



New or Expanded Services, 2008 – February 2012

2/14/2012

ITS has expanded or initiated a wide range of services since 2008, to respond to University strategic needs and requests from other divisions. These new/expanded services are listed here under three headings: new services; enhancements to existing services; and infrastructure expansion to provide additional capacity to meet demand and growth.

E.1. New Services

- On 2/10/12, ITS announced availability of the first two "virtual UNCG desktop" services which provide faculty and staff cloud-based access to fully functional University supported desktops from almost any Internet-connected device.
 - The **Virtual Administrative Desktop** provides a secure 32-bit Windows 7 GCN desktop with limited external browsing and storage access capabilities that faculty and staff can use to more safely access restricted University data from any network or computing device.
 - The **Virtual Academic Desktop** provides a 32-bit Windows 7 GCN desktop with unrestricted access to the virtual desktop and no access to restricted University data through web-enabled applications and direct database connections.
- The Active Directory/General Computing Network was implemented which provides faculty, staff and students in office and campus computer labs with a more secure computing environment. These managed desktops operate on a private campus network that is enhanced with intrusion prevention and unified threat management perimeter security. During this project, more than 4,000 workstations, 150 University departments, and 2,500 individual faculty and staff members were migrated to the new environment, and most departments' computers were upgraded to the Windows 7 OS (32-bit version). New services introduced as part of the AD/GCN implementation include:
 - Deployment of centrally managed computing policies ("GPO's") to facilitate local workstation configuration/administration and lower the risk of workstation compromise, improving performance and security
 - Automation of workstation patching and virus definition updates to increase security and provide a more stable, highly available computing environment, while better protecting the University's data assets
 - Improved mobility, including the ability to move computers with wired connections from one location to another across the campus without technical staff intervention, and seamless connectivity and functionality between the wired and wireless networks
 - A major increase (more than 5x) in individual and departmental network file space allocations, up to 5 Gb individual and 200 Gb department file space
 - Implementation of file space checkpoints that individuals can utilize to perform on-demand self-restoration of previous versions of directories or files
 - Implementation of Wake on LAN services to "wake-up" groups of computer workstations (e.g., labs, classroom machines) that have been powered down and apply updates and patches in off hours to prevent disruption during normal hours of operation

- Deployment of a non-Windows GCN environment that allows Mac and Linux workstations to leverage services in the GCN environment (network file space, printing, and University licensed applications) comparable to those provided to Windows workstation users
- ITS has obtained full membership in both Internet2 (an advanced high-speed networking consortium led by the research and education community) and InCommon (a national federated identity management consortium that facilitates online research and collaboration) for UNCG faculty, staff, and student use.
- For web applications that require Secure Socket Layer (SSL) certificates to provide protected data transmission between the server and the end-user, UNCG's membership with Internet2 and InCommon now allows a flat-rate annual fee for unlimited certificates at a cost savings to the University. ITS previously managed the purchase of these certificates for campus at a per-certificate cost that was passed on to the client.
- Shibboleth with UNC Federation and InCommon Federation has been implemented for use with RAMSeS, Inter-institutional Registration, General Administration web applications, and EduCAUSE.
- A "hot-site" disaster recovery solution was implemented for the most critical parts of the Banner application allowing for the recovery of those Banner services within 4 hours of a disaster with minimal data loss. The solution is a collaborative effort with Appalachian State (which is hosting UNCG hardware) and is tested annually for data accuracy and restoration timeliness. Data is automatically sent at periodic intervals to the servers at Appalachian State. This level of disaster recovery functionality would be cost-prohibitive with a vendor.
- The Remote Vendor Secure Connection (Vendor ASA) dining solution was implemented which allows faculty, staff, and students to make purchases at multiple off-campus establishments using their SpartanCard. A secure connection is established between UNCG and the vendor to process SpartanCard transactions between the BlackBoard transaction server and AT3000 card swipe device by utilizing network appliances to encrypt the data before it is transmitted. This solution is currently being utilized by Papa John's, Mimi's Kitchen, Ghassan's, and Barnes and Noble to process SpartanCard transactions.
- Enterprise Departmental Hosting Services have been implemented that offer departments a highly cost-effective means to fully leverage the existing campus data center infrastructure for hosting non-ITS managed server farms. Currently Chemistry/Biochemistry, the Library, and Geography all host significant non-ITS server infrastructure in a campus data center. Locating network and server infrastructure in the proper environment provided by an enterprise class data center ensures that the equipment is operated correctly to achieve maximum useful life for the University's investment. Around-the-clock monitoring by central ITS staff also ensures that equipment malfunction is remediated quickly with minimal impact. Not only does this transition enable staff in these departments to fully leverage existing campus investments in technology, it prevents these units from having to duplicate services that are already offered centrally.
- ITS now offers specialized departmental application support to the many workgroups across campus that utilize department-specific applications to perform daily operational functions (some examples include Admission Pros, Ad Astra, Nolijweb, and SHS-Medicat). The Departmental Application Support Team was created to provide technical assistance to departments on equipment specifications and configurations, as well as integration between many layers of middleware required to implement and manage their applications.

- The Instructional Linux Environment is a multi-user computing environment based on the Linux operating system that is used for running technical applications for research and instructional purposes. Examples of the technical applications used in this academic computing environment include SAS, MATLAB, and Maple. The applications in this environment are managed and updated by ITS and allow for off-loading the computations from a local workstation to the remote ILE server.
- File space has been significantly increased for the AFS/ILE/Unix academic computing environments. When the Instructional Linux Environment was implemented, each faculty/staff/student was given a 5 gigabyte disk storage space in addition to their AD/GCN filespace, which is more than 500 times their original quota. This enhancement allowed for a secure, backed-up space for storing research data and class work.
- The Coradiant tool was implemented and is used by Systems Engineers to analyze network traffic between client workstations and applications to determine root cause failures of client sessions. Faculty often requests an analysis to confirm or deny student allegations that Blackboard went down during a test on a specific time/date.
- The new cPanel environment is a self-service web environment that allows clients to manage a departmental website without requiring setup and administration of their own webserver environment. cPanel enables departments to create and manage websites with the University look and feel using technical tools, such as database and web programming languages, or with a content management system, which requires less technical skill. Implementation of the CPANEL “LAMP” stack (Linux, Apache, MySQL and PHP) environment provides a new supported web platform for our clients that enables clients to run many popular “LAMP” applications (e.g., Wordpress, Drupal).
- The new Varonis service provides access logging on AD/GCN files, which enables UNCG to meet HIPAA compliance standards. (*Research provided funding*). This service can be used to determine who has viewed, modified, or deleted particular files. Other uses include the ability to view at a glance using a web interface those who have access to a particular file.
- ITS purchased and deployed Identify Finder to find and remove PII (personally identifiable information) from client computers.
- ITS implemented the University Compromised Machine Procedure, including a “compressed” process option, that balances the need for quick restoration of end-user service with the appropriate response to potential data breaches under relevant rules and regulations.
- The Campus-wide Hardware Procurement (CHP) program, launched in 2008, saves money on University computer purchases and provides central services for receiving and setup of computers. In 2011, CHP standard models were expanded to include “workstation” class machines suitable for compute-intensive activities such as high-end graphics rendering and advanced computational analysis and modeling.
- Clean Address has been implemented for improved Address accuracy and reduced postal rates.
- SciQuest eProcurement (“eMarketplace”) was implemented as part of a campus-wide effort to improve procurement efficiency and reduce costs.
- Banner Production Automatic Creation of Runtime Accounts for Employees has been designed and implemented.
- The NCSU Virtual Computing Lab (VCL) used by UNCG students for anywhere-computing environment was enhanced to allow students to store data at UNCG while computing at NCSU. This allows large data sets to be accessed using school-to-school networking speeds without students having to upload data from probably slower home networking connections.
- Since 2008, ITS has significantly expanded its support for online collaboration, communication, web, and multimedia technologies:
 - The Go-live of Google Apps for Education (“iSpartan”) in August, 2008, provided students, faculty, and staff with new tools for collaboration (Docs and Sites) and made available the University’s first supported text chat client.

- The iSpartan email/calendaring implementation also significantly increased the storage size of UNCG email accounts (from Lotus email quotas of 50 Mb for students and 5 Gb for faculty/staff to 25 Gb for everyone in iSpartan today).
- The July 2009 implementation of the Google Message Discovery (GMD) email archiving service for faculty/staff provided the University with 10 years of email retention to meet or exceed State of NC retention policies.
- UNCG's first supported video chat client was added to iSpartan in 2009.
- The iSpartan integration of 10+ additional Google tools in summer 2011 included popular collaboration and multimedia tools such as Blogger and YouTube.
- The iSpartan integration of Google+ in January 2012 provides the University with a new supported tool for two-way interactive audio/video as well as text chat, document sharing, and other collaborative features. By the second week of Spring 2012 classes, the product was already in use by a UNCG French class for language practice with students in France.
- The Qualtrics web survey tool university-wide license, application administration, training and support were implemented by ITS in early fall 2010. This tool is especially of interest to University researchers, but is used in other areas as well (e.g., administrative surveys).
- iTunes @ UNCG, which makes UNCG academic and promotional content available to all iTunes users, went live in February 2011. ITS led the UNCG iTunesU implementation and provides application administration and support for the service.
- ITS has implemented central support for the WordPress web content-management system (e.g., runs *Inspire.Change*. at <http://ure.uncg.edu/prod/inspirechange/>).
- Since 2008, ITS has significantly expanded support for mobile computing:
 - Support has expanded to include application support on personally-owned devices for students as well as faculty and staff; support is no longer limited to university-owned Blackberry devices.
 - Support for wireless connectivity and application assistance (e.g., Google Apps) is available in the Technology Support Center.
- ITS purchased the university-wide Blackboard Mobile Learn license and implemented application administration, support and training services in summer 2011. This service allows access to blackboard.uncg.edu in a mobile-device friendly format.
- ITS purchased the Blackboard Mobile Central license, and is implementing application administration, support, and training services. The first "UNCG Mobile" App will be released in Spring 2012.
- ITS has begun offering non-academic units the opportunity to save money by buying into academic concurrent license agreements where appropriate (e.g., ORED, FDC/Facilities Ops purchases).
- ITS has developed, implemented, and continues to enhance the TimeTrack project portfolio and data management tool:
 - This tool has become an essential resource for the university-wide prioritization process for projects requiring ITS resources
 - Data is used by ITS and division representatives for project planning/scheduling, and data is available to any faculty or staff member interested in the status of projects
- ITS has developed and continues to update the ITS Metrics website to communicate information such as service uptime and utilization to the University community.

E.2. Enhancements to Existing Services:

- New specialized networks were deployed to meet specific University needs, including:
 - The Dining Services Point of Sale Network which allowed transaction processing to move from dial-up to high speed network (Dining Services reported a 60% reduction in wait time for students at registers)
 - The Police Video Surveillance Network which allows the Police department to monitor video from cameras across the campus both at the station and in cars
 - The Physical Plant Human Safety Related Network, which is a secure, isolated single utility network that supports all of the campus building access security systems (card swipe) and building physical plant automated systems (HVAC)
 - The Declining Balance Network that allows students to use remote card swipe devices to conveniently pay for laundry, vending machines, and other services
 - The Middle College at UNCG network enables the eighth early middle college high school in the Guilford County School System to connect directly to County offices
- 801.11n wireless coverage was extended to the Bryan School, part of the Becher-Weaver warehouse, the new School of Education building, and to the new Joint School of Nanoscience and Nanoengineering building.
- SSL VPN service was extended to students giving them a more reliable tool for remote access to network file space.
- Thirty-eight building blocks have been installed or updated in the enterprise Blackboard environment since 2008 to significantly enhance functionality for faculty and students (examples are Class Climate, Starfish, and Blackboard Collaborate).
- ITS now provides university-wide licenses, application administration, support, and training for the Blackboard Collaborate (formerly Elluminate) online synchronous learning/collaboration tool. In 2011, the license was upgraded to a university-wide enterprise license, permitting use of the tool for online workshops, campus organization activities, administrative meetings and other uses beyond online classes.
- 6-TECH hours of support were expanded to include 5 – 10 pm Monday – Friday and 1 – 10 pm on Sunday to provide increased support for classrooms, distance learning and residence hall wireless.
- Full technology support was added for JSNN faculty, staff and students on the South Campus.
- New Banner File Upload servers were implemented for improved Banner database security (removed client logins from database servers).
- Server infrastructure was implemented for Banner data exchange with non-UNCG systems in order to improve security by isolating the Banner database server which eliminates direct connections to the outside world.
- Hardware was re-purposed to create improved and separated Banner environments for development and project Banner and ODS.
- The Student Laptop Program was expanded to include lower-cost hardware options, such as the Lenovo Edge laptop and slate-style tablets.

E.3. Infrastructure Expansion to Provide Additional Capacity to Meet Demand and Growth:

- Major power, cooling, and support infrastructure upgrades to the Bryan and McNutt data centers were completed (in cooperation w/Facilities) to increase capacity and extend the useful life of these critical facilities.
- Significant upgrades of campus telecom closets were performed to ensure physical security and University audit and regulatory compliance.
- New fiber optic infrastructure was installed between campus data centers to accommodate high speed network redundancy for all campus buildings and increase data center capacity.
- The data center network was upgraded to enable 40 Gbps (from 10 Gbps) transfer speeds inside the data centers to support new high speed private cloud and hosting services.
- The core, distribution and border routers were upgraded to 10 Gbps (from 1 Gbps) to position campus to leverage new high speed research network services such as Internet2
- Electrical meters were installed in the data centers as part of a joint project with Facilities Design and Construction to monitor the impact of greening initiatives in the campus data centers on overall campus power consumption reduction mandates.
- \$1.5M (13 miles) of new fiber infrastructure was installed between UNCG/NCA&T/South Campus to extend high speed/high availability campus network services to researchers in the Joint School of Nanoscience and Nanoengineering (JSNN) to provide the appropriate level of computing resources required to successfully compete for national awards and perform cutting-edge research activities at the school. *(JSNN provided funding)*.
- The Spartan Village Fiber Loop project (currently underway) will result in two miles of new fiber infrastructure to extend the UNCG campus network to the 25 planned facilities in the Glenwood Mixed-Use Village which will expand UNCG's campus along Lee Street. *(The project provided funding)*.
- Campus Internet (NCREN) redundancy was achieved with the implementation of dual Gigabit peering links to MCNC.
- The campus wireless computing environment was re-designed to deploy new Aruba wireless architecture that provides students, faculty, staff, and guests an enhanced wireless network with substantially increased bandwidth and access to the same services available on the campus wired network, while reducing infrastructure costs per square foot of coverage area and implementing encryption for better data security. This initiative resulted in significantly expanded wireless coverage in academic buildings and outdoor areas (from 30% to 85% campus coverage).
- Full coverage Aruba wireless services were extended to students in campus residence halls in early summer 2010. *(The Chancellor provided funding)*. The ITS Technology Support Center provides connection support to resident students and 6-TECH provides extended hours phone support for residence hall wireless services.
- ITS implemented Cloudpath Express Connect for automatic configuration of client devices to connect to the UNCG wireless network.
- Expanded wireless coverage led to significant increases in the demand for Internet usage. Demand and cost for commodity Internet services on our campus has tripled since 2010, which moved UNCG from a Tier 6 usage category with our provider NCREN (150 Mbps bandwidth usage commitment at \$27,442.34 annual recurring cost) to a Tier 4 usage category (475 Mbps bandwidth usage commitment at \$86,900.74 annual recurring cost). We expect to see another substantial jump in demand concurrent with the opening of the Glenwood Village residence halls.

- A multi-year enterprise server virtualization and transition to blade architecture initiative (still underway) has allowed hundreds of physical servers to be consolidated into a more cost-effective, disaster resistant and manageable virtual server blade environment. To date, server virtualization has provided significant hardware cost avoidance, while improving reliability of services and reducing the footprint of servers in our campus data centers, which positively impacts data center capacity.
- Significant upgrades to the enterprise Banner environment were completed to accommodate increased demand and growth, including 30 – 50% memory increases, 5x increase in CPU capabilities, doubled connectivity speed for Banner Database and Application servers to the Storage Area network (Genie, INB, WebFocus), and an addition of 32 Terabytes of SAN storage.
- The enterprise Blackboard environment has also undergone major upgrades to support increased demand and growth, which include doubling of CPU's and memory, creation of a mid-tier application cluster optimized for application delivery, and an increase from 300 GB of content storage to more than 2 terabytes. The overall capacity of the Blackboard environment has quadrupled.
- The F5 BigIP traffic management environment that performs load balancing and traffic optimization for the Banner and Blackboard enterprise environments has been upgraded to double the hardware capacity, improving the transaction limit to 2000 per second.
- Voice over IP infrastructure was deployed in 2009 that leveraged existing investments in network, fiber, and data center infrastructure to provision voice services in the most cost-effective way, while allowing rates to remain constant, with the exception of voicemail. Voicemail rates were reduced by more than 50%.