TIERED STORAGE

Achieving Storage Optimization and Efficiency

Author: Marketing

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Introduction

IT organizations today are facing relentless growth of data volumes. Applications are creating larger files and companies rarely delete data. The price of hard disk storage has decreased significantly over the last 5 years, thus, the trend has been to buy more disk based storage. This solution, however, creates complex and cumbersome storage environments that require more maintenance, management and money to operate. Buying ever increasing disk capacities breeds inefficiency.

IT departments often set aside large amounts of free storage space to prevent capacity failures. Analysts report UNIX and Windows storage utilization rates from 20 – 50 percent. On top of this, consider that 80 percent of the data in these systems has often not been accessed in months or even years. These architectures waste system resources, require more attention from administrators, increase backup costs and take longer to restore from failure.

By addressing these inefficiencies, organizations can tap into unused storage space they have already purchased, streamline data protection and disaster recovery operation, consolidate hardware and reduce operational overhead. To accomplish this, there are only a few viable options, delete data or move it.

According to Gartner Research Inc. it is predicted that that data will grow 800% over the next five years, with 80% of it unstructured.

Data deletion will free up significant amounts of space, but is not always ideal. Deletion is a manual process that carries the risks of data loss and unpleasant legal ramifications, as many regulations prevent data from being deleted or destroyed. IT Directors are constantly reminding users to delete content that they no longer need. They are reluctant to delete data for users, knowing they could be criticized for poor judgment.

If data is to be retained for long periods of time, storing it automatically on the correct performance and cost storage technology is a massive advantage for IT Directors. Data is still available and accessible by the user or application that created it. Time to access specific data may change, but this is a reasonable overhead to keep primary storage plus backup from growing out of control.

The Solution

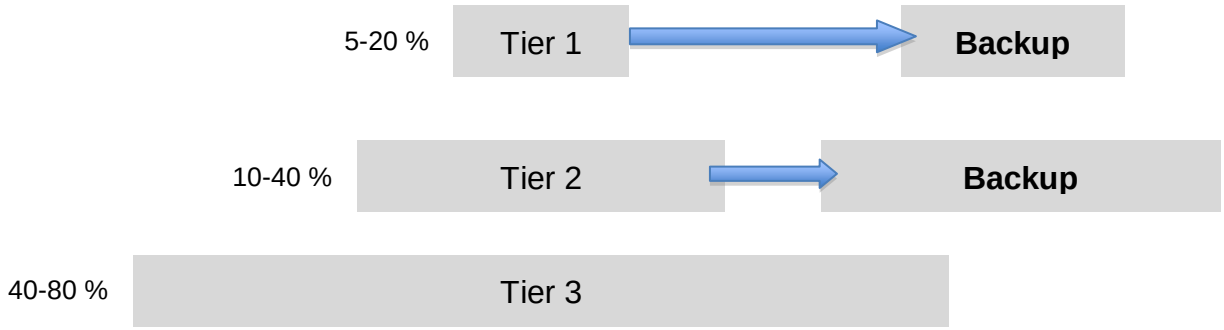
Storage management through the utilization of tiers of storage has brought about a means of managing data over a network in which the data resides on specific storage devices based on the value of the data.

Intelligent storage management software that facilitates the management of files across storage resources to house data in the most appropriate media given its usage patterns and value to the organization is the basic concept behind tiered storage management.

Heavily used or mission-critical data is stored on high performance RAID, non-mission-critical data that still requires good availability and performance can be on lower-cost, lower performance RAID, while unchanging, infrequently accessed data can reside on an archive tier, using less costly removable media, such as tape or optical.

A successful tiered storage solution will also enable simple access to all data, preferably with little administrative assistance.

Tier 1	Production / Primary Tier	Mission critical / frequently changing data SAN or NAS Disk Arrays using FC or SAS drives
Tier 2	Production / Secondary Tier	Non-mission critical, infrequently changing data NAS or Direct Attach Disk Arrays using SATA drives
Tier 3	Archive Tier	Active, long-term data preservation and compliance Removable media libraries (tape, RDX or optical) Object Storage and Hybrid Archives



Policy-based Migration

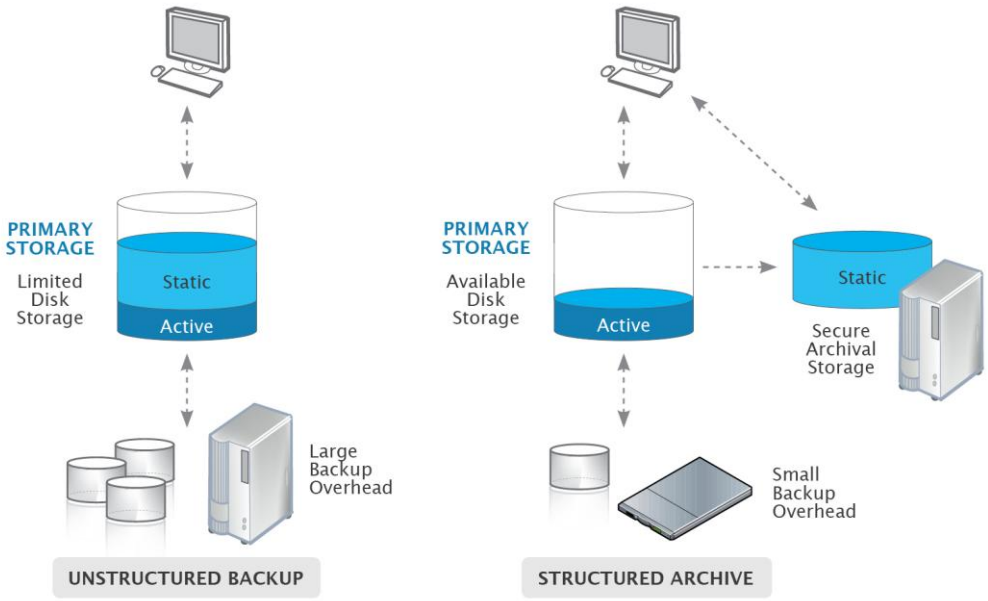
Migration/Deletion Policies

- Time – Modification or Access
- File Types – Extensions
- File Size – Greater Than, Less Than, Between Two Sizes
- Managed Storage Thresholds – Watermarks

Administrators create policies to sweep storage looking for files of a certain age, size, name, type or location. When the storage management application finds a file that meets the policy, it is copied to an alternate storage device. Once the data is moved to the appropriate location, the application can delete the original file and create a placeholder or redirector for the file, allowing users and applications to seamlessly access the data, regardless of its physical location.

Because of the policy-based nature of tiered storage management, it is ideal for managing the lifecycle of data. When data is created and used heavily, it should reside on the fastest disks for fast access. As files are accessed less frequently, the software can move the data to less costly, lower performance disk such as SATA-NAS devices. The application can also leverage removable media libraries (tape or optical) as archive storage.

Tiered storage management applications also have the ability to monitor disk capacity and react to critical capacity conditions. The software is configured to provide a minimum amount of free space on a given volume, for example, 20 percent. If the software detects that the volume has less than 20 percent of capacity available, data is relocated from the volume to lower tiered storage with larger capacities.



Valuable in its own right, this feature also allows organizations to increase their utilization rates and therefore, consolidate their hardware. Much of the unused storage on a disk is allocated so that users and application have sufficient free space. Administrators would rather over-provision storage than have to spend all day, every day, managing it. By using a policy-based tiered storage methodology to monitor storage and automatically move data, administrators can run disks at 80 to 90 percent of capacity without fear of out-of-space failures. This allows each server to store more of the active data. Since there is less data to store on the disk, and because less of the disk is dedicated to free space, organizations need less hardware and can reduce the number of servers in their environment.

The QStar Solution

An efficient storage environment, streamlines operations like backup and restore, which will complete much more quickly and consume far less media. Backup jobs will only copy the small placeholder file rather than the entire file. Restores are also more efficient. Rather than restore all the data in the environment, administrators need only concern themselves with restoring the data that is critical to getting operations running again. The tiered based managed data can be restored when the time is available.

QStar Network Migrator utilizes advanced policy management for server based data movement through storage tiers to archive devices.

A combination of File Modification, File Extensions, Regular Expression Searches plus high water mark attributes can define policies. Retention times can also be specified. QStar Network Migrator can prevent deletion of files in the archive by storing files as read-only for a specified time period. Once this time has lapsed, the Administrator can remove outdated files.

Network Migrator uses the following properties to select appropriate files:

Time Based
Creation, modification or accessed dates can be monitored and files can be automatically archived when certain thresholds are met.

Extensions or extension groups
Certain files may be automatically archived dependent upon the extensions. Alternatively, an exclusion list can be created to migrate all files except the files matching the extensions listed. In addition, specific file extensions may be flagged for deletion. This is effective when monitoring user home directories to remove non-authorized material or when temporary files need not be archived.

File Name

Files will be archived when the file's name matches a specified pattern, ie. "Archive any file with the string 'project1' in the name". Files can also be deleted based on a file's name matching a specified pattern. This method can be used to remove all the files from a finished project that share a common nomenclature.

File Size

The system is designed to identify and archive or delete all files that are larger than, smaller than or in-between the range of two size values. This policy ensures larger files do not consume large quantities of primary storage space.

Threshold

Files will be archived when a certain space threshold is reached. This policy ensures that primary or secondary storage systems are kept as full as possible without reaching full capacity, causing an 'Out of Space' error.

File Versioning

Network Migrator will compare the modification date and file size of the source file and the file on the specific remote destination. If they match, the system will re-link to the current remote file that already exists. Should either the modification date or the file size not match, then the remote file will be renamed with the time stamp extension and the source file will be migrated to the remote location maintaining the files original name.

Conclusion

In conclusion, through the use of storage tiers, organizations gain a number of advantages:

1) Tier 1 and 2 RAID storage is reduced by allowing each to reach close to full capacities
2) No "Out of Disk Capacity" messages
3) Backup is reduced by archiving unchanging, less frequently accessed data
4) Restore operations are improved through data classification
5) Cost of storage infrastructure is reduced by moving significant quantities of data to lower cost media
6) Cost of power is reduced, creating greener data centers, as fewer disk drives are spinning
7) Requirement on users to delete data is reduced by storing oldest data on very low cost media
8) Provides an infrastructure for data preservation and compliance to internal or external mandates

About QStar Technologies

Since 1987, QStar has delivered enterprise class data management and archival storage software solutions to customers around the world. QStar consistently meets increasingly sophisticated requirements with an industry leading technology platform, which has the capability and flexibility to meet the demands of today's challenging business climate.

QStar's archive solutions are part of a complete archive and data management platform that is hardware, system and data independent. This unique architectural approach enables customers to optimize their existing IT infrastructure while minimizing disruption and capital expense. With thousands of customers across a wide range of industries, QStar provides corporations, government agencies, and medical facilities with the strategies and solutions to manage a changing technology landscape while protecting their valuable digital assets for the future. www.qstar.com info@qstar.com