dark optical fiber between the Main Campus and East Campus.**

UNA currently leases a 1-gigabit MetroE data connection between the campuses. When the Physical Plant offices are officially moved to the East Campus bandwidth demand to that location will increase. Leasing unused (dark) fiber will allow UNA to increase the bandwidth to 10 gigabits per second using UNA-owned equipment.

Currently the East Campus uses non-UNA centrex phone service. The dark fiber project will enable the East Campus phone service to become part of the Main Campus phone service.

What is the estimated Expenditure for this Initiative?

The current 1-gigabit MetroE connection costs approximately $2800 per month. A dark optical fiber path between campuses will cost a fraction of the current MetroE service. Initial costs to purchase equipment to establish a 10-gigabit per second connection will be approximately $50,000. Return on this investment is expected to be two years.

**Statement of Priority Initiative 4: Diversification/redundancy of UNA bandwidth and ISPs**

The current 55-megabit connection to the Alabama Supercomputer Network using BellSouth optical fiber and the 1-gigabit BellSouth MetroE connection between Main and East campuses make UNA vulnerable to a single disruption on either path. Our connectivity to ASN is disrupted on average once per year. The path from Main campus to East campus has not been disrupted to date.

A more reliable architecture is to have no more than 50% of the UNA bandwidth flow through a single path. This means at least one more path to ASN and one more path to East campus is needed.

What is the estimated Expenditure for this Initiative?

Between $36,000 and $50,000 per year.

**Statement of Priority Initiative: Implement a Voice Over IP (VOIP) system to phase out the existing telephone switching system.**

The UNA telephone switch is almost 10 years old. Certainly within five years it will need to be replaced. The current telephone wired infrastructure at UNA is nearing saturation. Increasing the telephone capacity to various campus buildings would require a year-long project estimated at $200,000 and much disruption to the campus because of extensive trenching and recabling.

VOIP does not require any new wiring and can be implemented in the same amount of time.

CTS will purchase and install a VOIP system and connect one building to it for approximately three months as a pilot study.

After a successful pilot study CTS will gradually cutover one UNA building at a time to the VOIP system.

The project may span two years.

What is the estimated Expenditure for this Initiative?

VOIP will cost at least $100,000 but that is considerably less than the cost of replacing the old telephone switch.