

SQL SERVER ADVANCED PROTECTION AND FAST RECOVERY WITH EQUALLOGIC AUTO-SNAPSHOT MANAGER

MANAGEMENT SERIES

Business critical applications depend on Relational Database Management Systems (RDBMS) to store and manage data that they collect, process, and report on. Since RDBMS must maintain data integrity as well as ensuring data availability and performance, it is critical that data be well protected and stored on high-performance, highly available storage resources.

Microsoft[®] SQL Server is the fastest growing RDBMS solution and supports a vast range of business critical applications. EqualLogic PS Series iSCSI SANs provide the optimal storage architecture for local and remote protection and high availability of SQL Server environments, offering Smart Copy snapshot and replication capability and automated management. EqualLogic's Auto-Snapshot Manager and integration with enabling technologies such as Microsoft Volume Shadow Copy Services (VSS) enable customers to implement comprehensive data protection strategies, simplifying management while retaining flexibility.

EqualLogic provides highly available storage environments to help customers maintain the highest levels of business continuity. EqualLogic's iSCSI SAN solutions include SQL Server protection features such as database Smart Copy snapshots, cloning, remote replication, and quick restore and recovery. EqualLogic's PS Series arrays complement and enhance SQL Server fault tolerance and recovery capabilities.

VSS SIMPLIFIES SNAPSHOT MANAGEMENT

Information availability is a major business requirement, and SQL Server databases, as the repository of many organizations' most valuable information, are no exception. Microsoft Volume Shadow Copy Service (VSS) supports SQL Server database backup and recovery to simplify data protection and ensure high availability and data integrity.

VSS integrates and coordinates database protection and recovery tasks among SQL Server, backup applications, and storage arrays to provide application-aware data management. This tight integration allows for backup, recovery, and data mining operations to take place without affecting the performance or availability of online applications.

Shadow Copies – commonly known as Snapshots, are point-in-time copies of a volume or collection of volumes. Snapshots preserve the state of a volume at a specific instance and can be retained for future use – particularly for instant copy and quick recovery operations utilizing vendor-supported snapshot technologies. Two types of copies can be made: 1) clones, which are full copies of a volume; and 2) differential copies, which include only the changes made to a volume since the last copy.

VSS can be described as a broker, coordinating events among the backup application, SQL Server database, and storage array for smooth operation. Its primary components are:

- The *VSS Coordinator*, which handles all interactions
- The *Requestors*, which are the storage management applications (e.g., backup/data protection) that initiate VSS operations such as creating, importing, or deleting snapshots
- The *Writer*, which is the application being backed up or recovered (in this case, SQL Server)
- The *Provider*, which is the hardware provider or storage array

EqualLogic PS Series arrays work efficiently with VSS to ensure the highest levels of SQL Server availability and data integrity.

EQUALLOGIC AUTO-SNAPSHOT MANAGER AND VSS INTEGRATION

EqualLogic's Peer Integration Tools include Auto-Snapshot Manager, an advanced snapshot management and recovery tool. Auto-Snapshot Manager is an extension of the Peer Integration Architecture hosted on the server and acts as a Requestor in the VSS stack. It was developed to take full advantage of EqualLogic's snapshot, clone, and replication functionalities while leveraging VSS's integration and application awareness to create a full-featured SQL Server protection solution. This integration automates operations such as capturing database snapshots, creating local clones or remote replicas, and performing fast recovery to eliminate downtime or performance degradation. Auto-Snapshot Manager eliminates hours of tedious work that other systems require to recover a database after data corruption or loss.

AUTO-SNAPSHOT MANGER PROVIDES DATA PROTECTION AND RECOVERY OPTIONS

SQL Server deployments can be very large and complex. Auto-Snapshot Manager simplifies data management tasks and offers a comprehensive approach to SQL Server protection by providing both local and remote data-base protection, allowing for quick data recovery in case of data loss or site failure.

An extension of EqualLogic's data protection features, Auto-Snapshot Manager facilitates Smart Copy snapshots, clones and replicas of SQL Server databases. It recognizes the makeup of SQL Server databases and coordinates fully consistent point-in-time copies of these databases. These Smart Copy snapshots are instantaneous and can be saved locally on the same SAN or to a remote site by leveraging the PS Series' built-in remote replication features.

LOCAL DATABASE BACKUP OPTIONS

Auto-Snapshot Manager provides a robust set of tools to simplify and accelerate database copies by utilizing the snapshot functionality built into every PS Series array. Smart Copy allows Auto-Snapshot Manager to utilize different data protection options that can be selected depending on application objectives and protection requirements. These options are:

- Differential Smart Copy snapshots – This space efficient method copies only the modifications to the database volume that have occurred since the last database snapshot was taken.
- Smart Copy clone – This method performs a full copy of the database volume – because it uses the entire size of the original volume it is not recommended for frequent backup operations. Smart Copy clones are generally used to create entire temporary database environments for data mining, development, and testing.

Using Auto-Snapshot Manager, both options take only seconds to complete and can be executed online with no application disruption.

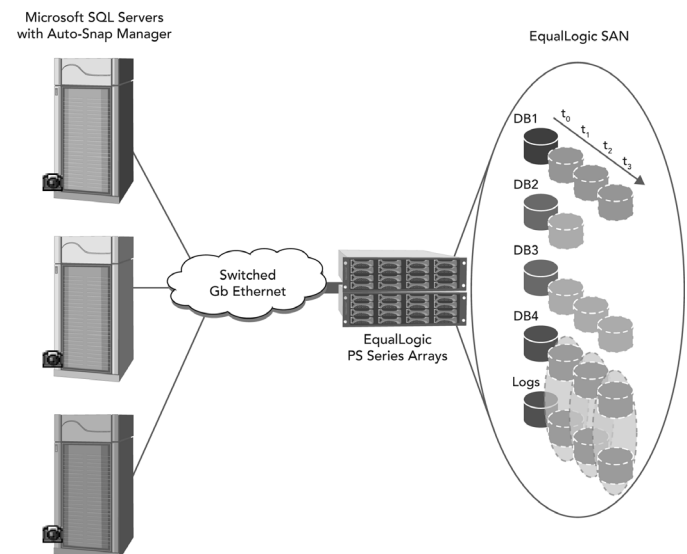
LOCAL DATABASE RESTORE OPTIONS

Auto-Snapshot Manager is simple to use and provides powerful automation while maintaining the flexibility and fault tolerance needed for database restore and recovery operations. With multiple SQL Server restore options, recovery can be as instantaneous and granular as required. Restore options include:

- Restore Database – This method restores the original database in-place, recovering the database volume to its state at a certain point in time. This also allows also for rolling log file backups that can provide a more granular restore operation if desired.
- Restore As New Database – This method creates a new instance of the original database as a separate database. It is generally used for data mining, development, and test purposes as well as file-, table-, or object-level recovery of a database to a specific earlier state.

With Auto-Snapshot Manager, database restore can be done from either Smart Copy snapshots or clones. In addition, as the restore operation is launched, another database Smart Copy snapshot is taken to preserve its state of the database at the time of recovery. This safety net is a valuable feature that allows for fault-tolerant recovery operations. While the priority is to restore lost data in case of a database corruption or failure, this safety net also provides a reference point of the corrupted state of the database to enable more detailed analysis of the cause of the corruption.

Smart Copy Snapshots for Microsoft SQL Server



REMOTE REPLICATION AND FAILOVER

Data replication is becoming a more common practice to respond to network failures, power outages, and complete site failures caused by natural or human-created disasters. PS Series arrays include remote site replication as a built-in feature. Regardless of distance or network bandwidth, remote replication sites can be setup to maintain off-site copies of SQL Server databases.

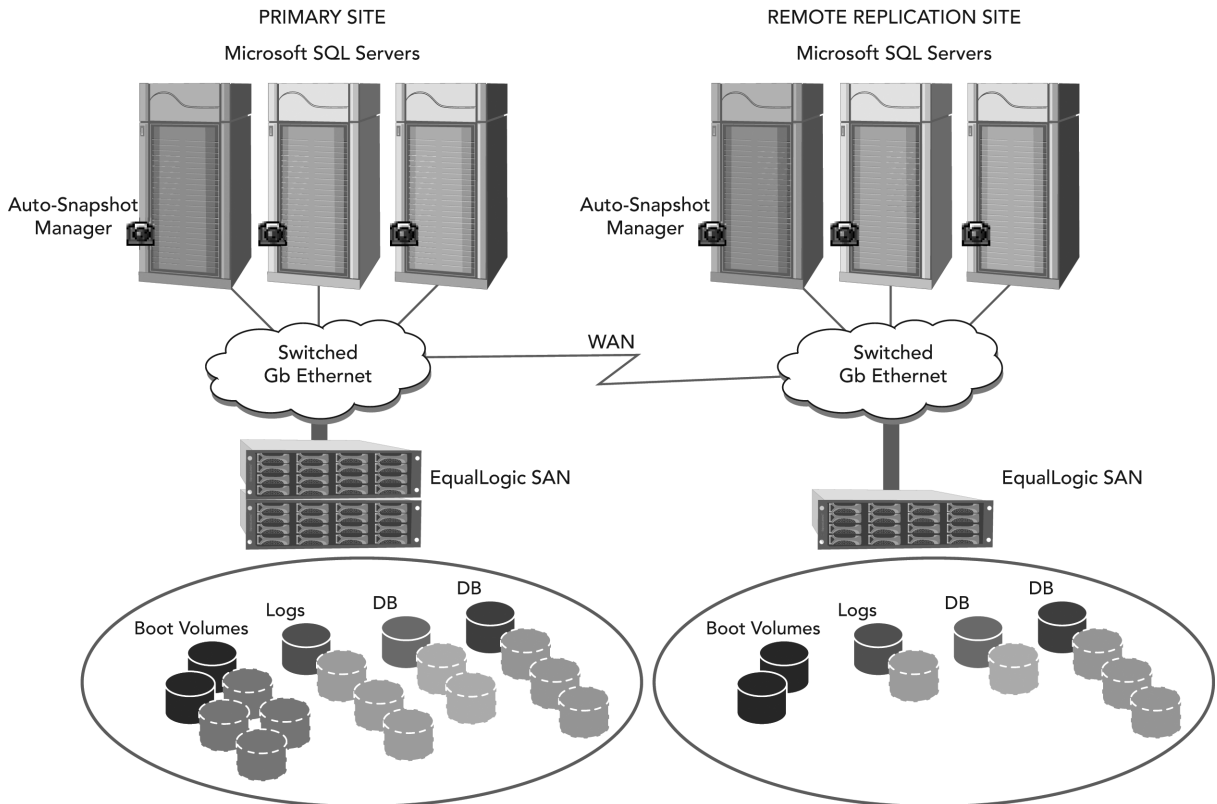
PS Series remote replication can be managed through Auto-Snapshot Manager to create Smart Copy replicas of SQL Server databases. EqualLogic replication is extremely flexible, supporting replication implementations tailored to your specific needs. For example, you can setup a central replication site that receives data from multiple sites or data centers. Two-way replication can

also be setup easily between two distinct sites, allowing both sites to replicate data to each other to maintain data availability in case either site fails.

Lengthy processes such as backup to tape can now take place at the remote site without affecting daily operations or consuming valuable resources of the server hosting the SQL database. In addition, backup operations can be consolidated and offloaded to a remote site to enhance and streamline this traditionally complex backup process.

PS Series replication also enables IT administrators to easily and affordably setup failover and failback between locations, providing effective disaster recovery for SQL Server databases with minimal downtime and without data loss.

Comprehensive Microsoft SQL Server Protection



AUTOMATION KEEPS MANAGEMENT SIMPLE

All SQL Server protection features within Auto-Snapshot Manager can be scheduled, to simplify and streamline your data protection processes. Multiple schedules can be created to automate Smart Copy snapshots, clones, and replicas between sites, simplifying your backup and data protection implementation for SQL Server. Smart Copy snapshot and replica tasks can be automated to take place as frequently as needed to meet business continuity and service level agreement objectives.

EQUALLOGIC DELIVERS VALUE THROUGH ADVANCED PROTECTION AND MANAGEMENT

EqualLogic iSCSI SAN solutions deliver best-of-breed data protection features and all the functionality needed to build a fully protected, high availability SQL Server environment. Protection operations can be scheduled at regular intervals, significantly reducing manual administrative tasks and freeing staff to focus on IT services and business projects.

Other administrative tasks such as validation of database integrity, creating new database instances for data mining, or more frequent updates to testing and development can now be done through Auto-Snapshot Manager with as little as a couple of mouse clicks.

Beyond data protection, PS Series arrays offer a consolidated storage platform that simplifies overall storage management. As your business grows, EqualLogic's virtualization technology makes it easy to linearly scale up capacity and performance with online addition of PS Series arrays. EqualLogic's exceptional performance and automatic load balancing ensure optimal storage operations to meet the needs of your most demanding applications.



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