2011

UA3/9/2 I.T. Division Annual Report + Tactical Plan

WKU Information Technology

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I.T. DIVISION

2011
ANNUAL REPORT + TACTICAL PLAN

WKU

WKU.EDU/INFOTECH

A message from Dr. Bob Owen, Vice President for Information Technology

I am pleased to present the 2011 IT Division Annual Report and Tactical Plan. The accomplishments noted in this document reflect the commitment of 143 IT Division staff members to provide our students, faculty, and staff with superior customer service; reliable and timely technical support; state-of-the-art technology tools; comprehensive training; and convenient access to computing and telecommunications resources.

WKU's IT Division had an extraordinary year in 2010. As noted later in this report, we successfully completed numerous major projects, including the WKU website redesign and deployment (in partnership with WKU Public Affairs); the launch of iWKU (our university's first mobile app); the WKYU-PBS Studio One LED lighting project; the introduction of WKU-GUEST wireless network access; major Banner and Blackboard upgrades; and numerous new construction and existing facilities modernization and renovation projects.

At the same time that we completed these projects (as well as a large number of other projects, both major and minor), we delivered excellent customer support services and training to the University community. We supported 109 departmental computing labs consisting of 1,784 computers; and supported 14 Student Technology Centers, with 591 computers. 3,114 unique visitors utilized our video tutorial site 12,545 times. Our Technology Resource Center (TRC) provided 7,019 equipment loans (5,622 to students, 297 to faculty, and 1,100 to staff). TRC staff also completed 528 multimedia projects for WKU users. The TRC in-house multimedia lab was used by WKU students 1,751 times.

Our mission-critical TopNet and Banner systems had an uptime of 99.998%; TopNet was accessed 4.4 million times last year. Blackboard was available 99.911% of the time. Our website – www.wku.edu – was up 99.985% of the time and experienced 600 million hits. Our firewall and backup systems were up 100% of the time. We supported over 7,500 campus telephones, and assisted professors who taught 110 classes (amounting to 12,000 credit hours) via Interactive Video Services (IVS). We also supported 1,300 wireless access points throughout campus, and 37,000 hard-wired network connections. Our email system delivered 27 million messages, while blocking 77 million spam messages.

The IT Helpdesk closed 31,651 cases last year, an increase of 25% from 2009; ResNet closed 3,072 cases, representing a 37% increase from 2009. Overall customer satisfaction with HelpDesk services was 4.54 on a scale of 1 to 5, with 5 being the highest customer satisfaction level.

WKYU-FM Public Radio and WKYU-PBS Television continue to provide a valuable service to our university and the citizens of this region. WKYU-FM serves a population of 1,171,895 citizens of Kentucky, Southern Indiana, and Northern Tennessee. WKYU-PBS serves a population of 249,376 citizens of South Central Kentucky and Northern Tennessee. Our PBS staff received four Emmy awards in 2010, and our NPR staff won 22 of the 91 Kentucky Associated Press News Coverage Awards given, more than any other radio station in Kentucky.

We also enjoyed a very successful year of fundraising. The IT Division brought in $318,500 of cash donations and in-kind donations of product and services. At the same time, through identification and implementation of various projects and processes, we conservatively estimate that we saved the university $300,000 through cost avoidance.

The projects planned for 2011 are many. We have set the bar very high for this next year, as we will for every year to come. Philosophically, we will always attempt to do the most that we can do, even if we fall short in a few cases. We will never scale back the number of projects attempted simply so we can claim that we completed everything we sought to do.

Finally, with the inclusion of WKU on Dell's Platinum Advisory Council and Sungard's PILLAR Group – along with a variety of presentations that IT staff have made at national conferences and meetings – WKU's IT Division has achieved national recognition. We intend to help shape the larger technology discussion occurring in higher education in this country, rather than be shaped by it.

We look forward to working with you, and supporting your successes, during this upcoming year.

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Executive Summary

Foundational Goals

Three foundational goals were identified for 2010: establish/maintain a national presence for WKU IT; establish/maintain high quality professional relationships with key IT partners; and secure as much external funding as possible for WKU IT. These goals – especially the first two – are incredibly important, and form the foundation for much of our future success. The successful realization of the first two goals will contribute to the successful realization of the third goal.

We were very successful in meeting all three goals. Regarding establishing a national presence for WKU IT, WKU was invited to be a member of Dell's Platinum Advisory Council and Sungard's PILLAR Group. IT staff also presented at a number of national conferences and meetings. In terms of establishing and maintaining high quality professional relationships with key IT partners, we have also been very successful. We have forged high-quality relationships with senior executives at Dell, Sungard, SIS, and Cisco.

Finally, we were able to secure $318,500 for WKU IT, in terms of actual cash donations and in-kind donations of product and services. Given our desire to build on the successes of this last year, and especially in an environment of fiscal challenges to the Commonwealth and our University, we will be very aggressive in seeking additional funding.

Projects Completed in 2010

We completed numerous major and minor projects in 2010. All of the projects listed below are described in more detail later in this report.

Major Projects Completed

- Microsoft Exchange/Outlook Migration
- WKYU-PBS Studio One Lighting Project
- Enterprise Content Management System (ECMS) Evaluation and WKU Website Redesign
- Banner and Related Systems Upgrade
- Blackboard Upgrade
- iWKU
- iTunes U
- Altiris
- Hosted Student/Alumni Email Evaluation
- Oracle License Review
- Electronic W2 Delivery
- Online K4/W4 Tax Forms
- Online Admissions Event
- Online Honors Admission Application
- Budget Transfers Decentralized
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- Diploma/Degree Automation
- WKYU-FM Format Change
- WKYU-PBS Emmy Awards
- WKYU-FM Awards
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- Network Infrastructure Upgrades
- Wireless Network Upgrades
- Construction/Facilities Related Work
- Video Surveillance Services
- Cellular Allowance Program
- MMTH Auditorium
- IT Division Reorganization
- Single Points of Failure Reduction

Other Projects Completed

- Health Services Call Center
- University-wide Technology Advisory Committee
- Credit Card Processing Outsourced
- NetID Migration
- SAP Infoview Upgrade
- Advance Web Implementation
- Astra Course/Event System Upgrade
- Document Imaging (Payroll, President's Office, Provost's Office)
- HIRE Act Tax Changes
- Navitas Integration and Setup
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- UG/GR Online Admissions Application Enhancements
- Graduate Office "Go Paperless" Implementation
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- Online MPE
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- DELO Lab Exam Check In Tracking System
- Sprint Marketing
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- PBS Television Audience Growth
- WKYU-FM Master Control Room Rebuild
- PBS Multicast Channel
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- WKYU-PBS Automation and Archive System
- WKYU-PBS High Definition Video Remote Production Truck Design
- WKYU-FM and WKYU-PBS Audits

- IT Helpdesk Cases
- Interactive Video Services (IVS) Integration
- Self-Help Knowledge Base
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- 2010 Faculty Pool Computer Replacement
- New Departmental Desktop Support Server
- Dell Online Self Dispatch (DOSD)
- Networked Multi-Function Devices
- Printer Repair Process Redesign
- Lab Computer Replacement
- Academic Technology Advisory Group
- WKU Software Center
- Extended Technology Resource Center (TRC) Hours
- Extended Classroom Support Hours
- Network Services Projects
- Telecommunications Projects
- Digital Signage Projects
- Interactive Video Services (IVS) Projects

Projects Planned for 2011

All of the projects listed below are described in more detail later in this report.

Major Projects

- Firewall Upgrades
- Redundant Internet Services
- NAC upgrades
- Construction Projects
- TopperMail Live@EDU

- OmniUpdate Enterprise CMS Implementation
- Core Services VM Cluster
- IT Website Redesign in ECMS
- Blackboard Hardware

- Registration Wait List Implementation
- Altiris Implementation
- Customer Relationship Management Evaluation (CRM)
- Security Assessment
- Virtual Labs Evaluation
- Windows 7 Deployment

Other Projects

- Network Services Projects
- Telecommunications Projects
- Digital Signage Projects
- Interactive Video Services Projects
- Data Center Storage Assessment
- HR People Admin System Support
- Oracle 11g Upgrade
- DARS Web Version Upgrade
- Exchange 2010 Upgrade
- Banner Hardware Platform Migration
- OCS/Lync Upgrade
- SunGard Banner and Related Upgrades
- Banner Document Imaging
- AdvisorTrac Replacement
- Automation of Pre-registration Processing
- IT Policy Review and Revision
- iWKU Enhancements
- NBC Learn Implementation
- 2011 Lab Computer Replacements
- WKYU-FM and WKYU-PBS Student Membership Program Implementation

- Altiris Deployment
- WKYU-PBS HD Program Signal
- WKYU-PBS Video Remote Production Truck
- Enterprise Anti-Spyware Software
- Case Tracking Software Replacement
- Blackboard Software Upgrade

- Enhance WKYU-FM and WKYU-PBS Online Presence
- Campus CATV System Upgrades
- Data Recovery Tools Evaluation
- ResNet Knowledge Base
- Software Installations for Students
- Increase ResNet Hours
- Redesign of HelpDesk Front Counter Area
- Proactive ResNet Services
- IT Helpdesk Call Statistics
- Live Chat Support
- Self-Help Knowledge Base
- System Status
- Jabber Server Replacement
- Internships
- Microsoft Office Updates
- Data Backup Solutions
- Managed Printing Services
- Convene University Technology Advisory Group

Supported Systems and Services

Mission-critical systems are those systems that, if they were to fail, would immediately and substantially degrade the University's ability to conduct business.

Mission-critical Systems Supported

Blackboard Online Learning Management System – Our supported campus-wide course management system is Blackboard (ecourses.wku.edu). All WKU students, faculty, and staff have Blackboard accounts. Blackboard is heavily used for online courses and face-to-face classes as well. WKU had 2,144 course sites on Blackboard in Spring 2010 and 2,372 sites in Fall 2010. The number of course sites increased by about 8% from calendar year 2009. In Fall 2009, 59% of all WKU instructors and 61% of all WKU course sections used Blackboard course sites. Our Blackboard Academic Suite supports campus organizations as well as courses. We currently have 438 organizations utilizing sites on Blackboard. Building Blocks running within WKU's Blackboard service include Tegrity, an add-on for creating and sharing multimedia files; Blackboard Mobile Learn, which provides access to mobile devices; Adobe Connect, which is used for live synchronous class meetings; and Learning Objects, which enables instructors to put blogs and wikis into courses. Our home-grown online help system is called the

Blackboard Knowledge Base and it was used 6,297 times in 2010. WKU has been running Blackboard since 1998.

Banner ERP – Banner is a mission-critical Enterprise Resource Planning (ERP) system used by every office at WKU. The Banner student module houses academic and administrative records for all students, including student applications, courses, degree programs, grades, transcripts, financial aid, billing accounts, and over 20 years of academic history. The Banner Human Resources module houses key employee demographic data, position inventory and history, professional credentials, and benefits information. The Banner Finance Module includes general ledger, purchasing, grants accounting, asset inventory, accounts payable, and budgeting. Related modules include integrated document imaging, degree audit, and enterprise portal. The current Banner system runs on a combination of physical and virtual servers running on SUN, IBM Blade, SAN, and 4-way server hardware.

Main Web Servers – The University's primary public facing web servers (www.wku.edu and people.wku.edu) are housed in our "core services" cluster, which is a highly redundant, highly available hardware cluster designed for maximum uptime. We also have a backup www.wku.edu server at an offsite location in the event of a major disaster locally. These servers are the public face for the University, and are the central entry point for various constituencies who need information about or interaction with the campuses.

Exchange Email and Calendar – Microsoft Exchange is the email and calendaring system used by all faculty and staff at the University. Our Exchange installation is completely redundant and duplicated between our two data centers. It is run on IBM hardware and is highly available. It houses approximately 5,000 faculty, staff, retiree, and affiliate accounts.

Live@EDU TopperMail – All student and alumni email is hosted in the cloud on Microsoft's Live@EDU platform. Live@EDU is a free hosting service to universities and offers much greater functionality and capacity than we could offer economically on premise. We have approximately 45,000 accounts on Live@EDU. Alumni may keep their email account for life.

TopNet – This is the main secure, web interface to the Banner ERP system. TopNet is accessible anytime, anywhere and provides student, faculty, staff, retirees, alumni, and affiliates with access to all academic and administrative records. Faculty can manage and grade their classes via this interface. Students can register, and check grades, financial aid, billing accounts, transcripts, and much more. This system is accessed over 4 million times per year.

WKU Portal – This is a central, authenticated website that provides one stop access to most major WKU systems and services, and enables users to login once and then gain single click access to these services without logging in again. Examples of accessible systems are TopNet, Blackboard, Banner Forms, Exchange Email, TopperMail, WKU InfoView, and Request Tracking. Users can customize content and pick and choose information channels.

Advance Development System – This system is used by the University's Development organizations, and provides accounting and recording keeping for fundraising activities. It provides prospect tracking, gift and pledge processing, membership tracking, and fundraising functions. We run this system in a virtual server environment using IBM hardware.

VMware Environment – This environment underpins our virtual hosting architecture. We have over 100 virtual servers running on four physical IBM 4-way servers. We are virtualizing as many of our physical servers as possible. Virtualization enables us to run many servers with a much smaller physical data center footprint thereby reduce floor space and our carbon footprint.

Data Centers – We operate two data centers: a primary and a secondary (backup). Our primary data center houses over 200 virtual and physical servers and over 300 terabytes of raw storage. The primary data center has a backup generator and 130KVA of UPS capacity. We run two operations shifts and process 1,000 batch jobs per week. Our secondary data center has redundant hardware and software for most of our mission critical systems.

Banner Document Management Systems (BDMS) – BDMS is an add-on system to the Banner ERP system and provides integrated Document imaging and some workflow. It enables offices to digitize their paper workflows and filing. The Graduate Studies Office at WKU has virtually eliminated paper using this system. A number of other offices are in the process of "going paperless" using BDMS.

Active Directory (AD) – AD is a Microsoft product and provides directory, file, print, and identity management services. These type of services are "core systems" services on which many other systems depend. As an example, the University's main user ID and login credential is called the NetID, and it is managed and issued via Active Directory.

Server Hosting Service – This is a service provided by central IT to University departments who need a managed server, but don't have the resources or expertise to operate one. Departments that want to run specialized software that addresses a specific need can take advantage of this service and not have to worry about managing server hardware and software. We offer this service using our VMware environment (described above). We charge a yearly management fee for this service.

WKYU-FM Public Radio – We operate a 24 hour public radio service to 1.2 million citizens of Kentucky, Southern Indiana and Northern Tennessee. Programming includes news, information, classical music, arts, culture, and entertainment programming.

WKYU-PBS – We operate a differentiated public television program schedule to over 250,000 citizens of South Central Kentucky and Northern Tennessee. Programming includes iconic PBS series, "how to" programs, WKU sports, locally produced programs, and documentaries such as *MainStreet, Outlook*, and the Emmy award winning *Mammoth Cave* documentary.

Telephony Services – Our current telecommunications system is the AVAYA Communications Manager 5.2. This system supports all voice services for the main campus as well as all remote campus locations. This system is capable of providing voice services for analog, digital, and VoIP devices. We currently have approximately 7,500 phones in use.

BDMS (Banner Document Management Systems) – Banner integrated document management.

Active Directory – Directory, file, print, and identity management services.

Server Hosting Service – Virtual server hosting service for departmental systems and applications. We currently have approximately 20 hosted systems under contract.

Other Systems Supported

- Axis/Pinnacle
- E-signature Workflow
- Job Scheduling
- Infinitime Time Clock
- AdvisorTrac
- AceWare
- Tegrity
- Microsoft Lync (formerly OCS)
- Adobe Connect
- International Office System
- Digital Measures

- Windstar Tax System
- Tivoli Backup
- OmniUpdate
- Degree Audit System
- Astra Scheduling System
- Data Warehouse
- SAP InfoView / Crystal Reports
- OMR (Bubble Sheet) Scanning Service
- IT Helpdesk
- ResNet
- Desktop Support

- WKU Campus CATV System
- Television Production Services
- Hilltopper Sports Satellite Network
- Telephone Billing System
- Symon Enterprise Server (SES)
- Cellular Resale Service
- Campus Wireless Network
- University Video Surveillance
- Interactive Video Services (IVS)
- Classroom Technology

- Student Technology Centers (STCs)
- Computer Lab Printing
- Student Technology Group
- Technology Training
- Technology Resource Center (TRC)
- WKU Software Center
- iTunes U
- Qualtrics
- iWKU

Functional Overview of IT Departments

A functional overview of all IT Departments – Academic Technology, Administrative Systems and Applications, Communications Technologies, Educational Telecommunications, and Technical Support Services – is provided later in this report. Each departmental overview includes the department's mission's statement, organizational chart, and a brief description of functional areas and staffing.

Issues, Trends, and Future Technology Directions

A brief discussion is presented regarding technology issues currently facing WKU IT, and general trends and future technology directions. Predicting the future – especially the future of technology – is fraught with danger.

The biggest problem with predicting the future is that the nature of change has changed. Throughout most of human history, predictions were largely formulated by looking at past events, looking at current events, and then extrapolating into the future. This essentially represented an arithmetic change vector.

With the advent of technology in the 20th century, the nature of change became geometric, and has thus accelerated.

At least as it pertains to technologies in the last 30 years, the following observations have held true. In general, new technology is:

- Faster
- Cheaper
- Smaller
- More mobile
- More connected

What follows is a brief discussion of current issues facing the IT Division, and general trends and future technology directions in higher education.

Issues Affecting WKU's IT Division

FCC Broadband Plan – The FCC has embarked on a "National Broadband Plan" to prepare for the future capacity needs of wireless Internet services. Currently, part of this plan includes the re-distribution of some broadcast television frequencies to the broadband plan. This could have a major impact on distribution methods for over the air television in the next few years. We are monitoring this situation.

WKYU-FM Public Radio Future Technologies – WKU Public Radio has converted one of our four transmission ties to digital HD capability. Unfortunately, this technology has seen slow adoption by consumers and there are still some transmission issues that have yet to be satisfactorily resolved regarding power output and replication of the analog footprint. We received a CPB grant which paid for the majority of the conversion of our Bowling Green site. We will remain in a "holding pattern" on the three remaining sites until these transmission issues are resolved. However, it is the opinion of the Educational Telecommunications Director that HD radio's future is in jeopardy due to technical and market conditions.

We have been streaming our radio programming on the Internet for several years and use continues to grow. Through the creation of the national Public Radio Service application on the iPhone, users can now listen to us using that technology. We archive our local programming on our website for use by listeners and faculty on campus who can use it for classroom content, assignments, etc.

WKYU-PBS Television Future Technologies – WKYU-PBS Television has a nice website, but the use of online video is an area that needs to be developed. Hardware with the capacity to support such an effort is needed, as well as the development of a work flow to accomplish the goal of providing much of our local content online.

Mobile TV is an area of potential growth as well. As yet, there is no ATSC standard for mobile video, but one is being developed and is in beta testing in several television markets in the U.S. When this is rolled out, we could provide programming directly to mobile phones, video screens in automobiles, etc.

3-D television was introduced last year at the Consumer Electronics Show and NAB convention. One year later, adoption has been much slower than promoters had anticipated. We will monitor the development and acceptance of this technology.

Increasing Demand for Help Desk and ResNet Services -- As the IT Division continues to increase services and offerings, demand for prompt Helpdesk support increases as well. In the last few years, the IT Helpdesk has seen a significant increase in the number of Helpdesk cases logged in the case tracking system. Additionally, ResNet has evolved over the last several years into a critical service offering for WKU students. ResNet has also seen significant increases in the number of cases logged for their area.

We have improved the efficiency of service delivery in both of these areas in every way that we know how. Therefore, we hope to increase staffing in this area.

Aging Departmental Computing Labs – Many departments' lab computers are aging. For the past three years, we have recycled computers retired from open labs exclusively to departmental labs and classrooms. As of Summer 2010, we found that about 9% of supported departmental lab computers were more than five years old. When departments hang onto outdated computers in labs, it creates a cluster of problems: support staff tries to maintain equipment that is out of date and out of warranty; students try to run software on computers that aren't powerful enough; and prospective students get a negative impression of WKU as a place where student technology is not kept current. Academic Technology has been proactive in helping departments to plan ahead in their budgets for lab computer replacements, to dispose of outdated computers via Surplus, and to design lab facilities efficiently so that they are right-sized for the needs of the department and its courses. For the past three years, we have recycled computers retired from open labs exclusively to departmental labs and classrooms, to replace even older computers. We also annually commit funding from the Academic Technology budget to replace equipment in one or more computer labs; in Spring 2011, we replaced all the computers in Grise 135, a departmental lab primarily used by the Sociology department.

Desktop Video Conferencing – There is a growing trend for faculty and staff usage of desktop video conferencing services. These types of services have many advantages, including the ability to have remote office workers, and reductions in travel costs. We are currently in the pilot-phase of providing two types of these services for classes and faculty/staff/student support. Desktop video conferencing usage

is expected to continue to grow as faculty and staff become more aware of the travel and time saving capabilities of the technology.

Faculty and staff at the University have also requested the ability to bridge classroom and conference room locations with desktop video conferencing tools. The installation of the new multipoint conferencing unit will allow for increased blending of desktop-to-classroom (or conference room). Future applications of this technology would allow a student who could not attend class due to illness or weather to be able to join their class from their home computer.

Limited Space – Adequate physical office space and storage space for the IT Division continues to be problematic. Currently space issues are handled by just in time ordering of computers, and eliminating any excess materials that are not quickly utilized. The need for a staging area for equipment also contributes to space issues.

Mobility – Nationally, more than half (51.2%) of undergraduate students own an Internet capable handheld, or mobile device, and 11.8% plan to purchase one within the next 12 months. Of those students who currently own mobile devices, 29% access the Internet daily on their mobile device. 32.3% of students who own mobile devices spend 1-2 hours per week accessing the Internet from their mobile device. These percentages are expected to continue to increase.

Convergence of Voice, Data, and Video Technologies on Multiple and Mobile Devices

Over the next several years, voice services will migrate from a physical infrastructure based product to an application based product. Voice endpoints will become more diverse, allowing a mobile workforce to connect from any location. The availability of an application based voice service will promote the advancement of a converged voice architecture, enabling a more feature rich experience that will combine services such as video, instant messaging, and desktop sharing. Mobile devices will become seamless extensions of the desktop telephone.

Applications

Our user base is increasingly using mobile devices for everything and that user base expects us to deliver application functionality to their mobile device. Vendors are recognizing this and are providing more of this functionality built into their applications. SunGard, the Banner ERP vendor, has just released a mobile development platform called mobile connect. We hope to deliver more Banner functionality to the mobile devices soon.

Increased Demand for Wireless Networking – The speed of wireless networks will continue to expand allowing many of our users to be served by wireless-only devices. This shift from a physical wiring plant to an RF based model will exceed the availability of wireless spectrum in many areas. The FCC will continue to move wireless frequencies around, which could cause overlap in some of our legacy systems.

Cloud Computing – As good of a definition as any of "cloud computing" may be found in the Educause 2009 Horizon Report: "The *cloud* is the term for networked computers that distribute processing power, applications, and large systems among many machines."

Cloud computing offers many benefits to WKU IT. Since applications are staged and maintained offsite, it frees up time for our system administrators to manage critical systems, like our Banner ERP system. Additionally, we do not have to invest in the hardware, software, and storage needed to run an application; all of this is provided in the cloud. We save money from not needing maintenance contracts on hardware, software, and storage. We save physical space in our data center. Finally, we reduce our power and cooling costs.

Developments such as Google Apps and Microsoft Office 365 are moving the traditional desktop application, such as Microsoft Word, PowerPoint, and Excel, to the cloud – off the desktop and into the cloud, where the application may be accessed over the Internet via a browser. We will closely monitor and evaluate our current model of support and deployment of Microsoft Office, as well as other desktop

applications. Many universities are eliminating local desktop applications entirely, and migrating these functions to the cloud.

Additionally, more and more of our IT services are becoming candidates for the cloud. In early 2011, we moved student and alumni email to a cloud-based application – Microsoft Live@EDU. Data center virtual server services, backup services, and disaster recovery services are also good candidates for migration to the cloud.

Unified Communications (including messaging) – Our recent implementations of Microsoft Exchange and Microsoft OCS (now called Lync) have moved us closer to the Unified Communications reality. Email, calendar, instant messaging, phone calls and voicemail, and chat are all integrated on one platform and accessible anywhere, anytime. We are very close to achieving this model.

Future Technology Trends and Directions

As noted earlier, it is extremely difficult to predict the future of technology. A number of predictions and thoughts regarding future technologies (as envisioned by various companies, experts, and organizations) are presented.

While no company, organization, or individual has a perfect track record of predicting future technologies in higher education, Educause probably does the best job. Educause is the pre-eminent non-profit professional organization dedicated to technology in institutions of higher education. Every year, Educause produces a "Horizon Report", which reviews technologies that are likely to become mainstream technologies within the near-term (within the next twelve months), the mid-term horizon (within two to three years), and the far-term horizon (within four to five years).

The following is excerpted from the Educause 2011 Horizon Report:

On the near-term horizon — that is, within the next 12 months — are *electronic books* and *mobile devices*. The mid-term horizon considers technologies expected to gain widespread usage within two to three years, and this year's candidates were *augmented reality* and *game-based learning*. Looking to the far-term horizon, four to five years from now for widespread adoption, are *gesture-based computing* and *learning analytics*. Both remain largely speculative and are not yet in widespread usage on campuses, but both are also garnering significant interest and increasing exposure.

Overview

This report discusses foundational goals, and lists IT Division projects completed in 2010. Projects planned for 2011 are noted. Supported systems and services are described, including mission-critical systems. A functional overview of the IT Division's departments is presented. Finally, the report concludes with a brief discussion of current issues facing the IT Division, as well as general trends and future technology directions.

Foundational Goals

Three foundational goals were identified for 2010. These goals – especially the first two – are incredibly important, and form the foundation for much of our future success. The successful realization of the first two goals will contribute to the successful realization of the third goal.

   a. Establish/maintain a national presence for WKU IT.

The first goal is, quite simply, to put WKU IT on the map. We have made significant progress in this regard. Our staff has presented at national conferences, and WKU IT is considered a leader in the implementation of certain types of technology (e.g., WKYU-PBS Studio One LED lighting, Microsoft OCS pilot with the doctoral program, the ability to use Skype to call into WKU). The Vice President of IT (VPIT) represents WKU on two national technology boards, both of them well-recognized in the higher education technology community; membership on either board is highly coveted. The VPIT sits on the Dell Platinum Advisory Council, which Dell describes as their "thought leaders from their most strategic accounts", and the Sungard Higher Education Pillar Group, which Sungard regards as their 40 top thought leaders among their 1,800 customers world-wide (Sungard is the vendor of our Banner ERP system).

   b. Establish/maintain high quality professional relationships with key IT partners.

There are many reasons why it is desirable to have high quality, close relationships with our strategic IT partners (vendors). We have the opportunity to find out about new products and services prior to release, and an opportunity to comment on and, in some cases, shape the new product or service. If we have a problem and need immediate assistance, we can quickly escalate up the chain of command to get our situation resolved. We can learn what our peers are doing, and what is and isn't working. We can be (and over this last year, have been) the recipient of grants and donations. Finally, it raises our image in the larger technology community.

We have been very successful in establishing very strong partnerships with our key vendors. At Dell, we have forged a relationship with key executives, all the way to the level of the President of Dell Global Public Sales and Services, Paul Bell. The VPIT has had several good conversations with the CEO of Dell, Michael Dell. At Sungard Higher Education, we have good professional relationships with Sungard's senior executives, including their President, Ron Lang. We have established a good relationship with the regional Vice-President of Cisco. We have good relationships with key Microsoft telephony executives. Consequently, as a result of all of these relationships, we have been the recipient of a number of donations (noted below) and other technology opportunities.

   c. Secure as much external funding as possible for WKU IT.

We have been very successful in securing additional funding to augment the IT Division budget, both in terms of actual cash donations and in-kind donations of product and services. Over this last year, we secured $318,500 of additional funding, broken down as follows:

Microsoft OCS Pilot grant	$150,000
Dell Storage Area Network donation	$70,000
Dell laptop donations	$75,000
SIS Systems	$21,500
Ikon Office Solutions	$500
Sprint	$500
CIM Technology Solutions	$500
OfficeWare	$500
Total	$318,500

In terms of fund raising, we had a very succesful year in 2010. Much of our success in attracting additional funding is due to the fact that WKU has been very visible at national conferences and meetings. Additionally, we benefited from our participation on national technology advisory boards, and the high quality of the relationships that we have established with our key vendors. Success begets success. Given our desire to build on the successes of this last year, and especially in an environment of fiscal challenges to the Commonwealth and our University, we will be very aggressive in seeking additional funding.

Projects Completed in 2010

Major Projects Completed

Microsoft Exchange/Outlook Migration – These programs provide calendar, email, and contact functionality. This was a very large project that touched all colleges and divisions at WKU. Three IT departments worked on this project: Administrative Systems and Applications (ASA), Academic Technology (AT), and Technical Support Services (TSS). We migrated all employee email and calendar accounts to Exchange.

ASA provided high level project management, communication, and systems administration. TSS' Desktop Support group employed a team of temporary employees during 2010 to assist in migrating faculty and staff email accounts from an antiquated email system to Microsoft Exchange. In all, 1,928 clients were migrated throughout the year. This team went onsite to each WKU employee's office and physically migrated required data to the new system. This team also created and delivered custom information sessions tailored to each and every department on campus, as well as custom onsite training to every user migrated.

Supporting this effort, Academic Technology's IT Training group developed 41 video tutorials for Outlook and Entourage (the Apple version of Exchange); created an Exchange Knowledge Base; and offered live training throughout the year on Outlook.

The feedback for the migrations was overwhelmingly positive, and the project was completed slightly ahead of schedule.

WKYU-PBS Studio One Lighting Project – We completed the LED studio lighting project. Previously, Studio One utilized a tungsten/quartz system installed in the late 1960s. The new LED lighting system has yielded a 97% reduction in our electricity consumption; additionally, LED bulbs last for 30-35 years. The new system is much more flexible/adaptable, allowing for not only a much more environmentally friendly lighting system, but also much more ease of control. The lights can be individually controlled for intensity and color with the simple tap on the screen of an iPad. This was the first totally LED studio at any university or public station in the nation and has garnered much attention and positive media coverage for the station and the University.

Enterprise Content Management System (ECMS) Evaluation and WKU Website Redesign – In the spring of 2010, the IT and Public Affairs Divisions began working collaboratively together to redesign and re-architect our University website. This was a huge project, involving many different people.

To facilitate this project, two separate teams were created: a web redesign committee, and a web architecture committee. The web redesign committee was charged with creating the "look and feel" of the new website: the fonts, type points, colors, organization, and navigation of the new web pages. The web architecture committee was tasked with evaluating and selecting an Enterprise Content Management System (ECMS), which is a software package that allows designated members of the user community to maintain the content of particular pages while streamlining the design and content across the website. These committees worked in parallel, and by early winter, we had agreed on a new website design and an ECMS package (OmniUpdate).

The IT division managed the detailed committee evaluation and RFP process resulting in OmniUpdate being selected as the WKU ECMS.

Banner and Related Systems Upgrade – Banner is a mission-critical Enterprise Resource Planning (ERP) system used by every office at WKU. The Banner student module houses academic and administrative records for all students, including student applications, courses, degree programs, grades, transcripts, financial aid, billing accounts, and over 20 years of academic history. The Banner Human Resources module houses key employee demographic data, position inventory and history, professional

credentials, and benefits information. The Banner Finance Module includes general ledger, purchasing, grants accounting, asset inventory, accounts payable, and budgeting. Related modules include integrated document imaging, degree audit, and enterprise portal. Upgrading this environment was a major project and required campus wide cooperation and coordination by IT. We completed this upgrade on schedule with no significant issues.

Blackboard Upgrade – Blackboard is our mission-critical learning management system. WKU faculty use Blackboard to provide students with instant access to course materials, online discussions, multimedia files, and real-time grades. Blackboard is the engine that allows many WKU courses to be offered entirely online, with its secure online testing and assignment modules. In 2010, we upgraded from Blackboard 8.0 to Blackboard 9.0. This was a major upgrade.

ASA provided systems and database support for the Blackboard upgrade. Academic Technology was heavily involved in this upgrade, and their IT training section created or redesigned 104 video tutorials. Additionally, live training was provided to faculty throughout the year. The IT Helpdesk staff was heavily involved in testing and providing feedback to Academic Technology regarding the upgrade to Blackboard 9, and compiled and provided feedback to Academic Technology.

iWKU – The iWKU mobile application was developed and released, offering campus maps, directory, course schedule, news, events, athletics, library catalog, and much more. The original iPhone version was released April 3rd, 2010, and the BlackBerry version was released on June 24th, 2010. Version 2 for the iPhone was released in October. The Android version is in testing as of January 2011.

iTunes U – WKU's iTunes U sites were developed and released. There is a restricted online site containing academic content, accessible only through Blackboard course sites. There is also a public site accessible to all users containing WKU news, tutorials, and other public content.

Altiris – Altiris is a desktop software deployment and management system. Desktop software deployment and management systems provide a set of tools that allow IT staff to remotely repair or upgrade PCs without having to physically travel to the office or classroom where a PC is located. With this type of a system, some of the services that IT staff could provide from MMTH, without ever needing to leave the building, include installing new or upgraded software on PCs; installing software patches that might need to be applied for various software packages; and deploying new or upgraded operating systems for PCs. Another invaluable feature typically provided by these types of packages includes the ability get a real-time inventory of hardware and software (e.g., how many PCs do we have? What is the capacity of the hard drives on those machines? What software packages are installed on those machines?).

An IT committee was formed to evaluate potential packages, and recommended Altiris as the best Desktop Management solution. The product was purchased in Summer 2010. Implementation discussions commenced, and committees were formed to make decisions and come up with an implementation plan. Two Altiris Administrators were named, one of which is from the Desktop Support area, while the other is from Academic Technology. Progress with implementation will continue in 2011.

Hosted Student/Alumni Email Evaluation – Over the course of this last year, we evaluated two cloud-based email solutions: Google Apps and Microsoft Live@EDU. Intensive analysis and testing was conducted for both possible solutions, and the evaluation committee selected Live@EDU for our new student e-mail solution. The implementation of this solution has yielded approximately $50,000 in operational savings.

Oracle License Review – Oracle is an extremely large technology company that makes the database that we use with our Banner ERP system. In early Spring 2010, Oracle contacted us, and informed us that they would be conducting a license audit of their products.

WKU IT has been very vigilant in making sure all of our software packages, including Oracle, are properly licensed. A comprehensive license audit was conducted in December 2005, and a license review was conducted in 2008; in both cases, Oracle concluded that we were fully licensed.

In March 2010, Oracle notified us that they were conducting a licensing audit. Further, they stated that, based on their preliminary calculations (formulated without even talking with us), we owed them an additional $810,000 in license fees.

Gordon Johnson, our Director of Administrative Systems and Applications, had numerous interactions over a five month period with various people from Oracle regarding this situation. The Vice-President of IT escalated up to the level of a Senior Vice-President of Oracle, and also escalated with Sunguard (our Banner ERP vendor) to the CEO level.

After five months of difficult and contentious negotiations, we reached an agreement with Oracle regarding licensing, in which we agreed to pay an additional $218,000 in licensing fees.

In escalating at Sungard, and in talking with other institutions, it quickly became apparent that we were not the only institution in this situation. Because of the economic downturn, Oracle has not been able to sustain previous sales volume. Consequently, they are trying to generate additional revenue from license reviews.

We communicated to Sunguard's senior executive staff our extreme displeasure in having only one database to choose from to run the Banner system. They indicated that they are working on rolling out another database option in the next 3-5 years. When that happens, we will take a very serious look at whatever new database is available.

In the meantime, we are evaluating the hardware platform on which our Banner and Oracle systems run. We may be able to reduce licensing costs by switching platforms. We currently have a SUN server, and we are in the process of evaluating Dell and IBM server offerings.

Electronic W2 Delivery – We implemented online electronic W2s for employees. Historically, we print over 7,000 W2s per year. This year, 1,300 users opted for the online version, thereby reducing our printing costs. We expect this savings to increase each year as more users opt for the online version.

Online K4/W4 Tax Forms – We implemented online versions of these tax forms. While not a high volume print application, moving these forms online has improved workflow efficiency and added convenience for our employees.

Online Admissions Event Registration – We created an online event registration process for prospective students. This eliminated a paper form and manual data entry process. Students can now register and pay for events online, thus reducing Admissions Office processing time per registered student by over 50%.

Online Honors Admission Application – We developed and implemented a custom, online Honors admissions application. The Honors program has special requirements which required a custom application process. We integrated their requirements with the standard online admissions application, which eliminated an extra paper form and manual data entry, and enabled the applicant to complete the online application in one step. The processing time for each application was reduced by at least 50%.

Budget Transfers Decentralized – Working with the Budget Office, we developed and implemented a budget transfer workflow, which distributed the data entry to the end-user and the approval process to the departmental level. This saved the Accounting Department and the Budget Office significant staff time because as they no longer had to enter and approve budget transfers. The time to process a budget transfer was reduced by over 75%. In addition, we developed a training video to train the end users and departments. Delivering training online for this kind of process was very efficient and enabled us to implement this very quickly once we had it developed.

Online Electronic Transcript – Working with the Registrar's Office, we completely digitized the process whereby students request that copies of their transcripts be sent to other institutions to which they are

applying. For participating institutions and agencies, this completely eliminated the need for Registrar's Office staff to handle or process transcript requests. In the case of participating institutions, the time to process a transcript request has been reduced by 75% to 100%.

Diploma/Degree Automation – We automated the arduous process of degree checkout, transcript audit, and diploma production. Using business process analysis, workflow, and programming, we reduced the amount of time needed to process all diplomas after each spring and fall semester graduation from 4 weeks to 10 days.

WKYU-FM Format Change – WKYU-FM radio completed the first year of a format change to a primarily news and information program schedule during the weekdays. The transition has been successful and has recieved positive reviews. Once again, we exceeded CPB fundraising goals; experienced a 9% increase in membership numbers; and had a record year for radio underwriting.

WKYU-PBS Emmy Awards – The WKYU-PBS production staff were nominated for six Emmys, and won four.

WKYU-FM Awards – WKU Public Radio news staff won 22 of the 91 Kentucky Associated Press News Coverage Awards given in 2010, more than any other radio station in Kentucky. The next closest station was WFPL in Louisville with 15. Additionally, Public Radio News Directors International awarded us 2nd place in a national competition for our documentary, "A New Look at the New Deal."

Tech Expo 2010 – The 2010 Tech Expo is an annual event sponsored by WKU IT, and held every fall in MMTH. Technology vendors are invited to exhibit their products and interact with the University and Bowling Green communities. This last year, 18 vendors participated in the IT department's second annual technology expo. Vendors at the expo were able to demonstrate current and new technologies that support the mission of the University. Communications Technologies staff managed the event, and the IT Helpdesk provided additional logistical support and services. This was a very successful event.

Windows 7 – The newest Microsoft operating system became available in 2009 and IT saw the need to create a plan to migrate faculty, staff, and lab computers to Windows 7. A committee was formed to create an implementation plan. The majority of 2010 was focused on testing and development, while deployment strategies took a back burner until the end of the year. It was decided that a team would be hired on a temporary basis to help migrate computers to the new operating system. Three people were hired and report directly to the Desktop Support Coordinator. Work will continue on this project throughout 2011. The Windows 7 Technical Implementation Committee began work. Testing and planning are underway, and an implementation schedule for 2011 has been disseminated.

Qaultrics Survey Software – Qualtrics survey software provides faculty and staff with the ability to conduct online surveys. This package was licensed and made available to all students, faculty, and staff for web surveys.

Network Infrastructure Upgrades – Upgrades were completed in numerous academic, administrative, and residential locations. These upgrades represent over 3,800 new high-speed data ports replacing legacy equipment that had been in service up to eleven years. Locations included:
- Administrative/Academic
  - Knicely
  - Potter Hall
  - HL
  - DC's
- Residential
  - Northeast Hall
  - Southwest Hall
  - Poland Hall
  - Gilbert Hall
  - Bates-Runner Hall

Wireless Network Upgrades – Prior to last year, a visitor to WKU's campus could only get access to WKU's wireless network by having a WKU employee issue them a 24 hour temporary network pass. In 2010, we redesigned this system by implementing the WKU-GUEST network, which allows any visitor or guest to access a high-speed wireless network while they are on campus.

Construction/Facilities Related Work – We completed a variety of projects at a number of locations. Some of these projects spanned multiple years, culminating in 2010; others occurred entirely within the past calendar year. All projects included our standard services provided by network services, including: design work; drawings; data network implementation; and technical assistance to multiple parties. In many cases we acted as IT project managers for the projects (as opposed to outside contractors providing this function). Locations and projects included:
- Knicely Expansion, Knicely Center (Capital Construction Project) – IVS personnel managed the audio visual installations for new conference and meeting rooms utilizing the latest in audio visual technologies with full automation.
- Gary A. Ransdell College of Education Building (Capital Construction Project) – IVS began installation of 27 Smart Classrooms, 2 Distance Learning Classrooms, 1 Educational Technology Center, 9 Meeting Rooms, and 1 state-of-the-art auditorium featuring dual high-definition projectors, multi-screen projection, and digital media technologies. Installation will be completed during Winter Term, 2011.
- Colonial Court / International Scholar Village
- International Center *(design work, project placed on hold)*
- Elizabethtown
- Facet Trailer
- Chandler Memorial Chapel *(finalization)*
- Baseball Clubhouse *(finalization)*
- Owensboro *(finalization)* New WKU-Owensboro Building (Capital Construction Project) - IVS installed 12 Smart classrooms, six distance learning classrooms, one general purpose meeting room, one advanced recording classroom, one conference room, and the audio visual technology for the computer lab.
- Preston *(finalization)*
- Science andTechnology Hall / College High Hall *(finalization)*
- College Heights Hall (Capital Construction Project) – IVS installed 13 Smart Classrooms and 1 Distance Learning Classroom in the renovated College Heights Hall.
- IVS completed 30 Classroom Improvement Projects - Projects included projector and screen installations, audio upgrades, Crestron Touchpanel Control System upgrades, and Smart classroom installations. Of these 30 projects, 6 rooms were fully digital installations to support high-definition video sources such as Blu-Ray players and other digital media devices.

Video Surveillance Services – All legacy fixed cameras under the responsibility of the WKU Police department were replaced to allow us to better support them and deliver higher quality video. This project covered four buildings and over 30 cameras, including:
- Florence Schneider Hall
- Food Services Buildings
- Public Safety Building
- South Campus

Cellular Allowance Program – Previously, the University provided cellular devices and a cellular services plan to employees who needed a cell phone. We transitioned to a cellular allowance program, whereby employees are paid a monthly stipend for voice and data service (as required), and are given a small stipend every two years to help pay for a device. As a result of this transition, we reduced our cellular costs by an estimated $100,000 annually.

MMTH Auditorium – We finished a complete upgrade of Audio/Video functionality, deploying a fully digital system with state-of-the-art video and audio technologies.

IT Division Reorganization – In July, 2010 the Director of Network and Computing Support retired. In order to reduce administrative staff overhead, the Vice President of IT reorganized the IT Division, and did not fill the open Director position. Network Services was assigned to Communication Technologies; Desktop Support was assigned to Technical Support Services; and the Security Office was assigned to Administrative Systems and Applications.

Single Points of Failure – We continue to identify and ameliorate single points of failure in our IT systems. We have looked at a wide variety of systems – both human and automated systems – to identify and address single points of failure in our IT system. For example, we have aggressively promoted the cross-training of individuals who are the only staff members who know how to maintain a particular mission-critical system. We have initiated discussions to secure a second Internet connection to the University. We will continue these efforts over the next several years.

Other Projects Completed

Health Services Call Center – We re-designed Health Services' call center to provide better customer service for callers.

University-wide Technology Advisory Committee – The University currently has an Academic Technology Advisory Group comprised primarily of faculty members that meets three times a year to discuss technology issues. The committee is chaired by a faculty member (currently Dr. Raymond Poff). This committee has provided very useful advice and feedback to Academic Technology staff.

Credit Card Processing Outsourced – We rewrote all web credit card interfaces to move credit card processing to an offsite 3rd party service in order to enhance PCI compliance. PCI (Payment Card Industry) is the regulatory organization that sets and enforces credit card processing rules, regulations, and standards. PCI requirements are becoming so stringent that most organizations are moving the processing of credit cards offsite to 3rd parties who specialize in that service and are PCI compliant. We conducted a comprehensive evaluation process and selected AuthorizeNet to process our online credit card transactions. We have over 25 online credit card payment applications which had to be rewritten.

NetID Migration – The NetID system provides enhanced security for our network. We moved 80 major and minor applications to NetID authentication. Blackboard and lab computer logins were converted to NetID authentication. Formerly, these systems authenticated with an email address, which was a much more insecure protocol.

SAP InfoView Upgrade – SAP InfoView (aka Crystal Reports) is the online reporting system that enables end user offices to run reports, data extracts, and update processes on a schedule or on demand. We have over 10,000 reports and processes in this system that user offices utilize for back office reporting and auditing. We performed a hardware and software upgrade, which involved migrating this system to a new server and upgrading the database and all the reports. This was a major project executed with minimal disruption to our user base.

Advance Web Implementation – Advance is the enterprise development, fund raising, and accounting system used by the Development Office and Alumni Development to develop prospects and track gifts and donations. We had a major system upgrade to this system which changed the entire user interface. Working with the Development Office, we tested and customized this version to meet their needs and rolled it to production with no significant issues. This especially improved the ability of travelling development officers to have access to prospect and donor data while on the road, since the system is completely web accessible.

Astra Course/Event System Upgrade – Astra is an enterprise level system used to schedule all academic courses across campus classroom facilities. It is also used to schedule events in non-classroom spaces. We performed a major version upgrade to this system with no significant issues.

Document Imaging (Payroll, President's Office, Provost's Office) – We assisted these offices with the implementation of several different document imaging and digitizing projects. Depending on the situation, we configured and utilized either Banner Document Imaging (BDMS) or Adobe Professional. All of these offices were able to digitize old paper records and/or go paperless with current and future processes.

HIRE Act Tax Changes – The federal HIRE act (Hiring Incentives to Restore Employment) requires we help the payroll office implement changes to the way payroll taxes are calculated for qualified employees. We implemented these changes with no significant issues.

Navitas Integration and Setup – We developed and implemented systems interface procedures to integrate Navitas students and employees into the WKU environment. We completed a custom setup of a Navitas network and systems environment.

Banner Finance/Data Warehouse Implementation – We have developed and maintain a multi-terabyte Data Warehouse which is utilized extensively by Institutional Research, and that has historically only housed student and employee data. Due to some reporting needs of Academic Affairs, we worked with Institutional Research to load a large amount of finance data into the Data Warehouse to facilitate financial analysis and predictive modeling.

UG/GR Online Admissions Application Enhancements -- We implemented highly enhanced versions of the undergrad and graduate online admissions applications in response to significant changes in the way the admissions offices needed to process applicants. This was a significant project which required many hours of programming and testing, and one we agreed to after a CollegeNet implementation did not prove viable. Due to these changes, both applicant time to complete and staff time to process have been reduced.

Graduate Office "Go Paperless" Implementation – We provided technical and programming support to a paperless office initiative in the Graduate Studies Office. This required business process analysis, workflow, and programming to implement. This office now operates with little or no paper workflow or storage.

Study Away Online Application – We developed and implemented a custom online Study Away admissions application.

Admissions Tape Loads Automation – The Undergraduate Admissions Office loads a number of different types of test scores and prospect data to Banner from external sources. We analyzed this process and were able to streamline many of the tasks and give the end users greater control over the entire process. This greatly reduced the turnaround time for getting data loaded and ready for further processing.

QAS on TopNet Implementation – QAS is a software package that resolves, standardizes, and corrects address information dynamically as it is entered into a web form. We implemented this at several levels in TopNet where address information is collected, including admission applications. This eliminated a manual review and data entry process that was being done in the Registrar's Office. It has also corrected a number of errors in our existing address data.

Online MPE – Administering the Math Placement Exam (MPE) online to incoming students has been goal of the Math department and the Advising Office. After several unsatisfactory attempts at using 3rd party services, we developed an online system for administering, tracking, grading, and reporting MPE testing not only to incoming, admitted students but to prospective high school students as well. We collaborated heavily with Dr. Bruce Kessler, Associate Dean of Ogden College.

Athletic Grade Review on TopNet – Working with Athletics and the Advising Office, we developed an early intervention web application and auditing reports to monitor all NCAA athletes and their academic progress. This tracking system identifies student-athletes who are at risk and need attention, and enables early intervention.

DELO Lab Exam Check In Tracking System – We developed custom software to allow the DELO computer lab to track student exam attendance.

Sprint Marketing – We started marketing Sprint cellular service along with AT&T Wireless. Both offer WKU faculty, staff, and students a cellular discount.

Music on Hold – We implemented a campus Music on Hold system that utilizes CD's from WKU's music department.

PBS Television Audience Growth – WKYU-PBS continued its trend in television audience growth. February Nielsen ratings data of the Cumes for all the public TV signals in each market in Kentucky shows that WKYU-PBS has the highest Metro Cume and the second highest DMA Cume (second only to KET in their "home" Lexington DMA). A comparison of all public TV primetime Cumes in Kentucky shows WKYU-PBS out ahead in both Metro and DMA (17 and 12, respectively, compared to the next highest numbers, KET in Lexington, at 10 and 11, respectively.)

WKYU-FM Master Control Room Rebuild – The radio master control room was completely rebuilt and upgraded to totally digital operations.

PBS Multicast Channel – WKYU-PBS launched a multicast channel. "Create" is a 24 hour "how to" channel and is being well received by over the air viewers. It is not yet carried on the Bowling Green cable system, but a recent conversation with their V.P. for programming indicates that it will be coming soon.

WKYU-PBS Master Control – We completed construction and moved into a new digital master control room.

WKYU-PBS Automation and Archive System – We installed and tested an automation and archive system that provides more precise control of our on-air programming and storage of video programs that will be broadcast at a later time. In addition, this will allow for un-attended operation during overnight hours.

WKYU-PBS High Definition Video Remote Production Truck – WKYU-PBS uses two trucks, a satellite uplink truck and a remote production truck. The Video Remote Production (VRP) truck is an integrated system that allows for the production of television programs in non-campus locations. Approximately 15-20 students use the truck to gain practical, real-world work experience. Our VRP truck was acquired in 1979, and its expected life was estimated to be 10-12 years. The truck has been rebuilt three times and cannot be rebuilt again. Failure of the truck will result in loss of broadcasting for the sporting, theater, and music events six months, which is the minimum amount of time required to order and build a new truck. The design of the new VRP truck is nearly complete and ready for bid. Our goal is to take possession of a new truck in late summer.

WKYU-FM and WKYU-PBS Audits – Once again, radio and television received a clean audit.

IT Helpdesk – In 2010, the number of cases closed by the IT Division totaled 49,184. The IT Helpdesk closed 31,651 of those, which equates to 64% of the total number of cases closed.

Interactive Video Services (IVS) Integration – The IT Helpdesk worked with the IVS area of Communication Technologies to integrate them more into the consolidated IT Helpdesk. Accomplishments included modifying the case tracking software in order to handle that area's case types. Also, we modified the IT Helpdesk's phone tree to include IVS support calls, eliminating the need for two separate phone numbers. When contacting the IT Helpdesk, a client is now given the option to press "9" for classroom technology, IVS, or desktop conferencing support. If chosen, the client is transferred to the IVS Helpdesk. This new integration has improved response time and efficiency.

Self-Help Knowledgebase – The IT Helpdesk worked with Academic Technology to pilot a self-help knowledgebase. The Exchange Migration project allowed for the pilot to be focused on one area. 188 questions with answers were created ranging from simple to complex for a variety of email clients. To date, 9,736 users have used this system to get help.

Modifications for Routing Password/PIN Resets – The IT Helpdesk identified resetting passwords/PINS as the number one call in terms of frequency. Because student employees do not have rights to reset accounts, anytime a student employee received a password/pin request, it required tying up two people – the student and a full-time/part-time staff member. In order to be more efficient at handling these calls, the phone tree was modified to allow a client to press an option for a Password/PIN reset. Once selected, the client would be directed to a full-time/part-time staff member who could reset the password more quickly. Overflow calls would still have the possibility of going to the students. Most recently, Administrative Systems and Applications provided a self-help solution for resetting accounts, therefore reducing this type of call to the Helpdesk by 58%.

File Sharing Cases – The IT Helpdesk worked with the IT Security Office and ASA to develop a better method for handling File Sharing offenders. File sharing offenders are student, faculty, or staff who have been identified by the Security Office following a report from the RIAA or MPAA that copyrighted materials have been publicly shared from the individual's computer. The IT Helpdesk became responsible for working with clients to remove the offending files once the Security Office identified that there was a problem and turned off the offender's ability to access this type of information. The IT Helpdesk then notifies the Security Office to re-enable access. In order to handle the additional work-load, ASA is funding an additional student employee in the IT Helpdesk. This has allowed us to improve customer service and satisfaction.

Client Satisfaction Surveys – In order to gather information regarding client satisfaction, the IT Helpdesk implemented a survey that is delivered to each client after their problem is closed. The survey consists of five questions with a 1 to 5 ranking scale, and one open-ended suggestion question. On a scale of 1 to 5, with 1 being totally dissatisfied, and 5 being extremely satisfied, WKU students, faculty, and staff rate their level of satisfaction with our IT Helpdesk at 4.54 out of 5.

Student Employee Training – The Consultant Accelerated Development and Education in Technology (CADET) program was further developed, and Modules I thru IV were available in entirety for the first time in 2010. This included creating new courses and revising existing ones to make sure the information accurately reflected the systems and procedures used at WKU. One significant change that has been a valuable improvement is the creation of "mock call" and "mock case" scenarios, wherein new employees role-play with other employees and practice providing support for simulated "live" events. The IT Helpdesk had the first student complete the entire CADET training program in 2010. Student feedback has been gathered about the training and will be used to modify some of the presentation styles in 2011. We also found this same training to be useful in getting new full-time staff trained and have future plans to utilize this for that purpose.

HDDatabase Program – The IT Helpdesk and ResNet Student Consultant Leaders developed an internal knowledgebase program that allows easy indexing and searching of various internal reference documents and information updates. We have been piloting and tweaking the program with various improvements in 2010 and plan to heavily populate it with additional information in 2011. This is viewed as the replacement for the information housed on the internal Blackboard Org, which is difficult to use due to the volume of information, subjective organization, and inability to search. There are several initiatives underway to populate this knowledgebase with information on both common and uncommon calls that come to the Helpdesk. The goal is a collective of knowledge so that if one consultant has encountered a specific problem before, any other consultant can easily find the solution that was utilized. This should improve customer service.

NCWeb1 Server Retirement and Case Tracking Software Upgrade – The server that housed the IT Division's case tracking software, NCWeb1, was retired and the software moved to a new virtual server. This required ASA setting up a virtual server and the IT Helpdesk testing existing ColdFusion applications on the new system. Many hours were spent redesigning significant portions of the HD3 software, streamlining the appearance, adding new features, incorporating Exchange for mail delivery, transferring from an LDAP reference system to Active Directory, and implementing more advanced error-checking. The new version was so significantly different, it was renamed Paradigm.

IT Helpdesk Staff Cross-Training – All IT Helpdesk staff were trained on the ResNet policies and procedures and were able to provide technical assistance to the ResNet operation during the Spring and Fall 2010 semesters, closing 292 ResNet cases. This helped reduce the turnaround time for student computers as well as helped keep consultant hands-on skills sharp. In many cases, this was able to be accomplished in a multi-tasking situation, where ResNet processes would be running on a machine and the consultant resolved phone calls while waiting on them to finish. Also, the IT Helpdesk staff were trained and participated in the ATP process in order to have backups for the ResNet area.

Supporting Changing Technology – In 2010, the IT Division implemented new or upgraded several systems for the WKU campus. Some of these included Exchange, Blackboard 9, WKU-Wireless and WKU-Guest, File Sharing offenders, people.wku.edu, Guest Account System, InfoView, NetID universal login, Software Center, Qualtics Survey software, and so on. For each of these, the IT Helpdesk was required to learn a new system or change its support to accommodate an upgraded system. Steps taken to address these changes included training, learning or changing policies and procedures, creating or updating case templates, creating or updating documentation, etc. This allowed our clients to have a better customer service experience when looking for help with changing technology.

ResNet – Resnet provides technology support and repair services to our students. ResNet closed 3,072 cases in 2010. This is an increase of 829 cases, or 37%, from 2009. We had anticipated an increase because the number of cases has risen each year since ResNet has existed. In order to handle the increased work load, we applied several means of being as efficient as possible. Training materials, policies, and checklists were updated and provided to all student employees. We created mock case scenarios to help train new students. Changes were made to the case tracking software to expedite the check in/out process. We setup a fully-functional Helpdesk station in the ResNet office to allow consultants the ability to work on ResNet cases when calls were slow in the Helpdesk, without completely removing them. Lastly, we continued to employ a part-time temporary employee to help handle the volume.

Academic Transition Program (ATP) – ResNet remained extremely involved in the ATP process in 2010. We attended 15 ATP events that reached many incoming freshman and transfer students. In 2010, we focused on improving our image at the Information Fair by purchasing banners, displaying material from Dell and Apple, utilizing a 30-inch LCD to display videos and presentations related to our services, and exhibiting up-to-date laptops, iPads, and mobile devices. We also updated the information we present at the Parent and Student Information sessions. We wanted to be certain we were providing our audience with the best information possible to ensure the best IT-related experience. Lastly, we cross-trained the IT Helpdesk staff on every aspect of the ATP process in order to have backups when needed.

Gatton Academy Support – ResNet has the primary responsibility for issuing new laptops to Gatton Academy students. In 2010, 70 new Dell E6410 laptops were purchased for incoming students. Images were created and pushed to each laptop and then dispersed to the students. Also, we arranged a meeting with all Gatton Academy students to discuss IT services available to them. ResNet also works with this area to recycle older laptops no longer used by their students. In 2010, 90 Dell D620 and D630 laptops were going to be recycled to other University departments. In order to prepare these for use, ResNet completed warranty work on 67 out of the 90 laptops (consisting of 127 different parts).

IT Publications Committee – This committee was created with representatives from all IT departments. James Kennedy, ResNet Coordinator, was named chair. During 2010, this committee focused on proactively marketing IT Division services. Several projects were completed. A new Student Services website was created that consolidates IT related information into one place. The student brochure was revamped and included information from all division areas. This is now distributed by several different methods, including ATPs. A new website, similar to the student site, was created for employees. And lastly, a printed brochure and quick resource bookmark were created that includes IT Division services needed by employees. These will be distributed to new employees at orientation and new faculty fairs.

2010 Faculty Pool Computer Replacement—The Faculty Pool this year went through some changes, several of which had a major impact on the project. First, Academic Affairs assumed responsibility for deciding which faculty members would be considered for a new or replacement computer. Prior to 2010, this list was pulled from Banner information, and it often times had incorrect information. That problem has been fixed. The second major change was charging departments the full difference if they chose a laptop or Apple computer over a standard Dell desktop. This does not appear to have reduced the number of laptops and Apple computers chosen by faculty members. The third significant change was placing multiple orders for a smaller number of machines, instead of one or two large orders. This limited the amount of time computers were sitting in boxes with warranties expiring. Lastly, the decision to utilize other IT Division staff members to help with installations has created a quicker and more efficient process. Overall, the project consisted of purchasing and installing 263 computers for faculty. Forty-six were provided to new faculty members, while the rest were replacement computers for existing faculty.

New Departmental Desktop Support Server – With the assistance of ASA, Desktop Support implemented a new departmental server to handle the storage needed for data backups for faculty and staff members. Approximately 2.5 TB of data and Ghost images were moved to the new server, shares were established, and boot media was made operational. The server now has 8 TB of total disk storage, and increased processing power and memory, allowing for more data backups to be stored longer.

Dell Online Self Dispatch (DOSD) – In 2010, Dell completely overhauled the way companies could order warranty parts and requested reimbursement. This created a lot of work for Desktop Support to determine what had changed and how operations would change. Also, each technician was required to become certified on the new DOSD system, as well as recertify on each of their product certifications.

Networked Multi-Function Devices – Desktop Support worked with Network Services and ASA to improve the process of vendors installing multi-function devices on WKU's network (multifunction devices combine various functionality into a single unit, such as printing, scanning, photocopying, and faxing). Internally, a process was worked out regarding expectations for delivery, security, and device performance that was the most efficient for all groups involved. This process was then delivered to the vendors and Desktop Support has continually been working with them to assist them with the changes. Work will continue in 2011 to make this process even more efficient for everyone involved.

Printer Repair Responsibilities – Desktop Support assumed responsibility for servicing and repairing printers on campus. Desktop Support quickly became familiar with outstanding issues, and implemented a plan to continue servicing the equipment. The plan included training all Desktop Support staff members on common issues, and arranging for an outside company to handle repairs outside of a Desktop Support staff member's knowledge. In order to increase the staff's skill set, each one has or will attend an in-depth printer hardware training course.

Lab Computer Replacement – Lab computers were replaced at Grise Hall, South Campus, and Glasgow Student Technology Centers. A total of 179 lab computers were replaced. The retired computers remained in service in departmental labs and classrooms.

Academic Technology Advisory Group – The new Academic Technology Advisory Group was organized and held its first meeting. ATAG is a faculty-led organization that will evaluate promising new technologies, provide advisory guidance to the IT Division, and facilitate dialogue about academic technology.

WKU Software Center – The WKU Software Center migrated to a new platform, ELMS Express, which will save the University thousands of dollars each year. The campus software procurement contract was re-bid and a new money-saving contract with PCMall was implemented. The Software Center staff also saved $14,000 annually on our renewal of the Microsoft Campus Agreement.

Extended Technology Resource Center (TRC) Hours – In order to better meet the needs of students and faculty, the Technology Resource Center added evening hours. The TRC is now open until 8:00 pm on weekdays.

Extended Classroom Support Hours – Support for classroom technology problems (including classroom computers, projectors, audio, and media players) is now available during evening hours, until 6:30 pm, Monday through Thursday.

Network Services – A variety of projects were completed by Network Services.
- Major wireless system software upgrades were performed to keep us up-to-date with the latest features and to address bugs.
- We eliminated all Power over Ethernet (PoE) injectors that were being used to provide power to wireless access points. This allowed us to remove a point of failure and increase the reliability of the wireless network.
- We designed and implemented the "Voice Control Network" to assist Telecommunications with their voice system upgrades. This created multiple redundant routes for voice traffic to travel across campus to ensure the reliability of the telephone system and help to improve our ability to monitor and maintain voice services.
- We decommissioned the Netware servers/services, which also allowed us to eliminate IPX from the network. This allowed us to reduce the number of network protocols supported, thus increasing the quality and quantity of support that we can provide to the user community.
- A significant amount of time and effort was dedicated by Network Services and other areas to support the ACE Conference. Several interesting and custom things were designed and implemented to assist them with a successful conference.
- The DNS (Domain Name Server) was successfully migrated to new hardware and the legacy hardware was decommissioned. The DNS server is the system that converts people speak to network speak, and allows users to use common naming conventions such as the wku web server at www.wku.edu or the email server at email.wku.edu.
- A wireless solution was created to provide 7-mile long point to point wireless connectivity to connect the Bell Observatory to the WKU Network, thus eliminating the need for the leased solution previously in place. This saved the University $5,275 annually.
- As the University continues to grow, so does the WKU data network. Over 400 Ethernet ports (computer jacks) were added last year. This does not include upgrades and construction projects.
- Several enhancements were made to our management systems and monitoring operations. Rather than investing in another stand-alone product for UPS management, we elected to leverage our existing Orion system. Orion itself also went through several upgrades over the course of the year to introduce new function and features. These enhancements have improved our ability to manage the network, and improved reliability. The Orion system monitors network performance, availability, and capacity, allowing technicians to proactively fix many problems before outages occur. If problems are seen, the Orion system sends text messages and emails to available technicians notifying them of the problems.
- Working with our partner vendors, we conducted beta testing of several product enhancements.
- The majority of Network Services systems were virtualized and consolidated into fewer physical systems.
- All Core data communications closets now have video surveillance.
- The Commonwealth School sponsored a project to replace their legacy system and added fourteen cameras.
- The Knicely Center sponsored a project to expand their video surveillance system into to their new expansion area. This project package contained thirteen cameras.

- Over 20 other miscellaneous cameras were installed for our clients and WKU-IT.

Telecommunications Projects – A variety of projects of telecommunication projects were completed.
- We upgraded the Axis billing system to the newest version 5.4.11, on Oracle 11G so that we can prepare to upgrade the system to version 6 in 2011. This will migrate our work order system to a web-based system, allowing users and technicians the ability to input work orders and make modifications to system activities virtually.
- Voice equipment was installed at Cravens Library to support expansion and growth of phones for the building and surrounding area.
- Our Call Management System was upgraded. This system collects all call center data and allows call center managers to print reports about traffic in the individual call centers. This allows managers of areas (such as the IT Help Desk and Financial Aid) to make decisions on how to handle incoming call volume.
- Skype was integrated into our existing telephone system. Skype is a free software program that allows someone to place a telephone or video Skype call to someone else who also has Skype software installed on their computer. In order to provide a free means of communication for our international current and potential students, as well as travelling faculty and staff, we created a way for someone to use Skype to place a call to WKU that would then enter our traditional telephone system as a regular call. As far as we know, we are the first University in the world to implement this approach.
- We eliminated paper work orders for telecommunication services by setting up an Axis Technician Portal, and then adding technician accounts to it.
- We upgraded the firmware on the campus Telecommunications system as well as campus telephones. We completed site preparation documents for the Via Group and provided them access to the AVAYA Communication Managertelephone system (the Via group provides support for telephones services to us). We worked with the Via Group to cut over to the new Communication Manager.

Digital Signage Projects – Digital signage is present throughout the University, and consists of the TV monitors that are distributed throughout campus that provide various streams of information. We completed a variety of digital signage projects.
- The digital signage system was upgraded to the latest release from Symon Communications (the company that makes the software that runs the digital signs). The upgrade included all digital signage media players and software. The upgrade was completed the week before Christmas Break.
- Digital Signage Subscription Forms were created which allow digital signage site managers to subscribe to automatic content updates. The subscription forms were updated and completed by WKU digital signage site managers. This is just another form of customer service provided by our department.
- In addition to the Digital Signage Code of Ethics, Digital Signage Guidelines/Policies were added to the draft WKU Communications and Branding Policy. This will help set standards for digital signage site managers and the campus community as they utilize this particular communication tool.
- The Academic Complex computer lab installed a 42" LED LCD screen and digital signage media player. Much like the digital signage screen in the MMTH 24/7 lab, important campus information and lab hours are displayed.
- Craig Alumni Center installed a new screen above the fireplace in the lobby of the building. This screen will access the University Digital Signage Channel 25, among other uses.
- WKU Owensboro Regional Campus added 3 digital signage screens (32"-42" LED LCDs) to the building. All three screens are controlled by a single media player.
- In addition to the growing digital signage system at PHAC, the Health and Fitness Lab installed an existing screen that accesses the in-building digital signage channel. The screen can easily be taken off the wall to be used for other purposes.
- Commonwealth School's digital signage media player, that controls the four event screens, was updated due to the Astra upgrade. The screens are used to display current events that take place in each room as scheduled.

- A member of our team attended the Blackboard Mobile SDK (Software Development Kit) Summit in December. This event allowed WKU to meet and possibly work with other universities across the country to co-develop potential mobile applications to add to their respective university. Mobile applications discussed included: parking space availability, campus safety, social media, alumni, and many more.
- Phase 1 of the Maps module within the iWKU mobile app was completed. This marked the creation of the first bird's eye view, northward facing, to-scale map of WKU. The WKU Map features campus building, parking, and bus stop locations.
- The touch screen kiosk in MMTH is a tool available to visitors, tour guides, and campus community. Each year the touch screen is updated with important content including academic calendars, information about WKU, MMTH building directory, and more. A video that highlights MMTH is in production and will be added to the kiosk.

Interactive Video Services (IVS) – A variety of IVS projects were completed.
- Garrett Conference Center, Room 109 (Institute for Citizenship and Social Responsibility) – We installed a new, fully digital media system using state-of-the-art video and audio technology.
- MMTH Board of Regents Room – We replaced the failed projector and installed a new projector lift in the Board of Regents Room.
- FAC Choral Hall – IVS personnel designed and submitted budget numbers for the upcoming FAC Choral Hall project. The original plans called for an outside designer to be used at a cost of $300,000. However, IVS designed the system for $150,000, providing a $150,000 cost-savings to WKU.
- Upgraded Touchpanel Control Systems – IVS upgraded eight existing distance learning classrooms with improved Crestron Control systems for improved functionality and ease of use for faculty.
- IVS completed 60 Departmentally-Funded Projects - Projects included flat-panel monitor installations and installation of fully integrated Smart Classrooms.
- Van Meter Hall (Capital Construction Project) – IVS personnel advised on audio visual technologies for the renovation of Van Meter Hall.
- Preston Center (Capital Construction Project) – IVS personnel managed the Preston Center Audio Visual upgrade.
- Completed IVS Help Desk Cases - IVS personnel completed 1,122 Help Desk cases in 2010, including projects, problems, and maintenance cases.

Projects Planned for 2011

Major Projects

Firewall Upgrades – The University internal and border firewall clusters are due for a hardware refresh. We are evaluating the major enterprise vendors' hardware and software solutions and will select and implement the best solution this year. Firewall technology has become one of the most mission critical functions in any IT organization's security architecture as Internet dangers continue to proliferate.

Redundant Internet Services – Given our size and the now critical nature of Internet access, WKU should have redundant and diverse Internet provisioning.

NAC upgrades – We will be upgrading both software and hardware used in our Cisco NAC implementation.

Construction Projects – The following construction projects are scheduled for Network Services involvement in 2011.
- o Block12
  - Parking Structure
  - Police Department
  - Alumni Center
  - Book Store
  - Housing / Student Life Foundation
- o Music Recital Hall
- o Agriculture Flower Lab
- o Sigma Nu

TopperMail Live@EDU – We started this project to move all student and alumni email to the "cloud" in Fall 2010. Phase I involved migrating over 42,000 accounts to Microsoft's Live@EDU on January 1, 2011. Phase II and III will be completed in 2011 and will involve decommissioning our old email server, disabling old email accounts, and reprogramming all back-end student email processing on the cloud platform.

OmniUpdate Enterprise CMS Implementation – In 2010, we evaluated and selected OmniUpdate as our Enterprise Content Management System (ECMS). An ECMS enables an organization to standardize website layout, navigation, and branding, and to more efficiently keep content updated and current. In 2011, in partnership with the Office of Public Affairs, we will migrate all WKU University, College, Division, and Departmental websites to the OmniUpdate ECMS. This is a large, mission critical implementation that will require training and support.

Core Services VM Cluster – We will develop and deploy a highly redundant, highly available systems cluster to house our most mission critical core services. "Core Services" are underlying systems services on which all other systems depend. Examples are Active Directory, DNS, and web services. This will ensure, to the extent possible, that our core services remain available and are resistant to hardware or software failures.

IT Website Redesign in ECMS – The IT Division has appointed a committee to study the best practices in the IT industry regarding website organization and content for IT organizations. This committee will recommend a content design for the IT Division's website, and we will implement that content design within the new ECMS. As IT is a service organization, how we organize our content and services is crucial to our user base.

Blackboard Hardware – We are going to perform a major hardware upgrade to our Blackboard Course Management system this year. Blackboard is currently housed on several physical servers. Hardware

virtualization is the direction we are heading with all systems, as it is more flexible and dynamically scalable. "Virtualizing" the Blackboard servers will improve flexibility, processing power, and redundancy.

Registration Wait List Implementation – "Waitlisting" enables students to provisionally register for courses that are full and be put on a "waitlist". They are notified automatically via email if a seat opens up in the course and are given 24 hours to complete the registration and secure the seat. Students have requested this service as it will be more efficient and fair, since waitlisted students are processed in time/date order and they do not have to continually remember to check full courses for openings.

Customer Relationship Management Evaluation (CRM) – CRM systems enable efficient communications with and monitoring and tracking of various "customer" constituencies. In a university setting, these customers can be students, alumni, or prospects. Currently, there are a number of uncoordinated methods being used to manage these customer relationships on campus. We will initiate a process to evaluate whether or not an "enterprise" CRM makes sense.

Security Assessment – Many universities and colleges conduct regular security audits of their network systems. Typically, a company that conducts such an audit asks a university to do some form of a self-assessment, and the company also usually attempts to break into the network using a variety of tools and techniques. The results of the self-assessment and the attempted network intrusions are summarized in relationship to existing accepted standards (typically ISO standards) to note areas of particular strength and areas of weakness.

There are a variety of companies that perform this type of service. Philosophically, wherever possible, the IT Division should adhere to accepted networking standards and networking best practices. This is not to say that IT has not done a good job with our network security. It is to say that we can do better. Consequently, we will work with consultants to assess the security posture of our network and systems.

Virtual Labs – Continue evaluation, research, and pilot testing of virtual lab services.

Windows 7 – Convert open labs to Windows 7; develop new lab login system to support Windows 7; design and implement Windows 7 live training program and video tutorials for the campus.

WKU will be moving to the newest Microsoft operating system, Windows 7, in 2011. Desktop Support will have a critical role in its implementation. We have hired three temporary employees to assist with migrating clients to Windows 7. This group will work with Desktop Support and Academic Technology to test and research compatibility with University systems and software. They will also help create and deploy images for faculty, staff, and lab computers. Lastly, this group will be responsible for physically migrating computers to the new operating system.

Altiris – Improve software deployment in Student Technology Centers and departmental labs using Altiris client management system.

Implementing Altiris 7.1 is one of the highest priority projects for Technical Support Services. We will continue testing and researching how Altiris will be used in the WKU environment. We will also be working with a third party company to help implement this product at WKU. Once the software is installed on all the computers, our goal is to begin using the imaging, deployment, and inventory functions as quickly as possible. We will also use other functions of Altiris, such as Software Delivery and Patch Management.

WKYU-PBS HD Program Signal – Implementation of full-time HD program signal on WKYU-PBS primary channel.

WKYU-PBS Video Remote Production Truck – Complete the design and construction of this truck.

Enterprise Anti-Spyware Software – For years, Desktop Support and ResNet have used several utilities and programs to combat spyware and malware on faculty, staff, and student computers. While these methods have been effective, these programs continually must be uninstalled from the client's computers because of licensing issues. We are going to research, and potentially implement, enterprise-level solutions with the intention of utilizing this for faculty, staff, and students if possible.

Case Tracking Software Replacement – The current in-house call tracking software has grown beyond its ability to run consistently. It was originally designed in a time where annual call volume was measured in thousands, not tens of thousands, and was used by a single department. We now have a need for a more robust call tracking database program that can meet the diverse needs of an entire division. This will require a selection committee that evaluates multiple packages and gathers the needs of all of the IT Division.

Blackboard Software Upgrade – We will upgrade to Blackboard 9.1. As in the previous year, the Helpdesk staff feedback is requested and will require time and effort in testing features and documenting the findings. The 2010 procedure included dividing sections (or functions) of Blackboard among the IT Helpdesk staff and having each test on various platforms and browsers and report the results back to a project coordinator. Then, the coordinator re-divided the sections and had everyone test something different that another had already tested. This allowed us to get two perspectives for every tested section. A similar process is in the works for the 2011 upgrade.

10 Year Capital Budget Plan – We will establish a 10 year IT capital budget projection. This is a needed financial planning document that will help us make informed and appropriate decisions in the future.

Other Projects

Data Center Storage Assessment – A large percentage of our Data Center storage (disk space and tape space) is over five years old. Technology in this area is moving quickly and constantly changing. We will evaluate a number of storage technologies and solutions and develop a "roadmap" to replace and upgrade our Data Center storage over the next five years.

HR People Admin System Implementation – We will continue to provide technical project management and programming support to the Human Resources initiative to implement the People Admin 3rd party applicant tracking and position management system. The current applicant tracking system was developed in-house and while it has served us well, our HR area has outgrown its features.

Oracle 11g Upgrade – Oracle is the underlying database technology for all of our mission critical systems. We are currently on Oracle version 10g and must upgrade to 11g on all of our systems. This is a major and necessary project, and an example of the kind of project from which most end users do not feel any direct benefit, but which must be undertaken and completed by IT staff keep our mission critical systems functioning.

DARS Web Version Upgrade – DARS is our enterprise degree audit system that is integrated with our Banner ERP. Students can plot their course work and degree requirements with this system. We must complete a major version upgrade to this system in 2011 in order to maintain vendor support.

Exchange 2010 Upgrade – Microsoft Exchange is the email and calendar system used by faculty and staff. We migrated faculty and staff email to Microsoft Exchange (version 2007) in late 2009 and 2010. In 2011, we must upgrade all users to Exchange version 2010. This will be a major effort and will affect approximately 4,000 users.

Banner Hardware Platform Migration – We want to move our Banner ERP to a different hardware platform this year. The current SUN/Oracle hardware platform is no longer optimal or desired. Oracle purchased SUN Microsystems in 2010, and we are troubled with the direction that they are taking the SUN hardware platform, as well as their plans to increase the cost for us to maintain it. We will evaluate

both the IBM AIX/Power 7 solution and the DELL Intel/Linux platform, and select the one that provides the best performance for the money and optimizes our current Oracle Database licensing.

OCS/Lync Upgrade – Provide systems administration support for major upgrade to OCS.

SunGard Banner and Related Upgrades – We will be performing our annual upgrade to our Banner ERP software this year as we update form version 8.5 to 8.x. There will also be a major change to the Banner web server platform. As mentioned earlier, Banner is a mission-critical Enterprise Resource Planning (ERP) system used by every office at WKU. It provides modules for all our major administrative functions including Student Records, Human Resource, Finance, and Budgeting.

Banner Document Imaging – We will be implementing Banner Document Imaging (BDMS) in undergraduate Admissions, Registrar, and Human Resources offices this year. This will be a major undertaking that will involve business process analysis, workflow, and custom setup and configuration of BDMS for each office. As a result, all these offices will greatly reduce their physical paper workflow and storage.

AdvisorTrac Replacement – Advisor Trac is a 3rd party system IT maintains for the Advising Office. It is used by students and advisors to schedule and document student advising. This system lacks needed functionality and is not enterprise level software. We will replace it with either a better 3rd party system or we will develop a system internally.

Automation of Pre-registration Processing – Pre-registering ATP students is a large time consuming task for the Advising office. We will develop and program enhancements to TopNet which will greatly automate this process and reduce Advising staff time by up to 75%.

IT Policy Review and Revision – All IT external and published policies are in need of review and revision. We will undertake this task this year and get all policies updated and current. We are also providing technical support for a newly implemented University Policy Site and will coordinate our policy reviews and structure with this site.

iWKU – Release upgrades to iWKU mobile application, including Tours, Transit, and Android release.

NBC Learn – Implement the NBC Learn multimedia add-in to Blackboard.

2011 Lab Computer Replacements – These are scheduled for the Helm lab, the Gatton Academy, and MMTH training facilities.

WKYU-FM and WKYU-PBS Student Membership Program – Implementation of a student membership initiative for WKU students to become involved with radio and TV.

WKYU-FM and WKYU-PBS Online Presence – Implementation of a greatly enhanced presence in online services such as video streaming, video archiving, social media promotions, etc.

Campus CATV System Upgrades – Continued expansion and modernization of the Campus CATV system through the replacement of existing copper lines with fiber optic distribution wherever feasible.

Data Recovery Tools – Desktop Support and ResNet are not equipped with the tools necessary to recover data in the event faculty, staff, or students lose data, for whatever reason. We are going to research, and potentially implement, a data recovery solution in order to provide better service to the client, as well as, save the University money, due to drives not having to be sent to other companies for this service.

ResNet Knowledgebase – ResNet currently uses the Departmental Blackboard Org to store documentation for its operation. In order to make the information easier to find, ResNet is going to pursue putting this into a knowledgebase. Research will be done to determine the best solution, which could easily be something already in use by TSS. Then, the majority of the time will be populating it with data. Once setup for internal use, a long term goal is to provide the information to our clients for self-help solutions.

Software Installations for Students – Feedback from our student clients indicate they would like for the ResNet office to reinstall their software when their computer must be rebuilt. The ResNet office plans to research the feasibility of installing software packages, such as Microsoft Office, for students with appropriate media. Also, installing free software and plugins, such as Firefox, Flash, Java, and so on, will be explored. This will potentially provide the student with a better ResNet experience, as well as lower the number of post-rebuild calls to the IT Helpdesk.

Increase ResNet Hours – We have discovered the hours the ResNet office is open are not conducive to handling students' needs. As a pilot, the ResNet office intends to change the ResNet hours during the first three weeks of the Fall 2011 semester. Currently, ResNet is only open Monday – Friday, 8:00 a.m. – 5:00 p.m. We intend to remain open until at least 6:00 p.m. Monday – Thursday, 5:00 p.m. on Friday, and add a 4-hour window on Saturday. The pilot is intended to gauge whether students would take advantage of the additional service time.

Redesign of Help Desk Front Counter Area – Several support options for our clients are pending due to the need to redesign the front counter area on the third floor of MMTH. We intend to get a design created and quoted in order to see if it is feasible to implement.

Proactive ResNet Services – Student computers are required to pass certain security measures prior to being granted access to the University network. Inevitably, there are numerous students who have difficulties completing the checks or upgrades required. This causes numerous Helpdesk calls and many ResNet drop-offs in order to resolve such issues. We would like to provide students with the tools necessary to update their computers before they ever come on campus. This way, many students will already have their computers in an acceptable condition, and it will decrease the number of problems at the start of a semester. In 2011, we intend to create a webpage that includes the criteria needed to pass Cisco NAC. We will offer links to Windows service packs, University-provided anti-virus software, anti-spyware programs, and so on to help the students meet the criteria before coming to campus. We also plan to work with SGA to see what ideas they have about meeting the students' needs.

IT Helpdesk Call Abandoned Calls – In 2010, 17% of the calls placed to the Help Desk were abandoned. Frequently, this is due to the length of time that the customer is on hold. For this next year, we will try to reduce the number of abandoned calls by utilizing a variety of approaches, including introducing new avenues of support, increasing self-help, improving training, implementing better reference methods, and becoming more efficient in resolving calls.

Live Chat Support – As a supplement to existing online form and phone methods of contact, online live chat would allow for our Help Desk consultants and clients to communicate directly via typing. With funding from the Vice President, the IT Helpdesk will hire a temporary full-time Helpdesk Consultant to add the manpower needed to take on this new responsibility in a pilot program. This will include evaluating our chat system options, developing best practices, advertising to clients, and measuring the utilization. It will also be interesting to see if any noticeable impact is seen on call volume. Adding this service may appeal to users who may not wish to speak on the phone or have impaired ability to do so without assistance.

Self-Help Knowledgebase – In 2010, the IT Helpdesk worked very closely with Academic Technology to develop a pilot knowledgebase providing Exchange information to our clients. With close to 10,000 article views, it has been deemed a success. We want to start expanding the information available in the knowledgebase to a system providing detailed IT answers to various questions from the end users. The challenge is in laying the foundations for even further expansion in such a manner that not only does good information get added, but it gets reviewed and kept current.

System Status – The campus community needs more timely and accurate information provided about system downtimes and disruptions. We plan to quickly move forward with the Helpdesk staff having primary responsibility for System Status, allowing for immediate communication with the user community. The initial stage will encompass utilizing the new SysStatus website already created by ASA. Research will be conducted on future improvements including RSS subscription, Twitter updates, or other methods for clients to have information sent or pushed rather than sitting on a website.

Jabber Server Replacement – Internally, the IT Helpdesk heavily relies on the WKU Chat server for quiet and quick communication between students and staff in the Helpdesk room, communication with staff at the front desk, communication with supervisors and staff, and communication between ResNet and Helpdesk. The WKU Chat server is being retired, and we have plans to test the new group chat options in OCS once installed by ASA. If OCS is unable to fill the department's needs, other systems will be evaluated.

Internships – The IT Helpdesk previously worked with the Computer Information Systems department to employ student workers, as interns acquire 3 hours of college credit by working 150 hours in a semester within the department. Now that CIT is almost entirely online, few students are actually on campus and taking advantage of the CIS 369 course. Identifying and implementing a new source of interns would allow the IT Helpdesk to gain more labor resources while providing hands-on practical IT experience to college students.

Microsoft Office – Microsoft has released two new Office products, Office 2010 for PC's and Office 2011 for Macs. Desktop Support will help test and research the new features of both products, and assist Academic Technology with creating installation packages for deployment. Lastly, we need to determine the best approach to handling the support of the new products needed to make the transition as smooth as possible for our clients.

2011 Faculty Pool – Desktop Support will work with individual colleges to help assess their needs for new faculty hired in the fall, as well as replacement computers for existing faculty members. As this is one of the largest recurring IT projects, spending approximately $300K every year, a lot of time and effort is put into ensuring that individual's needs are met, while maintaining what is best for the whole. We will work with Dell and Apple to secure reasonable prices for the purchases. We will also strive to improve communications with colleges and faculty members to make sure they get the appropriate information. In addition, we will continue to research different ways to be as efficient as possible with installing the approximately 200 computers.

Data Backup Solutions – Employees at WKU should have the ability to backup data on a regular basis. It should not be IT's responsibility for a person's data; however, it should be IT's responsibility to provide a means for doing a backup. In 2011, Desktop Support plans to research and evaluate different backup solutions that meet the needs of the campus as a whole. The physical process of data backups, as well as communications to employees on data backup best practices, will be assessed to deploy a solution that is the most cost effective, secure, and easy to use.

Managed Printing Services – A Managed Print Services System is designed to reduce the cost related to printing and imaging in an enterprise environment, as well as reduce resource consumption, and improve an organization's sustainability program. On the surface, it appears WKU is in need of this type of system; however, we have not conducted research to see there would be benefits in adopting such a system. Desktop Support intends to research the pros and cons of such system and compare it with how printing is being done now. If findings are in favor of managed printing, it will be critical to involve other campus departments, such as Purchasing and Sustainability, as we deploy this solution.

University Technology Advisory Group – While it is helpful to have the insight the Academic Technology Advisory Group, it would also be helpful to have the feedback and input of a broader-based group representing additional constituencies. Such a group would most likely be comprised of the following members: a representative from each of the University's divisions (Athletics, Institutional Advancement, Facilities and Campus Services, General Counsel, Public Affairs, Student Affairs, and Finance and Administration); a

representative from each of the University's colleges; a representative from the extended campuses; a representative from DELO; a representative from the Faculty Senate; a representative from the Staff Council; and a student representative. The VPIT would serve as chairperson, and the group would probably meet twice a year.

Network Services (NS)
- Wireless Services – NS will be working to implement an automated white-listing system to better handle the needs of mobile and similar devices.
- We have been deploying 802.11N technologies in new implementations for the last 3 years; however, we still have a large 802.11a/b/g implementation. It is anticipated that we will begin replacing legacy access points in 2011.
- Edge/Access Network Equipment Upgrades – There are several locations that contain legacy gear that is approaching twelve years of service. It is our goal to replace this equipment as soon as resources permit.
- Communication Technologies Technical Resources Reorganization - A large and important goal that has been established for 2011 is the reorganization of the CT technical resources to make the best use of what we have available.
- Completion of Documentation
  - o Existing fiber plant mapping and documentation.
  - o Duct Bank.
- Video Surveillance Services
  - o A $60K project will be completed in the first half of 2011 for the Owensboro campus.
  - o A $110K upgrade and expansion project for the WKU PD will be completed in 2011.
  - o All related documents and policies related to WKU video surveillance services will be completed in 2011.
- By the end of the year, we will complete a network master plan for the next generation WKU network.
- We will further implement centralized logging and include some automated log analysis capabilities.
- It is anticipated that we will begin our IPv6 implementation in 2011.

Telecommunications Projects
- Upgrade the Axis billing system to version 6.4 on Oracle. Version 6.4 is a web-based software and will require a rebuild of the system. Upgrading will consist of training office staff, with minimal training to end users. Project will take 4 to 6 months to complete before going live.
- Create a marketing campaign for student cellular resale program for both Sprint and AT&T. Look at new ways to target student population along with current ATPs, M.A.S.T.E.R. Plan, and Focus on Western.
- Increase our local monthly service charge to include long distance and digital equipment. This will allow departments to move to digital/IP phones with extra features (as compared to analog phones), and provide free domestic long distance calling.
- Release an RFP for long distance services for the main campus and some remote campuses/offices. Our existing contract will expire this summer and we anticipate receiving lower rates in responses from vendors.
- Upgrade from Microsoft OCS deployment to Microsoft Lync.
- Migrate the telephone system so all legacy telephone network devices are moved from telephone network to the data network and remove the telephone network.
- Install new telephone equipment for the Block 12 project.
- Replace lightening protection at Gilbert Hall and re-terminate all station cables to krone blocks.
- Develop plans for a copper and fiber infrastructure that will abandon all unprotected direct buried copper.
- Install VOIP monitoring software to monitor PBX and VoIP phones.

Digital Signage
- Symon Care 2011 maintenance renewal: Yearly maintenance renewal for SDA and Symon Design Studio software licenses. We currently have 20 licenses and 18 site managers (which have and use a license) that have to be maintained.

- Career Services: Total of 8 digital signage screens in the DUC Main and DUC Annex areas. Two SDAs have been added to control content for each side of DUC.
- Gary Ransdell Hall (GRH): Move existing digital signage system from TPH to GRH.
- Alumni (Block 12): Possibly install SMA 3000 for conference room screens, two separate digital signage systems, plus software.
- Digital Signage Semi-monthly Trainings: Trainings are offered to all site managers and areas with digital signage twice a month to update their content, create content, brainstorm, and basic software training if needed.
- Review other digital signage provider's equipment and software to determine if there is other technology to better fit our needs.
- Add the WKU Digital Signage Policy to the upcoming WKU Communications and Branding Manual.
- Crisis Management for WKU: The University may begin to utilize the cable TV emergency system through a digital signage media player that broadcast a radar image, scroll, and includes the emergency audio. Emergency messages would broadcast to all TV screens on campus that have access to campus cable.
- iWKU Mobile Application: A phase 2 update to the main campus map and south campus map is underway. Phase 2 will also provide users with the Transit add-in which provides bus schedules and routes. The Tours add-in will provide users with a self-guided tour of the campus, including images and optional audio description of the site.
- Redesign and update of the IT website to provide more hands on information and tutorials. This should provide easier navigation, making it more user friendly.
- Online work request forms for Telecommunication's needs have been created. Due to the WKU website redesign the forms have not been implemented.

Interactive Video Services
- Installation of New Video Conferencing Bridge – RSS 2000, Polycom
- Installation of Upgraded Digital Video Recording System – RSS 4000, Polycom
- Classroom upgrades will include audio enhancements in five regional and two Bowling Green classrooms.
- Relocation of Tate Page 339 – Due to the re-allocation of space in Tate Page Hall, it has been determined that TPH 339 is no longer required in that building. Due to course demands, there is a need for an additional IVS classroom in the Cherry Hall area of campus. Plans are currently underway to determine an optimal space for this new IVS classroom.
- MMTH 250 and MMTH 249 will receive an in-house facelift from the IVS technical staff to incorporate newer technology capabilities in these two existing classrooms. This will include a re-programming of the Crestron Control system and improvement to the overall room functionality.
- There are an estimated 25 projects to be scheduled for 2011, including Instructional Equipment funded projects. The projects range from small projector or sound upgrades to full AV systems needed for classrooms and meeting spaces, as well as one new IVS classroom.
- Departmentally-funded projects are currently being scheduled for 2011, with additional projects anticipated to be added as the year progresses.
- Tate Page Hall will have several projects scheduled once the College of Education has completed their move to the new building. As new offices and departments are relocated into Tate Page Hall, there will be some work needed to accommodate their audio/video requirements. The full scope of work on this project is not yet known.

Supported Systems and Services

Mission-critical systems are those systems that, if they were to fail, would immediately and substantially degrade the University's ability to conduct business.

Mission-Critical Systems Supported

Blackboard Online Learning Management System – Our supported campus-wide course management system is Blackboard (ecourses.wku.edu). All WKU students, faculty, and staff have Blackboard accounts. Blackboard is heavily used for online courses and face-to-face classes as well. WKU had 2,144 course sites on Blackboard in Spring 2010 and 2,372 sites in Fall 2010. The number of course sites increased by about 8% from calendar year 2009. In Fall 2009, 59% of all WKU instructors and 61% of all WKU course sections used Blackboard course sites. Our Blackboard Academic Suite supports campus organizations as well as courses. We currently have 438 organizations utilizing sites on Blackboard. Building Blocks running within WKU's Blackboard service include Tegrity, an add-on for creating and sharing multimedia files; Blackboard Mobile Learn, which provides access to mobile devices; Adobe Connect, which is used for live synchronous class meetings; and Learning Objects, which enables instructors to put blogs and wikis into courses. Our home-grown online help system is called the Blackboard Knowledge Base and it was used 6,297 times in 2010. WKU has been running Blackboard since 1998.

Blackboard is considered to be a WKU mission-critical system. Following our upgrade on June 6-7, we are running the Blackboard Academic Suite, version 9.0.539. It runs on IBM blade server hardware administered by ASA in the Data Center. Four blades are utilized, running the Blackboard application, the Blackboard database, the test server application, and the test server database. The production database server has two dual-core 3.0 gHZ Xeon processors and 16 GB memory. The production application server has two dual-core 3.8 gHZ Xeon processors and 8 GB memory. We expect to replace the production application server with redundant, load-balanced virtual machines in 2011. Storage for Blackboard uses our IBM Storage Area Network (SAN), as well as 73 GB of internal disk space on each of the blade servers. As of January 2011, the Blackboard hardware also incorporates a dedicated collaboration server, running on a virtual machine allocated 2 GB of RAM and 25 GB of disk space.

Banner ERP – Banner is our mission-critical Enterprise Resource Planning (ERP) system used by every office at WKU. The Banner Student module houses academic and administrative records for all students, including student applications, courses, degree programs, grades, transcripts, financial aid, billing accounts, and over 20 years of academic history. The Banner Human Resources module houses key employee demographic data, position inventory and history, professional credentials, and benefits information. The Banner Finance Module includes general ledger, purchasing, grants accounting, asset inventory, accounts payable, and budgeting. Related modules include integrated document imaging, degree audit, and the enterprise portal. The current Banner system runs on a combination of physical and virtual servers running on SUN, IBM Blade, SAN, and 4-way server hardware.

Main Web Servers – The University's primary public facing web servers (www.wku.edu and people.wku.edu) are housed in our "core services" cluster, which is a highly redundant, highly available hardware cluster designed for maximum uptime. We also have a backup www.wku.edu server at an offsite location in the event of a major disaster locally. These servers are the public face for the University, and are the central entry point for various constituencies who need information about or interaction with the campuses.

Exchange Email and Calendar – Microsoft Exchange is the email and calendaring system used by all faculty and staff at the University. Our Exchange installation is completely redundant and duplicated between our two data centers. It is run on IBM hardware and is highly available. It houses approximately 5,000 faculty, staff, retiree, and affiliate accounts.

Live@EDU TopperMail – All student and alumni email is hosted in the cloud on Microsoft's Live@EDU platform. Live@EDU is a free hosting service to Universities and offers much greater functionality and capacity than we could offer economically on premise. We have approximately 45,000 accounts on Live@EDU. Alumni may keep their email account for life.

TopNet – This is the main secure, web interface to the Banner ERP system. TopNet is accessible anytime, anywhere and provides student, faculty, staff, retirees, alumni, and affiliates with access to all academic and administrative records. Faculty can manage and grade their classes via this interface. Students can register, and check grades, financial aid, billing accounts, transcripts, and much more. This system is accessed over 4 million times per year.

WKU Portal – This is a central, authenticated website that provides one stop access to most major WKU systems and services, and enables users to login once and then gain single click access to these services without logging in again. Examples of accessible systems are TopNet, Blackboard, Banner Forms, Exchange Email, TopperMail, WKU InfoView, and Request Tracking. Users can customize content and pick and choose information channels.

Advance Development System – This system is used by the University's Development organizations, and provides accounting and record keeping for fundraising activities. It provides prospect tracking, gift and pledge processing, membership tracking, and fundraising functions. We run this system in a virtual server environment using IBM hardware.

VMware Environment – This environment underpins our virtual hosting architecture. We have over 100 virtual servers running on four physical IBM 4-way servers. We are virtualizing as many of our physical servers as possible. Virtualization enables us to run many servers with a much smaller physical data center footprint, thereby reducing floor space and our carbon footprint..

Data Centers – We operate two data centers: a primary and a secondary (backup). Our primary data center houses over 200 virtual and physical servers and over 300 terabytes of raw storage. The primary data center has a backup generator and 130KVA of UPS capacity. We run two operations shifts and process 1,000 batch jobs per week. Our secondary data center has redundant hardware and software for most of our mission critical systems.

Banner Document Management Systems (BDMS) – BDMS is an add-on system to the Banner ERP system and provides integrated document imaging and some workflow. It enables offices to digitize their paper workflows and filing. The Graduate Studies Office at WKU has virtually eliminated paper using this system. A number of other offices are in the process of "going paperless" using BDMS.

Active Directory (AD) – AD is a Microsoft product that provides directory, file, print, and identity management services. These type of services are "core systems" services on which many other systems depend. As an example, the University's main user ID and login credential is called the NetID, and it is managed and issued via Active Directory.

Server Hosting Service – This is a service provided by central IT to University departments who need a managed server, but don't have the resources or expertise to operate one. Departments that want to run specialized software that addresses a specific need can take advantage of this service and not have to worry about managing server hardware and software. We offer this service using our VMware environment (described above). We charge a yearly management fee for this service.

WKU Public Radio – We operate a 24 hour public radio service to 1.2 million citizens of Kentucky, Southern Indiana and Northern Tennessee. Programming includes news, information, classical music, arts, culture, and entertainment programming.

WKYU-PBS – We operate a differentiated public television program schedule to over 250,000 citizens of South Central Kentucky and Northern Tennessee. Programming includes iconic PBS series, "how to"

programs, WKU sports, locally produced programs and documentaries such as *MainStreet*, *Outlook*, and the Emmy award winning *Mammoth Cave* documentary.

Telephony Services – Our current telecommunications system is the AVAYA Communications Manager 5.2. This system supports all voice services for the main campus as well as all remote campus locations. This system is capable of providing voice services for analog, digital, and VoIP devices. We currently have approximately 7,500 phones in use.

BDMS (Banner Document Management Systems) – Banner integrated document management.

Active Directory – Directory, file, print, and identity management services.

Server Hosting Service – Virtual server hosting service for departmental systems and applications. We currently have approximately 20 hosted systems under contract.

Other Systems Supported

Axis/Pinnacle – This system is a telecomm management system used to track call activity on the University's phone system.

E-signature Workflow – This system enable users to automate and digitize paper forms workflows, and route paperwork with electronic signatures. There is wide application of this system at WKU, and it used for everything from HR and Payroll forms to performance appraisals.

Job Scheduling – This system is used to schedule and track all the jobs in the nightly batch cycles run by Data Center operations staff. This system manages approximately 1,000 jobs per week.

Infinitime Time Clock – This system is used to track student worker work schedules. It basically provides an electronic punch clock function.

AdvisorTrac – Advisor Trac is a 3rd party system IT maintains for the Advising Office. It is used by students and advisors to schedule and document student advising.

AceWare – Aceware is a 3rd party system IT maintains for Correspondence Studies; it is used to track registrations and payment for non-credit classes.

Tegrity – Tegrity is a 3rd party system used primarily by DELO faculty to deliver video lectures and tutorials. It is highly utilized and enables distance learning students to get quality instruction delivered remotely.

Microsoft Lync (formerly OCS) – Microsoft Lync brings the promise of true Unified Communication to reality, transforming every communication into an interaction that is more collaborative, engaging, and accessible no matter where the individual using the service is located. It combines traditional voice with instant messaging, email, voicemail, video, and collaborative desktop sharing to provide a new and engaging user experience for our students, faculty, and staff.

Adobe Connect – Adobe Connect is a pilot project allowing faculty to teach synchronously from any location to students who may be hundreds or thousands of miles away. Students can enjoy a collaborative learning environment embedded inside of the existing Blackboard course management system.

International Office System – iStart by Sunapsis is a 3rd party system we operate for the International Office. This system tracks and federally reports on all foreign students attending or associated with WKU at any given time.

Digital Measures – Digital Measures is a 3rd party, remotely hosted system that tracks student academic and engagement activities, as well as faculty professional, research and engagement activities.

Windstar Tax System – Windstar is a 3rd party, Banner partner system used by the Payroll area to calculate and track tax on foreign employees. Visiting scholars and employees working under visas must have different payroll tax calculations depending on their home country.

Tivoli Backup – This is the IT central backup system used in the Data Centers to backup and archive all mission critical system and user data. This system has a massive amount of disk and LTO tape space.

OmniUpdate – OmniUpdate is our Enterprise Content Management System (ECMS). An ECMS enables an organization to standardize website layout, navigation, and branding and to more efficiently keep content updated and current. We are migrating all existing WKU websites to this ECMS in 2011.

Degree Audit System – Originally called DARS, now called ICAP, this system is a Banner partner system that is highly integrated with Banner. It enables students to track degree progress, check course articulations, and to run "what-if" scenarios against potential change-of-major situations. This system has had almost a half million degree audit scenarios run since it was implemented in 2006.

Astra Scheduling System – Astra is an enterprise level space utilization and event tracking system used to schedule all academic courses across the campus classroom facilities. It is also used to schedule events in non-classroom spaces.

Data Warehouse – The WKU Data Warehouse is a reporting database which is built and refreshed each night from the Banner Production system. The Data Warehouse is a multi-terabyte, highly denormalized datamart that houses both current and longitudinal data. It is used heavily by central IT and Institutional Research to satisfy information requests.

SAP InfoView / Crystal Reports – SAP InfoView (aka Crystal Reports) is the online reporting system that enables end user offices to run reports, data extracts, and update processes on a schedule or on demand. We have over 10,000 reports and processes in this system that user offices utilize for back office reporting and auditing.

OMR (Bubble Sheet) Scanning Service – Currently a larger number of offices still utilize OMR (Optical Mark Reader) bubble sheets to administer tests, evaluations, and surveys. We print and scan the bubble sheets for user offices. We maintain two high volume scanners and a highly accurate Xerox industrial printer to scan and print the OMR sheets. As tests, evaluations and surveys move online, we will hopefully see a reduction in the need for this service.

IT Helpdesk – The IT Helpdesk, located on the third floor of Mass Media and Technology Hall, is a customer-driven service available to all faculty, staff, students, alumni, and affiliates, which comprises a user-base of approximately 40,000 clients. The IT Helpdesk serves as the initial point of contact for all technology-based issues and requests. The IT Helpdesk provides initial support for most platforms and applications under the IT Division umbrella. This includes Macintosh and Windows-based systems, email, Blackboard, Topnet, Active Directory, Banner, and various other applications. For WKU-owned workstations and students' personal computers, the IT Helpdesk troubleshoots and resolves software and hardware issues.

Helpdesk services are available at (270) 745-7000 for 90 hours a week: 8:00 a.m. to 10:00 p.m. Monday thru Friday, 8:00 a.m. to 8:00 p.m. Saturday, and noon to 8:00 p.m. Sunday.

ResNet – The ResNet Office, located on the third floor of Mass Media and Technology Hall, is a full computer service center providing hardware support and software troubleshooting for all WKU students both on and off-campus, reaching a user-base of approximately 20,000 students. Virus and spyware removal, hardware diagnostic testing, data backup, operating system re-installations, and game console registrations are just a few of the services provided.

ResNet services are available Monday thru Friday, 8:00 a.m. to 5:00 p.m.

Desktop Support – Desktop Support, located on the third floor of Mass Media and Technology Hall, provides technical assistance for all faculty and staff, creating a user-base of approximately 3,500 clients. Services include hardware and software maintenance for University-owned Windows-based and Macintosh systems, hardware replacement and upgrades for University-owned faculty and staff computers, printer and projector repairs, and the installation and configuration of University-supported software. Desktop Support works with primary vendors to set up and maintain purchasing information for supported University computer systems, as well as for the personal purchase program which provides discounts for computers bought by faculty, staff, and students for personal use.

Desktop Support services are available Monday thru Friday, 8:00 a.m. to 4:30 p.m.

WKU Campus CATV System – We provide cable television distribution to University classrooms and offices, as well as service to all rooms in residence halls on campus.

Television production services – These services are provided to University departments as well as outside clients on a contract basis.

Hilltopper Sports Satellite Network – We provide programming and services for the University Athletics Department. In addition to producing men's and women's basketball telecasts for WKYU-PBS and Fox College Sports, the unit also provides operational support for Videoboards in Diddle Arena and Houchens Stadium, as well as streaming production for minor sports.

Telephone Billing System – Our current billing system for all voice and cabling services is Paetec AXIS version 5.4.3. This system operates on an Oracle database that is supported by Administrative Systems and Applications. AXIS provides departmental billing and other billing for long distance, voice and cellular service, as well as equipment and materials charges for any maintenance service that we provide.

Symon Enterprise Server (SES) – This system directs WKU's digital signage throughout the campus and extended campuses. SES manages and distributes content to each Symon Digital Appliance (SDA) media player through the Symon Design Studio software. Currently there are 36 media players distributing content to displays in 17 different buildings across the main campus, including the Commonwealth School. WKU has implemented a University digital signage channel and multiple in-building channels for the following buildings: Housing and Residence Life (for all residence halls), Gatton Academy, Smith Stadium, and Preston Center. The in-building channels are driven by Western cable (student areas) and Academic cable (learning areas) systems. Commonwealth School has installed Symon's SMA-3000 media player that will work with our event management system, Astra, to provide content to four conference room door screens. All SDAs, SMA and Design Studio clients are running the latest version 11. The Digital Signage Administrator is responsible for planning, installation, training, content creation and management, interactive programming, and required upgrades.

Cellular Resale Service – Student Telephone Services currently supports the student cellular resale service, which has grown to more than 3,565 registered devices, and created $7,000 in new revenue quarterly.

Campus Wireless Network – The campus wireless network provides full wireless network coverage of all WKU academic, administrative, and residential buildings, as well as outdoor coverage in multiple high traffic locations across campus. To provide this service, we support over 1,300 wireless access points. These access points are controlled by twelve wireless controllers installed in each core router.

University Video Surveillance – University video surveillance services include security design, system implementation, and training for video cameras across campus. The video surveillance system currently consists of over 215 cameras. The backend hardware is comprised of seven servers, six with external drive arrays offering a total of 90 terabytes of storage.

Interactive Video Services (IVS) – IVS provides increased educational opportunities for place-bound students across the Commonwealth. In the 2010 calendar year, IVS provided connectivity and classroom support for over 200 IVS courses serving nearly 5,400 students. This is a significant increase from the end-of-year totals in 2000, which were 101 classes serving 2,800 students.

Classroom Technology – Classroom technology provides audio and video project design, programming, management and Tier 3 classroom technology support for approximately 423 audio/video enhanced classrooms at WKU, with new installations added each year. Also, as a part of this project and centrally-funded by Academic Affairs, a fund has been created that helps department replace common items such as projector bulbs, thus limiting the amount of class down time.

Most normal services and all critical services are extensively monitored 24 hours a day, 7 days a week, 365 days a year.

Student Technology Centers (STCs) – STCs are open computer labs provided for students and supported by the Student Technology restricted tuition account. There are 14 STC lab locations, including labs at each regional campus and the South Campus. The newest STC lab opened in Fall 2009 in Snell Hall 1104. The largest and most heavily-used lab is the 24-hour STC in Mass Media and Technology Hall. Student consultants staff the labs to provide user assistance in most locations, and more than 70 students per year are employed in these positions. We have a total of 591 computers in our Student Technology Centers.

Student Technology Centers are on a replacement cycle of three years for the most heavily used lab locations and four years for most others. As of January 2011, out of 635 STC computers, 29% are new (May 2010 purchases), 30% are one year old, 33% are two years old, and the remaining 8% are now three years old (and will be four years old before they are replaced in Summer 2011). Most of our lab replacements are done once a year in May, and our most recent purchases were Dell Optiplex 780 computers with an original system price over $1,200. As a result of our negotiated volume purchase discount, WKU paid about $1,004 per system for these computers. New computers in Summer 2010 went to the labs in Grise Hall, South Campus, and Glasgow. Most lab computers are running Windows XP, but we also support Macintoshes (nine located in the MMTH lab and six more in other lab locations). Lab software includes general-use commercial software (Microsoft and Adobe applications) along with specialized academic software requested by faculty. Central lab support systems, including print management and login authentication, are run on Data Center servers administered by ASA. Both print management and login authentication are considered to be WKU mission-critical systems. In 2010, Student Technology Center computers had 575,843 logins by 18,783 distinct users.

Computer Lab Printing – A new system of lab free printing allocation began in Spring 2009, and 2010 was the first full calendar year on the system. Lab printing is still free, but it is not unlimited. Students receive an allocation of free pages each year (1,500 pages per year for a full-time undergraduate student; a higher allocation for graduate students and a lower allocation for part-time students). The total number of pages printed in labs in 2010 was 6,880,970 impressions, including 642,100 from departmental labs. The print rate has remained relatively steady since the conversion, reflecting a total reduction in lab printing of about 15%. Because some printing is now paid rather than free (for color printing and for users who exceed their free print allocation), we had revenue of $5,983 from the Personal Print Value kiosk and $3,672 from Big Red Dollars in 2010, which helped cover print operating expenses. We have a total of 34 printers attached to the Uniprint-based free print allocation system: 28 in Student Technology Centers, and six in departmental labs.

Student Technology Group – The Student Technology group provides extensive technical support services to departmental labs, by managing software images and licensing, maintaining hardware and software, and providing the campus-wide lab login and print management systems. Supported departmental labs on campus include 109 locations with a total count of 1,784 computers. Many of these are specialized teaching classrooms with computers at student desks, while others are open computing facilities with academic software provided for the use of students in a department or major. In 2010, departmental labs had 305,333 logins by 18,061 distinct users.

The lab support group also supports classroom technology, including the computers, projectors, media players, and other equipment used in WKU's classrooms. IT Division support for classrooms began in 2007, and we now support 229 classroom locations. By including classrooms in the planning for recycled lab computers, we have reached the point as of January 2011 where all supported classroom computers are five years old or less. We now include five-year warranties on all open lab (STC) computer purchases, recognizing that retired lab computers go on to provide additional service in departmental labs and classrooms. In the 2010 calendar year, the IT Division purchased and installed most of the classroom computers and audiovisual equipment in the new College High Hall. In Spring 2010, we extended service hours for classroom technology support to include evening hours (until 6:30 pm) for the first time.

Technology Training – Live workshops and online video tutorials are the two key components of the Academic Technology training program for WKU faculty, staff, and students. Video tutorials are short, Flash-based animations with narration showing how to do technology tasks using screen shots. All the Academic Technology trainers are developers of video tutorials. We currently have 318 video tutorials available in 25 categories. Almost half of these were new or updated in 2010. Special areas of focus in 2010 were support for Exchange-based email (40 new tutorials produced) and the Blackboard 9 upgrade (104 new or revised tutorials). Usage statistics for year showed that the video tutorials were heavily used both on campus and off. Our video tutorial site had 12,545 visits from 3,114 unique visitors, with an average time on-site of almost seven minutes per visit. Using video tutorials to offer more comprehensive online training, we combine them into online workshops with graded learning assessments using Blackboard. We currently have 15 longer training workshops offered fully online. The Blackboard New Course Instructor online training has had more than 700 total WKU faculty enrollments since it was made available in December 2007.

During 2010, the IT Division offered 211 live training workshops. We had a total of 943 individuals attend these workshops. There were also 386 one-on-one Banner training sessions conducted by ASA. Workshop offerings covered special initiatives such as TopperMail, the migration to Exchange, and the Blackboard upgrade, as well as general technology topics such as Basic Word 2007. In addition to these workshops, we also had the all-day IVS Winter Workshop (13 attended) and we presented sessions at the New Faculty Orientation (61 attended). The five-day Online Teaching Summer Camp was held in August. Our technology training rooms are equipped with instructor stations and with high-quality Dell Inspiron multimedia laptops, licensed with all supported software titles including the Adobe multimedia suites.

Technology Resource Center (TRC) – The TRC supports multimedia production at WKU by providing equipment for loan, specialized recording and editing equipment, and technical assistance with multimedia projects. In 2010, the TRC provided 7,019 equipment loans (5,622 to students, 297 to faculty, 1,100 to staff). This represented an increase of 33% over 2009 statistics. In 2010, a total of 528 multimedia projects were completed by WKU users by TRC staff, and the in-house multimedia lab was used by WKU students 1,751 times. Evening users represented about one-third of these (504 users), after service hours in the TRC were extended to 8:00 PM beginning in April 2010.

TRC facilities include ten high-end workstations for video editing, an audio production room, DVD/CD duplication services, and an excellent collection of multimedia production equipment for checkout. This includes video cameras, laptops, projectors, screens, digital still cameras, and audio recording equipment. Video cameras are in several different formats, recording to tape or hard drive. The most recent video camera purchases have HD (high-definition) capability. New equipment for loan and new video editing stations are added each year. Responding to a substantial increase in laptop checkouts by WKU's most needy students, Dell donated 22 new laptops to the TRC in November 2010. The oldest equipment still in inventory is six years old, and the oldest video editing stations still in service are four years old. The oldest (Dell D600) TRC laptops were replaced in 2010 with ten new Dell E6500 laptops.

WKU Software Center – The WKU Software Center is our campus service for distributing licensed software to WKU-owned computers and for selling software at academic discount prices to WKU students and employees. Under the Microsoft and Adobe personal sales programs, we had net revenue of $44,712 in 2010 on discounted software sales to WKU students, faculty, and staff for their personally-owned computers. The Software Center distributes many applications free to WKU-owned computers, including Microsoft Office, Mathematica, SPSS, and Symantec Endpoint. Distribution of commercial software from Adobe and others resulted in $7,622 of net revenue from sales to WKU departments. In managing the Microsoft volume licensing agreement, which makes Windows, Office, and other titles available for WKU-owned computers, we were able to identify a change to the agreement that will save WKU $14,000 annually beginning in 2010.

The Software Center database system itself is an off-campus service managed by a vendor, E-Academy. In 2010, we migrated the system to an alternative E-Academy platform ("ELMS Express") which will allow us to provide the same services with greatly reduced costs. Where the previous system had a subscription cost of about $14,000 annually, the new system charges on a per-transaction basis, and it is projected that WKU's cost will be less than $3,000 annually.

iTunes U – WKU's iTunes U site is a service added in 2009. Multimedia files are made available to iTunes users through this service. We have both public content and restricted (course) content available. At present, there are 393 files being offered through iTunes U. We had a total of 58,085 file downloads in 2010.

Qualtrics – A new campus-wide license for Qualtrics web survey software was added in Spring 2010. This has become a major research tool for faculty and students.

iWKU – Recognizing the need to support mobile device users, WKU released the "iWKU" suite of applications in April 2010. Services in iWKU include campus maps, the course catalog, searchable campus directory, news and events, athletics, images, videos, and the library catalog. iWKU was released for iPhone in April and for BlackBerry in June, with version 2 of the iPhone version released in October, and an Android version in testing as of January 2011. A mobile browser version is also available, which is device-independent.

Functional Overview of IT Departments

Office of the Vice President for Information Technology
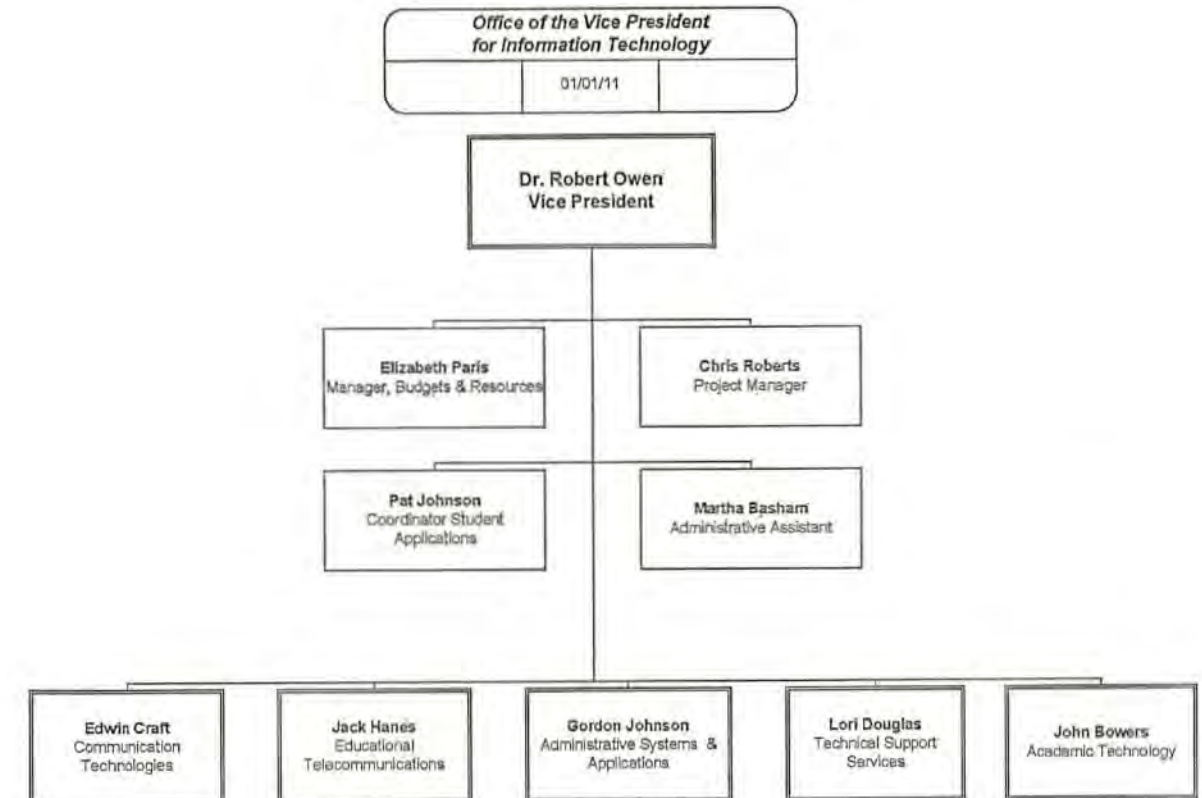
Academic Technology

Mission Statement

WKU Academic Technology provides technology support, training, labs, systems, and resources to the faculty, academic staff, and students of WKU.

Organizational Chart

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                    │    Academic Technology      │
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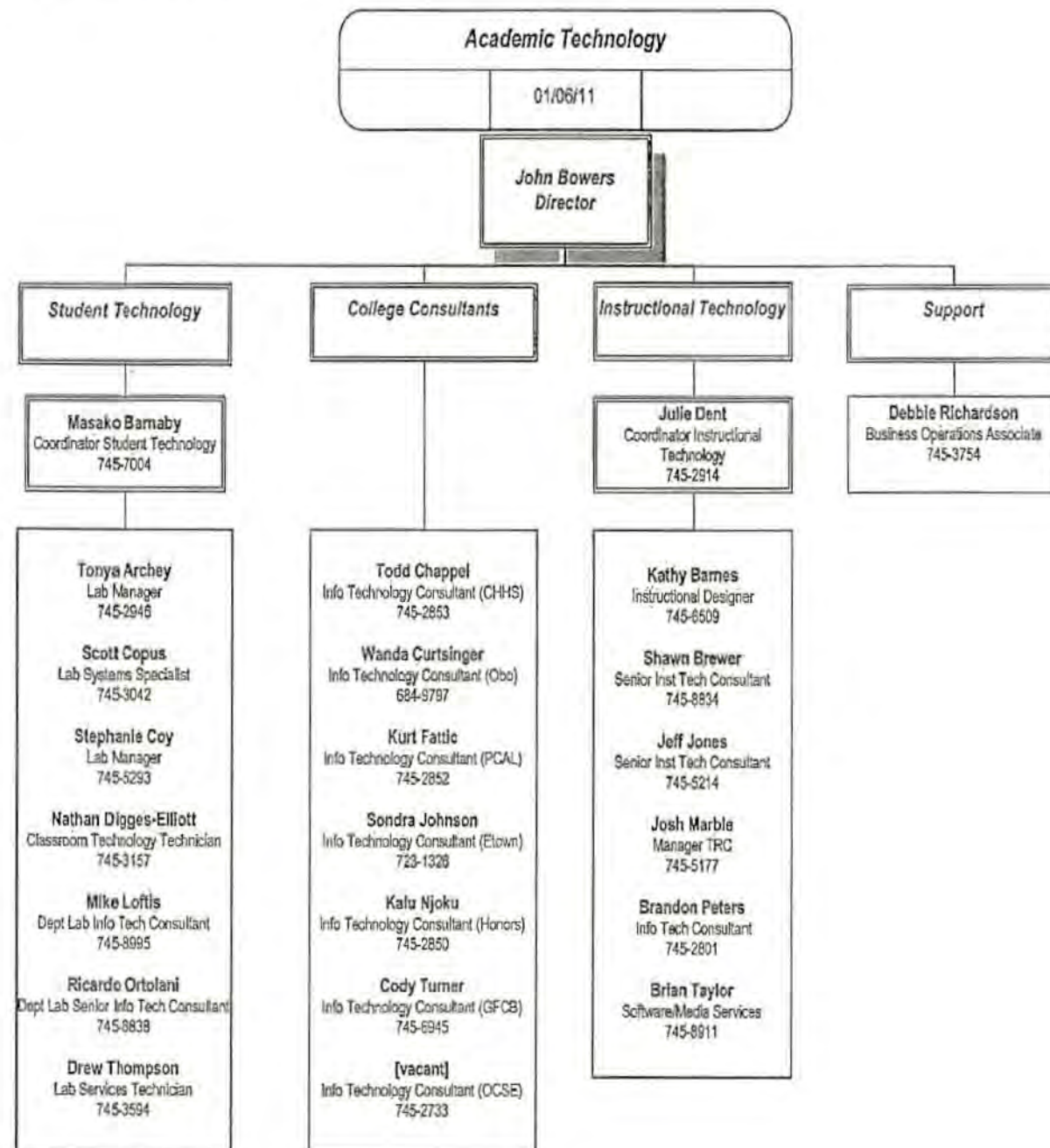| Student Technology	College Consultants	Instructional Technology	Support
Masako Barnaby Coordinator Student Technology 745-7004		**Julie Dent** Coordinator Instructional Technology 745-2914	**Debbie Richardson** Business Operations Associate 745-3754
Tonya Archey Lab Manager 745-2946	**Todd Chappel** Info Technology Consultant (CHHS) 745-2853	**Kathy Barnes** Instructional Designer 745-6509	
Scott Copus Lab Systems Specialist 745-3042	**Wanda Curtsinger** Info Technology Consultant (Obo) 684-9797	**Shawn Brewer** Senior Inst Tech Consultant 745-8934	
Stephanie Coy Lab Manager 745-5293	**Kurt Fattic** Info Technology Consultant (PCAL) 745-2852	**Jeff Jones** Senior Inst Tech Consultant 745-5214	
Nathan Digges-Elliott Classroom Technology Technician 745-3157	**Sondra Johnson** Info Technology Consultant (Etown) 723-1326	**Josh Marble** Manager TRC 745-5177	
Mike Loftis Dept Lab Info Tech Consultant 745-8995	**Kalu Njoku** Info Technology Consultant (Honors) 745-2850	**Brandon Peters** Info Tech Consultant 745-2801	
Ricardo Ortolani Dept Lab Senior Info Tech Consultant 745-8838	**Cody Turner** Info Technology Consultant (GFCB) 745-6945	**Brian Taylor** Software/Media Services 745-8911	
Drew Thompson Lab Services Technician 745-3594	**[vacant]** Info Technology Consultant (OCSE) 745-2733		

Functional Area Overviews and Staffing

Academic Technology has three major functional groups.

Instructional Technology (8 staff)
- Provide support for Blackboard, Qualtrics survey software, Tegrity, TurningPoint clickers, and other online instructional technology systems;
- Provide technology training to the campus, including the very popular series of video tutorials on technology topics;
- Operate the Technology Resource Center (TRC), a support center for student and faculty multimedia projects including digital audio and video;
- Manage software licensing and distribution;
- and provide related instructional technology support and consultation services for WKU teaching faculty.

Student Technology (9 staff)
- Operate the Student Technology Centers (open computer labs), with labs in 14 locations including all extended campuses, offering over 600 computers with service to all WKU students, faculty, and staff;
- Provide support services to all departmental labs on campus, including the campus-wide lab login system, management of software images, design and installation of new labs, and hardware/software maintenance;
- Manage print services, free print allocations and paid printing in both Student Technology Centers and departmental labs;
- and maintain and support technology in classrooms, including projectors, audio, media players, instructor lecterns, and instructor computers.

College Consultants (7 staff) These staff members are sometimes informally called "50/50s" because their salaries and benefits are funded 50% by the colleges and 50% by Academic Technology. They report directly to the Director of Academic Technology, but they receive operational supervision and daily task assignments from the college Deans' offices. Their duties vary by college, but generally these staff members:
- Manage college web sites;
- Provide hands-on technology support and training to faculty and academic staff in the colleges;
- Oversee lab and classroom technology installations and operations;
- and assist with college technology planning and purchasing.

The department also manages many miscellaneous projects that don't neatly fit into any of the functions described, such as the iWKU application for mobile devices, WKU's iTunes U services, campus Windows 7 planning, and so forth.
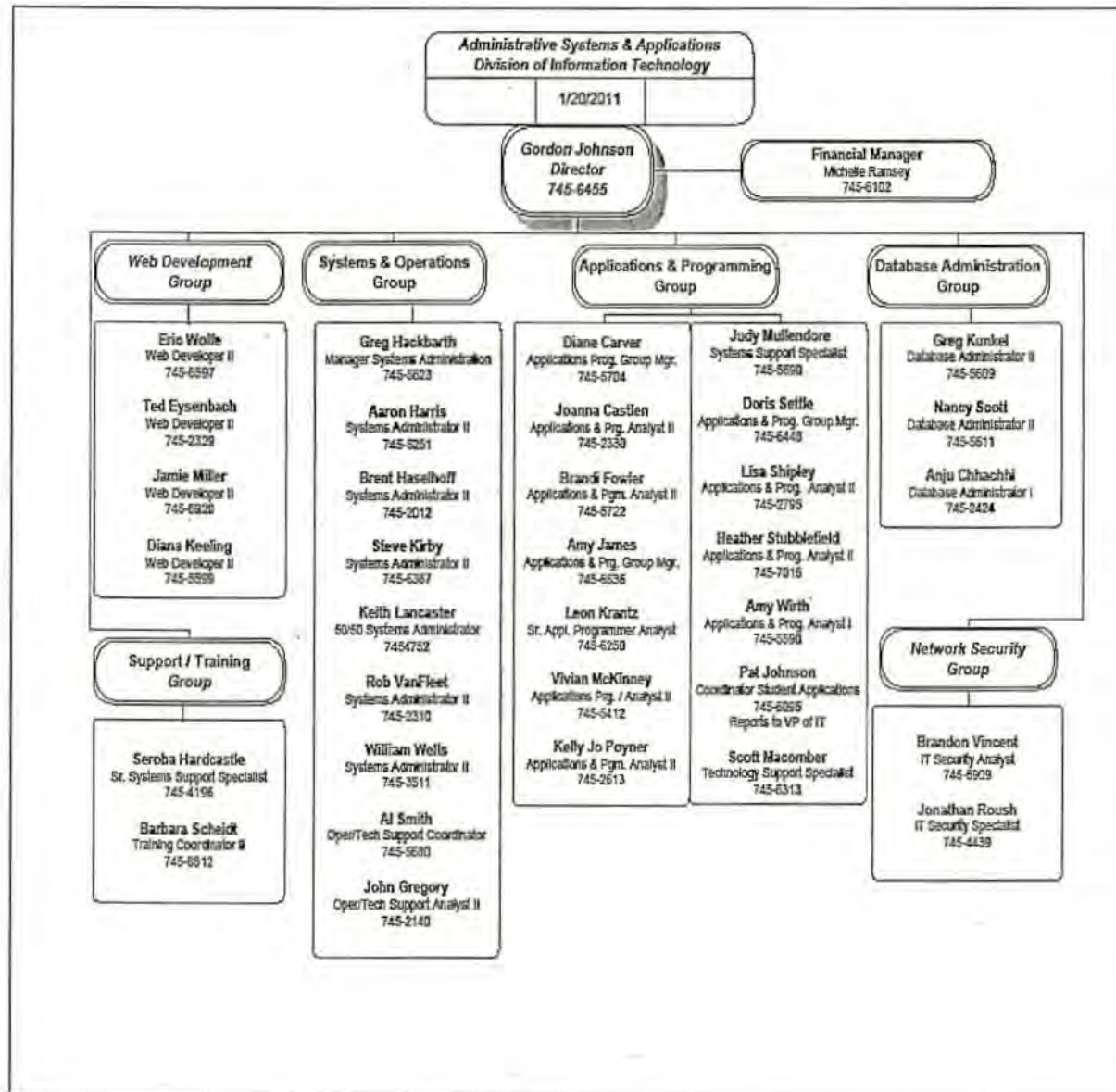
Administrative Systems and Applications (ASA)

Mission Statement

Provide high performing and reliable mission critical administrative and academic systems and services in accordance with the University's strategic needs and initiatives. Ensure adequate security, oversight, and data integrity for mission critical systems and services. Evaluate and implement new and emerging technologies where appropriate and strategic.

Organizational Chart

Functional Areas and Staffing

Administrative Systems and Applications (ASA) is a department in the Information Technology Division at WKU. ASA operates and supports the University's enterprise-level, mission-critical administrative and academic systems such as Email, Learning Management, Student Records, Finance, HR, and Institutional Development. The department operates two Data Centers, approximately 150 different systems and applications, and 200+ physical and/or virtual servers. It is organized into seven functional support groups:

Application Programming (13 staff)
- Project Management
- Support of core operational systems processes and workflows
- Application software configuration and support
- Consulting and systems analysis
- Programming, report generation, data extraction and interfacing

Web Development (4 staff)
- Enterprise web application development
- Web standards development and administration
- Content Management
- Existing code base maintenance

Database Administration (3 staff)
- Management and security of the many underlying relational databases that store application data on all platforms
- Installation and upgrades of application and database software
- Core SQL programming
- Technical Consulting for programmers and systems staff

Operations (2 staff)
- Data Center operations and security
- Facilities Management and logistics
- Batch Cycle execution and monitoring
- Production, processing and delivery of printed and scanned material

Systems Administration (7 staff)
- Server hardware and operating system administration
- Server Hosting Service for departmental systems
- Web server installation and maintenance
- Backup and Disaster Recovery
- Systems Security and patch management

Training/User and Systems Support (4 staff)
- Development and delivery of training for enterprise applications
- Training documentation
- Application testing - upgrades, new development, problem escalation
- User security setup and access controls
- 3rd Level Help Desk support

Enterprise Security Office (2 staff)
- Security awareness education

- Identification of threats and risks
- Vulnerability assessment
- Copyright infringement response and remediation
- Security policy development and governance
- Incidence response

Educational Telecommunications
"WKU Public Media"

Mission Statement

University
The mission of Educational Telecommunications is to create and distribute radio, television, and video, in order to (a) support the public service, (b) make the resources of Western Kentucky University accessible beyond the physical borders of all of WKU's campus sites, (c) increase educational opportunity, and (d) improve the quality of life for the people of Kentucky.

Community
To enrich the quality of life in our community by providing vital programs and services that otherwise would not exist.

Organizational Chart
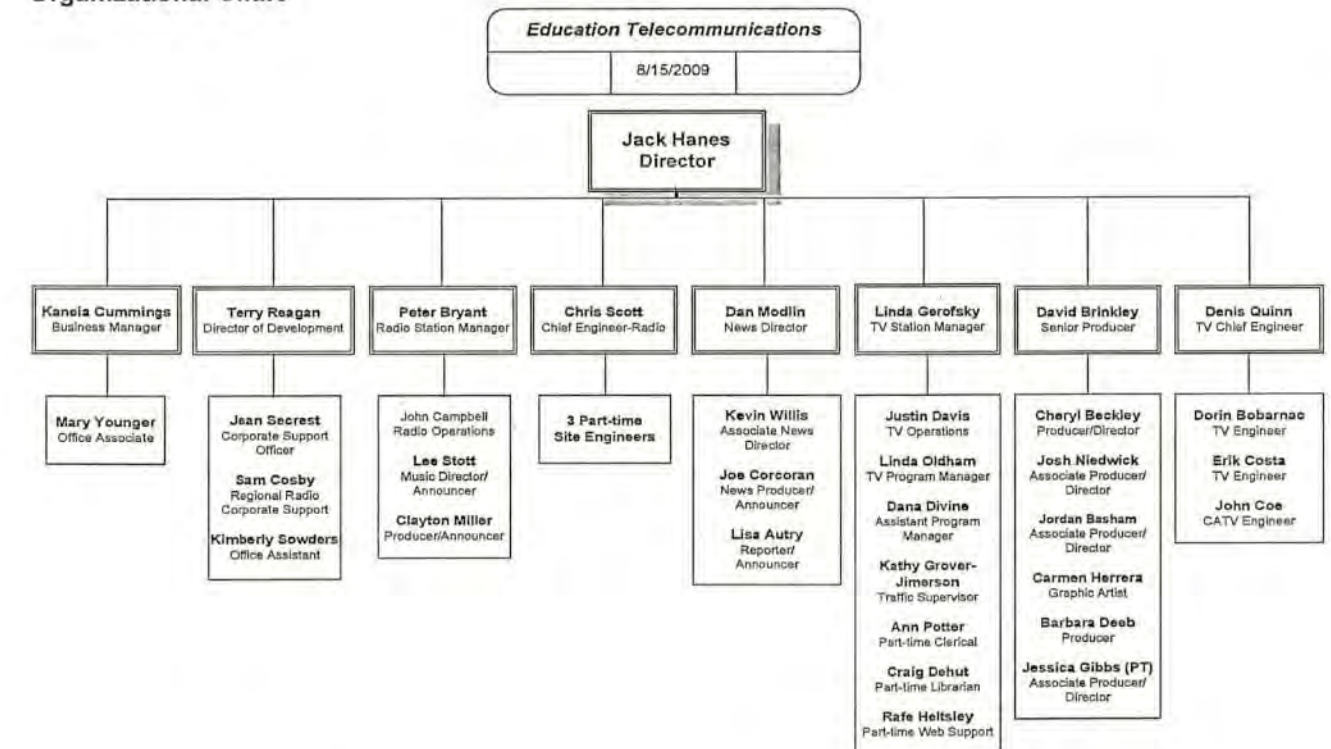
Functional Descriptions:

Educational Telecommunications is organized as follows with a Senior Staff supervising each functional area. Each of the Senior Staff reports to the Director of Educational Telecommunications.

WKU Public Radio (4 Staff)
- Responsible for the daily operation of the station and all of the "non-news" programming.

WKU Public Radio News Department (4 staff)
- Responsible for all of the state and regional news content for the station. They gather, report, write, and deliver the daily news content for WKU Public Radio.

WKU Public Radio Engineering (1 full-time, 3 part-time staff)
- Responsible for the technical infrastructure of the radio stations. The part-time site engineers provide quick access to the remote transmitter sites in case of technical difficulties that cannot be resolved by remote control.

WKYU-PBS Television (5 full-time and 3 part-time staff)
- Responsible for the programming, scheduling, and on-air operation of the television station.

WKYU Television Production Services (6 full-time and 1 part-time staff)
- Responsible for producing all of the local television programming for the station. This includes a weekly public affairs program, a monthly magazine program, specials, documentaries, and all of the sports programming for WKU Athletics.
- The WKU basketball productions are also carried by Fox College Sports nationwide. In addition to the on-air sports productions, this department also operates the videoboards for all events in Diddle Arena and Houchens/Smith Stadium.
- Production Services also engages in significant contract video production work for departments in the University, local businesses, government agencies, etc. These services provide significant revenue for the operation of the station.

WKYU Television Engineering (4 staff)
- Provides support for the technical infrastructure for the television station and television production services as well as the WKU campus cable television infrastructure.
- Provides support for Studio and Field Equipment for the Broadcast Program in the School of Journalism and Broadcasting.
- Support includes some operational duties during local program production.

Development (4 staff)
- Provides revenue for radio and television through development activities. This includes underwriting, membership drives, major gifts, etc.
- In addition, this area also has responsibilities for Outreach and some Public Relations duties.
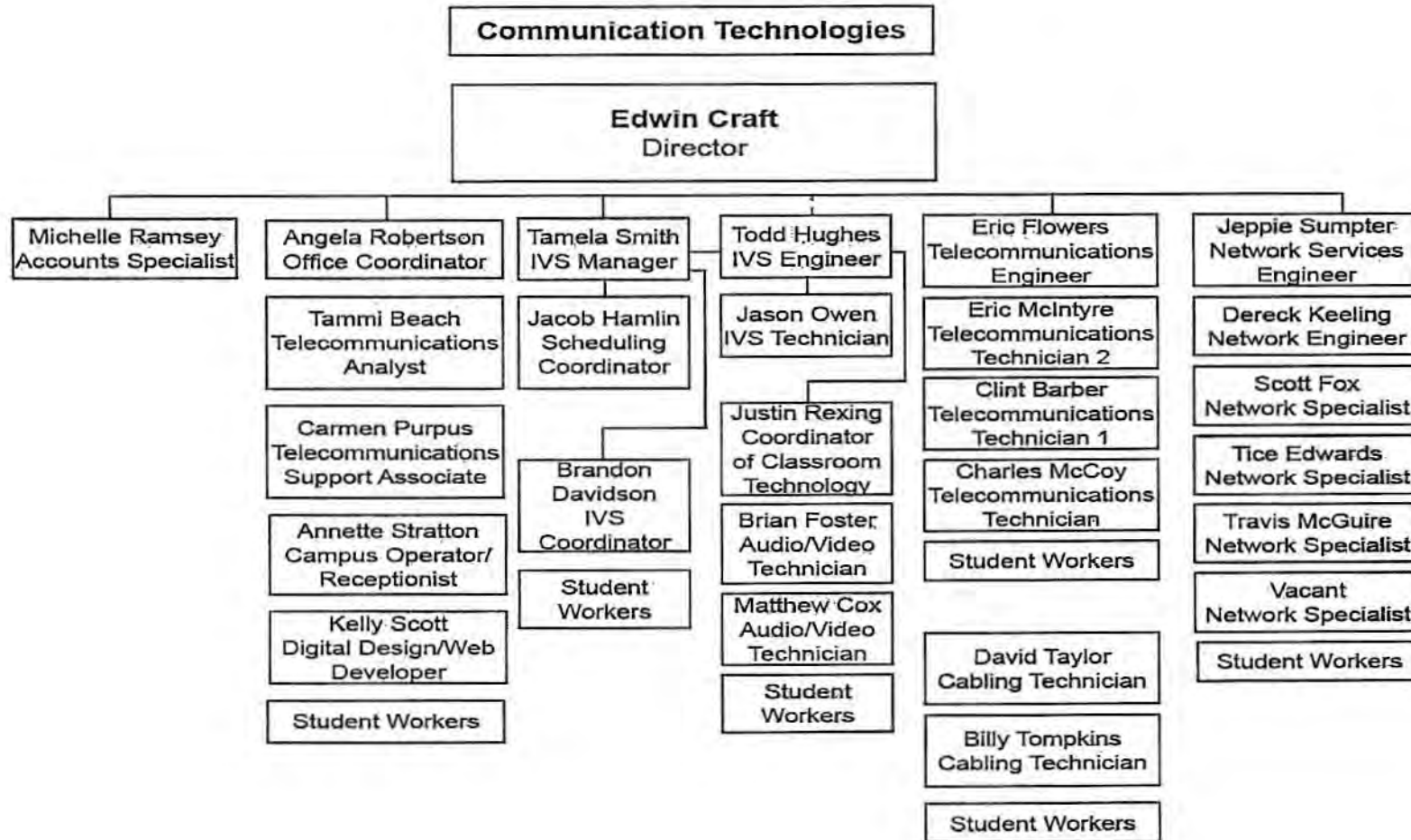
Business/Finance (2 staff)
- Responsible for all of the financial processing and record keeping for Educational Telecommunications. In addition to handling several University general budgets, they administer foundation and grant accounts for radio & TV as well.
- There is significant responsibility in this area for federal grant reporting requirements, including annual audits of radio and TV as required by the Corporation for Public Broadcasting.
- In addition to the financial duties, this area also has responsibility for receptionist duties of the stations.

Student Employment (40 part-time students)
- Student part-time employees are also involved in all areas listed above. Significant student numbers are used in the television production area.
- This provides nearly 40 WKU students per year with valuable experience in the field of broadcasting which greatly enhances their career progress. We work closely with faculty in SJB and some of our staff serve as adjunct faculty as well.

Communications Technologies

Mission Statement

The mission of the Communication Technologies department is to provide the communication infrastructure (network, telecommunications, video, cellular, campus cabling, and digital signage) that allows the University to achieve its strategic mission. In doing this we will provide excellent customer service to the campus community.

As defined by the staff of the Communication Technologies department, the following five terms are considered our main goals and define the priorities that we place on our department:
1. Customer Service – We will consistently meet and exceed the needs of the WKU community.
2. Communication – We will strive to achieve effective and efficient communication with internal and external constituents and to promote an environment that fosters the open-flow transfer of information between teams.
3. Efficiency – We will strive to achieve optimal utilization of the resources at hand.
4. Teamwork – We will contribute to the overall success of the organization. Even though you have a specific job function and belong to a specific department, you are unified with other organization members to accomplish the overall objectives.
5. Organizational Stewardship (Mindful) – As a department and as individuals, we will uphold moral obligations to develop and utilize our resources to fulfill the needs and future goals for WKU faculty, staff, and students while being economically accountable for those resources. We will conduct our work with the best behaviors and attitudes while accepting the consequences of our actions/decisions.

Organizational Chart

Communication Technologies

Edwin Craft
Director

Michelle Ramsey
Accounts Specialist

Angela Robertson
Office Coordinator

- Tammi Beach
  Telecommunications
  Analyst
- Carmen Purpus
  Telecommunications
  Support Associate
- Annette Stratton
  Campus Operator/
  Receptionist
- Kelly Scott
  Digital Design/Web
  Developer
- Student Workers

Tamela Smith
IVS Manager

- Jacob Hamlin
  Scheduling
  Coordinator
- Brandon
  Davidson
  IVS
  Coordinator
- Student
  Workers

Todd Hughes
IVS Engineer

- Jason Owen
  IVS Technician
- Justin Rexing
  Coordinator
  of Classroom
  Technology
- Brian Foster
  Audio/Video
  Technician
- Matthew Cox
  Audio/Video
  Technician
- Student
  Workers

Eric Flowers
Telecommunications
Engineer

- Eric McIntyre
  Telecommunications
  Technician 2
- Clint Barber
  Telecommunications
  Technician 1
- Charles McCoy
  Telecommunications
  Technician
- Student Workers

- David Taylor
  Cabling Technician
- Billy Tompkins
  Cabling Technician
- Student Workers

Jeppie Sumpter
Network Services
Engineer

- Dereck Keeling
  Network Engineer
- Scott Fox
  Network Specialist
- Tice Edwards
  Network Specialist
- Travis McGuire
  Network Specialist
- Vacant
  Network Specialist
- Student Workers

Functional Area Overview and Staffing

Telecommunications (9 staff) – The Telecommunications Department provides all voice services to over 7,500 voice ports for the WKU main and remote campuses. Convergence has become a key buzz word in this area for some time, as such the Telecommunications Department reviews and analyzes the convergence of voice services with desktop video, instant messaging applications, web-based voice services such as Skype, as well as other new and emerging technologies to ensure that we offer communication services that meet the needs of the campus community.

- Provides all voice services for the main and remote campuses/offices.
- Coordinates vendor billing for all voice services.
- Processes Communication Technologies voice services billing to WKU departments.
- Manage, update, and provide training for the PaeTec Axis Billing System.
- Provides operator service for the campus.
- Provides loaner and department wireless devices and support to WKU Departments.
- Provides a check out system for cellular equipment/service.
- Provides support for University provided software that is used on cellular devices to synchronize them with University email accounts, calendars or other University systems and services.
- Provides maintenance and support for crisis management system.
- Provides support for all telephone devices, features, and call centers on WKU's main and remote campus locations.
- Provide recommendations to departments who have expressed their needs for usage of voice, data services, and equipment.
- Management of student telephone service in residence halls, including monthly billing for long distance usage. Every on-campus residence hall room is provided with, at no additional cost, a custom calling package that includes: basic dial tone with unlimited local calling, call waiting, three-way calling, and auto call back.
- Management and marketing of student cellular resale program.
- Conducts informational sessions about Student Telephone Services at ATPs (approx. 19 annually), new faculty orientations, M.A.S.T.E.R. Plan, open houses, spring and fall previews, Focus on Western and Academic Expos.
- Develop and facilitates training sessions for Residence Hall Directors, Residence Assistants and Admissions staff.

Communications Cabling (Cabling) (2 staff) – Our campus cabling groups support the maintenance and installation of a wide range of cable types.

- Provides design, installation, and maintenance of all in-building campus cabling systems.
- Procures all IT cabling related materials for campus cabling projects.
- Installs and maintains the campus cabling infrastructure (fiber, copper, and CATV building interconnects).
- Ensures that all low voltage cabling systems are installed to life safety, NEC, and other code standards.

Digital Signage (1 staff) – The WKU Digital Signage System provides the WKU community with a powerful visual communications tool. The WKU main campus and regional campuses are able to quickly inform and educate students, faculty, staff, and guests using digital signage. Currently WKU's Digital Signage System provides an academic cable channel 25, HRL channel 12, and various in-building channels that push content to any television on campus. Individual digital signage sites are located across main campus, including locations such as DUC, MMTH, Helm and Cravens Libraries, PHAC, and Smith Stadium. Current regional campus locations include South Campus and Owensboro Regional Campus.

- Consultation and project management of digital signage equipment and screens in all campus locations.
- Symon Design Studio software is used to manage, design, schedule, and deliver content to screens.
- Symon Design Studio software training for site managers with a software license.

- Interactive programming for touch screen kiosk, using Symon Design Studio.
- Event management, for conference rooms, using hospitality plug-in and Astra, using Symon Design Studio.
- Provides two monthly Digital Signage Content Creation and Organization Sessions for digital signage software users and site managers.. This is a group or one-on-one session for brainstorming, content creation, and additional software training.
- Provides version upgrades of Design Studio software and SDA media players.
- Digital Signage Semi-monthly Trainings: Trainings are offered to all site managers and areas with digital signage twice a month to update their content, create content, brainstorm, and basic software training if needed.
- Departmental website maintenance.
- Developing video tutorials and updating Communication Technologies website with important information for the campus community- including tutorials for Symon Design Studio Software and Mobile Devices.
- Aiding in the development of IT Publications.
- Aiding in the redesign of the WKU IT Website.
- WKU IT Technology Expo event planning, committee member.
- iWKU mobile application, responsible for the Maps (main campus, south campus, regional campus) and Images (campus photos).
- Aiding in the development of IT Publications, as a part of the IT Publications Committee, creating IT brochures for marketing purposes.

Interactive Video Communications (Interactive Video Services/Classroom Technology) (8 staff) –
Interactive Video Communications provides room-based and desktop video conferencing support at seven WKU campus locations, as well as providing full audio/video support for WKU classroom technology integrations. IVS staff provides complete on-going training and technical support for the services provided.

- Provides full design, installation and technical support (Tier 1, 2, & 3) for nearly 40 video conferencing classrooms, located at seven WKU campus locations.
- Provides Tier 3 technical support for over 390 technology-enhanced classrooms.
- Provides full design and installation support for all new classroom technology integrations, including obtaining equipment quotes, and coordination with Planning, Design, and Construction and the IT Project Manager, where applicable.
- Provides logistics, support, and training for the desktop video conferencing program, currently utilizing Adobe Acrobat Connect Professional.
- Provides technical training for faculty, staff and students for technology-enhanced classrooms, conference rooms, and non-academic rooms.
- Provides logistics and support for the Projector Bulb Replacement Program.
- Coordinates the interactive video class schedule with regional sites and departments, with an average of 100 courses per Spring and Fall terms.
- Coordinates, schedules, and provides technical facilitation of the IVS Video Conferencing rooms for use by the WKU and Bowling Green community.

Network Services (NS) (5.5 staff) – The Network Services team provides all data network services for the WKU main and remote campuses. This includes wired and wireless data technologies which serve as the foundation for the majority of Information Technology services. The network services group strives to provide highly reliable services by leveraging proven technologies and procedures, while also being mindful of up and coming technologies and how those can be leveraged to further the mission of Information Technology.

- Designs, implements, and maintains all aspects of the University data infrastructure and associated supporting systems which connect over 70 buildings and consist of over 37,000 wired Ethernet ports.
- Designs, implements, and maintains the University wireless data network. This network consists of over 1,300 access points that provide full interior coverage of all WKU academic,

administrative, and residential buildings as well as outdoor coverage in multiple prominent locations.
- Designs, implements, and maintains the fiber optic interconnectivity of the three University fire alarm systems. These systems are crucial life-safety components serving major University buildings.
- Provides all aspects of the University standard video surveillance services, including security design work, system implementation, fully managed services, and training. This area has been very successful and has received extremely positive feedback from client.
- Provides several critical infrastructure services including Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), Network Admission Control (NAC) and many others.
- Provides a multitude of other services including but not limited to 3rd-level IT support and consultation both inside and outside of IT, small and large project management, software design steering, and product testing.
- All services are extensively monitored 24 hours a day, 7 days a week, 365 days a year and personnel are always on-call.
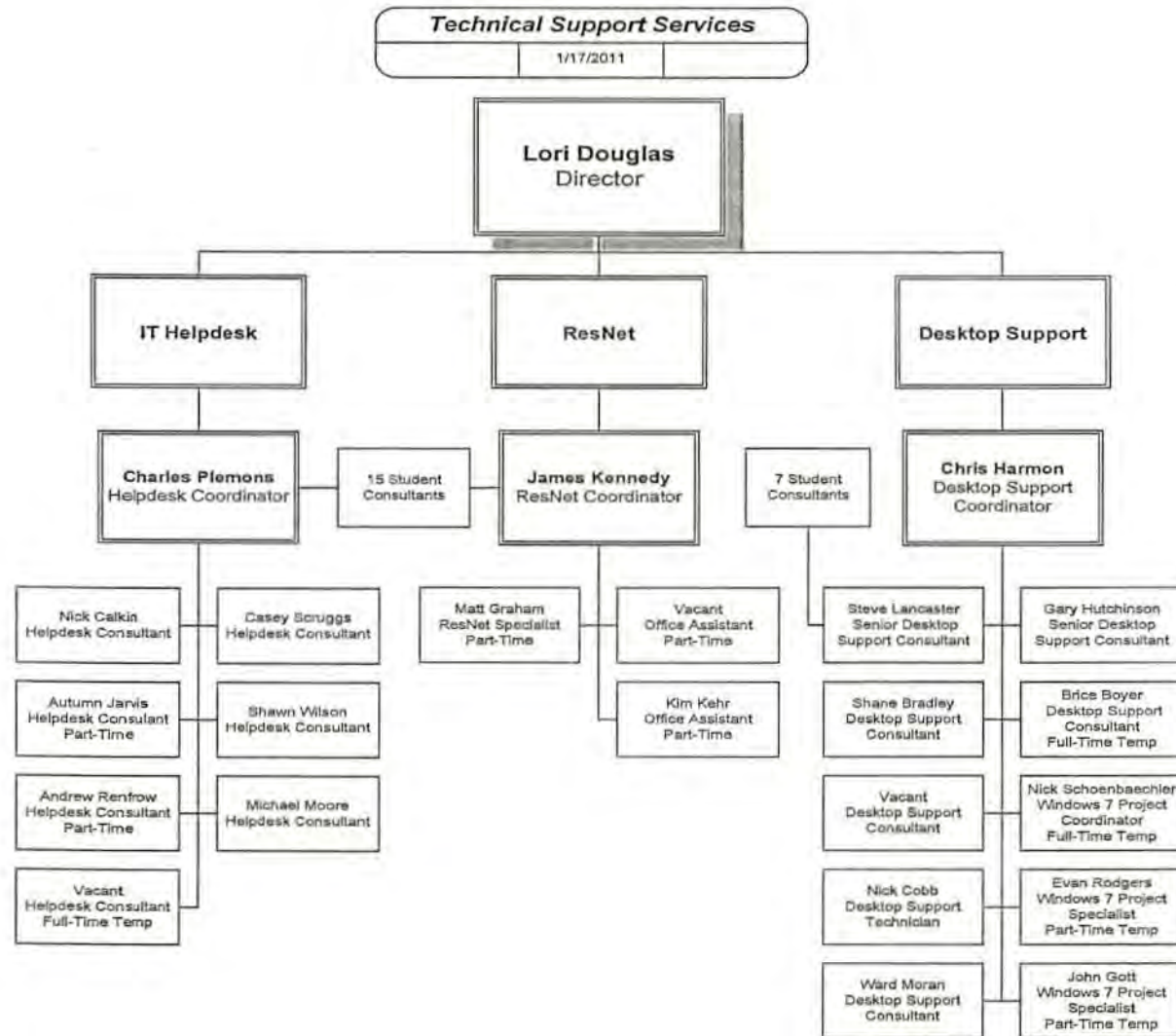
Technical Support Services

Mission Statement

Technical Support Services (TSS) is dedicated to serving the Western Kentucky University community by providing technology support to all faculty, staff, students, alumni, affiliates, and so on. The department makes every effort to provide high quality services necessary to meet the strategic goals of the University.

Organizational Chart

Functional Area Overviews and Staffing

Technical Support Services (TSS) is a department in the Information Technology Division at WKU. TSS provides technical support to the University community through a combination of telephone, onsite, and drop-off services. It is organized into three functional support groups supplemented with shared student labor:

Desktop Support (11 staff)
- Provide both drop-off and onsite troubleshooting and repair for WKU-owned computers and printers across campus, including Macintosh and Windows-based systems.
- Provide onsite hardware replacement and upgrades for purchased components.
- Provide in-house Dell warranty work for WKU-owned computers.
- Work with primary vendors to setup and maintain purchasing information for WKU entities, as well as personally-owned computer purchase discounts.

IT Helpdesk (8 staff)
- Provide first level point of contact and customer service for IT technology needs to faculty, staff, students, and alumni.
- Provide initial support for most IT platforms and applications including Macintosh and Windows-based systems, email, Blackboard, Topnet, Active Directory, Banner, and so on.
- Troubleshoot software and hardware issues for WKU-owned workstations and student personal computers.
- Route requests to the proper areas within the division for advanced troubleshooting and resolution.

ResNet (4 staff)
- Provide a computer drop-off troubleshooting and repair service for all registered WKU students, including virus and spyware removal, hardware diagnostics, data backup, system installation, and more at no additional charge.
- Provide face-to-face customer service at the front desk to check in/out computers for both ResNet and Desktop Support.
- Provide in-house Dell warranty work for student-owned computers.
- Provide face-to-face interaction with students at freshman orientation events, introducing IT services and avenues of support.

Student Consultants (22 staff)
- Desktop Support utilizes 7 student employees, and the IT Helpdesk and ResNet share a pool of 15.
- Provide supplemental assistance to part-time and full-time staff while gaining practical on-the-job training and experience in the IT field.

Issues, Trends, and Future Technology Directions

Predicting the future – especially the future of technology – is fraught with danger. Consider the following predictions and observations, which were made by people and companies with extensive knowledge of their particular fields:

"Everyone who is somehow familiar with the subject will recognize that it will be a failure." – Henry Morton, President of the Stevens Institute of Technology, 1880. Referring to Edison's lightbulb.

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

'Who the hell wants to hear actors talk?" – H.M. Warner, Warner Brothers, 1927.

"I think there is a world market for as many as five computers." – Thomas Watson, President, IBM, 1943.

"Computers in the future may weigh no more than 1.5 tons." – Popular Mechanics, 1949.

"Nuclear vacuum cleaners will be a reality in ten years." – Alex Lewyt, President, Lewyt Corp., 1955.

"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." – The editor in charge of business books for Prentice Hall, 1957.

"But what ... is it good for?" – The Advanced Computing Systems Division of IBM, 1968, commenting on the microchip.

"There is no reason anyone would want a computer in their home." – Ken Olson, President, Chairman and founder of Digital Equipment Corp., 1977

The biggest problem with predicting the future is that the nature of change has changed. Throughout most of human history, predictions were largely formulated by looking at past events, looking at current events, and then extrapolating into the future. This essentially represented an arithmetic change vector.

With the advent of technology in the 20th century, the nature of change became geometric. Consider the following chart, which graphically depicts the growth of cellular telephones:

Growth in Cell Phones 1991 - 2004
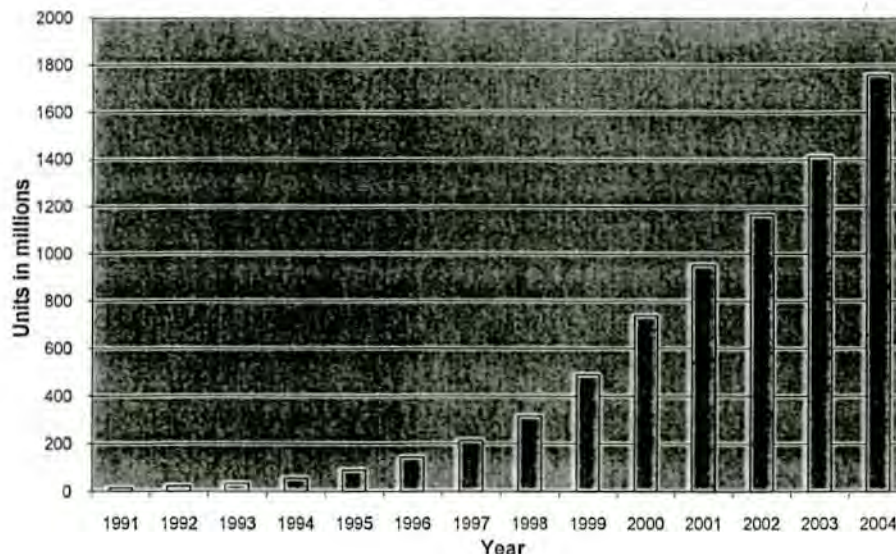
This graph clearly depicts the nonlinear nature of change. Similar graphs may be found for the growth in Internet usage, the growth in microcomputers, etc. The nature of change became geometric, and has thus accelerated.

At least as it pertains to technologies in the last 30 years, the following observations have held true. In general, new technology is:

- Faster
- Cheaper
- Smaller
- More mobile
- More connected

What follows is a brief discussion of current issues facing the IT Division, and general trends and future technology directions in higher education.

Issues Affecting WKU's IT Division

FCC Broadband Plan

The FCC has embarked on a "National Broadband Plan" to prepare for the future capacity needs of wireless Internet services. Currently, part of this plan includes the re-distribution of some broadcast television frequencies to the broadband plan. This could have a major impact on distribution methods for over the air television in the next few years. We are monitoring this situation.

WKU Public Radio future technologies

WKU Public Radio has converted one of our four transmission ties to digital HD (high definition) capability. Unfortunately, this technology has seen slow adoption by consumers and there are still some transmission issues that have yet to be satisfactorily resolved regarding power output and replication of the analog footprint. We received a CPB grant which paid for the majority of the conversion of our Bowling Green site. We will remain in a "holding pattern" on the three remaining sites until these transmission issues are resolved. However, it is the opinion of the Educational Telecommunications Director that HD radio's future is in jeopardy due to technical and market conditions.

We have been streaming our radio programming on the Internet for several years and use continues to grow. Through the creation of the national Public Radio Service application on the iPhone, users can now listen to us using that technology. We archive our local programming on our website for use by listeners and faculty on campus who can use it for classroom content, assignments, etc.

We see the online area as a growth opportunity.

WKYU-PBS Television Future Technologies

WKYU-PBS Television has a nice website, but the use of online video is an area that needs to be developed. Hardware with the capacity to support such an effort is needed, as well as the development of a work flow to accomplish the goal of providing much of our local content online.

Mobile TV is an area of potential growth as well. As yet, there is no ATSC standard for mobile video, but one is being developed and is in beta testing in several television markets in the U.S. When this is rolled out, we could provide programming directly to mobile phones, video screens in automobiles, etc.

3-D television was introduced last year at the Consumer Electronics Show and NAB convention. One year later, adoption has been much slower than promoters had anticipated. We will monitor the development and acceptance of this technology.

Increasing Demand for Help Desk and ResNet Services

IT Helpdesk – As the IT Division continues to increase services and offerings, demand for prompt Helpdesk support increases as well. In the last few years, the IT Helpdesk has seen the following increases in the number of Helpdesk cases logged in the case tracking system:

- 2005 to 2006 – 59% increase
- 2006 to 2007 – 13% increase
- 2007 to 2008 – 4% increase
- 2008 to 2009 – 40% increase
- 2009 to 2010 – 25% increase

In 2010, 64% of the logged cases were closed at the Helpdesk level. These statistics prove there has been more demand each year on the IT Helpdesk. Because of this, we hope to increase staffing levels in this area.

ResNet – This area has evolved over the last several years into a critical service offering for WKU students. ResNet has also seen increases in the number of cases logged for their area:

- 2006 to 2007 – 7% increase
- 2007 to 2008 – 14% increase
- 2008 to 2009 – 56% increase
- 2009 to 2010 – 37% increase

Even with this large increase over the last few years, there has been no increase in staffing. ResNet has improved efficiency with things such as cross-training with Helpdesk staff, increasing information provided to the students, and automating support tasks. This operation is completely run by the ResNet Coordinator, one part-time temporary position, two part-time clerical positions, and student employees. Therefore, we hope to increase staffing in this area as well.

Aging Departmental Computing Labs

Many departments' lab computers are aging. For the past three years, we have recycled computers retired from open labs exclusively to departmental labs and classrooms. As of Summer 2010, we found that about 9% of supported departmental lab computers were more than five years old. When departments hang onto outdated computers in labs, it creates a cluster of problems: support staff tries to maintain equipment that is out of date and out of warranty; students try to run software on computers that aren't powerful enough; and prospective students get a negative impression of WKU as a place where student technology is not kept current. Academic Technology has been proactive in helping departments to plan ahead in their budgets for lab computer replacements, to dispose of outdated computers via Surplus, and to design lab facilities efficiently so that they are right-sized for the needs of the department and its courses. For the past three years, we have recycled computers retired from open labs exclusively to departmental labs and classrooms, to replace even older computers. We also annually commit funding from the Academic Technology budget to replace equipment in one or more computer labs; in Spring 2011, we replaced all the computers in Grise 135, a departmental lab primarily used by the Sociology Department.

Desktop Video Conferencing

There is a growing trend for faculty and staff usage of desktop video conferencing services. These types of services have many advantages, including the ability to have remote office workers, and reductions in travel costs. We are currently in the pilot-phase of providing two types of these services for classes and faculty/staff/student support. Desktop Video Conferencing usage is expected to continue to grow as faculty and staff become more aware of the travel and time saving capabilities of the technology.

Faculty and staff of the University have also requested the ability to bridge classroom and conference room locations with desktop video conferencing tools. The installation of the new multipoint conferencing unit will allow for increased blending of desktop-to-classroom (or conference room). Future applications of this technology would allow a student who could not attend class due to illness or weather to be able to join their class from their home computer.

Limited Space

Adequate physical office space and storage space for the IT Division continues to be problematic. Currently space issues are handled by just-in-time ordering of computers, and eliminating any excess materials that are not quickly utilized. The need for a staging of area for equipment also contributes to space issues.

Mobility

Nationally, more than half (51.2%) of undergraduate students own an Internet capable handheld, or mobile device, and 11.8% plan to purchase one within the next 12 months. Of those students who currently own mobile devices, 29% access the Internet daily on their mobile device. 32.3% of students who own mobile devices spend 1-2 hours per week accessing the Internet from their mobile device. These percentages are expected to continue to increase.

Convergence of Voice, Data, and Video Technologies on Multiple and Mobile Devices

Over the next several years, voice services will migrate from a physical infrastructure-based product to an application-based product. Voice endpoints will become more diverse, allowing a mobile workforce to connect from any location. The availability of an application-based voice service will promote the advancement of a converged voice architecture, enabling a more feature rich experience that will combine services such as video, instant messaging and desktop sharing. Mobile devices will become seamless extensions of the desktop telephone.

Applications

Our user base is increasingly using mobile devices for everything and that user base expects us to deliver application functionality to their mobile device. Vendors are recognizing this need and are providing more of this functionality built into their applications. SunGard, the Banner ERP vendor, has just release a mobile development platform called Mobile Connect. We hope to deliver more Banner functionality to the mobile devices soon.

Increased Demand for Wireless Networking

The speed of wireless networks will continue to expand allowing many of our users to be served by wireless only devices. This shift from a physical wiring plant to an RF based model will exceed the availability of wireless spectrum in many areas. The FCC will continue to move wireless frequencies around which could cause overlap in some of our legacy systems.

Cloud Computing

As good of a definition as any of "cloud computing" may be found in the Educause 2009 Horizon Report: "The *cloud* is the term for networked computers that distribute processing power, applications, and large systems among many machines. Applications like Flickr, Google, YouTube, and many others use the cloud as their platform, in the way that programs on a desktop computer use that single computer as a platform. Cloud-based applications do not run on a single computer; instead they are spread over a distributed cluster, using storage space and computing resources from many available machines as needed. 'The cloud' denotes any group of computers used in this way; it is not tied to a particular location or owner, though many companies have proprietary clouds. 'Amazon's cloud,' for instance, refers to the

computers used to power Amazon.com; the capacity of those servers has been harnessed as the Elastic Compute Cloud (EC2) and can be leased from Amazon for a variety of purposes" (p.11). As the Horizon Report notes, to the end user, the cloud is invisible; the technology that supports the applications doesn't matter — the fact that the applications are always available is key.

Cloud computing offers many benefits to WKU IT. Since applications are staged and maintained offsite, it frees up time for our system administrators to manage critical systems, like our Banner ERP system. Additionally, we do not have to invest in the hardware, software, and storage needed to run an application; all of this is provided in the cloud. We save money from not needing maintenance contracts on hardware, software, and storage. We save physical space in our data center. Finally, we reduce our power and cooling costs.

Developments such as Google Apps and Microsoft Office 365 are moving the traditional desktop application, such as Microsoft Word, PowerPoint, and Excel, to the cloud – off the desktop and into the cloud, where the application may be accessed over the Internet via a browser. We will closely monitor and evaluate our current model of support and deployment of Microsoft Office, as well as other desktop applications. Many universities are eliminating local desktop applications entirely, and migrating these functions to the cloud.

Additionally, more and more of our IT services are becoming candidates for the cloud. In early 2011, we moved student and alumni email to a cloud-based application – Microsoft Live@EDU. Data center virtual server services, backup services, and disaster recovery services are also good candidates for migration to the cloud.

Unified Communications (including messaging)

Our recent implementations of Microsoft Exchange and Microsoft OCS (now called Lync) have moved us closer to the Unified Communications reality. Email, calendar, instant messaging, phone calls and voicemail, and chat are all integrated on one platform and accessible anywhere, anytime. We are very close to achieving this model.

Future Technology Trends and Directions

As noted earlier, it is extremely difficult to predict the future of technology. What follows are predictions and thoughts regarding future technologies, as envisioned by various companies, experts, and organizations.

Microsoft sees the following as dominant themes for the future of technology:

- Unified communications
- Academic search technologies
- Education analytics
- Cloud services
- Virtualization
- Social computing
- Mobility

Dr. Mark Milliron, Deputy Director of Post Secondary Improvement at the Bill and Melinda Gates Foundation, is regarded as an expert in educational technologies, and is also a respected "futurist." Dr. Milliron believes the future includes the following:

- Blurring and blending of traditional and online instructional delivery
- Mobility
- Gaming
- Social Networking
- High-Impact Presentation/Engagement Technologies

- Analytics, Diagnostics, and Evidence-Based Education

Thomas Friedman is a noted American journalist, columnist, and author. In his book *The World is Flat*, he notes that the following phenomena will be predominant in the future:

- Digitization, democratization, and deregulation
- Perpetual learning
- Globalization

While no company, organization, or individual has a perfect track record of predicting future technologies in higher education, Educause probably does best. Educause is the pre-eminent non-profit professional organization dedicated to technology in institutions of higher education. Every year, Educause produces a "Horizon Report", which reviews technologies that are likely to become mainstream technologies within the near-term (within the next twelve months), the mid-term horizon (within two to three years), and the far-term horizon (within four to five years).

The following is excerpted from the Educause 2011 Horizon Report.

On the near-term horizon — that is, within the next 12 months — are *electronic books* and *mobile devices*. Electronic books are moving closer to mainstream adoption for educational institutions, having appeared on the mid-term horizon last year. Mobile devices reappear as well, remaining on the near-term horizon as they become increasingly popular throughout the world as a primary means of accessing Internet resources. Resistance to the use of mobile devices in the classroom continues to impede their adoption in many schools, but a growing number of institutions are finding ways to take advantage of a technology that nearly all students, faculty, and staff carry.

Electronic books continue to generate strong interest in the consumer sector and are increasingly available on campuses as well. Modern electronic readers support note-taking and research activities, and are beginning to augment these basic functions with new capabilities — from immersive experiences to support for social interaction — that are changing our perception of what it means to read.

Mobiles devices enable ubiquitous access to information, social networks, tools for learning and productivity, and much more. Mobile devices continue to evolve, but it is the increased access to affordable and reliable networks that is driving this technology now. Mobile devices are capable computing devices in their own right — and they are increasingly a user's first choice for Internet access.

The second adoption horizon considers technologies expected to gain widespread usage within two to three years, and this year's candidates are *augmented reality* and *game-based learning*. Both intersect with practices in mainstream popular culture, both have been considered significant tools for education for many years, and both have made appearances on a number of campuses already. Advances in hardware and software, as well as in a broader acceptance of new methods in teaching, secured the place of these innovations as the top technologies for the mid-term horizon.

Augmented reality refers to the layering of information over a view or representation of the normal world, offering users the ability to access place-based information in ways that are compellingly intuitive. Augmented reality brings a significant potential to supplement information delivered via computers, mobile devices, video, and even the printed book. Much simpler to create and use now than in the past, augmented reality feels at once fresh and new, yet is an easy extension of existing expectations and practices.

Game-based learning has grown in recent years as research continues to demonstrate its effectiveness for learning for students of all ages. Games for education span the range from single-player or small-group card and board games all the way to massively multiplayer online games and alternate reality games. Those at the first end of the spectrum are easy to integrate with coursework, and in many institutions they are already an option; but the greatest potential of games for learning lies in their ability

to foster collaboration, problem-solving, and procedural thinking. For a variety of reasons, the realization of this potential is still two to three years away.

Looking to the far-term horizon, four to five years from now for widespread adoption, are *gesture-based computing* and *learning analytics*. Both remain largely speculative and not yet in widespread usage on campuses, but both are also garnering significant interest and increasing exposure.

Gesture-based computing moves the control of computers from a mouse and keyboard to the motions of the body via new input devices. Depicted in science fiction movies for years, gesture-based computing is now more grounded in reality thanks to the recent arrival of interface technologies such as Kinect, SixthSense, and Tamper, which make interactions with computational devices far more intuitive and embodied.

Learning analytics loosely joins a variety of data-gathering tools and analytic techniques to study student engagement, performance, and progress in practice, with the goal of using what is learned to revise curricula, teaching, and assessment in real time. Building on the kinds of information generated by Google Analytics and other similar tools, learning analytics aims to mobilize the power of data-mining tools in the service of learning, and embracing the complexity, diversity, and abundance of information that dynamic learning environments can generate.