

LAB VALIDATION REPORT

Dell PowerVault NF100 File Sharing Made Simple

By Claude Bouffard
With Brian Garrett

August, 2008

Table of Contents

Table of Contents	i
Introduction	1
ESG Lab Validation.....	4
<i>Getting Started</i>	5
<i>File Sharing</i>	7
<i>Backup Repository</i>	9
ESG Lab Validation Highlights.....	11
Issues to Consider	11
ESG Lab's View	12
Appendix.....	13

ESG Lab Reports

The goal of ESG Lab reports is to educate IT professionals about emerging technologies and products in the storage, data management and information security industries. ESG Lab reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objective is to go over some of the more valuable feature/functions of products, show how they can be used to solve real customer problems and identify any areas needing improvement. ESG Lab's expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments. This ESG Lab report was sponsored by Dell.

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of the Enterprise Strategy Group, Inc., is in violation of U.S. Copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at (508) 482.0188.

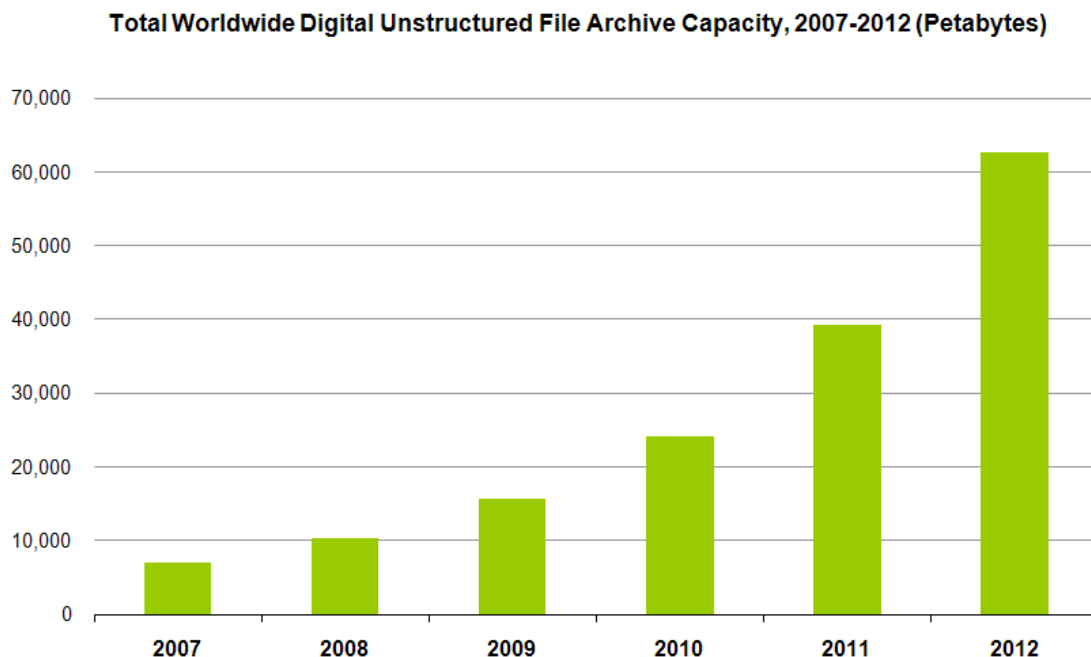
Introduction

The Dell PowerVault NF100 storage server is a convenient and cost-effective solution for file sharing. This ESG Lab Validation report explores how the NF100, with pre-configured RAID and pre-installed Microsoft Windows Storage Server software, can be deployed and sharing files in less than 15 minutes. This report also explores how the NF100 can be used as a backup and recovery platform for local, remote and mobile users.

Background

There are three fundamental realities facing small businesses today: 1) They are generating a lot more data than ever before, 2) the value of the data they are generating continues to mount and 3) they are becoming more aware of the need to protect their data resources or face significant business risk. The fastest growing type of data within small businesses is file data. From the documents, spreadsheets and presentations associated with general office productivity applications to the large files associated with images and videos, ESG research indicates that file data is expected to constitute the bulk of digital assets for the foreseeable future.¹ As shown in Figure 1, the projected world-wide capacity growth for digitally archived file data is growing at an alarming rate and is projected to exceed 60,000 petabytes in 2012.

FIGURE 1. THE WORLD-WIDE GROWTH OF FILE DATA



Small businesses face a number of challenges as they struggle to provide shared access to a protected pool of file data. Short on budget and lacking full-time IT staff, organizations often end up with valuable files lost on unprotected islands of direct-attached storage. As the number of these islands increases, so too does the complexity of managing and protecting vital digital assets. As users struggle to find the files they need to do their job, productivity suffers. Last, but not least, multiple copies of the same files and exploding file capacity demands are driving up the cost of disk capacity.

¹ Source: ESG Research Report, *Digital Archiving Survey*, November 2007

The Dell PowerVault NF Family

From quick deployment to ease of administration and management, the Dell PowerVault NF family of storage servers provides convenient and cost-effective NAS storage that is optimized for file sharing in small- to medium-sized businesses. PowerVault NF storage servers, configured at the factory by Dell with pre-configured RAID and pre-installed Microsoft Storage Server software, provide everything needed for centralized file sharing.

No additional software installation is required, unless users choose to install supported 3rd party backup, anti-virus or other software products. Backup software installed on an NF family storage server can be used to create a centrally managed platform for backup to disk that protects remote and mobile user data. Requiring no client licenses and starting at less than \$2,000, the NF family storage servers are designed for speedy deployment and simplified file sharing.

As shown in Figure 2, tower and rack mountable form factors are offered to meet a wide variety of storage needs. The entry level Dell PowerVault NF100 evaluated by ESG supports up to 4 TB of SATA capacity and is designed for small businesses looking for a simple networked file sharing solution.

FIGURE 2. THE DELL POWERVAULT NF FAMILY



The higher capacity and processing power of the PowerVault NF500 and NF600 models is designed to meet high-density and high-capacity file sharing needs. On top of the enhanced capacity and performance, the NF500 and NF600 models also come pre-loaded with powerful additional storage capabilities, including snapshots, DFS-R and Single Instance Storage (SIS).

TABLE 1. THE DELL POWERVAULT NF FAMILY

	NF100	NF500	NF600
Maximum Internal Capacity	4 TB	6 TB	10 TB
External Capacity Expansion²	No	Yes	Yes
Drives supported	SATA	SAS/SATA	SAS/SATA
Snapshots	No	Yes	Yes
DFS-R	Yes ³	Yes	Yes
Single Instance Storage (SIS)	No	Yes	Yes

² Internal PERC 6/e RAID card connected to external PowerVault MD1000 drive expansion module(s)

³ Workgroup edition

Distributed File System Replicator (DFS-R) is used to create a central location on the network for storing and sharing files. Using a network-efficient replication engine, DFS-R keeps folders synchronized over a local or wide area network. Ideally suited for small to medium sized businesses with multiple offices, DFS-R automates and simplifies the task of sharing a network-resident file folder. From an administrator stand-point, automated replication of a centralized file repository is easy to configure and manage. From an end-user perspective, DFS-R presents a collection of file shares as a single drive letter which eliminates the hassle of remembering the server or drive letter that important files are stored on.

Built-in snapshot support provides simple and almost instantaneous restoration of a previous version of a file or folder that was accidentally deleted or overwritten. Snapshots can be taken as frequently as an administrator feels necessary, as often as every four hours. Unlike tape backup, taking a snapshot is a non-intrusive process where users do not need to stop work on open files.

Single Instance Storage (SIS) is a particularly powerful capability. This feature helps organizations reduce disk requirements by freeing up the capacity associated with duplicate files. SIS is a form of data de-duplication that can lead to significant capacity savings. For example, consider a 5 MB file that has been copied ten times and saved on a networked file share. By saving only one unique copy, SIS can save 50 MB of capacity.

Backup to disk is another great example of the power of SIS technology. A series of backups stored on a PowerVault NF storage server typically contains a lot of duplicate data. SIS can be used to dramatically reduce the capacity required to store that backup data. As a matter of fact, hands-on testing by ESG Lab with a number of data de-duplication solutions indicates that the capacity required to store a month's worth of backup data can be reduced by 90% or more using data de-duplication.

SIS changes the economics of backing up to disk. With less disk capacity required to retain weeks or months of backups, SIS drastically reduces the cost of backup to disk making it an approachable option for a growing number of organizations. As a matter of fact, a recent ESG survey concluded that 43% of respondent organizations currently utilize or plan to use some type of data de-duplication technology to eliminate redundant data.⁴ These results are significant given the relative youth of data de-duplication technology. ESG believes that SIS support, built-in to the Dell PowerVault NF500 and NF600, is an excellent first step for organizations looking to get some experience with this powerful new technology.

The balance of this report presents the results of hands-on testing of an entry level PowerVault NF100 at ESG's corporate headquarters in Milford, Massachusetts. The evaluation was designed to confirm the ease of ordering and deployment, the value of a consolidated file sharing platform and the enhanced recoverability that can be achieved when using the NF100 as a centralized repository for disk-based backup data.

⁴ Source: ESG Research Report, *Data Protection Market Trends*, January 2008, N=398

ESG Lab Validation

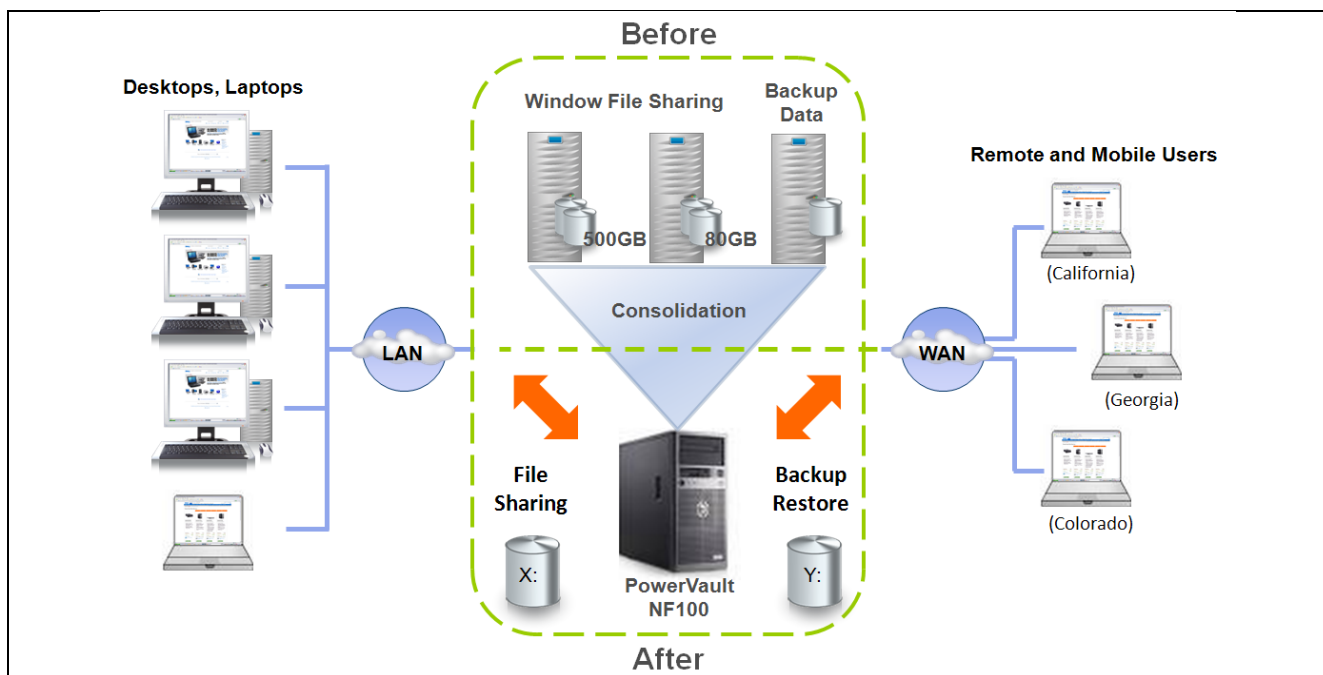
ESG is a proto-typical small business with thirty local employees and six remote users. In addition, at any given time, a number of employees are either mobile or working from home. ESG relies on a number of applications commonly used by small businesses including Active Directory, Microsoft Exchange⁵, Microsoft SharePoint, Microsoft SQL Server and Microsoft Business Contact Manager and Office Accounting.

ESG relies heavily on a large volume of shared file data including documents, spreadsheets and presentations. The historical approach to meeting increasing shared file needs was to add a server with internal storage and create another network share. A pair of aging NAS appliances had also been deployed for shared file data and backup images. As the ESG infrastructure grew, power consumption and heat problems in a small data closet necessitated the addition of a new circuit and an air conditioning unit. Backup procedures needed improvement and were virtually non-existent for remote users. Data growth and complexity were driving increased usage of a part time IT consultant.

An ESG IT infrastructure consolidation project was designed to support up to 100 employees in global locations. Server virtualization has been used to consolidate eight physical servers down to two. It has also improved resource utilization, increased availability and simplified management. This ESG Lab report focuses on the next stage of ESG's IT consolidation effort as shown in Figure 3.

The Dell PowerVault NF100 was evaluated as a consolidation platform for two Windows files shares and a network attached backup to disk repository. In addition to consolidating the three shares into one centrally managed file share repository, the NF100 was also used as a backup and restore engine and disk-based repository for file data belonging to local, remote and mobile employees.

FIGURE 3. REDESIGNING ESG SHARED FILE ACCESS AND END-USER FILE BACKUP

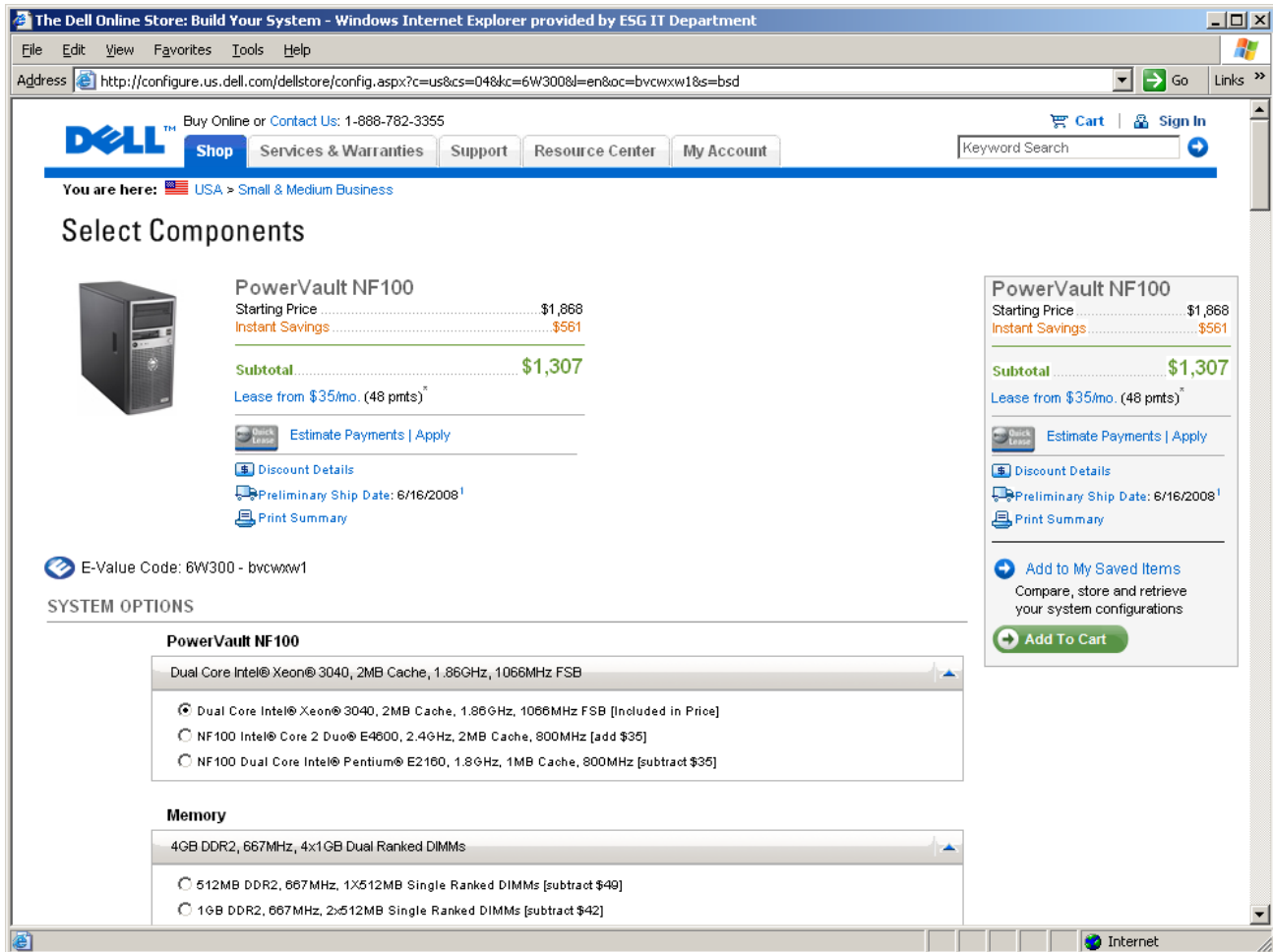


⁵ Historically, ESG has relied on Lotus Notes for e-mail and messaging. Conversion to Microsoft Exchange was nearly complete as of the writing of this report.

Getting Started

A PowerVault NF100 storage server can be configured and ordered using the Dell web site as shown in Figure 4. Note how the wizard-based configuration process used by ESG Lab looks and feels like the familiar interface that small business owners have come to appreciate when ordering IT supplies from Dell.

FIGURE 4. ORDERING A FACTORY-CONFIGURED DELL POWERVAULT NF100



ESG Lab Testing

The Dell PowerVault NF100 network-attached storage system arrived pre-configured and pre-installed with Microsoft Windows Storage Server 2003 R2 according to ESG's specifications.⁶ The Dell NF100 was pre-configured for hardware-level RAID-5 disk protection.

ESG Lab began the validation by un-packing the NF100 and connecting a keyboard, monitor, and mouse. Next, the server was connected to the ESG network. ESG powered on the server and configured its network IP address settings. ESG Lab used the Dell OpenManage Server Administrator utility to browse the factory-installed configuration. The screen shot shown in Figure 5 shows the physical disk configuration.

⁶ Configuration details are listed in the Appendix.

The NF100 server tested at ESG headquarters came installed with four 500 GB SATA disk drives pre-configured into two partitions: 12 GB for the operating system and the remaining capacity for file sharing and backup data.

FIGURE 5. THE FACTORY-INSTALLED NF100 DISK CONFIGURATION

Dell OpenManage Server Administrator

nf100 Properties Information/Configuration

Physical Disks on Controller

Print Export E-mail Refresh

Status	Name	State	Failure Predicted	Type	Capacity	Used RAID Disk Space	Available RAID Disk Space	Hot Spare	Vendor ID	Product ID
✓	Physical Disk 0:0	Online	No	SATA	465.25GB	465.25GB	0.00GB	No	DELL	Hitachi HUA721050K
✓	Physical Disk 0:1	Online	No	SATA	465.25GB	465.25GB	0.00GB	No	DELL	Hitachi HUA721050K
✓	Physical Disk 0:2	Online	No	SATA	465.25GB	465.25GB	0.00GB	No	DELL	Hitachi HUA721050K
✓	Physical Disk 0:3	Online	No	SATA	465.25GB	465.25GB	0.00GB	No	DELL	Hitachi HUA721050K

Why This Matters

Configuring storage systems, managing RAID levels and installing operating systems wastes precious time. Ease of ordering, configuration and deployment is always desirable—especially for small businesses with no full-time IT staff. ESG Lab found that configuring and ordering a factory-installed Dell NF100 was extremely easy. Five minutes after opening the box, the NF100 was ready for file sharing.

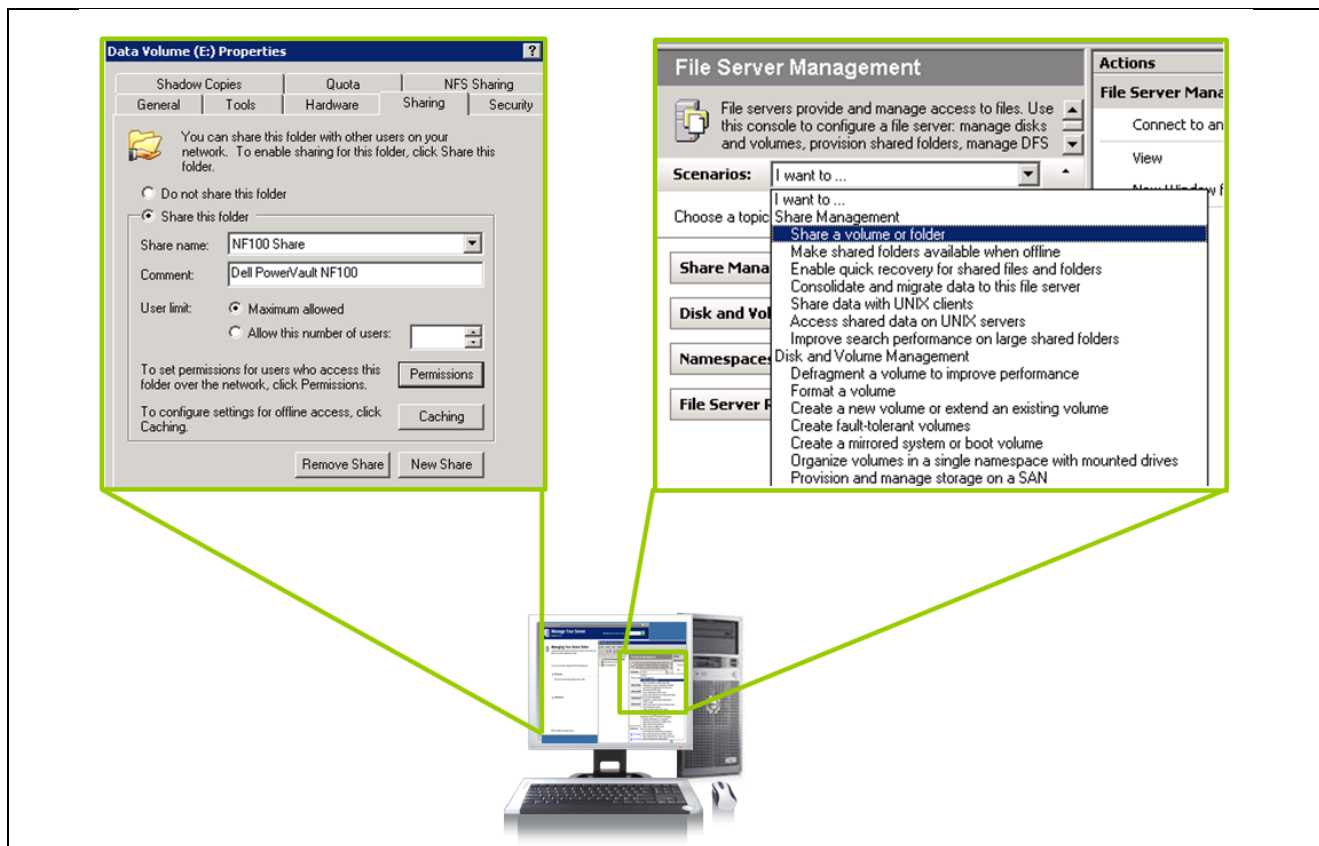
File Sharing

The Dell PowerVault NF100 storage server provides a central point on the network where users can store files and share them with others. The combination of the PowerVault NF100 server and Microsoft Windows Storage Server software provides a file sharing solution that is ready to go right out of the box. Network attached drives can be configured using either the familiar Windows Explorer or the Windows Storage Server user interfaces.

ESG Lab Testing

ESG Lab used the NF100 to create a corporate shared drive. Figure 6 shows the two methods that can be used to create a share: the Windows Explorer interface on the left and the Windows Storage Server Management wizard on the right.

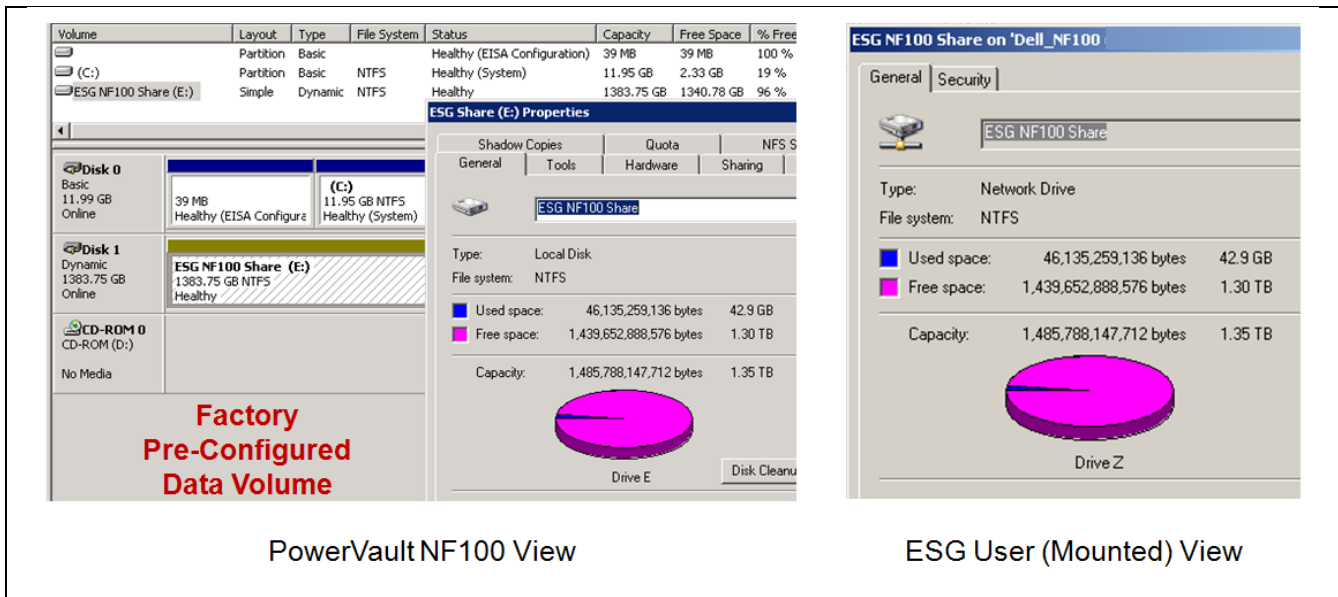
FIGURE 6. SHARING A NF100 DATA VOLUME



After the share had been defined, ESG users were able to map the file share on their desktops/ laptops as a drive letter using the “Map a Network Drive” option from the Windows Explorer or My Network Places utility.

Figure 7 shows the NF100 file share from the perspective of the PowerVault NF100 (the E: drive) and an end-user (the Z: drive).

FIGURE 7. MOUNTED FILE SYSTEM VIEW



Less than fifteen minutes after opening the box, files were being copied from a local hard drive to a network attached shared drive.

Why This Matters

The legacy method of building and managing servers full of hard drives for file sharing can be complex, expensive and hard to manage—especially as the number of file shares within a small business begins to multiply. ESG Lab found that the NF100 is a convenient and easy to install appliance that creates a centrally managed platform for file sharing. The NF100 was ready to go right out of the box in less than fifteen minutes. ESG end-users had no problem learning how to use an NF100 shared drive—it appears as a drive letter that works like any other network drive.

Backup Repository

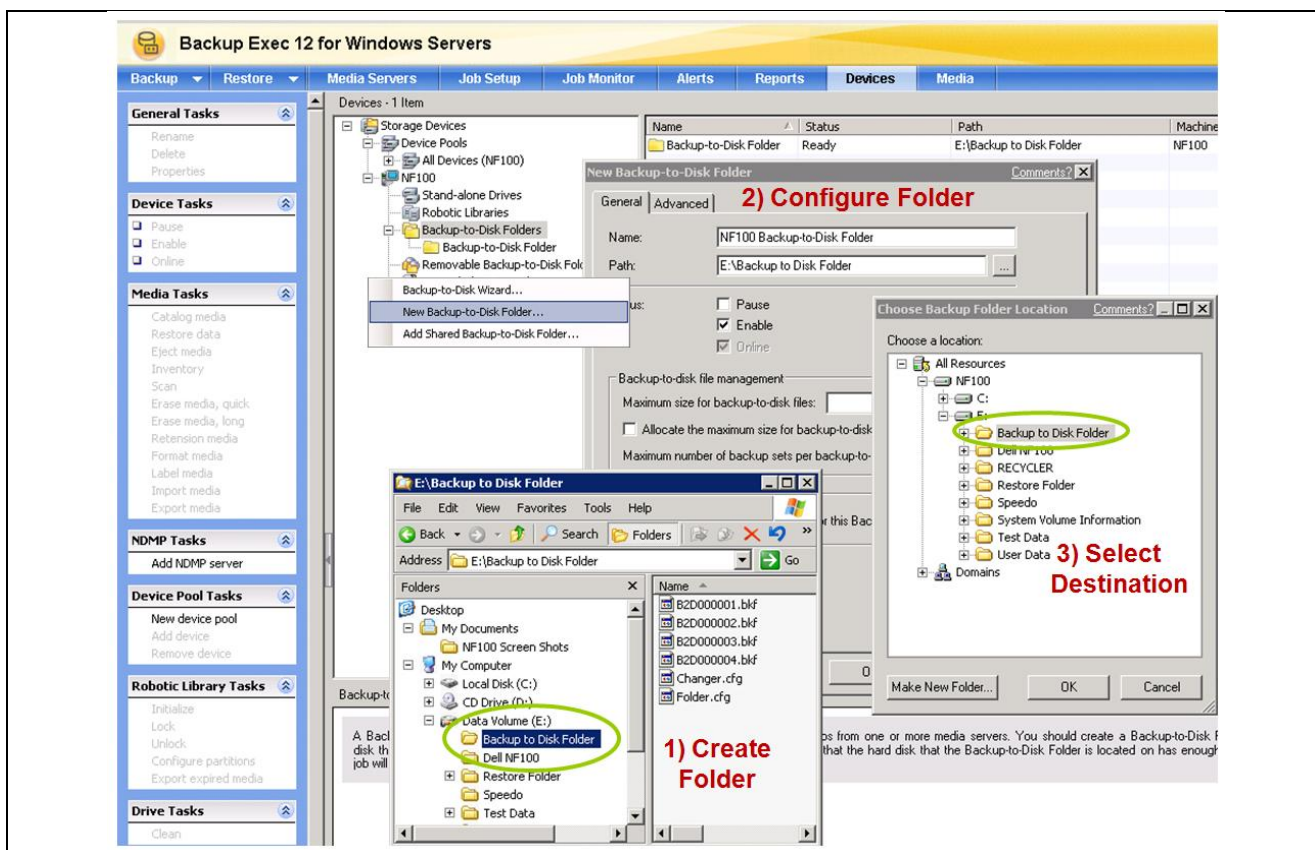
Good things often do come in small packages, but for small and medium-sized businesses, this hasn't always been the case when it comes to data protection solutions. For years, small organizations—particularly those with limited or no designated IT resources—have struggled to find products that enable them to easily and cost-effectively protect their data, especially for remote and mobile users. The Dell PowerVault NF100 not only provides a disk-based repository for fast and reliable backup and restores, it can also be used as a backup server by installing supported 3rd party backup software.

ESG Lab Testing

Symantec BackupExec software was used to evaluate the efficacy of using the NF100 to improve data protection and disaster recovery for file data on local and remote users' laptops at ESG.

Symantec BackupExec Version 12.0 for Windows was installed on the PowerVault NF100 on the NF100 storage server's C: drive. A folder called "Backup to Disk Folder" was created on the E: drive. Using the BackupExec Device Wizard, ESG Lab configured a backup-to-disk device that used the "Backup to Disk Folder" for disk-based backup and recovery operations. BackupExec treats a backup-to-disk device like a tape drive. Like a tape cartridge, a backup-to-disk device can be inventoried, cataloged, erased and restored. Figure 8 shows the three-step process used to configure the NF100 E: drive as a backup-to-disk device.

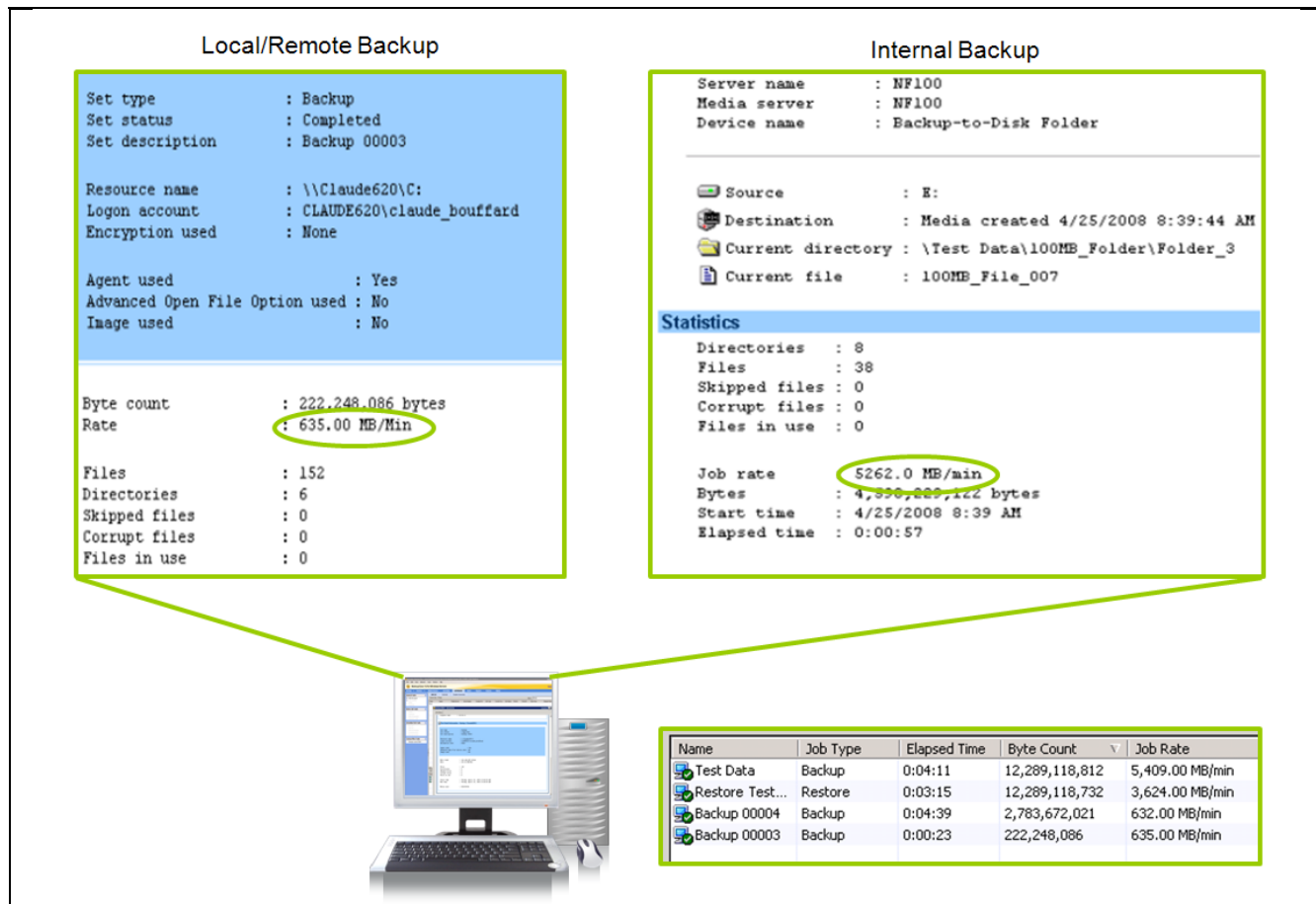
FIGURE 8. BACKUPEXEC BACKUP-TO-DISK DEVICE CONFIGURATION



Next, ESG Lab installed the BackupExec remote agent on a pair of laptops. The first was for a user located in corporate headquarters. The second was for a mobile user connected to ESG corporate headquarters through a cable modem.

The first backup ran over LAN at ESG headquarters using a standard 10/100 based Ethernet network. Approximately 222 MB of typical office file data files (e.g., Word, Excel, and PowerPoint) was backed up. A partial restore of the recently backed up data set was performed. The restore operation was performed on the same laptop, but to an alternative location. A file comparison program was used to verify the integrity of the restored data—it completed without error. The experiment was repeated for the same set of data residing on the home user's laptop. BackupExec was also used to perform a backup of the NF100 itself—backing up 4.5 GB of shared file data. Figure 9 shows the results as reported by BackupExec. Note how the last test, labeled as Internal Backup, ran significantly faster than the laptop backup jobs because the backup software and the files it was backing up were in the same server.

FIGURE 9. BACKUPEXEC PERFORMANCE RESULTS



Why This Matters

According to ESG research, small businesses are adopting disk-based backup solutions because they can significantly help improve performance, reliability and manpower utilization (by reducing or ideally eliminating the handling of tape).⁷ ESG Lab found that configuring and deploying a Dell PowerVault NF100 server as a repository for file data belonging to remote and local users was straightforward and intuitive. Five minutes after ESG had installed BackupExec, disk-based backup jobs were running on the PowerVault NF100.

⁷ Source: ESG Research Report, *Data Protection Strategies for SMBs*, March 2007

ESG Lab Validation Highlights

- ☑ Ordering and configuring an NF100 using the Dell Website was quick and easy.
- ☑ The NF100 arrived with pre-configured RAID and pre-installed software.
- ☑ The storage server was ready to go right out of the box in less than 15 minutes.
- ☑ Creating, sharing and managing file shares with the NF100 was straightforward and intuitive.
- ☑ Veritas BackupExec was installed on the NF100 and configured to use NF100 disk capacity for backup and restore operations.
- ☑ The NF100 was deployed as a backup to disk repository for remote and local user file data.
- ☑ A single internal backup operation was able to stream backup data at an impressive rate of 88 MB/sec (5,262 MB/Min).
- ☑ A single NF100 appliance provided a centralized platform for file sharing and backup.

Issues to Consider

- ☑ Disk capacity and performance planning is recommended before choosing and configuring a Dell PowerVault NAS solution. The NF100, as tested by ESG lab, is an entry-level model of the PowerVault NAS family of file sharing solutions that is well suited for small businesses.
- ☑ While a disk-based backup solution can be used to improve the speed and reliability of backup and restore operations, it does not provide protection from a disaster (e.g., fire or flood). As such, ESG recommends that small businesses consider cloning disk-based backup data to tape or to another location over a WAN for disaster recovery. As a matter of fact, ESG research indicates that early adopters of backup to disk solutions are doing just that. They tend to augment their existing tape environment—not replace it.
- ☑ Network planning is recommended before deploying a LAN or WAN-intensive backup to disk solution.

ESG Lab's View

There are currently over a half million companies with 20 to 99 people and over one million remote offices in the US alone—each of which have similar problems and issues facing small companies, including little to no IT staff to deploy, configure and manage growing IT infrastructures. Fast-growing stores of unstructured file data pose some of the most significant challenges. Unstructured file data, which includes traditional office productivity files (e.g., documents and presentations) and large rich media files (e.g., videos and images), is growing at an alarming rate. As a matter of fact, ESG research indicates that capacity of file data archived on external disk systems will exceed the overall market growth rate, increasing at a 79% CAGR between 2007 and 2012. Simple and cost-effective network-attached storage systems are needed so that small companies can store, protect and exploit these valuable information assets.

Small companies have historically shared unstructured file data by creating network shares for files stored within desktops and servers. While these direct attached storage methods are quick and easy at first, they can quickly turn into a management nightmare as capacity and backup requirements grow. A growing number of small businesses are deploying purpose-built NAS appliances as a simple and cost-effective alternative.

The Enterprise Strategy Group is a typical small business with 30 employees, including a number of remote and mobile users. Shared files were housed on direct attached storage within servers and a pair of aging NAS appliances. ESG Lab recently evaluated a Dell PowerVault NF100 NAS storage server for use as a company-wide repository for file sharing and a platform for the backup and recovery of files belonging to local and remote employees. ESG Lab was impressed with how easy it was to order, configure and centrally manage a Dell NF100. With pre-configured RAID and pre-installed Microsoft Storage Server 2003 R2 software, the NF100 creates a central point on the network where users can store and share files. The NF100 was ready to go right out of the box—less than 15 minutes after opening the box, users could simply map a network connection to one or more folders on the server.

The bottom line with the Dell PowerVault NF100 is cost-effective simplicity. With no fee for client licenses and starting at less than \$2,000, the NF100 not only provided ESG with a platform for the consolidation of shares residing on a server and a pair of aging NAS appliances, it was used to create a centralized platform for disk-based backup and recovery of files belonging to local and remote employees. For organizations with more demanding capacity requirements, ESG recommends a similar strategy using the larger NF500 or NF600 with built-in single instance storage support. ESG Lab is pleased to report that the PowerVault NF family of storage servers lives up to its reputation as a convenient and cost effective storage solution that makes file sharing simple.

Appendix

Table 2. TEST CONFIGURATION

Hardware	Software
Dell PowerVault NF100 3 GHz Xeon (x64); 4 GB Memory (Bios A05) Perc 5/i RAID Adapter (PCI-E) Four – 500 GB SATA drives	Microsoft Storage Server 2003 R2 (SP-2) (x64) version
Dell Latitude D620 Laptop Core 2 Duo	Dell OpenManage Server Administrator Version 5.3.0
	Symantec BackupExec Version 12.0 (1364) Remote Agent Version 12.0 Desktop/Laptop Version 3.1 (Rev 3.35.61A)



20 Asylum Street
Milford, MA 01757
Tel: 508-482-0188
Fax: 508-482-0218

www.enterprisestrategygroup.com