



Storage Management in Microsoft® Windows Server™ 2003 R2: Customer Case Study – Mesirow Financial

Microsoft Corporation

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Abstract

Focus: This white paper documents the implementation of Windows Server 2003 R2 at Mesirow Financial in Chicago, Illinois. The white paper will provide a summarized history of the firms involved in this project (specifically Mesirow Financial and EqualLogic®), and an overview of the key features in Windows Server 2003 R2 that will be utilized by Mesirow to address their current storage management challenges. The white paper will include relevant input from representatives of Mesirow, EqualLogic, and Microsoft gathered during the planning and execution of the R2 upgrade. The content will be supplemented with customer evidence and before/after comparisons that illustrate the benefits to Mesirow of implementing the new storage management technologies at its Chicago operation. Target audience: This white paper is intended for business/technical decision makers, IT administrators, and technology implementers from end user organizations who are responsible for server deployments and the management of internal and external storage resources on the Windows Server 2003 platform.

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Introduction

Businesses of all sizes need effective, straightforward storage management solutions to help them deal with the rapid growth in stored data within their storage infrastructure. Using the storage-friendly platform of technologies in Windows Server 2003 R2, Microsoft is working with its storage partners to help drive the creation of simple storage solutions for its customers.

This white paper illustrates how storage management solutions from Microsoft and EqualLogic are being applied to address the business and IT challenges at one organization – Mesirow Financial in Chicago, Illinois. Topics include background information on Mesirow business challenges and IT environment, and the key technologies provided by iSCSI storage vendor EqualLogic, a Microsoft storage partner and the first iSCSI storage vendor to obtain the Complete Solution designation under Microsoft's Simple SAN initiative. The white paper also discusses how the new storage management tools integrated into Microsoft Windows Server 2003 R2 provide manageable, reliable, and cost-effective solutions designed to meet the challenges at Mesirow and other organizations.

Storage Management Challenges

Windows administrators who are managing storage face a number of ongoing challenges, regardless of the size of their business. The growing data storage needs of the organization need to be met, and stored data must be available on demand—usually on a 24x7 basis. As well, mission-critical corporate information contained in the data must be protected from a variety of risks including hardware failures, security vulnerabilities, and natural disasters.

There are five key criteria that generally must be addressed in any storage management solution to meet the needs of business owners and Windows administrators:

- Scalability
- Fault tolerance
- Data protection
- Ease of management
- Cost-effectiveness

This white paper details how storage management solutions from Microsoft and EqualLogic are helping Mesirow Financial to address the above challenges and plan for future growth in data storage needs.

Audience – Who Manages Storage?

Today, businesses of all sizes need to be smarter about the way they manage their storage resources. Regardless of the size of network or the number of people being supported, storage administrators need a centralized view of storage that simplifies planning, provisioning, and maintenance. They require the ability to monitor available storage resources and generate alerts when problems arise. Based upon the monitoring and alert data generated, rich reporting and trend analyses may need to be created as well.

This white paper is intended to provide some insight into how one organization addressed its storage management challenges with Microsoft Windows Server 2003 R2 and EqualLogic's PS Series iSCSI storage solutions. The intended audience is business/technical decision makers, IT administrators, and technology implementers from end user organizations who are responsible for server deployments and the management of internal and external storage resources on the Windows Server 2003 platform.

Case Study: Storage Management with Windows Server 2003 R2

Country or Region: United States

Industry: Financial Services

Customer: Mesirow Financial

Founded in 1937, Mesirow Financial is one of the largest diversified financial services firms in Chicago. The firm is an employee-owned, private company, headquartered in Chicago, with more than 1,000 employees in 26 offices nationwide. Mesirow reported fiscal 2004 revenues of more than \$298 million, and has \$25.5 billion in assets under management, advisory, and custody.

Originally a one-man brokerage firm, Mesirow Financial has grown to encompass six divisions of services:

- **Investment Management** – Advanced Strategies, Currency Management, Equity Investments, Fixed-income Investments, Investment Advisory
- **Investment Services** – Broker/Dealers and IAs, Institutional Markets, Investment Brokerage
- **Insurance Services** – Employee Benefits, Life, Personal Lines, Property and Casualty
- **Investment Banking** – Corporate Investment Banking, Public Finance, Sale-leaseback Capital
- **Consulting** – Corporate Recovery, Litigation and Investigative Services, Valuation Services and Interim Management*
- **Real Estate** – Development, Consulting, 1031 Exchanges, Sale-leaseback Capital

* Interim Management services provided by Mesirow Financial Interim Management, LLC

EqualLogic

EqualLogic, Inc., is a leading provider of intelligent, enterprise-class iSCSI storage area network (SAN) solutions that enable businesses—from *Fortune 100* to small- and mid-size organizations—to realize the economic benefits of consolidated, self-managing storage. The EqualLogic PS Series of storage arrays, based on the company's patented peer storage architecture, delivers operational simplicity, comprehensive data management services, end-to-end data protection, and high data availability in a single, scalable pool of storage.

EqualLogic's award-winning and data-center-proven PS Series storage arrays offer a native iSCSI SAN solution with a comprehensive and fully integrated standard feature set. Each PS Series storage array comes with fully redundant fault-tolerant hardware, and includes full-featured automatic storage-management software in a self-contained chassis. Multiple arrays can be combined to form a scalable enterprise storage grid of more than 100 terabytes.

Since its founding in 2001, EqualLogic, a certified Microsoft Gold Partner and first iSCSI storage vendor to be designated as a Microsoft Simple SAN Solution, has been one of the leaders of iSCSI SAN deployments in Windows environments. EqualLogic's PS Series family of storage arrays supports the new Storage Manager for SANs in Microsoft's Windows Server 2003 R2. EqualLogic provides ongoing support for Microsoft's Universal Distributed Storage vision by bringing high-end storage management features integrated with the Windows Server System into the mainstream, and follows the company's achievement of Microsoft's Simple SAN for Windows Server designation.

EqualLogic's PS Series family is fully compatible with Windows Server platforms, and is designed to complement Microsoft's storage technologies, such as the Microsoft iSCSI Software Architecture, Volume Shadow Copy Service (VSS), Multi-path Input/Output (MPIO), Microsoft Cluster Server, and Microsoft Virtual Disk Service (VDS). EqualLogic has worked closely with Microsoft to ensure integration of the PS Series and Microsoft System Center Data Protection Manager (DPM) 2006 within Windows environments.

EqualLogic's headquarters are located in Nashua, New Hampshire. For more information, please visit <http://www.equallogic.com>.

Microsoft Windows Server 2003 R2 – Storage Management Technologies

Microsoft Windows Server 2003 R2 can help organizations reduce storage management costs while improving storage efficiency. With new storage management consoles, R2 also simplifies branch server management, improves identity management, and helps reduce the cost of server virtualization.

Enhanced built-in support for SAN hardware from multiple vendors allows easier, more reliable access to organizational data, without the need for third-party tools. Microsoft Windows Server 2003 R2 includes several new features to help organizations better manage corporate data, improve utilization of storage, and spend less time managing file servers. File Server Resource Manager and Storage Manager for SANs are two of the key technologies in R2 that help administrators to more efficiently manage their growing storage requirements.

When developing Windows Server 2003, Microsoft made a conscious effort to develop a platform that provided enhanced support for networked storage solutions. The Windows Server 2003 platform has been enhanced with a number of new services and drivers designed specifically to support higher performance and fabric management of SANs. While some of these SAN management capabilities have been back-ported to support Windows 2000 Server, the majority are unique to Windows Server 2003. These services include:

- Volume Shadow Copy Service (VSS), which enables current state “snapshot” style backups of volume, folders, or files¹. This technology is employed by the AutoSnapShot Manager for Windows from EqualLogic.
- Virtual Disk Service (VDS) enables software applications to configure and manage SAN arrays independent of specific implementations via a hardware provider model. VDS v1.1 is supported by Windows Server 2003 R2 and v2.3 of the PS Series firmware from EqualLogic.
- Enhanced disk management capabilities, such as the ability to grow volumes (using the Virtual Disk Service).²
- Support for SANs including remote boot, flexible volume mounting, and an enhanced driver model to support SAN deployment scenarios
- Multiple I/O path support (MPIO) for high availability and load balancing solutions.³

Storage Manager for SANs

Overview

A SAN is defined as a set of interconnected devices (for example, disks and tapes) and servers that are connected to a common communication and data transfer infrastructure, such as Fibre Channel or Internet Protocol (IP). The purpose of the SAN is to allow multiple servers access to pooled storage—

¹ For more information on the Volume Shadow Copy Service, see

<http://www.microsoft.com/technet/prodtechnol/windowsserver2003/library/TechRef/2b0d2457-b7d8-42c3-b6c9-59c145b7765f.mspix>

² For more information on Virtual Disk Service in Windows Server 2003, see

<http://www.microsoft.com/technet/prodtechnol/windowsserver2003/library/TechRef/57282c22-30e9-4d52-9c6d-2d2db8c56adc.mspix>

³ For more information on MPIO, see <http://www.windowssitpro.com/Articles/Index.cfm?ArticleID=41471&DisplayTab=Article>

ideally, any server can potentially access any storage unit. In this type of environment, management of storage resources plays a large role in ensuring access for application and users.

The market currently provides a wide variety of storage management software, but most of it is proprietary to a vendor's hardware offerings. Many larger enterprises have standardized existing offerings, and are now tied to a particular vendor. According to recent industry surveys (ESG⁴, IDC⁵) 35 percent of small- and mid-sized businesses (SMBs) have moved from direct attached storage to networked storage, and 40 percent of SMBs are considering moving to networked storage. Many of these organizations have deployed Windows as their server platform of choice. In fact, 43 percent of installed Windows servers are in environments where there are less than 15 servers. This data makes it clear that there is an immediate need for a tool that can make it easier to deploy and manage SANs in a Windows environment.

Functionality

Microsoft developed Storage Manager for SANs (SMfS) to address the challenges of storage administrators listed earlier in this document. SMfS is a software feature that administrators can use to create and manage the logical units (LUNs) or volumes that are used to allocate space on storage arrays in both Fibre Channel and iSCSI environments. Administered through a conventional Microsoft Management Console "snap-in," SMfS can be used on SAN-based storage arrays that support VDS using a hardware VDS provider. Because of hardware, protocol, transport layer, and security differences, configuration and LUN management differ for the two types (iSCSI and Fibre Channel) of supported environments. This feature will work with any type of Host Bus Adapter (HBA) or switches on the SAN.

File Server Resource Manager

Overview

Organizations now have more storage to manage, in more complex configurations, and, more than ever before, they count on 24x7 availability of their data. IT administrators face the challenge of overseeing a larger and more complex storage infrastructure, while at the same time tracking the types of data available in that infrastructure. Today, managing storage resources not only includes ensuring adequate storage resources and data availability, but also the enforcement of company policies and a very good understanding of how existing storage is being utilized. All of this is necessary for sound strategic planning and rapid response to organizational changes.

Functionality

File Server Resource Manager (FSRM) is a suite of tools that enables administrators to understand, control, and manage the quantity and type of data stored on their servers. By using FSRM, storage administrators can configure quotas to limit the amount of data stored at the folder, share, or volume level. FSRM also enables administrators to actively screen files and folders, and generate comprehensive storage reports. This set of advanced instruments not only helps the administrator to

⁴ The Future of Network-based Storage Intelligence
(<http://www.enterprisestrategygroup.com/ESGPublications/ReportDetail.asp?ReportID=204>)

⁵ Survey of IT Managers' Storage Buying Intentions: January 2004 (<http://www.idc.com/getdoc.jsp?containerId=31125>)

efficiently monitor existing storage resources, but it also aids in the planning and implementation of future policy changes.

You can use FSRM to perform the following tasks:

- Create quotas to limit the space allowed for a volume or folder, and to generate notifications when the quota limits are approached and exceeded.
- Create file screens to filter the files that users can save on volumes and in folders, and to send notifications when users attempt to save blocked files.
- Create periodic or on-demand storage reports that allow you to identify trends in disk usage, and to monitor attempts to save unauthorized files.

FSRM console consists of two snap-ins:

- Storage Resource Management, used to create quotas that place size limits on folder trees, and to create file screens that are used to block files from volumes and folders.
- Scheduled Storage Tasks, used to schedule several types of storage reports, and to generate reports on demand. You can also configure e-mail notifications to be sent when quota limits approach or when users attempt to save files that have been blocked.

Using the FSRM console, you can also manage storage resources on a remote computer. While you are connected, the results pane for that snap-in displays the objects created on the remote computer, allowing you to manage them from the console. In order to use FSRM remotely, the remote computer must also be running Windows Server 2003 R2, with the Storage Manager component installed. FSRM also supports servers that are clustered.

Storage Resource Manager quotas vs. NTFS Disk Quotas

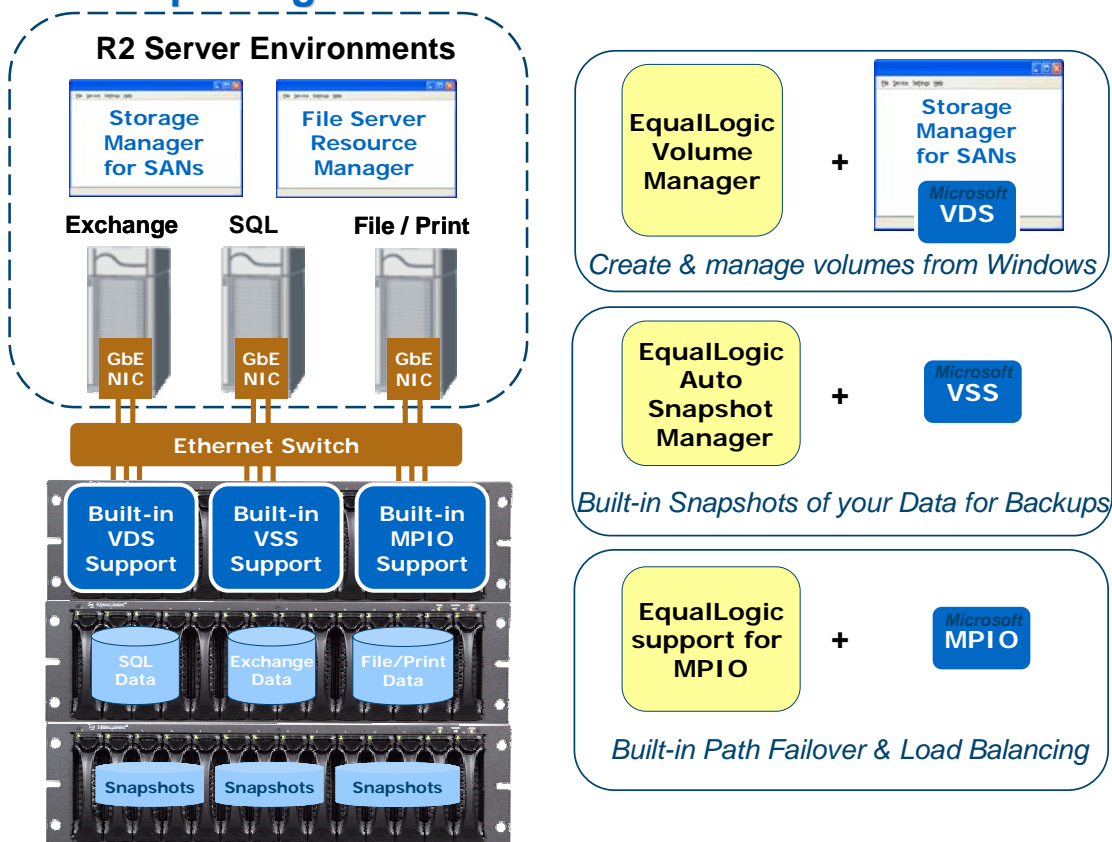
The Windows 2000 and Windows Server 2003 operating systems support disk quotas, which are used to track and control disk usage per user on NTFS volumes. The following table outlines the advantages of using the quota management tools in Storage Resource Manager.

Quota Features	Storage Resource Manager	NTFS Disk Quotas
Quota tracking	By folder or by volume	Per user on a volume
Disk usage calculation	Actual disk space	Logical file size
Notification mechanisms	E-mail, custom reports, command execution, event logs	Event logs only

How EqualLogic Works in a Microsoft Windows Server System Environment

Windows Server 2003 R2 now brings the Windows Server 2003 platform to a whole new level. And EqualLogic is right there to support it. Microsoft is now enabling efficient storage management and server resource management with Storage Manager for SANs and FSRM. Frameworks such as VDS, MPIO, and VSS control how the operating system interacts with the storage infrastructure to get consistent functionality that adds value. EqualLogic's strategy is to provide all the necessary engineering work in order to enable a seamless experience from the Windows platform. The following graphic illustrates how technologies and tools from Microsoft and EqualLogic work together to provide fully manageable storage solutions for companies such as Mesirrow.

How EqualLogic Works in a Microsoft Environment



Storage Management at Mesirow Financial

Historical Background

Mesirow Financial's IT infrastructure includes more than 100 servers distributed across the company's 26 offices to manage the company's financial data and transactions. In the past, Mesirow had stored its data in Direct Attached Storage (DAS) and Network Attached Storage (NAS) solutions. But with continued growth, Mesirow realized that this storage arrangement would not accommodate its long-term needs. The requirement to increase storage capacity was accentuated with the acquisition of another company – and the associated needs of 100 new employees.

Mesirow's IT integration challenges were also exaggerated by the need to update the company's communications infrastructure. In planning an upgrade, the company' messaging system to Microsoft Exchange Server 2003, Mesirow realized its existing storage solutions couldn't provide the block level or file-based access it needed to support this application. The combination of organizational growth, a significant acquisition, and the need to implement a company-wide infrastructure upgrade helped to drive the decision to bolster storage capabilities using a SAN-based solution.

The recent emergence of the iSCSI-standard and related storage solutions presented new opportunities for Mesirow Financial. Because Mesirow's infrastructure is heavily based on Microsoft Windows Server 2003 and the Windows Server System, Mesirow sought an iSCSI-based storage vendor closely aligned with Microsoft. After evaluating several alternatives, Mesirow chose to go with EqualLogic's PS Series storage. Mesirow found that EqualLogic's PS Series array was the most robust iSCSI that Mesirow had evaluated, and among the most cost-effective. Mesirow also felt EqualLogic's virtualization technology and snapshot capabilities were superior to all the other products it had considered. In addition, Mesirow found that the PS Series array was easy to set up and manage – requiring less than 20 minutes to install the front-end and server connections. Setup and management was also very straightforward, using the intuitive user interface and command-line utilities.

The combination of Windows Server 2003 and EqualLogic's PS Series virtualization capabilities have enabled Mesirow to quickly and dynamically allocate storage to support applications as needed. This storage management solution allows Mesirow to perform such formerly cumbersome tasks as allocating storage, load balancing, configuring RAID sets, and creating snapshot routines to backup data in a matter of minutes, as opposed to days.

Current Challenges and Business Drivers

Like many organizations, Mesirow Financial is always looking for ways to do more with less. The company's recent growth has created a rapidly evolving and more distributed environment for the existing IT group to manage. Having already consolidated company data onto an EqualLogic iSCSI SAN, Mesirow is migrating its existing Windows Server infrastructure to Windows Server 2003 R2 so that it can have the best tools available to manage its EqualLogic iSCSI storage infrastructure, Windows servers, and Microsoft applications. Mesirow is confident that the continued combination of these two vendors will pay further returns to its bottom line.

SMfS in R2 will allow Mesirow's server administration staff to manage all their storage resources from one consistent interface – eliminating the need for multiple tools to manage different storage

components. SMfS provides an easy-to-use GUI that is already familiar to Mesirow IT staff, allowing the company to reduce training requirements and streamline operations.

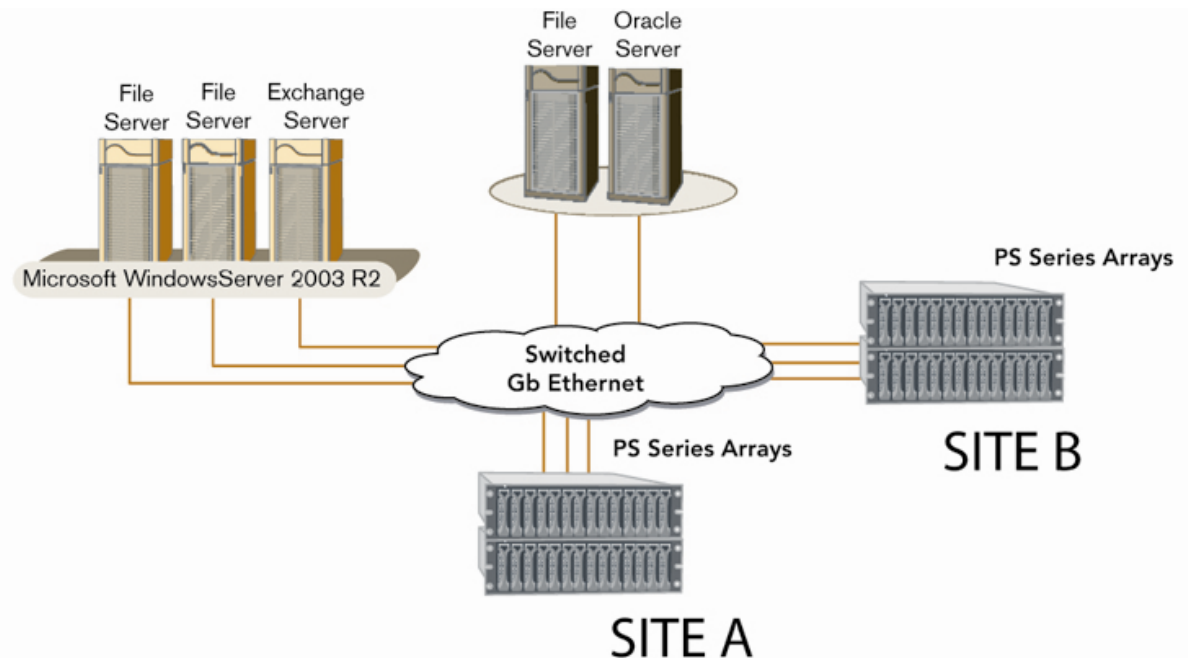
The quota management functionality in FSRM – a component of Windows Server 2003 R2 – also presents an opportunity for Mesirow to reduce storage management administrative overhead. FSRM will allow storage administrators at Mesirow to configure quotas to control the amount of data stored by users and applications at the folder, share, or volume level—helping to eliminate wastage and “runaway” storage growth requirements. The comprehensive storage reports generated by FSRM will help IT administrative staff to efficiently monitor existing storage resources, and also aid in the planning and implementation of future policy changes.

The acquisition last year of a corporate recovery division has added over 100 consultants to Mesirow’s user environment, located nationwide. Combined with the company’s existing distributed branch office structure, this creates challenges for data replication and remote data access. The need to manage distributed data is leading Mesirow to consider the Branch Office and Distributed File System Replication features in Windows Server 2003 R2.

IT Environment at Mesirow

- **iSCSI SAN Structure**

The following diagram illustrates the EqualLogic iSCSI SAN environment structure at Mesirow Financial.



- **Operating Systems**

Mesirow Financial’s current IT infrastructure utilizes several network operating systems, with a heavy concentration on Windows Server 2003 machines to support business-critical applications, such as Microsoft SQL Server™ 2005 and Microsoft Exchange Server 2003. The standard user desktop features Windows XP and Microsoft Office 2003.

- **Servers and Applications**

Mesirow's recent upgrade of its messaging system to Microsoft Exchange Server 2003 highlighted the need to move to a storage solution that supported block level or file-based access. Since Mesirow's infrastructure is heavily based on Microsoft Windows Server 2003 and the Windows Server System, it made business sense for Mesirow to implement an iSCSI-based storage solution from EqualLogic, a vendor that was an early adopter of Microsoft's Simple SAN initiative, and first storage systems vendor to be given Simple SAN designation by Microsoft.

EqualLogic Technologies at Mesirow

EqualLogic's PS Series array's virtualization and replication capabilities provide the greatest value with respect to meeting Mesirow's long-term storage needs. The PS Series array's virtualization capability dynamically allocates storage once an administrator specifies the required capacity for a volume. In addition to setting up the physical disk space needed, the PS Series array automatically creates the RAID sets for each server—which significantly reduces the time, effort, and knowledge required to manage storage. When new arrays are added, the PS Series array's load-balancing technology automatically redistributes data across volumes to achieve maximum performance and efficiency.

Mesirow is addressing its data protection issues with the PS Series array's and Auto-Snapshot Manager for Windows feature (which works with Microsoft's Windows Server 2003 VSS) for backup and recovery, and also with the PS Series' Auto-Replication feature for disaster recovery to automate the many tedious tasks required to set up and maintain a regular data protection capability and help recover failed data in minutes rather than hours. PS Series arrays also enable data to be mirrored, or copied, to volumes deployed in remote locations, which ensure that duplicated data is kept safe should a primary repository fail. Because Auto-Snapshot Manager and Auto-Replication are built-in standard features of the PS Series array at no additional cost to Mesirow that work over standard Ethernet connections, Mesirow has a full backup and disaster recovery solution without purchasing additional third-party software. And since all PS Series arrays seamlessly integrate with one another to comprise a unified local and remote storage solution, the arrays in the suburban offices can backup data for headquarters while the main office arrays backup data for the remote offices. EqualLogic's newly released Windows Host Integration Kit is designed to work with Windows Server 2003 R2, and will simplify Mesirow's upgrade to the Windows Server 2003 R2 platform.

Other key benefits:

- EqualLogic's iSCSI-based SAN solution allows Mesirow to seamlessly add additional capacity and processing power without disruption while continuing to manage the additional storage resources as a single pool of storage.
- iSCSI allows Mesirow to replicate data remotely over standard Gigabit Ethernet lines provided by its telecommunications provider.
- Mesirow is able to provision storage on demand, and uses it frequently to archive e-mail.

Microsoft Technologies at Mesirow

- **SMfS**

Administered through a conventional Microsoft Management Console (MMC) snap-in, SMfS can be used on SAN-based storage arrays that support VDS using a hardware VDS provider. On its iSCSI SAN, Mesirow can use SMfS to assign each LUN to a target—a

logical entity that contains one or more LUNs. A server accesses the LUN by logging onto the target using the server's iSCSI initiator. To log onto a target, the initiator connects to portals on the target; a sub-system has one or more portals, which are associated with targets. If a server's initiator is logged onto a target, and a new LUN is assigned to the target, the server can immediately access the LUN.

Securing data on an iSCSI SAN. To help secure data transfers between the server and the sub-system, Mesirow can configure security for the login sessions between initiators and targets. Using SMfS, you can configure one-way or mutual Challenge Handshake Authentication Protocol (CHAP) authentication between the initiator and targets, and you can also configure Internet Protocol Security (IPSec) data encryption.

- FSRM

With the increasing demand on storage resources as organizations rely more heavily on data than ever before, IT administrators face the challenge of overseeing a larger and more complex storage infrastructure, while at the same time tracking the kind of information it contains. Managing storage resources has come to include not only data size and availability, but also the enforcement of company policies and a very good understanding of how existing storage is utilized. This allows for sound strategic planning and proper response to organizational changes.

FSRM is a suite of tools that allows administrators to understand, control, and manage the quantity and type of data stored on their servers. By using FSRM, administrators can place quotas on volumes, actively screen files and folders, and generate comprehensive storage reports. This set of advanced utilities not only helps the administrator efficiently monitor existing storage resources, but also aids in the planning and implementation of future policy changes.

Mesirow Financial is interested in using the enhanced quota management features in FSRM to implement control over storage limits on a per volume or per share basis. Additionally, there is a need at Mesirow to file filtering/blocking based on certain file types. The goal is to limit users from storing personal files (such as MP3s or PSTs) on network file shares.

- Branch Server Management

Windows Server 2003 R2 provides technologies that can assist in simplifying Mesirow's branch server management for the following scenarios:

- Publishing files from centralized hubs to branch offices.
- Replicating files from branch to hub locations for backup, fault tolerance, or cross-branch publishing.
- Loose collaboration of documents between branches or between hubs and branches.
- Efficient management of printers in branch offices, including drivers and queue management.

These scenarios are supported by the Distributed File System (DFS) solution, which includes new tools for DFS Namespaces, a new replication engine known as DFS

Replication, and enhanced print management tools. There is a great deal of interest in DFS-R at Mesirow to help manage data integrity across the company's wide area network.

Mesirow Financial: Windows Server 2003 R2 Implementation

Project Plan Summary

To take advantage of the new features in Windows Server 2003 R2 in conjunction with EqualLogic storage arrays, Mustafa Sayla, Mesirow's Senior Network Administrator, worked with representatives from EqualLogic and Microsoft to initially set up a new test environment. The test setup included two Windows Server 2003 computers and an EqualLogic PS100 storage array with 3.5 terabytes of storage space. The plan was to implement a new storage environment based on Windows Server 2003 R2 and EqualLogic version 2.3 firmware. In conjunction with the release of version 2.3, EqualLogic has also introduced its Windows Host Integration Kit, which allows Mesirow to set up its EqualLogic SAN connected to its Windows Server infrastructure in under 10 minutes. Included in EqualLogic's Windows Host Integration Kit is: EqualLogic's Simple SAN Installer, Remote Setup Wizard, VDS 1.1 provider, Auto-Snapshot Manager, and EqualLogic VSS provider, Microsoft's iSCSI software initiator.

Pre-upgrade Requirements

In general, system requirement for Windows Server 2003 R2 are the same as the following general Windows Server 2003 system requirements:

Windows Server 2003 R2 System Requirements			
Requirement	Standard Edition	Enterprise Edition	Datacenter Edition
Minimum CPU Speed	133 MHz	<ul style="list-style-type: none"> • 133 MHz for x86-based computers • 733 MHz for x64-based computers 	<ul style="list-style-type: none"> • 400 MHz for x86-based computers • 733 MHz for x64-based computers
Recommended CPU Speed	550 MHz	733 MHz	733 MHz
Minimum RAM	128 MB	128 MB	512 MB
Recommended Minimum RAM	256 MB	256 MB	1 GB
Maximum RAM	<ul style="list-style-type: none"> • 4 GB for x86-based computers • 32 GB for x64-based computers 	<ul style="list-style-type: none"> • 64 GB for x86-based computers • 1 TB for x64-based computers 	<ul style="list-style-type: none"> • 128 GB for x86-based computers • 1 TB for x64-based computers
Multiprocessor Support	Up to four	Up to eight	<ul style="list-style-type: none"> • Minimum eight-way capable machine required • Maximum 64
Disk Space for Setup	1.5 GB	<ul style="list-style-type: none"> • 1.5 GB for x86-based computers • 2.0 GB for x64-based computers 	<ul style="list-style-type: none"> • 1.5 GB for x86-based computers • 2.0 GB for x64-based computers

Diary of Upgrade Process

1. Windows Server 2003 R2 is installed on test server machine; third-party NIC drivers added.
2. Using Control Panel Add/Remove Programs, the SMfS, FSRM, and DFS programs are added to the Windows environment.
3. Using Host Integration Tools from EqualLogic, the Remote Setup Wizard is launched to discover the array.
4. SMfS is run to:
 - a. Manage iSCSI targets
 - b. Manage iSCSI security
 - c. Create LUNs
 - d. Log onto iSCSI targets

Review of New Tools and Technologies in Action

The new tools and technologies provided by Microsoft and EqualLogic are returning immediate technical and business cost benefits to Mesirow. With a more centralized view of its servers and storage resources, Mesirow can carry out many of its storage management tasks from one familiar screen. From virtually any location on its network, Mesirow's IT administrators can create LUNs, analyze sub-systems, and configure LUNs. Mustafa sees this type of "dashboard view" of the organization's storage resources as being very helpful in aiding Mesirow's efforts to streamline and centralize all its storage management activities.

Mesirow will continue to incorporate the new features of SMfSs into its storage management practices, and is looking forward to continued development by Microsoft of this very useful management tool. All of Mesirow's EqualLogic PS Series arrays will be upgraded to version 2.3 by mid-March (additionally, all new PS Series arrays shipping from EqualLogic now include v2.3 firmware). Once the firmware upgrade is completed, Mesirow will then complete the upgrade of all remaining Windows servers to R2. At the completion of this stage, Mesirow will be relying on SMfS as the central tool for all of its additional storage management needs.

Mustafa is impressed with the wide variety of management capabilities that Microsoft has provided with the FSRM tool. Mesirow has an immediate need for file screening, storage quotas, and reporting capabilities to help manage storage utilization—in every location where storage is present throughout the organization. Mesirow can use FSRM on a per volume and per share basis to help manage storage by predicting usage, identifying types of data, and limiting unwanted usage. Screening out non-critical file types, such as MP3s and JPEGs, will be very useful to Mesirow's efforts to promote efficient storage utilization within the organization, and creating custom rules for screening or filtering is something that Mustafa will be using extensively moving forward. The ability to detect and report on duplicate files is a feature of FSRM reporting that will help Mesirow to maximize its storage resources usage. As no third-party software is needed on the server to do all this, it is "One less thing to worry about," says Mustafa.

Some Final Thoughts

The combination of EqualLogic PS Series firmware version 2.3 and Microsoft Windows Server 2003 R2 has given Mesirow a new set of highly effective tools and technologies with which to manage its

growing storage infrastructure. The new EqualLogic Windows Host Integration Kit will help Mesirow immensely in its efforts to quickly add and configure new storage arrays in many of its remote locations. As one of five key components in the Windows Host Integration Kit, the Remote Setup Wizard reduces the time and effort required for initial installation and configuration of storage arrays. No longer do Mesirow's server administrators have to download and install separate software drivers. As Mustafa says: "This is a great step forward. We can configure everything remotely via console. Someone connects and powers up the array, and I can do the configuration remotely."

Mustafa is also excited about the benefits that SMfS and FSRM bring to Mesirow. These new tools will help him with many of the ongoing questions that he must address in his daily storage management routines: How much data do we have? What types of data are we storing? How can we eliminate duplicate and unwanted file types? Mustafa is impressed with how quotas work in R2 now, and is looking forward to even better things with future versions. "Microsoft has come a long way. FSRM has all the features of other third-party solutions—and it's built-in!" He also really likes the new functionality of DFS-Namespace and DFS-Replication in his test environment, and is looking forward to doing some more analysis and performance testing in a bigger environment.

With the combination of storage management tools in Windows Server 2003 R2 and EqualLogic's PS Series Host Integration Kit, Mesirow Financial can effectively manage storage resources and company data throughout its organization. Windows Server 2003 R2 offers all the benefits of Windows Server 2003 with SP1, while greatly improving identity and access management, branch server management, storage setup and management, and application development for Mesirow's corporate IT infrastructure.

The PS Series storage arrays from EqualLogic provide Mesirow with virtualization capabilities that hide the complexity of managing its network storage. The snapshot features provide the backup and recovery capabilities that Mesirow needs to help run its business. And the new version 2.3 firmware helps streamline the addition of new storage arrays—delivering a flexible, high-performance, and cost-effective iSCSI SAN solution for Mesirow's growing storage needs.

Related Links

See the following resources for further information:

- Microsoft Windows Server System at <http://www.microsoft.com/windowsserversystem/default.mspix>
- Microsoft Storage at <http://www.microsoft.com/windowsserversystem/storage/default.mspix>
- EqualLogic PS Series at http://www.equallogic.com/pages/partners_microsoft_simplean.htm



Windows Server System is comprehensive, integrated, and interoperable server infrastructure that simplifies the development, deployment, and management of flexible business solutions.
www.microsoft.com/windowsserversystem