

## **Reduced Costs and New Service for Faculty, Staff and Students at UNCG**

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The financial crisis that our University has faced over the last several years (and will continue to face for the foreseeable future) has infused our normal determination to operate in the most efficient and cost effective way with an unprecedented sense of urgency. Across our division, we have taken an exhaustive look inward over the last 18 months seeking opportunities to refine our services and re-purpose our resources to ensure that we are providing the maximum value to our faculty, staff and students, and are being good stewards of the scarce dollars with which our University, our legislature, and taxpayers have entrusted us.

As the campus knows, we have undertaken a massive renovation of several legacy enterprise services. These service changes include transitioning our campus computing environment from Novell to Active Directory, outsourcing email from Lotus to Google, and transitioning from Centrex-based telephony services to Voice over IP. Some of the goals of these major initiatives have been to

- Increase baseline services (services one gets by default) to levels that better meet current faculty, staff and student needs, without increasing the cost to the University to provide the services
- Decrease (or hold constant despite considerable growth) costs charged directly to departments/divisions for additional services (above baseline) that faculty and staff need to accomplish the mission of the University

Completion of the Active Directory/General Computing Network (AD/GCN) and Gmail projects will allow us to sundown the Novell and Lotus infrastructure, and re-purpose both the equipment and staff who supported these legacy systems toward these goals. The changes described herein will allow us to help the University move toward addressing critical institutional challenges such as UNCG's mandate for energy savings and needs for additional physical space.

These changes apply only to the enterprise services that were previously offered in the Novell and Windows environments, as well as selected communications services. These changes do **not** affect other enterprise services such as Banner or Blackboard.

### **I. Network File Storage (home directory and department directory network file space)**

## a. The Challenge

A lesson learned from the field in the AD/GCN and Identity Finder projects is that a significant number of UNCG faculty and staff do not currently have an adequate amount of space to store their files and data on the University network (instead of their local workstation), as required by University policy when storing University restricted data.

The challenge we have historically faced in offering our clients the additional network file space they need is that we have had only one very expensive kind of storage to offer – high performance/high availability storage. This storage is fully redundant in every component of the architecture and mirrored between data centers. That means this design requires two times the amount of expensive equipment to provide the service. This kind of high availability/high performance design is required to sustain enterprise applications such as Banner and Blackboard, but not general end-user network file space. By redesigning this slice of our total service offering (end-user file space, not Banner or Blackboard), we can offer slightly reduced redundancy (where risk is minimal) and realize significant cost savings. Two critical characteristics can be altered in the design of enterprise network file storage:

- **Recovery Time** - how much time can I afford not to have access to my file space in the event of an outage?
- **Recovery Point** - how much data can I afford to lose in the event of an outage?

In the new UNCG network file storage model, redundancy between data centers will be eliminated, which potentially increases recovery time, but **does not alter the recovery point**. In the new model, home directory, department directory and special volume file space will no longer be mirrored between the Bryan and McNutt data centers. This means that home directories, department directories and special volumes will live on equipment located in either Bryan or McNutt, but not both. Equipment within each data center will remain fully redundant and the enterprise backup strategy for the data will remain the same as it is today, as shown in the following table:

Service Loss Characteristics	Network File Storage (New)	Network File Storage (Old)
Individual Hardware Component Failure	Zero data loss, Zero recovery time	Zero data loss, Zero recovery time
Single Data Center Failure	Zero data loss, <b>Recovery Time = length of time to restore data center</b>	Zero data loss, Zero recovery time
Complete UNCG disaster – no functioning facilities	Maximum 10 day data loss. Restore from off-site backup tapes. Restore according to University DR Plan.	Maximum 10 day data loss. Restore from off-site backup tapes. Restore according to University DR Plan.
Cost to Provide	<b>\$3.15 per Gb per year</b>	\$16.39 per Gb per year

In the new model, if one of the University data centers has a four-hour outage that affects network storage, users and departments with network storage located on equipment in that data center (half of campus) would not have access to that file space for four hours. The affected users would not lose any data stored in this file space, but would not be able to access the file space until data center services were restored.

Over the last five years, UNCG has made significant investments in improving the campus data centers and, while data center outages do occur, the occurrence rate is low. Since July 2009, there have been two instances of data center service outages that would have impacted network file storage, if the new model had been in place. The first service outage on 10/28/2009 lasted 56 minutes. The second service outage on 2/10/2010 lasted 53 minutes.

Accepting the risk of service outage introduced by breaking the mirrors effectively doubles existing campus network file storage capacity, at no additional cost to the University. We believe this is an opportunity to right-size one of our core service offerings, and that the benefit of increased network disk storage capacity and decreased operational costs far outweighs the risk of service interruption introduced by breaking the mirrors between the two campus data centers.

## I. Network File Storage

### b. Increasing Default Quota for Users in the AD/GCN

In the current Novell environment, faculty, staff and students are entitled to 1 Gb of home directory network storage space, which they can request to expand up to 2 Gb at no additional cost to their home department. Once faculty, staff and students have migrated into the new AD/GCN environment on the new network file storage model, they will be entitled to 5 Gb of home directory network storage space, without additional cost to their department.

In the Novell environment, departments have historically had a network storage quota based on the number of departmental staff (1 Gb x the number of faculty/staff in that department, plus 1 Gb). In this model, a department with 50 faculty and staff members would have 51 Gb of department network storage space available for use at no cost. Once a department has migrated into the AD/GCN on the new network file storage model, it will have up to 200 Gb of department network file storage available for its use at no cost.

	AD/GCN Environment Quota (new)	Novell Environment Quota (phasing out)
Home Directory Network Storage Space for every individual F/S/Stu	5 Gb	1 Gb
Department Network Storage Space	200 Gb	1 Gb per fac/staff + 1 Gb

Note: Today, average home directory size is .25 Gb with 18 individuals using in excess of 5 Gb. Today, average department directory size is 14 Gb, with no department using over 200 Gb.

Quota for specialized file storage will also be increased as follows:

	AD/GCN Environment Quota (new)	Novell Environment Quota (phasing out)
Windows Web & Database File Space *	5 Gb per department	NA
MS SQL Database Space	5 Gb per department	1 Gb per department
Streaming Media File Space	5 Gb per department	NA
AFS File Space *	5 Gb per department or user	NA

\*Expected transition to AD/GCN file space Summer 2011

**Please note that quotas are not transferrable between storage types.**

## I. Network File Storage

### c. New Costs for Purchasing Additional Disk Space for Users in the AD/GCN (above new user and department quotas)

Completion of the AD/GCN migration and faculty/staff email outsourcing to Google projects will allow ITS to reclaim and repurpose the network storage space that was utilized by Novell and Lotus. Reclaimed network storage combined with storage gains from the re-architecture of user and department file space described above will allow ITS to offer faculty and staff new and significantly more cost effective options for purchasing additional network storage.

Effective immediately, four new cost-effective options for purchasing additional network file storage are available to UNCG faculty and staff in the AD/GCN, as follows:

Network Storage Service Options	AD/GCN (new) Total Cost per gigabyte <b>per year</b>	Novell (phasing out) Total Cost per gigabyte <b>per year</b>

<b>SPARTANDRIVE:\\ Storage</b> Additional Home Directory or Department Directory Storage may be purchased by faculty and staff. This storage has enterprise class backup (daily).	\$3.15	\$16.39
<b>&lt;YouNameIt&gt; Storage</b> Faculty and staff can choose to purchase special-purpose storage distinct from their Home Directory or Department Directory with enterprise (daily), mid-level (weekly) or basic (monthly) backup.	\$3.15 (enterprise) \$2.15 (mid-level) \$1.65 (basic)	NA

For legacy “Special Volumes” offered in Novell and early AD/GCN migrations, ITS will assist in migrating data from current Special Volumes to the Department Directory space, or to the <YouNameIt> Storage volume. Because of the increase in Department Directory quota, some departments may find that their Special Volume can now be accommodated within their Department space, at no cost to the department. Details will be shared with affected units.

New options for purchasing specialized file storage will also be available as follows:

	<b>New Model Total Cost per gigabyte <u>per year</u></b>	<b>Legacy Model (phasing out) Total Cost per gigabyte <u>per year</u></b>
Windows Web & Database File Space *	\$4.00	\$16.39
MS SQL Database Space	\$4.00	\$16.39
Streaming Media File Space	\$4.00	\$16.39
AFS File Space *	\$3.15	\$16.39
Additional Virtual Server Space (data drive)	\$6.00	\$16.39

Historically, ITS has not enforced quota on specialized file storage, but will begin doing so on July 1, 2011, concurrent with full implementation of the new cost model shown above. Once the new cost model is in effect, and if these data are kept in special volumes, five departments will incur charges in annual cost for the space, with four being under \$72 and the fifth being \$780.

Beginning July 1, 2011

- clients who purchase space beyond the baseline will be billed on a 12-month cycle that begins July 1 each year
- clients may not purchase multiple years in advance
- mid-year purchases will be prorated as follows:
  - clients who request space between July 1 and December 31 will be billed a pro-rated amount for the current fiscal year
  - clients who request space between January 1 and June 30 will be billed a pro-rated amount that will be added to the next fiscal year bill

In order to respond to the departments with significant and urgent network storage needs, ITS will offer a one-time option for 2011-2012 only:

- clients who buy space as of March 1, 2011 can choose to pay for the 3 months remaining in the 2010 – 2011 FY
- OR**
- pay upfront for 15 months (the months remaining in this FY and the next FY)

## II. Application Hosting

ITS provides centrally managed hosting solutions for University department applications with server requirements. ITS provides multiple platforms (Windows and Red Hat Linux) geared to meet clients’ computing needs. This service

provides clients with a reliable, monitored, secure and managed solution. ITS provides hosting of servers (both virtual and physical) in the University Data Centers. Clients may use servers to provide applications to their departments. ITS hosts databases for University departments. Available databases are: Oracle and Microsoft SQL. For departments requiring MySQL and LAMP stack services, a new webhosting service option will become available in mid-2011.

Changes in data center server architecture will allow ITS to offer faculty and staff new and significantly more cost effective options for application hosting, effective July 1, 2011, as follows:

<b>Virtual Server Cost</b>			
Includes 40 Gb OS drive (Windows or Linux) + Enterprise Backup + Enterprise Monitoring			
<b>Size</b>	<b>VM Size in Gb</b>	<b>New Cost <u>per year</u> Effective July 1, 2011</b>	<b>Current Cost <u>per year</u></b>
M	1	\$ 450	\$ 1,060
L	2	\$ 650	\$ 1,490
XL	4	\$ 1,000	\$ 2,350

Additional CPU's (more than the 1 provided by default) cost \$200 each.

A summary of features for the application hosting service follows:

- Choice of operating system, Windows 2008 or Red Hat Linux RHEL version
- Administration of the server
  - ITS provides complete system administration for all virtual servers (includes OS patches and updates)
  - ITS performs enterprise class system backups
  - ITS can provide application engineering support, or simply function as a hosting ISP with clients managing their hosted application with complete administrator/root level access
- Disk storage on raid level volumes with a mirrored copy in opposite data center
- Redundant server hardware – hardware exists in McNutt and Bryan
- Capacity management – should the server become taxed, virtual server will be moved to server with appropriate resources

### III. Reduced Cost for Additional Network Data Ports

Every UNCG faculty and staff member is entitled to 2 wired network data ports operating at 1 Gb speeds in his or her office, at no cost to the department. Additional ports may be requested for a fee. This data activation fee is the actual cost to the University of a port on a network switch.

Currently, the network data activation fee is \$250 per port. Over the last five years, ITS has refreshed the network infrastructure on our campus, as well as leveraging mechanisms such as equipment trade-ins, to stabilize our operational costs despite significant network growth. These efforts have enabled us to reduce the actual cost of a single port switch as follows:

<b>New Additional Per Port Charge (effective immediately)*</b>	<b>Old Data Activation Fee (no longer in effect)</b>
\$175	\$250

\* As before, additional labor costs are charged if a new data outlet (“wall jack”) must be installed, or an existing one moved.

Effective immediately, the data activation fee for additional data ports will be replaced by a port charge of \$175 each, plus the cost of installing additional wiring if required (if the wall jack doesn’t already exist).

### IV. New Teleworking Services Bundles for users in the AD/GCN

Given that the University is faced with significant energy consumption and cost reduction mandates, as well as space constraints on the main campus, University leadership has been interested in the impact of teleworking in helping to achieve our goals and mitigate some constraints. The investments we have made in wired and wireless networking have allowed us to build an architecture that can support a very robust and full-featured teleworking experience for our faculty and staff. UNCG ITS is pleased to announce the upcoming release of a new remote access service into the AD/GCN computing environment. The Teleworking Services Bundles offered by ITS provide UNCG faculty and staff with:

- the ability to work from a remote location -- work from home as if you are in the office -- answer your phone and access your network files
- direct access to the GCN and corresponding Enterprise Services like email, Banner, and network file space -- just plug in your AD/GCN-imaged device and you can access the same services you can access from on-campus
- a hardware-based alternative to SSL VPN -- once you connect to the network via the remote access device, you have access to the same set of services that are available on the wired UNCG network -- no need to use a VPN client when connecting through the remote access device
- built-in wireless access to the GCN -- convenient access method enables personnel to set up a home office quickly and easily
- an optional software-based telephone -- either an extension to your current UNCG office phone or a new UNCG phone number

#### REQUIREMENTS

- AD/GCN laptop or desktop computer
- An active Internet connection, through a DSL or cable modem
- An electrical outlet for the remote access device
- A headset/microphone for the softphone, if selected

#### ANNUALLY RECURRING COSTS

- Teleworking Bundle 1
  - Comes with remote access device; no telephone option selected
  - \$ 210 per year
- Teleworking Bundle 2
  - Comes with remote access device and a softphone with the same phone number as your office phone
  - \$ 235 per year
- Teleworking Bundle 3
  - Comes with remote access device and a softphone with a new phone number
  - \$ 500 per year

#### INSTALLATION COSTS

- Remote Access Device
  - Faculty and staff can opt to install the remote access device themselves for free
  - On-site installation
    - available within a 25-mile radius of campus
    - \$75 per hour -- 30-minute minimum
    - the UNCG employee must be present at the time of installation
- Softphone
  - The Cisco IP Communicator will need to be installed on the faculty/staff laptop or desktop
  - New phone number: \$80 setup + Time and Materials at current labor rate

- Same phone number: Time and Materials at current labor rate