Microsoft SQL Server 2008

AT A GLANCE:

Microsoft® SQL Server® is the most powerful and flexible database system on the market. The storage infrastructure for SQL Server needs to be just as powerful and flexible. No matter how much the databases grow and change, the LeftHand Networks® SAN can easily accommodate it. No more add-on products, complex procedures, high-priced consultants or months of training; change, scale and protect the storage environment on the fly to accommodate whatever the SQL Server DBAs throw at it.

INTRODUCTION

Microsoft SQL Server is today's fastest growing database environment with over 75% of enterprises using the product. With SQL Server 2005, Microsoft has established SQL Server as a major application infrastructure for enterprise class applications and the new features of SQL Server 2008 promise to accelerate its adoption. SQL Server's roots are in the plethora of back room and homegrown applications that all companies have, but now SQL Server is also running the type of business-critical applications that were the exclusive domain of Oracle and DB2. Storage plays a key role in any major database environment. Reliability, availability, data protection, scalability, management and security all depend on the underlying storage. SQL Server must reside on a storage subsystem that delivers enterprise-class storage management to meet the ever-increasing business requirements. However, many companies cannot afford a million dollar storage system.

Capacity, performance, management, and data protection are the "big four" areas of consideration in implementing the SQL Server environment.

Capacity planning is the DBA's first challenge. How much storage does the system need? What is the growth rate of all of the databases? How much do they require for data protection? How will storage be allocated to new applications? Answering any of these questions wrong is a costly and risky endeavor requiring the re-provisioning of storage. Customers consistently cite re-provisioning of storage as the primary pain point in dealing with changes to an existing SQL Server environment leading to the expenditure of both time and money.

Performance management can also be a challenge as SQL Server databases are notoriously I/O bound; resulting in poor application performance and lowering productivity. From a storage perspective, adequate performance is usually a matter of having sufficient "spindles", or disk drives, in the storage subsystem to meet the I/Os per second (IOPS) requirements for each database. Re-provisioning storage to accommodate changing performance needs results in system downtime, complex architectural changes and in data loss as administrative errors inevitably occur.

Managing the SQL Server environment requires knowledge and expertise from dedicated specialists. Unfortunately, most storage arrays also require extensive knowledge and expertise and thus require additional dedicated specialists. The complexities of the storage environment can slow down application deployments, delay solutions to application specific problems and increase the total cost of ownership of applications.

Continuous data protection secures SQL Server data from loss and protects the applications from down time. Data protection needs to accommodate logical loss due to errors, software defects or malicious attacks, and from physical loss due to component failures within the IT infrastructure. Most companies rely on tape backups entailing backup windows with unacceptable potential data loss and unacceptable time to recover. This is leading to the fast adoption of disk-based backup products that address some of the problems, but usually lead to a dizzying array of expensive add-on products that are overly complex to manage.

What is needed is a storage subsystem that is flexible enough to meet a variety of initial demands and adaptable enough to accommodate both performance and capacity changes. In addition, the ideal storage system is highly available, does not lose data due to downtime and supports self-recovery – all without costing an arm and a leg or requiring an army of storage experts to manage.

SOLUTION OVERVIEW

An iSCSI SAN from LeftHand Networks is the best storage option for an SQL Server environment.

1. A LeftHand SAN is easy to manage. There is no specific expertise in array management or storage networking required. It leverages the existing Windows and IP expertise with implementations requiring less than half a day.
2. The SAN is easy to change and expand as the SQL Server environment changes and grows. Changes require no down time and can address both capacity and performance. Automation lowers the risk of costly administrative errors.
3. Never outgrow the storage environment. The SAN scales to any size SQL Server environment on the fly. There are no expensive "fork lift" upgrades – ever!

4. The SAN is highly optimized for SQL Server's random read/write IO. This ensures the highest performance possible from a set of disks and minimizes the dollars per IOPS for the system.
5. Construct a highly available storage environment that survives virtually any set of component failures to keep running without affecting application users.
6. Easily apply data protection features as needed for specific storage groups without downtime.

How does LeftHand do all of this? Based on our patented SAN/iQ storage management software, a LeftHand SAN is comprised of multiple "storage nodes," each of which is a self-contained server with 6 to 15 drives. The set of storage nodes are clustered together to create a virtual storage array or storage pool from which iSCSI volumes are created. SAN/iQ load balances volume data across the storage nodes within a cluster and replicates individual blocks to different storage nodes using a technology called "Network RAID (nRAID)." The storage subsystem scales by adding additional storage nodes to the cluster. Existing volumes are automatically re-balanced to accommodate the new nodes - increasing both the capacity and the performance of the storage cluster. A performance bottleneck relating to the storage subsystem can be immediately resolved by adding an additional node to the storage cluster. No re-planning or re-configuration. No downtime. No storage expertise required.

Additionally, nRAID provides the same level of protection between storage nodes as disk RAID provides between disks in a RAID array. Thus, if any part of a nodes fails (e.g. disks, CPU, network connections, power), other copies of the data within the SAN ensure that the data volumes are still available. In addition, due to the method by which nRAID creates data replicas, multiple nodes can fail without interruption of service. In fact, (here comes the really cool part) physically locating half of the storage nodes in one location and the other half in a different location allows the system to suffer the complete failure of a location (a failure of half the storage nodes) and still keep running! There are no additional products to buy and nothing administratively to do. Simply put half of the nodes in a different location and have instant, multi-site failover capability. Combine this with a Microsoft Cluster Server environment for the SQL Server databases and have a complete HA SQL Server environment – all at a price never thought possible.

Beyond the key features mentioned above, SAN/iQ has a rich set of additional storage management features, including:

- Thin provisioning
- Live snapshots
- Remote snapshots between SAN/iQ clusters
- Volume Shadow Copy Service (VSS) support
- Online upgrades of SAN/iQ
- Automated volume growth
- Automated snapshot capacity management
- iSCSI network load balancing (via Microsoft MPIO)
- Central SAN management console with administrative access rights
- Full iSCSI security and server authentication

All these features and more are included in the base SAN/iQ SAN - no ala carte feature pricing. In short, a LeftHand SAN is the best storage option for running a SQL Server environment.

THE POWER OF SQL SERVER AND LEFTHAND NETWORKS SAN/IQ

LeftHand Network's SAN/iQ provides a cost-effective, easy-to-manage, highly scalable and highly available iSCSI storage environment for use with SQL Server. The SAN/iQ storage infrastructure easily expands with the addition of new databases, capabilities or entirely new instances. SAN/iQ is flexible enough to allow SQL Server to start small on a two node SAN and scale alongside the business to a forty node, multi-site SAN without reconfiguring existing volumes or taking the databases offline. Try that with any other storage system!

ABOUT LEFTHAND NETWORKS AND MICROSOFT

LeftHand Networks and Microsoft have a strong partnership and work together to provide scalable IT and business solutions for the mid-tier market. LeftHand is a Microsoft Gold Certified Partner, a Managed ISV Partner and a Microsoft Storage Partner. LeftHand is also contributing storage systems to the SQL Server Customer Lab at Microsoft Corporate Headquarters, where the two companies collaborate on joint customer deployments, performance testing and best practice development.

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LeftHand NETWORKS

ABOUT LEFTHAND NETWORKS

At LeftHand Networks, we deliver physical and virtual SANs that are easy-to-install, easy-to-manage and designed to perform optimally in today's global data centers. LeftHand Networks pioneered IP-based SANs in 2001, and its innovative SAN products are engineered to deliver the highest availability and scalable performance, with integrated enterprise-class features.

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