Software to Simplify and Share SAN Storage

Achieving More with Less: How to Obtain the Benefits of SAN Storage Without Breaking the Bank

White Paper

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Introduction

There's a well-known proverb that says… "*You can't have your cake and eat it too!*" And while this may apply to a lot of things, there's no rule that says it has to apply to data storage. In fact, it can actually be quite easy for organizations to create robust, flexible, easy-to-manage storage solutions that allow them to realize far greater returns on the investments in their application, server and storage infrastructures, without digging deep into their coffers to do so.

This paper explains how organizations can achieve many of the inherent benefits of Storage Area Network (SAN) storage, including higher levels of performance, scalability, reliability and availability, without incurring many of the costs associated with procuring, operating and maintaining SAN storage hardware (i.e., storage arrays, switches, HBAs, fiber cables, power and cooling, etc.).

Achieving more with less

Using industry-leading SAN software from Sanbolic® and industry-standard server hardware, organizations can create software-based storage solutions that are comparable in terms of performance, scalability and availability to more expensive small- to mid-range hardware-based storage solutions, at a fraction of the cost.

The key to constructing a cost-effective software-based storage solution, or "***Soft-SAN***," lies in the ability to reuse hardware already in one's possession. By reusing or repurposing equipment which is not currently in service, organizations can leverage previous investments in their hardware and network infrastructures to garner the benefits of block-based storage. In addition to saving on hardware costs, organizations can also realize significant savings in time and energy, both of which may be heavily consumed while conducting the research necessary to determine which SAN hardware best meets their needs as well as their budgets.

Anatomy of a Soft-SAN

A Soft-SAN is a highly scalable and highly available storage solution that allows multiple Windows® servers to work in collaboration with one another to create storage volumes whose data is protected via software-based RAID 1 (mirroring).

Soft-SANs are comprised of two or more physical Windows Servers (Server 2003™ R1, R2 x64; Server 2008™ R1 x86 or x64; Server 2008 R2 x64) running on industry-standard server hardware, each containing a RAID controller and a minimum of three hard drives. The servers must have the following components installed:

- iSCSI Software Initiator
- iSCSI Software Target
- Sanbolic Melio 2010™ SAN software

Robust, flexible and easy to manage, Soft-SANs allow organizations to improve the performance, scalability and availability of their application, server and storage infrastructures, without bearing the costs of installing, configuring and maintaining hardware-based SANs.

An ideal storage solution for SMBs, Soft-SANs can also be extremely useful in larger enterprise environments as well. Some examples include:

- Allows users in remote offices or within individual departments to share access to critical files or data that must be available at all times to maintain business continuity.
- Allows development and/or QA teams to utilize shared storage for product testing.
- Allows organizations with limited budgets to add more servers and more storage resources on the fly whenever additional I/O performance and/or storage capacity is required.

Offering high availability and scalability, Soft-SANs possess the unique ability to address a wide range of use cases quickly and easily, at very little cost.

About Sanbolic Melio 2010

The driving engine behind a Soft-SAN is **Sanbolic *Melio 2010***, a feature-rich software product suite comprised of various applications that are designed to work together to simplify, share and enhance SAN storage.

At the core of Melio 2010 is an advanced, 64-bit symmetrical cluster file system called “Melio FS” that allows multiple servers to share simultaneous read-and-write access to block-based storage. As an all-purpose cluster file system, Melio FS supports all workload types and extremely large storage volumes.

Melio 2010 also includes a host-based cluster volume manager that greatly simplifies the management of Melio shared storage by creating virtual pools of storage (logical volumes) out of physical storage resources (hard disks), while providing advanced functionality such as the ability to create volume sets and stripe sets to improve I/O performance, as well as expand logical volumes dynamically to meet future growth needs.

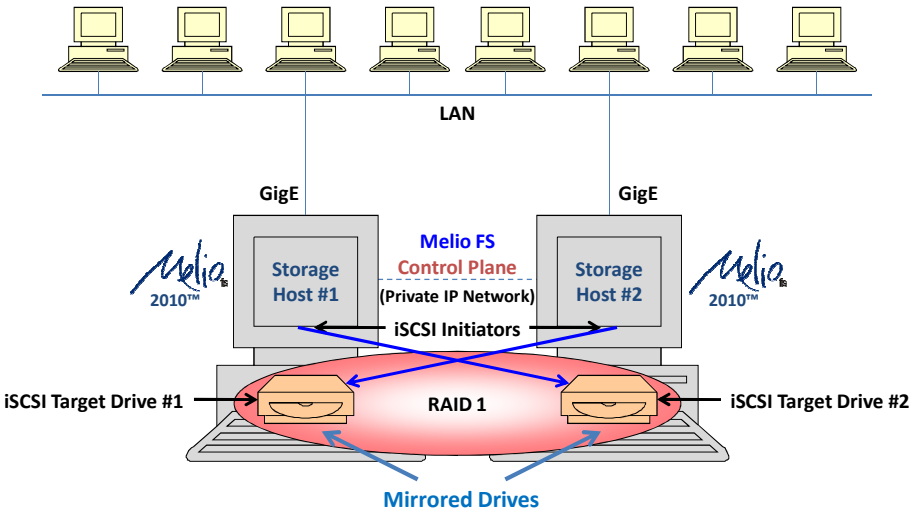
Using Melio 2010, applications can share access to data at block-level through dedicated I/O paths between storage clients and hosts without introducing any of the constraints associated with file-based shared storage solutions (i.e., locking contention incurred by CIFS and NFS in mid- to larger-size file-sharing environments; bandwidth saturation resulting from the shuttling of storage and application traffic over the same network; single points of failure introduced with file shares or NAS devices; etc.). Sharing access to a single pool of storage allows multiple instances of an application running on multiple servers to work in tandem to achieve significant improvements in performance, scalability and availability, while minimizing storage requirements.

For organizations looking to achieve additional versatility from their Soft-SANs, Melio 2010 also supports network sharing of RAID1 volumes, allowing storage clients to act as NAS heads to provide a highly scalable and highly available file-serving solution that allows workstations (non-storage clients) to access data on the Soft-SAN via CIFS at the same time that storage clients access data on the Soft-SAN at block-level.

Using Soft-SANs powered by Melio 2010, organizations can achieve the following benefits:

- High performance – Block-based access to storage with dedicated I/O paths
- Scalability – Ability to add more servers and more storage resources quickly and seamlessly
- High availability – Data mirroring to ensure data accessibility in the event of a storage host failure
- Simplified management – Ability to manage all storage resources via a central management console
- Data protection – Backup and recovery of data at various points in time using VSS-based snapshots

The following diagram illustrates a highly scalable and highly available Soft-SAN comprised of industry-standard servers and Sanbolic Melio 2010 SAN software.



How to Build a Soft-SAN

The steps outlined below describe how to create a robust, flexible, easy-to-manage Soft-SAN similar to the one depicted in the diagram above.

Using two physical servers (storage hosts), install a minimum of three hard drives in each server and perform the following steps on each server:

1. Boot up and enter the BIOS to access the RAID Controller.
2. Configure the disks to operate in a RAID group.
   ***Note:** The RAID level you choose will depend on the number of disks you have and the amount of protection you are looking to achieve.*
3. Reboot.
4. Use the iSCSI Target software to create a single drive out of the RAID group and mount it as a local drive.
5. Use the iSCSI Initiator to connect to the opposing server's iSCSI target drive and mount it as a local drive.
6. Install Sanbolic Melio 2010, launch the Melio 2010 cluster volume manager (*Start > All Programs > Sanbolic > LaScala cluster volume manager*) and follow the instructions in the LaScala Users Guide to create a RAID1 shared volume out of the two iSCSI target drives.

Congratulations… you've just created a Soft-SAN!

Conclusion

Deploying a Soft-SAN powered by **Sanbolic *Melio 2010*** allows organizations to make much better use of the equipment they already own, ensuring greater returns on the investments in their hardware while achieving many of the inherent benefits associated with hardware-based SANs, including high performance, scalability, reliability and availability. And best of all, organizations can accomplish all of the above without incurring the expenses associated with procuring, maintaining and managing hardware-based SANs.

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