

Software to Simplify and Share SAN Storage



Sanbolic's Portfolio of SAN Storage Enhancing Products



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About Sanbolic

Sanbolic® Inc. develops software designed to simplify and share Storage Area Network (SAN) storage. Offering innovative, cost-effective products, Sanbolic helps small-medium businesses (SMBs) and large enterprises realize the most value from their storage solutions by extending the capabilities of their storage infrastructures, allowing organizations to achieve a greater return on their investments.

Sanbolic's Melio FS™ and Kayo FS™ clustered file systems are designed to support concurrent block-level access to data stored on Storage Area Networks (SANs). Sanbolic's LaScala™ volume manager provides the ability to create and expand storage volumes dynamically, allowing more efficient use of storage while greatly simplifying storage management. Sanbolic's SILM™ allows storage administrators to create user-defined policies to automatically copy or move data from one SAN volume to another, facilitating data backup and recovery and data availability. While all four products greatly enhance SAN storage-based solutions, which product(s) to use depends on an organization's current needs and future growth prospects.

About Melio FS

Melio FS is a 64bit cluster file system that provides multiple servers with simultaneous access to data stored on the same storage partition or Logical Unit Number (LUN) on a SAN. As a general-purpose cluster file system, Melio FS supports access to all data types stored on the LUN and can support LUNs as large as 18 million terabytes (TBs). Employing advanced transaction managers, a symmetrical architecture, full journaling, and dynamic clustering capabilities, Melio FS ensures the integrity of the data stored on the shared LUN by controlling read/write access by multiple servers at any given time.

About Kayo FS

Based on the advanced technology found in Melio FS, Kayo FS was initially developed to enhance certain feature aspects of Microsoft's® Hyper-V™ server virtualization technology. By providing multiple hosts with concurrent access to virtual machine (VM) files stored on a LUN, Kayo FS addresses a void in the current implementation of Hyper-V; allowing Microsoft's Hyper-V to better compete with the more mature, fully-featured hypervisors offered by today's leading server virtualization vendors.

About LaScala

LaScala is a host-based volume manager that incorporates advanced transaction management, locking, and clustering technology, to simplify management and improve the flexibility and reliability of shared storage environments. Using LaScala, multiple hosts can share access to and administer storage volumes spanning multiple storage controllers and access to volumes can be secured by defining host access to specific volumes using native Windows™ security tools such as ACLs and Active Directory™. Used in conjunction with a cluster file system like Melio FS or Kayo FS, LaScala provides high performance shared access to data on volumes striped across many disks residing on multiple storage controllers.



About SILM

SILM, or Simple Information Life Cycle Management, is a standalone product that automatically copies or moves files or volumes based on user-defined policies. For example, a storage administrator could establish policies to copy any files created or modified in the past 4 hours to a backup volume and to move any files not accessed in 30 days to secondary storage. SILM offers universal connectivity support, allowing it to be deployed in mixed storage environments that include DAS, NAS, and SAN storage and supports both Microsoft and Sanbolic file systems.

Breakdown of Feature Support

This section offers a comparison of the supported features and configurations for each product; allowing readers to determine which product or products would prove most beneficial for their particular storage environment.

Feature definitions:

Cluster size

The maximum number of nodes that can access a single LUN formatted with Kayo FS or Melio FS.

Storage size

The total amount of storage shared by all the nodes participating in a cluster.

File System size

Refers to the architecture of the file system (i.e., 32bit, 64bit).

File Types

The types of files that can be written to/read from the file system.

DFS

Available in Microsoft Windows server-based operating systems, DFS, or Distributed File System, allows administrators to group shared folders residing on remote computers and present them to users as a virtual tree of folders known as a “namespace.” The benefits of using a namespace include increased data availability, load-balancing and simplified data migration.

NFS

NFS, or Network File System, is a file system developed originally for UNIX and Linux operating systems that allows files to be shared transparently between servers, desktops, workstations, etc. Using NFS, a file system or a portion of a file system located on a remote computer can be mounted on a local computer, allowing a user of the local computer to view, update, and save files stored on the remote computer as if they were on the local system.



MSCS

MSCS™, or Microsoft Cluster Server™, is software that runs on Microsoft Windows server-based operating systems that facilitates load-balancing and failover for systems participating in a cluster. With significant enhancements and a myriad of new features, MSCS was renamed “Windows Failover Clustering™” in Windows Server 2008™.



RAID

RAID, or Redundant Array of Independent Disks, is a set of hard disks that function as a single disk subsystem. Encompassing different levels (0, 1, 2, 3, 4, 5, 6, 10, 20, 50, etc.), RAID offers various degrees of read/write performance and/or failover protection.



NLB

NLB™, or Network Load Balancing™, is the name of the application load-balancing software available in Microsoft Windows server-based operating systems. Using NLB, client connections can be distributed across multiple servers, improving scalability and high availability for TCP/IP-based services and applications.



Access Control Lists (ACLs)

ACLs are policies designed to restrict access to a volume, directory, or file. Configured within Active Directory and deployed across the enterprise network, ACLs ensure that only specific nodes can access volumes, directories, or files.



File System Resize

File System Resize denotes the ability to modify (expand) the size of the file system dynamically (without the need to restart disk management services or reboot servers).



Volume Expansion

Volume Expansion allows administrators to dynamically extend the size of a volume without having to restart disk management services or reboot cluster nodes. With this feature, administrators can overcome the free space limitation by adding additional partition(s) to the volume when desired.



Network Sharing

Refers to the sharing of files amongst interconnected computers. NFS is used to share files amongst computers running Unix or Linux and CIFS, or Common Internet File System, is used to share files amongst computers running Windows.



Hyper-V Node support

The ability to install and run software on the Microsoft Hyper-V or VMware® ESX 3.5™ hypervisor.





Virtual Node support for Hyper-V and VMware


The ability to install and run software within a Microsoft Hyper-V or VMware ESX 3.5 virtual machine.

Disto Remote Management


Software that allows administrators to create, expand, and manage storage volumes remotely from a central console.




Quality of Service



Quality of Service (QoS) refers to a variety of techniques used to prioritize traffic or processes operating across a Storage Area Network. Rather than having to rely upon normal “best effort” mechanisms, Melio FS allows administrators to assign various levels of priority to specific traffic types or processes regarding their usage of a volume with respect to bandwidth. By employing a point based system ranging from 1000 (highest priority) to 1 (lowest priority), Melio FS is able to dedicate bandwidth for volume usage to traffic types or processes with the highest levels of priority.




EA



EA, or Extended Attribute, is a file system feature that allows users to associate computer files with metadata not interpreted by the file system.

Open by File ID




File ID is a 64bit reference number for a file. This number is assigned by and specific to a particular file system. An application can use a file_id to open the corresponding file.

Max directory levels




The maximum depth of nested folders or directories supported.

Mount Points



Originally found in UNIX and older minicomputer operating systems, mount points were developed to simplify storage management. A physical location in the directory structure on which the root directory of a volume is grafted, or mounted, mount points are persistent directories that point to disk volumes. In Windows OS, mount points resolve to the root directory of a particular volume.




Cluster Affinity




Cluster Affinity allows a specific cluster node (or group of cluster nodes) to keep the connection to a shared volume after it has lost communications with the remaining cluster nodes.

Application Data Clustering



The ability to combine multiple servers hosting a mutual application (i.e., SQL, Microsoft SharePoint™, etc.) to provide load-balancing and high availability for that particular application.



Product Comparison Chart

	<u>Kayo FS</u>	<u>Melio FS Professional</u>	<u>Melio FS Enterprise</u>	<u>LaScala Professional</u>	<u>LaScala Enterprise</u>
<u>Cluster size</u>	<u>5</u>	<u>5</u>	<u>Unlimited</u>	<u>5</u>	<u>Unlimited</u>
<u>Storage size (TB)</u>	<u>2¹</u>	<u>4¹</u>	<u>Unlimited</u>	<u>4¹</u>	<u>Unlimited</u>
<u>File System size</u>	<u>64 bit</u>	<u>64 bit</u>	<u>64 bit</u>	<u>N/A</u>	<u>N/A</u>
<u>File Types</u>	<u>Limited²</u>	<u>ALL</u>	<u>ALL</u>	<u>N/A</u>	<u>N/A</u>
<u>DFS</u>	<u>NO</u>	<u>YES</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>NFS</u>	<u>NO</u>	<u>YES</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>MSCS</u>	<u>YES³</u>	<u>YES</u>	<u>YES</u>	<u>Partial⁴</u>	<u>Partial⁴</u>
<u>RAID</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>NO</u>	<u>YES⁵</u>
<u>NLB</u>	<u>NO</u>	<u>YES</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>ACL</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>File System Resize</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>Volume Expansion</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>Network Sharing</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>Hyper-V Node support</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>
<u>Virtual Node support for Hyper-V and VMware</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>Disto Remote Management</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>NO</u>	<u>YES</u>
<u>Quality of Service</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>EA</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>Open by File ID</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>
<u>Max directory levels</u>	<u>3</u>	<u>5</u>	<u>Unlimited</u>	<u>N/A</u>	<u>N/A</u>
<u>Mount Points</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>Cluster Affinity</u>	<u>NO</u>	<u>NO</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>
<u>Application Data Clustering</u>	<u>NO</u>	<u>YES</u>	<u>YES</u>	<u>N/A</u>	<u>N/A</u>

¹ Refers to the *total* amount of storage shared by all nodes participating in a cluster; not the size of an individual volume or LUN.

² Kayo FS-formatted volumes store virtual machine files for Hyper-V (i.e., bin, exp, vhd, vsv, xml) and VMware Server (i.e., nvram, vmdk, vmsd, vmx, vmxf) only.

³ Only for clustering Hyper-V virtual machines.

⁴ Only Melio FS/Kayo FS-formatted LaScala-managed volumes with Hyper-V VMs can be clustered.

⁵ Shipping with RAID support in Q4 2008.

For more information regarding Sanbolic, Inc. and its industry-leading products designed to enhance SAN storage, please visit www.sanbolic.com or call 617-833-4242.

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