# IMPLEMENTING ENTERPRISE-WIDE DATA PROTECTION WITH DELL EQUALLOGIC SANs AND MICROSOFT DPM 2007

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In 24/7 production environments, advanced backup and recovery features can be critical to minimizing downtime. Combining Microsoft® System Center Data Protection Manager 2007 and Dell EqualLogic™ PS Series Internet SCSI (iSCSI) storage arrays can provide an efficient and cost-effective way for enterprises of all sizes to implement comprehensive, enterprise-wide data protection.

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Comprehensive data protection can be critical for organizations of all sizes to help protect against viruses, data corruption, site disasters, accidental deletions, or unnatural events, while long-term data retention is often required to satisfy both regulatory and enterprise policies. Recently, data protection has become intertwined with the concept of business continuity, because although preventing data loss is important, operations depend on data *recovery*—the ability to restore data after corruption or failure, and return it to production as quickly as possible.

In the past, organizations typically performed data backups at night or over the weekend, often requiring several hours of system downtime. Similarly, recovering data was slow and difficult, often significantly impeding businesses operations. Now, however, advanced data protection technologies and Internet SCSI (iSCSI)–based storage area networks (SANs) make it possible for almost any organization to back up and recover data quickly, efficiently, and with minimal or no downtime. Given the reduced complexity and cost, organizations of all sizes can create the type of enterprise-class data protection strategy that was previously reserved only for the largest and wealthiest companies.

Dell and Microsoft have worked to make advanced features and functionality available cost-effectively to organizations of all sizes. By combining comprehensive data protection applications such as Microsoft System Center Data Protection Manager (DPM) 2007 with SAN arrays such as the Dell EqualLogic PS Series, organizations of all sizes can take advantage of these technologies to help simplify and accelerate backup and recovery processes, ultimately helping ensure a rapid, timely recovery from data loss or other disaster.

## UNDERSTANDING TRADITIONAL BACKUP AND RECOVERY

Despite the often-encountered shortcomings of tape media, tape backup remains an important option for helping prevent data loss. Backup copies are typically cost-effective, and tapes can be physically moved to another location with relative ease. However, because performing traditional backups can interrupt business processes, efficiency and speed are key features of next-generation data protection software. Many backup applications provide incremental backups, recopying only changed files, which can help provide significant savings in bandwidth and computing resources and minimize backup windows. In addition, the more granular the protection of changed data can be, the faster systems can typically return to production after restoring data.

Backup integrity and accuracy are also important—in many organizations, a significant percentage of backups and restores from tape are unsuccessful, and

corrupted or incomplete backups offer little protection against primary data failure. Administrators must perform data consistency checks to authenticate the validity about backups, adding to the management effort. Automation can help dramatically simplify the highly complex and hard-to-manage backup processes.

Disk-to-disk-to-tape backups are becoming the standard method for enhancing backup processes because of the robustness, performance, and cost-effectiveness of SATA-based disk subsystems. These backups can later be offloaded to tape for long-term retention—helping minimize the amount of time the primary disk is out of production. In addition, a secondary disk provides a significantly superior restore experience—particularly in the case of single-file or object-level restores, which most organizations consider the majority of their recovery exercises.

While these features can help simplify and accelerate backup processes, traditional backup methodologies using general-purpose software may not be adequate for many organizations. A key feature of general-purpose backup software is typically the claim to back up all applications and devices—but with that breadth, quality can suffer, particularly by providing inadequate protection for advanced workloads like distributed Microsoft Office SharePoint® Server farms or advanced Microsoft Exchange deployments. In addition, tape backup with a general-purpose platform is simply not suitable for certain business workloads and many application types. With e-mail, database, and collaboration applications broadly distributed across multiple physical platforms, organizations often cannot simply back up a database as a file.

Equally challenging, databases and other applications are usually in continuous operation, requiring administrators to avoid shutting down databases for backup and necessitating the development of scripts to facilitate non-interruptive backups. And while consistent backup of advanced workloads can be a challenge, restoring data—which is usually more important—is even more difficult. Many legacy backup mechanisms use outdated or unsupported mechanisms for restoring data.[1] As the criticality of data continues to rise within organizations of all sizes, it becomes critical that the next generation of data protection solutions address not only performance and flexibility, but also supportability to help ensure long-term success.

## DEPLOYING HIGH-AVAILABILITY SANs

SANs provide a critical foundation for enterprise-wide data protection. As the core of many business operations, data typically must reside on highly available resources, and a reliable, fault-tolerant SAN designed with fully redundant, hot-swappable components and RAID functionality helps keep production data safe while providing a solid foundation for backups. Consolidating data onto this type of SAN not only allows data sharing across multiple servers, but also provides SAN-based data protection features such the following:

- **Snapshots:** Snapshots are volume- or logical unit (LUN)–level point-in-time copies that preserve data status when the snapshot is taken. Snapshots help provide rapid recovery following a failure, and running backups from snapshots enables administrators to offload backup processes from production systems.
- **Replicas:** Replicas are block-level copies, often transferred to a secondary system. Data protection can include making an initial replica that is copied to a remote site, after which only incremental changes need to be copied remotely to help keep data current.

Snapshots and replicas can also enable server-less backup, in which backup operations are offloaded from the application server to dedicated backup servers. These SAN copy features are intended for short-term data resiliency—backups are still essential for long-term data retention and recovery.

Snapshot-based backups to a SAN are perhaps the best way to create online backups that are consistent with running applications, but can be extremely complex to integrate and manage. Enabling snapshot-related applications to work together has typically required administrators to create complicated scripts designed to manually integrate these applications—and if they add an e-mail store or disk to the environment, they must modify these scripts accordingly.

In response to this type of backup challenge, OS vendors often include advanced capabilities designed to simplify backup processes and make backups application-consistent to ease restore processes. For example, in Microsoft Windows Server® platforms, Volume Shadow Copy Service (VSS) is designed to enable online, application-consistent backups. VSS provides a framework for different components to work together, helping coordinate different events between the backup software, Microsoft Windows® OS–based applications, and storage arrays to help ensure smooth operation. Its primary components are *VSS requestors* (storage management applications that initiate VSS operations, such as Dell EqualLogic Auto-Snapshot Manager and DPM 2007), *VSS writers* (applications being backed up or recovered, such as Microsoft Exchange, Microsoft SQL Server®, and Microsoft Office SharePoint® software), and *VSS providers* (hardware providers or storage arrays, such as Dell EqualLogic PS Series SANs).

Combining SAN copies with application-aware features such as VSS helps provide efficient, consistent data protection and recovery. By selecting products in each category that are designed to integrate with VSS, administrators can deploy turnkey backup solutions that use application-consistent snapshots—without requiring

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[1] For more information, visit support.microsoft.com/kb/904845 and support.microsoft.com/kb/895847.
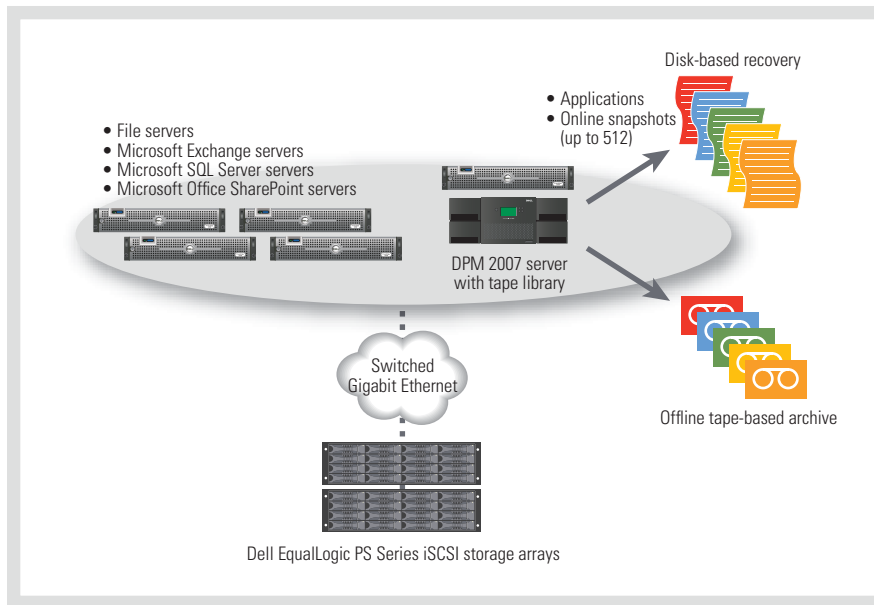
**Figure 1.** *Microsoft System Center Data Protection Manager 2007 and Dell EqualLogic PS Series storage help provide efficient, comprehensive data protection*

manual integration, and while systems remain online.

## USING ADVANCED DATA PROTECTION APPLICATIONS

Traditional backup and recovery methods are generally not well suited for environments requiring continuous business operation. But advanced technologies like DPM 2007 provide disk-based backup that enables application owners to manage their own backup and recovery solutions for their workloads, empower end users to restore data themselves without administrator intervention, and equip organizations of all sizes to achieve near-continuous protection of their applications and server platforms in an attainable way. The advantages of this type of application include frequent and accelerated backups, reduced backup windows, rapid recovery, and the opportunity to perform tape processing during standard business hours.

Next-generation data protection also helps reduce bandwidth and storage needs by only copying block-level changes, rather than copying entire files that may contain only a few changes. Because this approach helps reduce the amount of data to copy, these applications can also run faster and

more frequently than traditional backup applications, helping reduce lost work and lost productivity—if data is lost at 4 P.M., administrators can typically restore from a backup taken within the last hour, rather than one taken the previous day.

Equally important, these technologies typically are application and file-system aware. The applications can present administrators and end users with familiar objects during a restore process, rather than requiring them to first struggle through a lengthy process to return data to a usable format.

## INTEGRATING SANs WITH ADVANCED DATA PROTECTION

While applications such as Microsoft DPM 2007 help protect file systems, e-mail, databases, and other application data, they usually do not do so for system disks. However, advanced SAN-based features can handle that task—snapshots help provide rapid system-level recovery, while replication can provide fast and easy restore processes following a site disaster. While direct attach storage limits the scalability, performance, and availability of services such as DPM 2007, these applications can benefit from SANs

that offer seamless scalability such as Dell EqualLogic PS Series storage arrays, which can expand capacity simply by allocating additional disk space to the DPM 2007 storage pool.

Perhaps even more exciting is the DPM ability to use SANs in the recovery of large data sets, whereby if the production server and DPM server share the same SAN, then DPM can automate recovering a large data LUN by invoking the SAN to clone and remount its backup LUN to production for near-immediate data availability. Together, applications such as DPM 2007 and storage such as Dell EqualLogic SANs help provide the advanced protection and rapid recovery that enterprise data protection strategies require (see Figure 1).

Consolidating storage on a SAN also helps simplify management and provides a highly scalable platform for online and backup data. In addition, SAN boot capabilities help extend this data protection—rather than needing to back up individual system disks on every server, administrators can protect multiple system disks on a consolidated SAN, helping eliminate servers as a point of failure.

## CREATING EFFICIENT, COST-EFFECTIVE DATA PROTECTION

While backups remain a critical data protection task, traditional methods typically cannot support the applications and requirements of many organizations. Combining advanced data protection solutions such as Microsoft System Center Data Protection Manager 2007 with SANs such as Dell EqualLogic PS Series storage arrays can bring advanced data protection and storage technologies to organizations of all sizes—helping administrators implement the necessary system uptime, data availability, rapid recovery, and comprehensive data protection required in 24/7 IT environments.

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