



The Many Sides of Quantum's StorNext

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Management Summary

An ancient Indian tale tells of six blind men who approached an elephant. One blind man touched its side and thought it was like a wall. Another touched its tusk and said it was similar to a pipe. The one who touched its tail thought it was like a rope. A fourth blind man touched its leg and thought it was like a pillar. The one who touched its ear thought it was like a fan. The last blind man touched its trunk and proclaimed it was similar to a tree branch. Each blind man thought that he was correct. They argued among themselves for a long time. Finally, a very wise man approached them. He explained that there was no need to continue arguing; they were all correct. Each blind man had touched a different part of the elephant. The elephant was like all of the things that each blind man described. Each blind man only focused on one part of the elephant and had not experienced the whole elephant.

Storage software is like the Indian tale. Sometimes it is just like one part of an elephant – it does one task well. For example, it may do a great job of backing up data or archiving data or replicating data from one location to another. Other storage software products that at first appear to do just one thing often can do several things. *Quantum's StorNext* software may appear, like the experience of one of the six blind men, to do one thing. To some storage administrators, StorNext facilitates file sharing. To others, it allows easy expansion of storage capacity. Still others view it as a way to migrate data from one storage tier to another. Others view it as a way to reduce the amount of storage required to save storage costs. Another group views it as an archiving solution. As the wise man explained to the blind men, StorNext is each of these things.

What category do we use to describe this multi-functioned software? Do we group it with archiving solutions? Or do we group it with other file sharing software products? Or do we narrow its categorization to data migration products? **Placing StorNext in any one category does not do justice to its capabilities. In fact, StorNext spans multiple categories of storage software.** Read on to find out more about this new version of StorNext.

About StorNext

StorNext was first developed by *MountainGate Imaging Systems Corporation*. In 1999, *ADIC* purchased MountainGate and began marketing StorNext to its customers. Later, *ADIC* purchased *Rocksoft* to acquire its data reduction software. Last year *ADIC* was acquired by *Quantum*. Now *Quantum* has integrated the data reduction technology into version 3.0 of StorNext. The details follow.

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High Performance File Creation

Many industries need to ingest large amounts of data or images that are analyzed by numerous researchers. For example, a meteorological company analyzes geospatial images that are transmitted from weather satellites or airplanes to monitor and predict weather. We will use the processing and workflow requirements of this company to illustrate the many features of *StorNext*.

One of *StorNext*'s core components is its *StorNext Shared File System (SNFS)*, which supports data sharing between different operating systems. In the case of our meteorological company, images are captured by Linux and SGI systems. SNFS simultaneously stores images from the Linux servers and the SGI servers into a single repository – at speeds up to gigabytes per second.

To users, an SNFS storage pool looks like a single, local disk volume (e.g., **D:**); internally, though, it may be composed of multiple arrays and types of disk. This allows images that require higher performance to be stored on Fibre Channel disks while other images that do not require such high performance levels can be stored on lower cost SATA disks. The process of guiding files to the right type of storage, called *affinity*, is handled transparently by *StorNext*. Affinity minimizes management overhead and user complexity, and reduces storage costs by storing only those images that require high performance on more expensive, higher-performance storage devices.

High Speed File Processing

In many cases, images used to generate a final weather model are several gigabytes in size, and it takes time to transfer them over a network to servers that will process the images. *StorNext* supports a Fibre Channel environment, allowing the processing servers to have direct, low-latency access to the repository. The processing server retrieves images at very high speeds since *StorNext* utilizes up to 90% of the available bandwidth of the Fibre channel. Once the final weather models have been generated, they can be stored in the original repository or a second SNFS repository for distribution and long-term retention.

SNFS is file type agnostic – that is, SNFS repositories can store images regardless of

format. In our example, the initial meteorological image can be stored and then transformed into different resolutions and formats to suit the final distribution point. This allows data centers flexibility to store all images in one repository and make them available to every server.

Accessing the Processed Images

Many different users can now access the processed images, stored in the second repository, for viewing or analysis. Web servers can provide secure access to images in this common repository for users in many different and remote locations, eliminating the need to ship these images.

Archiving the Files

Over time, older images are accessed infrequently. Continuing to store these images on higher-cost, high-performance disk system is costly and impractical. *StorNext* supports multiple tiers of storage including different classifications of Fibre channel and SATA disks, network attached storage, automated tape libraries, and offsite tape storage. Based on defined policies, the *iMover* technology copies these images automatically between different tiers of storage.

StorNext's archiving component, called *StorNext Storage Manager*, is tightly integrated with SNFS. This integration makes it easy to migrate data between storage tiers transparently to the application.

Protecting the Files

New images are continuously downloaded and processed in this environment. The result – the repositories continue to grow ... and grow ... and grow in size. Backing up these large repositories can take a very long time. In fact, with a limited backup window, it can be impossible to back up all of the files in an environment.

StorNext provides data protection services to solve this problem for the files that it manages. When an image or file is entered into the *StorNext* repository, the Storage Manager uses the policies set up by the administrator to determine the proper level of protection for that file. For example, a newly created file is initially stored on high-performance disk. Once the file becomes “idle”,

StorNext automatically creates one to four copies of the file. Typically, one copy is stored on local disk while the second copy is transmitted to a remote tape drive for offsite storage. These copies are created in parallel for simplicity. Since StorNext creates and manages multiple file copies, the traditional backup process for these files can be eliminated.

The original file remains on primary disk storage until the high level watermark of the primary storage is reached. When the watermark is reached, the primary disk copy of the file is removed, leaving the secondary disk and remote copy of the file intact for data protection and disaster recovery.

Suppose an image created several months ago has been moved from primary disk storage to lower cost tape storage. Now, researchers need to review the weather images from a storm that hit the Florida coast five months ago. When the user attempts to access the file, StorNext automatically begins the process of restoring the file back to primary disk so it can be used. The researcher (and the application) is not aware that any data migration has occurred. Through the integration of file system and archive management technology, data movement is more seamless than with standalone data movement products.

StorNext takes data protection to additional levels. For example, StorNext can manage multiple versions of the same file, “undelete” files that were accidentally deleted, or run integrity checks on files to ensure that the files were not corrupted.

New Features

Previous versions of StorNext provided high-speed file ingestion sharing, and automated data migration. This latest version of StorNext extends data sharing and further reduces storage costs.

- The data de-duplication technology, originally developed by Rocksoft, has now been integrated into the StorNext software. Now, files and images are divided into small variable length segments when they are ingested. Each segment is compared to existing segments and redundant segments are eliminated. Eliminating repetitive segments can reduce the amount of storage required, and that reduces storage costs dramatically.

- StorNext has always supported Fibre channel environments. Now support is expanded to include servers on a local area network (LAN) via clustered gateways.
- Another new feature allows administrators to expand storage capacity dynamically. New storage systems can be added to StorNext without interrupting the system. This new feature makes it easy to replace aging disk systems with newer disk systems in StorNext’s environment. Files stored on the aging disk system can be migrated to the new disk volumes within the same shared storage pool. When the migration completes, the older disk system can be disconnected from StorNext without interrupting operations.

Conclusion

Should StorNext be classified as a data migration solution? Or should we classify it as an archiving solution? Or is it a file sharing solution? We could, possibly, classify it as a data reduction solution.

The problem with classifying StorNext into any one of these categories is that it ignores its other features. StorNext spans many of the categories that we traditionally use to describe software. **StorNext may be difficult to classify, but its integrated set of functions brings many benefits to the data center.**



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