

Enterprise Backup and Recovery Considerations

Improve Performance and Efficiency of
NetApp / IBM N series Storage Systems
Backup and Recovery Environments

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*White Paper
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With Contributions by

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1.0 Backup/Restore Strategies for NetApp and IBM N series System Storage

The exponential growth of critical data that resides on network file servers has created the need for more efficient backup, restore and archive options in both volume- and file-level restore scenarios. IBM and NetApp have worked together to integrate NetApp® Snapshot™ and SnapMirror® technologies with IBM® Tivoli® Storage Manager (TSM) 6.1, resulting in improved performance in the backup and restore functions for NetApp FAS (Fabric Attached Storage) or IBM N series system storage products.

This paper outlines the new capabilities and performance enhancements that NetApp / IBM N series clients can now realize with TSM 6.1 in two key enterprise backup and restore scenarios for network data storage:

1. Fast and simple backup and restore of large FAS systems in a disaster recovery (DR) scenario where large amounts of data must be quickly restored in the event of a data center outage.
2. Flexible and quick restores of specific files, in which a smaller subset of files—possibly supporting a single application, a department, or even a single user—must be restored because of an application-level failure, corruption, or user error.

IBM **Tivoli** software

Tivoli Storage Manager (TSM, and previous product names including ADSM) has been a strategic product in the IBM software portfolio for over 16 years. Today, more than 20,000 companies depend on TSM for backup, recovery and archive functions.

Companies using TSM to backup, restore and archive data on NetApp / IBM N series storage will see performance benefits upon upgrading to TSM 6.1.

Companies looking for a solution to backup, restore and archive data on NetApp / IBM N series storage should consider TSM 6.1 for its features and functions as well as its specific integration with NetApp / IBM N series storage products.

2.0 Recovering a System from a Disaster

2.1 Backing up and Restoring Data at the Volume or System Level

In a disaster recovery (DR) scenario, when whole systems fail, the ability to recover large amounts of data quickly at the volume or system level is very important. The objective is to restore the entire file system on to a backup server that may be local or in another location, or back on to the failed system if it has been repaired. Streaming data speeds of large blocks of data are more important than random access to individual files, and the back-end storage media needs to stream data reliably and very quickly.

2.2 NetApp SnapMirror to Tape Integration with TSM 6.1

TSM 6.1 supports the NetApp SnapMirror to Tape (SM2T) function to back up very large NetApp / IBM N series file systems. The result of the recent integration between the products is reduced time it takes to:

- Back up NetApp / IBM N series systems at the volume level
- Restore NetApp / IBM N series systems at the volume level

Tape will continue to play a part as a viable and cost-effective medium for long-term data storage.

Key Benefits:

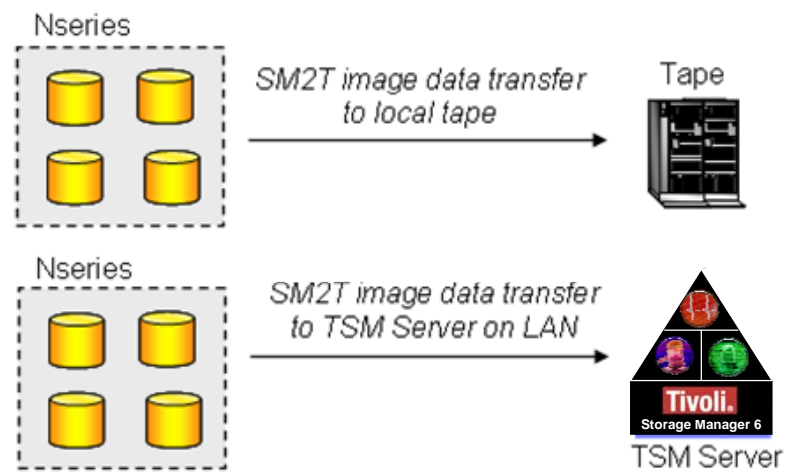
NetApp and IBM N series products are integrated with TSM 6.1 to help users:

- *Reduce the time it takes to conduct incremental backup file scans*
- *Identify new, changed and deleted files in seconds*
- *Complete volume backups and restores 12x faster*

How SnapMirror to Tape Technology Works with TSM 6.1

Faster Backups

The biggest benefit of using SM2T is faster backups. SM2T enables TSM to perform Network Data Management Protocol (NDMP) backups in a fraction of the time of traditional NDMP backups by eliminating the initial scan time at the beginning of a backup job. Large volumes of data are saved directly to tape, across the network, or to any device controlled by TSM, without having to scan the system to check for new or changed files. Eliminating the scan can help make the process of volume-level backups up to 12x faster. In the figure below, the TSM managed storage devices and/or a directly attached tape drive are shown as the repository of SnapMirror backup data. Using the SM2T function will result in improved backup and restore times when compared to traditional NDMP



backups. Having TSM manage the storage devices will result in more efficient use of the shared storage hierarchy.

3.0 Recovering a File from Accidental Loss or Corruption

3.1 Backing-up and Restoring Data at the File Level

More than 90 percent of restore scenarios are at the file level. When a file or subset of files on a storage device is accidentally lost or corrupted, the ability to access the specific file(s) quickly and at a correct point in time is important. The challenge in this scenario is performing the file-level backups in smaller and smaller backup windows.

3.2 NetApp Snapshot Comparison Technology Integration with TSM 6.1

IBM and NetApp worked together to address this requirement with TSM 6.1, which now supports the NetApp Snapshot comparison technology API. When used on incremental backups the NetApp Snapshot comparison technology API streamlines the backup process by using the list of changed files reported by the NetApp Snapshot comparison.

How Snapshot Comparison Technology Works with TSM 6.1

The Snapshot comparison technology API is used when backing up NetApp / IBM N series file server volumes that are NFS- or CIFS-attached. The Snapshot comparison API stores the last Snapshot and takes a Snapshot at the time of the new backup job. It compares the two Snapshots to generate the list of changes. Instead of doing a slow directory scan of the volume, TSM 6.1 and the Snapshot API allow for an almost instantaneous Snapshot comparison. Since a file scan performed by TSM takes approximately half the time of an entire backup, the elimination of the scan can reduce the process of file-level backups by up to 50 percent.

4.0 Summary

4.1 Using NetApp / IBM N series and TSM 6.1 to Recover a System or a File

In summary, NetApp Snapshot and SnapMirror technology are complementary products that are now integrated with IBM TSM 6.1 to improve functionality and performance.

SM2T and TSM 6.1 provide the ability to backup and restore systems at the volume level. File-level restores are not supported.

The Snapshot comparison tool API and TSM 6.1 provide the ability to backup and restore both single-file and whole-volume restores, however the performance is optimal for file-level restore. Volume- and system-level restores using Snapshot will not be close to the performance of SM2T.

“The improvements in Tivoli Storage Manager 6 are all about keeping ahead of the tidal wave of data growth. Integrating new NetApp Snapshot and SnapMirror to tape technology with the latest version of our TSM software enables us to provide our customers with much improved backup performance, even as their data volumes continue to grow. The ability to reduce the time it takes for incremental backups will instantly benefit NetApp customers who upgrade to TSM 6.”

–Kelly Beavers

Director, IBM Storage Software

5.0 Conclusions

5.1 What's known?

Companies using NetApp / IBM N series system storage need to be able to recover an entire system after a disaster, as well as recover a single file after accidental loss or corruption. To ensure both types of recoveries are reliable and timely, IT professionals must:

- **Create a plan for both disaster recovery and file recovery:** The planning, execution, and products needed to restore a full system in a DR scenario are very different from the resources needed to restore a file to a specific point in time. Plan for both.
- **Improve performance of backups to meet backup windows:** With smaller backup windows and instantaneous restore requirements, it's important to maximize the performance of both backups and restores.

5.2 What's new?

IBM/NetApp Integration: IBM and NetApp have delivered increased performance and functionality through product integration between TSM 6.1 and NetApp / IBM N series storage. Users can tailor their backup and recovery processes to meet individual IT requirements with greatly improved speed compared to previous NDMP backup utilities.

5.3 What's recommended?

These recommendations, meant specifically for companies using NetApp / IBM N series systems storage, can be taken one at a time or all together. SM2T and Snapshot technologies are complimentary.

- Consider TSM 6.1 whether you are a current TSM user or you need a new or improved backup, recovery and archive solution.
- And ...Implement TSM 6.1 and SM2T for system-level backup and recovery.
- And ...Implement TSM 6.1 and the Snapshot comparison technology API for file-level backup and recovery.

More information:

To learn more about the products discussed in this paper, including links to announcement letter and technical data sheets as well as Sirius service offerings for Enterprise Backup and Recovery solutions, please visit www.siriuscom.com/whitepapers.

About the Author:

Pete Stephen has over 20 years of IT experience in a variety of design, development, implementation, management and consulting roles. Pete is an IBM Certified Infrastructure Systems Architect and has earned The Open Group Architecture Framework (TOGAF) certification. He has strong IT architecture skills in systems optimization and server consolidation, analysis and definition of IT standards and processes, and systems migration planning and execution. He currently performs delivery consulting for Power Systems/System p and IBM Middleware design and implementation with AIX, TPC, DB2/UDB, TSM, HACMP, SAN and IBM and NetApp storage.

About Sirius:

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