Synology®

A NEW NAS Experience

Equipping the Classroom for the Digital Age

Storage, Sharing, and Backup for Education

May 2010

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The Problems

Like most organizations these days modern educational environments are faced with an ever-increasing need for data storage. Records need to be kept; students receive and submit their assignments electronically; grades and notices are posted via secure online portals; lectures and videos are stored and streamed. With the growing proliferation of e-book readers, even books can be stored and distributed digitally.

The traditional method of managing the data load would be to run a dedicated file server or a yet more complex server arrangement. This method can be costly to set up and maintain, owing to the complexity and price tags associated with the licensing and level of IT knowledge required.   This would be no less so for the issue of backups, requiring both client software and someone to configure it.

Schools of all sizes are experiencing growing pains when it comes to managing the ever-growing collections of digital files. It would be a challenge for any school to find an affordable, easy-to-manage solution for file sharing and backups; all the more so, for a solution that will integrate into existing network and/or domain infrastructures, while providing easy scalability.

The Solutions

As technology has progressed, a newer, more cost-effective solution has evolved- Network Attached Storage (NAS).   Network-attached storage, or NAS, is a self-contained computer on a network which functions similarly to a server, with particular expertise in file sharing and storage management. Often used in small and medium sized businesses, NAS fills the void between direct-attached storage and enterprise-level servers. While features differ among brands, common features include a file and print server, backup target, and multi-media services.

By deploying a Network Attached Storage solution, schools are poised to realize significant cost savings in hardware, software, setup, and maintenance. NAS offers backup, file sharing, media sharing, and web hosting, all from an easy to use network appliance. This introduces significant savings over a traditional server environment in that it does not require CALs (Client Access Licenses) or a dedicated IT staff to administer.

Synology DiskStations are a robust line of Network Attached Storage servers specifically designed to solve storage and file sharing problems such as those faced by educational institutions. Even the most demanding schools can benefit from Synology's offerings: local and remote file sharing, streaming video and lecture content, hosting student and/or instructor websites, backing up important administrative data, controlling access permissions, and even ADS domain integration.

Synology DiskStations boast several of the most important aspects that educational organizations seek in storage/file server solutions: reliability, scalability, and affordability. Synology offers powerful and feature-rich software, embodied in the award-winning DiskStation Manager 3.0. Synology offers configurations to fit every budget. Updates to the software are free and easy to apply, making Synology an ideal solution to complex data management solutions.

File Sharing

The Synology DiskStations easily perform the file sharing tasks of more expensive servers. Supporting a variety of common protocols such as Samba/CIFS, AFP, and NFS, the DiskStations natively support Windows, Mac, and Linux operating systems. Windows computers can easily map shared folders as network drives. Mac and Linux computers can perform the same with the simple "Connect to Server" function.

FTP and HTTP(S) provide access for remote users, a feature increasingly important to administrators, instructors, and students alike. Administrators can perform maintenance tasks, share, and access files from off site. Teachers and students can exchange and store assignments or common materials from anywhere with internet connectivity.

With the User Home function, the DiskStation can automatically create a private folder for each user created on it, accessible only by the user and the admin. This private share is easily accessible from within the school's network or remotely. The simplest method to connect to this externally is to use File Station, an included utility to allow file and folder manipulation through most browsers.   If security is a concern, it is trivial to set up HTTPS to run it over an encrypted connection.

ADS and ACL SupportSupport

DiskStation Manager includes ADS support for domains up to 100,000 users. The built-in wizard makes it easy to integrate into the domains of nearly any size for universities and schools. Once joined to the domain, the permissions can be set using the same intuitive interface used to set local permissions. Even non-IT personnel can easily assign privileges, create private shares (via the User Home function), and back up computers using ADS users and groups.

To assist administrators getting the most out of their domains, Synology has added support for Windows® access control lists (ACLs). ACLs allow for NTFS-style privileges to be set down to the file level, for more granular control.   ACL privileges are set using familiar Windows methods, reducing learning time.

Backup

Data loss can be crippling to any institution, but especially so to schools that may have fewer IT resources to recover the losses. One of the more common methods to back up data has been to use direct attached storage (DAS), such as a USB drive, connected to each workstation. This method makes centralized monitoring of backups more difficult.

Synology DiskStations will work effortlessly to back up Windows computers (via the included Data Replicator 3) or Macintoshes using Time Machine. Unlike traditional DAS setups, any Synology DiskStation using more than one disk can create redundant RAID arrays to protect your backups against disk failure. In addition, a centralized backup location reduces the number of drives that need to be monitored.

Windows Backup with Data Replicator 3

Data Replicator 3 is a backup utility designed to work on Windows workstations, and is included with the DiskStation. It requires no licenses, and can be installed on as many client computers as need backing up on the network. Backups can be configured using one of three modes: Immediate, Sync, or Scheduled.

The Immediate option performs a one-time backup of the specified folders. Sync moni-

tors for changes in the specified files and folders, synching them in real-time. A scheduled backup will begin with a full backup, following up with changes at the scheduled time. With the option to have Data Replicator 3 start up automatically, once configured, the user may not need to think about the task again. The administrator or user can set it to send email notifications to monitor the backup situation.

Backup Options with Data Replicator 3	
Immediate	Performs a one-time backup of specified folders.
Sync	Data Replicator 3 monitors changes to backed up folders and actively syncs with the DiskStation for real-time backup
Scheduled	Backups can be scheduled by week, day, and time to automatically occur.

Mac Backup with Time Machine®

Where Data Replicator 3 is provided to back up Windows clients, Macs have Time Machine already built in. DiskStation Manager will work as Time Machine a backup target in addition to Windows backup support. To configure Time Machine to target a Synology DiskStation, simply select the target folder from a drop-down menu in DSM 3.0. Then, enable Time Machine in Leopard or later and choose the destination folder previously selected.

DiskStation Backup

For external backups, tape drives used to be the norm. With the ubiquity of USB drives, it is easier than ever to run backups to a dedicated USB drive for secure storage (often rotated out to a fireproof safe or off site). As with other backup methods, the backups can be scheduled during the off hours so that performance is not impacted during peak times.

Another simple backup method is to back up to another DiskStation, either over the internet or across campus. This method has the added advantage that the drives do not require the same level of manual intervention (in the form of changing out drives for storage). Network backups can utilize SSH encryption if necessary for an added level of privacy.

Whichever method is used to back up the DiskStation, the task creation is painless using the wizard in DiskStation Manager 3.0. Either method starts with the same wizard, the difference being that one is a local backup, as opposed to a network backup. Both methods make it easy to remain in control of the backups.

Storage Expansion

Schools are faced with multiple forces pushing their storage needs. Perhaps the more obvious of these would be the increased availability of multimedia offerings to students and teachers. In addition, the flow of incoming and outgoing students is unending. Synology DiskStations offer multiple methods to increase the storage pool available.

The first, and perhaps most straightforward, method is referred to as Vertical Expansion. This works replacing disks (one at a time) with larger disks, then expanding the volume to take advantage of the extra space. This method works well when the DiskStation is already using the maximum available number of disks. Synology DiskStations currently support disks up to 2TB in size.

The second supported method is referred to as Horizontal Expansion. This is nothing more complicated than adding more disks to a volume and reshaping the volume to take advantage of the increased space. An example of this would be starting with 3x 2TB hard drives in a DS1010+ in RAID 5. This would yield approximately 4TB of usable storage. Adding 2 more drives of the same size, it is possible to expand the volume to 8TB.

The third method is referred to as Plug and Use Expansion. Selected models (such as the DS1010+ or DS710+) can take advantage of the DX510; a 5 disk expansion unit unique to Synology. The DX510 can add up to 10TB of additional capacity to the DiskStation in just a few clicks. In rack mount configuration, the RS409+ and RS409RP+ will work with the RX4 (a four-disk rack mount expansion) in the same way.

The fourth, and perhaps least obvious, method is System Migration. This works by migrating to a faster and/or bigger system. This would begin by performing a configuration backup (to preserve user and permission information). Next the disks would be placed into the new DiskStation and the Synology Assistant used to reload the firmware. After restoring the configuration backup, the new system would be ready for use with an absolute minimum of downtime.

Additional Beneficial Features

Surveillance Station

The ability to secure important assets, both digitally and physically, has become critical in today's world. Monitoring buildings and systems is an easy way to gain peace of mind and

deter theft and vandalism. Setting up a building surveillance system can be done simply and affordably with the help of Surveillance Station 5, a program integrated into every DiskStation.

Surveillance Station 5 makes it affordable to tie IP cameras into a single centralized portal, without requiring a dedicated NVR. IP cameras obviate the need for custom configurations or coaxial cabling, working instead with existing network infrastructure. For an even faster installation, wireless IP cameras are supported, too.
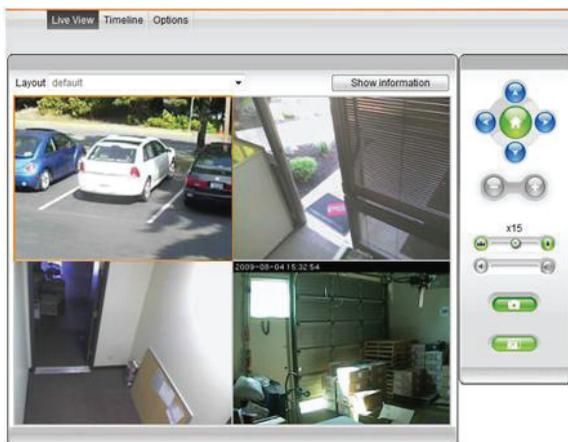
Surveillance Station 5 offers viewing of multiple cameras at once, remote pan/tilt/zoom control, remote access, motion detection, and audio recording. It is possible to schedule surveillance and recording to avoid wasting storage.

Web Hosting

All schools and organizations need websites these days. The school website will be the first place looked to by parents and students for information. Synology DiskStations will allow schools to host their own sites, avoiding the costs of third-party hosting. Using Web Station (a tool included in the DiskStation Manager) a single DiskStation can host up to 30 sites. The Web Station is also compatible with a number of CMS software such as WordPress, Drupal, and Joomla, making it easy to create, publish and host web sites at no additional cost.

Photo and Video Sharing

Photo Station makes it easy to share photos and videos with others. Schools, instructors, classes, or students can host photos or videos in browsable albums; then allow access to the public or only to selected users.

iSCSI

iSCSI, once a SAN-only technology, is now available at a more reasonable price. A single DiskStation can host up to 10 iSCSI targets to effortlessly extend the usefulness of existing servers by expanding their available storage. The iSCSI targets can sit on top of the RAID volume for built-in redundancy.

Real World Examples

Saratoga High Connects Teachers & Students, Enables Digital Classroom

Mariam Fan of Saratoga high School in Saratoga, CA, needed to share data effectively with both teachers and students within her language department.   With their previous solution, data from one class period could not be shared with another period, and students did not have an easy, convenient place to store their data. Neither were students able to create private web pages for their school projects.

After implementing a DS209 and 2x500GB hard drives, Ms. Fan was able to integrate with an existing Windows ADS database so permissions were already configured and they were up in very little time. With the User Home function enabled, each student was also given a private folder to store their schoolwork as well as a private web hosting folder that allowed each student to produce and maintain their own website hosted from the DS209. Photo Station 4, included with DSM 2.3, gives Ms. Fan and her students an easy way to share photos in a polished, easy-to-use interface. For complete details regarding connecting to ADS from a DiskStation, visit the SynologyWiki by *Clicking Here*.

Labs at Clemson University Gain Control, Simplify Access to Data

Brad Rauh, at Clemson University, needed more readily accessible and manageable storage than was widely available on the university network for his lab. To use the available resources would have required him to work through the IT department, resulting in extra strain on the department and the delays this would have entailed. To function for him, it had to be easily scalable, affordable, and easily manageable. To meet these needs, Brad implemented the DS1010+ and provided his network with simple file sharing, fast and responsive performance, and access to files from not just his lab, but elsewhere across campus.

Using minimal IT resources with an easy setup and maintenance and with a price under $1,000, the DS1010+ was the perfect answer to file sharing across a large network. In the fast-paced university atmosphere, the features and expansion options included provide Brad the flexibility to grow on-the-fly and provide maximum uptime to his users. The easy steps to setup a DiskStation are outlined on the SynologyWiki. To read, *Click Here*.

Medical College of Wisconsin Streamlines Backup, Protects Vital Data

At the Medical College of Wisconsin, Jason Long needed an inexpensive replacement that would also streamline the backup process. Backing up crucial medical and administrative documents is a must in both the healthcare and education industries and DiskStation Manager 2.3, included with every Synology DiskStation, streamlines the process. With just a few clicks, a volume can be created and mapped as a drive visible to the network. Using Synology's own Data Replicator or Time Machine compatibility, Backup Exec, TrueImage, or any other backup suite that can see a network resource as a mapped drive makes DiskStations flexible and simple to setup and integrate.

Jason chose the DS210j, an affordable 2-bay with performance to meet his needs as a backup target. Backups require very little human intervention as they occur automatically and occasional maintenance is the only task required. As a result, time and effort are saved while improving the backup process and staying well within budget. Detailed steps on configuring a backup task can be found on the SynologyWiki. To view, *Click Here*.

Summary

There are plenty of challenges facing today's educational systems without having to worry about their data, too. Synology DiskStations provide an affordable, dependable, and simple solution for everything from file sharing to backups. That it does not require a system admin to configure and run allows educators and administrators to focus on the business of education rather than their networks.

Synology DiskStations offer excellent value to schools through the price/performance ratio, the ease of configuration and management, and the included tools and applications. Synology allows schools and teachers to maximize their productivity, by allowing them to focus more on their projects than on their technology. Synology gives assurance, featuring free US-based technical support by phone and email, and competitive warranties.

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