Technical report:

IBM System Storage N series with NearStore and SnapVault Options and Symantec Veritas NetBackup

Disk-Based Backup & Recovery

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Abstract

Today, enterprises increasingly seek alternatives to tape-based backup to reliably and rapidly restore business-critical data. An IBM System Storage N series with NearStore and SnapVault options delivers a scalable, reliable, disk-to-disk backup and recovery solution and provides a compelling alternative to traditional tape-based backup environments. In addition, the IBM N series is tightly integrated with Veritas NetBackup, delivering additional backup capabilities.

Introduction

Traditional tape-based data protection has been overwhelmed by explosive data growth and expanding data recovery requirements. Today's enterprises demand a scalable backup and recovery solution to reliably and rapidly restore business-critical data. Increasingly, they seek alternatives to tape-based backup to address these needs. The IBM System Storage N series with NearStore® option and SnapVault® disk-to-disk backup solution provides a compelling alternative to traditional tape-based backup environments.

Mercer Management Consulting, a global strategy consulting firm, conducted primary research on the cost of acquiring, deploying, managing and maintaining data backup environments used to ensure the safety and security of corporate data. The study objective was to understand the total cost in typical enterprise deployments of two competing backup technologies: IBM N series with NearStore option and SnapVault disk-to-disk backup systems and traditional tape-based backup technologies. Data was provided by the backup operators, storage administrators and IT managers using SnapVault.

The study interviews yielded two major findings:

- IBM N series with NearStore option and SnapVault is considerably less expensive than tape backup alternatives. Based on typical configurations and backup policies, an IBM N series with NearStore option and SnapVault backup system is 54% less expensive than a tape-based backup solution of similar capacity and size over a typical backup product life-cycle.
- The drivers of the IBM N series cost advantages are quite consistent across companies and operating environments. Analysis of study participant data shows that the IBM N series advantage is driven primarily though lower labor and operating costs, supported by reduced media costs. For example, respondents indicated that, on average, a tape system required 4x more labor resources than an IBM N series disk-to-disk system.

And, SnapVault functionality is deeply integrated with Symantec™ Veritas™ NetBackup®. Now enterprises can augment the lower labor, operating and media costs of SnapVault with the robust management capabilities of NetBackup to further simplify backup environments.

This paper provides an overview of how NetBackup management capabilities are combined with IBM System Storage N series with NearStore option and SnapVault—as well as IBM System Storage N series with SnapRestore® and IBM System Storage N series with Snapshot™ software—to improve backup performance, minimize media requirements, simplify recoveries, and enable end-user restores while seamlessly moving backup data across tiers of storage.

Complete Data Protection

Organizations can simplify their data protection strategy by managing all data protection stages from a single interface, including snapshot management for short-term protection and instant recovery, disk-to-disk backups for near-term data protection, and enhanced network data management protocol (NDMP) tape backups for long-term storage.

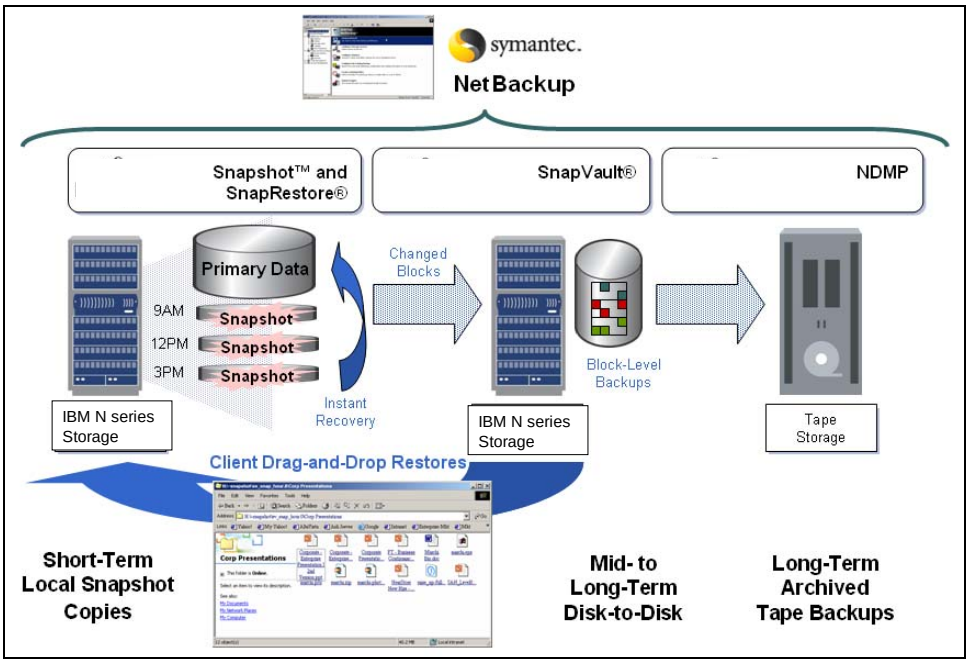

Figure 1. Solution architecture.

Short-Term Data Protection: NetBackup Snapshot Management Integration

NetBackup software integrates with IBM N series Snapshot and SnapRestore software to enable low-impact backups, rapid restores of individual files, and the ability to roll back an entire IBM N series volume or file system to a specific point in time. IBM N series Snapshot management integration commenced with the introduction of NetBackup Enterprise Server 5.1 software. The NetBackup Advanced Client option supports the NDMP V4 snapshot management extension, enabling control and management of IBM N series Snapshot copies.

NetBackup software presents individual client views of the space-optimized, block-level snapshot copies that are stored locally on the IBM N series storage system. Each snapshot copy is a full backup, with the possibility of hundreds of snapshot copies (full backups) kept online for verifiable, reliable backups and immediate access and quick recovery. NetBackup simplifies and consolidates the management of IBM N series Snapshot copies across multiple storage systems into a single, integrated data protection solution. Administrators no longer have to manually configure IBM N series Snapshot copies outside of NetBackup software.

Managing IBM N series Snapshot Copies

The IBM System Storage N series with WAFL® (write-anywhere-file-layout) file system supports Snapshot technology, an IBM System Storage N series with Data ONTAP™ feature that provides the ability to maintain online, read-only versions of each file system. Data ONTAP versions 7.1 and higher support hundreds of snapshot copies per volume.

Symantec Veritas NetBackup Enterprise Server 5.1 software and higher versions for Solaris™ and Microsoft® Windows® configure, schedule, and catalog IBM N series WAFL file system snapshot copies. The NetBackup Advanced Client option provides an intuitive graphical user interface (GUI) facilitating scheduled, policy-based snapshot copy creation and retention. Using the NetBackup Backup, Archive, and Restore (BAR) GUI, administrators or users can recover files, directories, or entire file systems from WAFL file system snapshot copies, allowing service-level agreements to be met for short-term data protection strategies.

WAFL file system snapshot copies consist of a copy of the set of pointers from the active file system. Because the snapshot creation process does not copy file system data blocks, the entire process executes almost instantaneously. Snapshot copies typically incur a small disk space premium, and are maintained as pointers to disk blocks containing data. As the active file system changes, snapshot copies continue to point to deleted or changed disk blocks, holding these blocks from the file system's free space.

Instant Recovery: NetBackup SnapRestore Integration

The IBM N series SnapRestore option leverages the Snapshot technology feature of Data ONTAP software by restoring a file or entire file system to an earlier preserved state. It can be used to recover a single file or an entire volume to a defined point in time.

The NetBackup software contains integrated instant recovery support for SnapRestore via the BAR GUI. Point-in-time rollback of a single file or an entire WAFL file system volume is accomplished easily and quickly.

Online Oracle® Database Protection

The NetBackup Advanced client also supports WAFL file system snapshot management integration for Solaris clients running Oracle databases on IBM N series storage systems. The solution includes Oracle Recovery Manager (RMAN) proxy copy functionality, as well as integrated support for the NetBackup for Oracle agent backup and recovery wizards.

Operation Type	Supported Functionality
Backup	WAFL file system snapshot copies
Restore	Single file Subdirectory Full volume (Oracle)
SnapRestore	Single file Full volume (Oracle)

Table 1. Supported backup and restore types (A).

Near-Term Data Protection: NetBackup and SnapVault Management Integration

IBM N series SnapVault management is integrated with Symantec Veritas NetBackup Enterprise Server 6.0 software for Solaris and Windows. The NetBackup Advanced Client option supports the NDMP V4 SnapVault management extension, enabling configuration and control of SnapVault data movement and cataloging of the backups.

Managing IBM N Series SnapVault Disk-to-Disk Backup and Recovery

The integration of Symantec Veritas NetBackup 6.0 software with SnapVault technology provides online disk-to-disk backup and recovery for IBM N series storage systems. SnapVault software leverages WAFL file system snapshot copies to transfer data from one IBM N series storage system (SnapVault primary) to another (SnapVault secondary). Since only the changed blocks are transferred from the primary to the secondary, substantial performance improvements can be realized and the amount of disk storage consumed dramatically reduced. Even though few data blocks are transferred, each operation with Snapshot and SnapVault is a full backup, with the possibility of hundreds of these kept online on the secondary storage system for verifiable, reliable backups and immediate access and quick recovery.

NetBackup Enterprise Server 6.0 software, combined with the NetBackup Advanced Client option, provides fully integrated support for SnapVault. The NetBackup Administration Console is used to configure, control, and manage SnapVault disk-to-disk backup and recovery operations like:

- Creation and management of SnapVault relationships between SnapVault primary and SnapVault secondary storage platforms
- Scheduling of snapshot copies
- Scheduling of SnapVault transfers
- User-directed browsing and restoring
- Support for individual file, subdirectory, and entire quota tree recoveries
- Oracle Database backup and recovery.

With SnapVault software, intelligent data movement reduces network traffic and the impact on production systems. SnapVault software makes a baseline transfer of the data (comparable to a full backup for tape backups).

When updates to data occur on a SnapVault primary, only new or changed data blocks are transferred to the SnapVault secondary.

Operation Type	Supported Functionality
Backup	WAFL file system snapshot copies SnapVault transfers
Restore	Single file Subdirectory Quota tree (Oracle)

Table 2. Supported backup and restore types (B).

Long-Term Data Protection—NDMP Tape Backup and Restore

Organizations can leverage NetBackup 6.0 software's NDMP support to complete their data protection lifecycle, and enhance their backups of IBM N series storage systems to long-term tape storage. Using NetBackup 6.0 software's ability to support local, three-way, and remote NDMP configurations, integration with IBM N series offers the flexibility to leverage tape resources and simplify management operations.

Operation Type	Supported Functionality
Backup	NDMP backups
Restore	Single file Subdirectory Quota tree Volume

Table 3. Supported backup and restore types (C).

Additional NetBackup 6.0 for NDMP enhancements include:

- Remote NDMP support for AIX, HP-UX, and Linux® platforms; Solaris and Windows platforms were already supported
- NDMP backups greater than 1TB.

Summary

IBM N series and Symantec provide comprehensive short-term, near-term, and long-term data protection solutions for critical enterprise data. Leveraging NearStore and SnapVault functionality as well as integrated support for NDMP V4 extensions enabling snapshot and SnapVault management combined with tape management provide a complete solution. The solution improves backup performance, minimizes media requirements, simplifies recoveries, and enables end-user restores while seamlessly moving backup data across tiers of storage.

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