WHITE PAPER

Preventing Storage Outages with Capacity Management and Virtualization

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1. Introduction

The demands for continuous storage availability have increased dramatically over the years, in part spurred by the adoption of web-based initiatives in corporate data centers. Businesses are now open 24 hours a day through their web storefronts. Others have seen increased storage needs from multimedia and CRM applications being implemented that require larger amounts of storage to function. The demand for storage is rising at an incredible compound annual rate of 100 percent across all industries. Digitization of everything drives even more storage demand. The zero-down-time requirement has further complicated storage management by reducing the time available to perform backups and critically impacted the time available to upgrade systems to add more storage capabilities. Further, with the five percent IT personnel growth a year, there is a significant shortage of IT professionals to manage the storage environment properly and the gap is widening.

2. Managing Storage Growth

To address the difficult capacity expansion issues that come from ever-increasing storage requirements, more and more companies are turning to storage virtualization to simplify their storage management.

Virtualization tools provide what appears as a single storage pool from all available physical resources in the environment, disk, tape, RAM drives, etc. By morphing all storage resources into one common entity, management as well as allocation becomes immensely easier for the storage administrator. One common console controls all provisioning aspects of storage. Adding more capacity to a particular machine is a matter of a few keystrokes. Load balanced disk I/O (input/output), the reads and writes of data onto storage media, becomes easier. Backup jobs can be offloaded from application servers by having the file-sets stream through to a separate machine. And in cases where virtual volumes are spread over many disks, I/O speed improves from the increased number of media devices, multiple disks are seeking multiple files to read or write and delivering them in parallel.

Using virtualization, storage is provisioned to individual servers based on their determined needs. Administrators can add on more storage as needed, providing they are given sufficient advance warning of impending capacity crises. Once additional storage has been made available to the application servers, file systems need to be re-configured to address the additional space. This

process generally requires that servers be taken off-line in order to finalize the process. What was missing was a means to automatically provision additional storage as needed, without impacting operations by incurring downtime.

3. Automatic Self-Provisioning

Solution-Soft's SafeCapacity[tm], when integrated with storage virtualization, provides continues up time in data storage environments by automatically provisioning storage before critical issues arise.

The file system abilities of SafeCapacity allows individual application servers to sense when their available disk space is reaching a critical point by setting a high-water mark on available storage. When this point is reached, SafeCapacity sends a request to the virtual storage system informing it to allocate a pre-defined amount of storage in either percentages or megabytes. Once the virtual storage pool has allocated additional space, SafeCapacity prepares the new area for use by the operating system. After the new space is brought online, the high-water mark adjusts the new level ensuring that operational storage remains protected. This entire process is done in real time without having to take the system off-line.

4. Prevent Down-Time

The two primary storage management issues that causes down time are out of disk space errors and planned capacity upgrades. SafeCapacity provides out-of-disk protection in heterogeneous storage environments by continuously monitoring file systems, and allocating more storage space when needed, seamlessly and automatically. Using a policy-based configuration, you establish high and low capacity thresholds, which when triggered, can invoke relocation of infrequently used files to an overflow storage pool, inline compression of targeted files, or as mentioned previously will cause a file system to grow to match needs. Any of these options prevents downtime due to running out of disk space.

5. **Eliminate Over-Provisioning**

SafeCapacity and storage virtualization both decreases the need to over provision storage resources on individual systems. With the combined solution storage administrators can leverage all available free space across their entire operation and provide this as overflow storage. This allows for more granularity on assigning storage to individual systems. Before virtualization software was available to the open systems world storage was locked into each machine and therefore capacity planning meant estimating storage needs and adding 25 percent to cover planned growth and or unexpected surges. With storage virtualization, administrators are able to pull this 25 percent from across the aggregated pool. Adding SafeCapacity to the configuration allows this percentage to shrink to 10 percent per server once a common overflow area is configured.

Capacity planning in a virtualization environment becomes easier with SafeCapacity. By monitoring the email notification features of SafeCapacity, administrators can calmly plan storage expansion. Because SafeCapacity sends notification when corrective action is taken, administrators are aware that more storage has been consumed and need only plug in more storage to the pool to match or exceed the newly consumed overflow space.

6. **Support for Heterogeneous Storage Architectures**
   Interoperability and compatibility in heterogeneous environments are keys to successful enterprise-wide storage management. With SafeCapacity, as with any standards based storage virtualization, adding additional storage is as simple as bringing it online in your environment and reconfiguring SafeCapacity to exploit it. SafeCapacity is compatible with all data storage architectures: Network Attached Storage (NAS), Storage Area Network (SAN), SCSI over IP (iSCSI) and Direct Attached Storage (DAS).

7. **Summary**
   Solution-Soft's SafeCapacity, when used in conjunction with storage virtualization, provides continues up time in corporate data center storage environments by automatically provisioning storage before critical issues arise.

   Management by crisis becomes a thing of the past; administrators are now able to be pro-active rather than re-active.