

LAB VALIDATION REPORT

Dell PowerVault™ DP100 **Hands-Free Data Protection**

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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.

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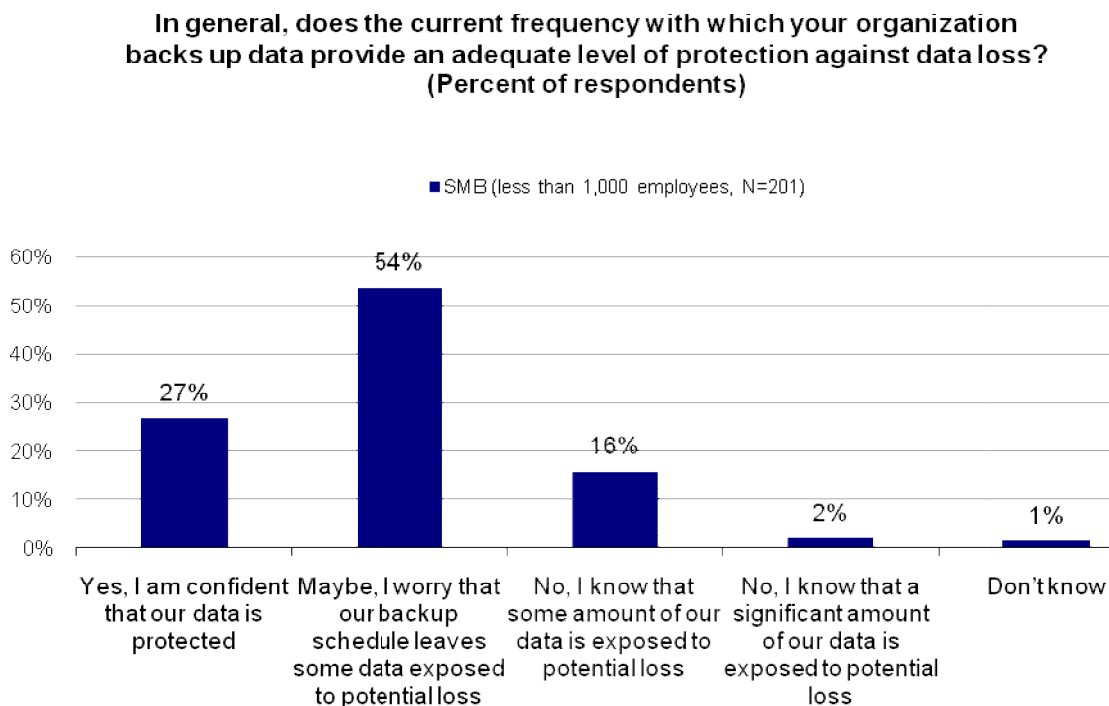
Introduction

The Dell PowerVault DP100 is designed for small and medium business to provide hands-free data protection in a pre-configured turn-key appliance. This ESG Lab Validation report explores how the DP100, with pre-configured RAID and pre-installed Microsoft Windows Storage Server software and Microsoft® Data Protection Manager 2007 software, can be deployed and can protect critical data in less than 15 minutes. This report also explores how the DP100 can be used to protect Microsoft application by provided near zero data loss recovery of Microsoft Office SharePoint Server (MOSS), Exchange and SQL Server.

Background

Relentless growth in the volume of data to be protected creates a number of challenges for today's IT organizations, including the need to reduce backup and recovery times, the need to contain the cost of storage systems and media, and general difficulty keeping pace with the capacity of data that needs to be protected. Databases and e-mail/messaging applications are most frequently cited as creating the most challenging data protection requirements. As shown in Figure 1, small to medium-sized organizations are particularly concerned that their data protection strategy leaves them exposed to potential data loss.¹

FIGURE 1 ADEQUATE DATA PROTECTION CONFIDENCE



It is clear from the survey data that—despite improvements in data protection technologies—most organizations still have room for improvement when it comes to their core backup and recovery processes. As we have seen, today's IT organizations continue to struggle with a number of basic data protection challenges, including disappointing backup and recovery success rates and infrequent and/or inconsistent backup schedules that leave unacceptable levels of corporate data exposed to potential loss.

¹ ESG Research: Data Protection Research; January 08

The Dell PowerVault DP Family

The Dell PowerVault DP Family of appliances is designed to provide hands-free continuous data protection of Microsoft applications and files for small and medium-sized businesses. The PowerVault DP Family was designed for ease of use and simplified deployment. A storage server configured at the factory by Dell with pre-configured RAID and pre-installed Microsoft Storage Server and Data Protection Manager (DPM) software provides everything needed for hands-free continuous data protection (CDP).

The beauty of the Dell family of PowerVault DP solutions is that it can be used to restore or recreate data – at very granular levels – to virtually any point in time. Should a file become corrupted or be accidentally deleted, an application can be rolled back to a point in time before the deletion or corruption occurred. Instead of waiting to recover last night's – or last week's – backup from tape, data can be recovered from minutes ago. Using a "set it and forget it" model that is ideally suited for small to medium sized businesses, data protection is brought to a whole new plane – one that even the most sophisticated enterprise-class IT organization would envy.

Three appliance models are provided to meet a wide variety of protection needs. Up to 7 TB of internal storage is supported. Optional external connection to PowerVault MD1000 expansion modules in the DP500 and DP600 modules increase the maximum usable capacity to 40 TB. Integration with Microsoft Exchange, SQL Server, SharePoint and Microsoft file systems provides quick and reliable recovery for commonly deployed office productivity applications. Granular recovery at the mailbox or file level is provided to quickly respond to a request for lost or corrupted data. Tape backups from the PowerVault DP appliance can be used with existing tape drive - at any time without impacting performance of the production server.

FIGURE 2 THE POWERVAULT DP FAMILY

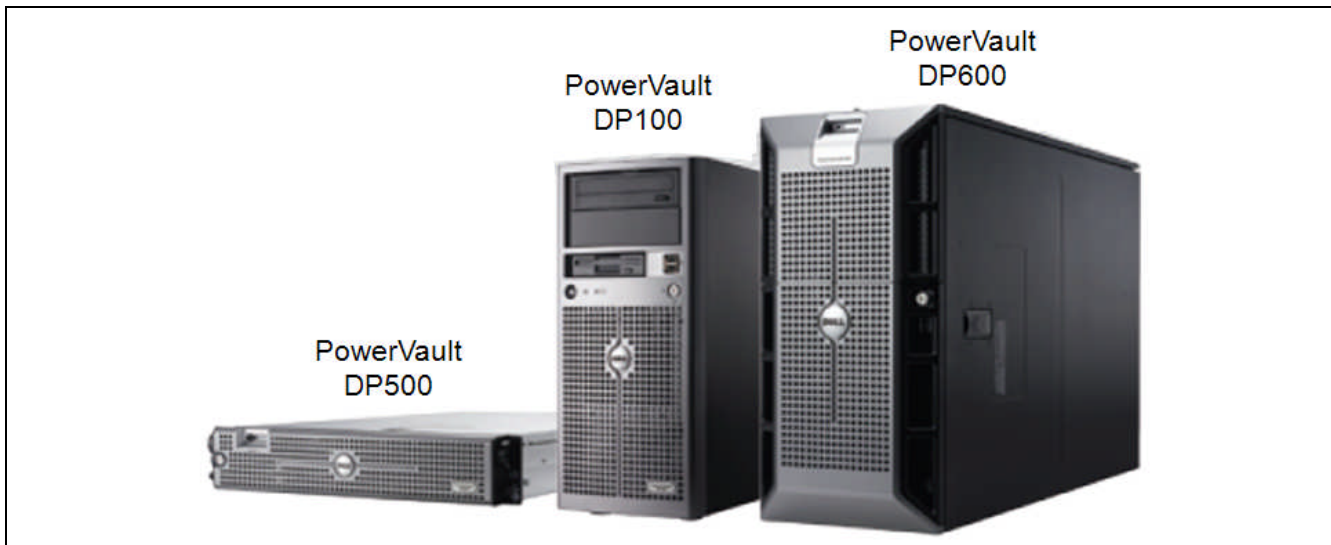


TABLE 1. THE DELL POWERVAULT DP FAMILY

Highlights ²	DP100	DP500	DP600
Usable Internal Storage	3 TB	5 TB	7 TB
External Storage Support	No	Up to 40 TB	Up to 40 TB
Hot Spare Support	No	Yes	Yes
Maximum Exchange Mailboxes	2,000	3,500	4,500
Maximum SQL Server DB size	700 GB	800 GB	1,000 GB

² The Dell DP Solutions Advisor tool should be used to choose the correct PowerVault DP model based on sizing requirements.

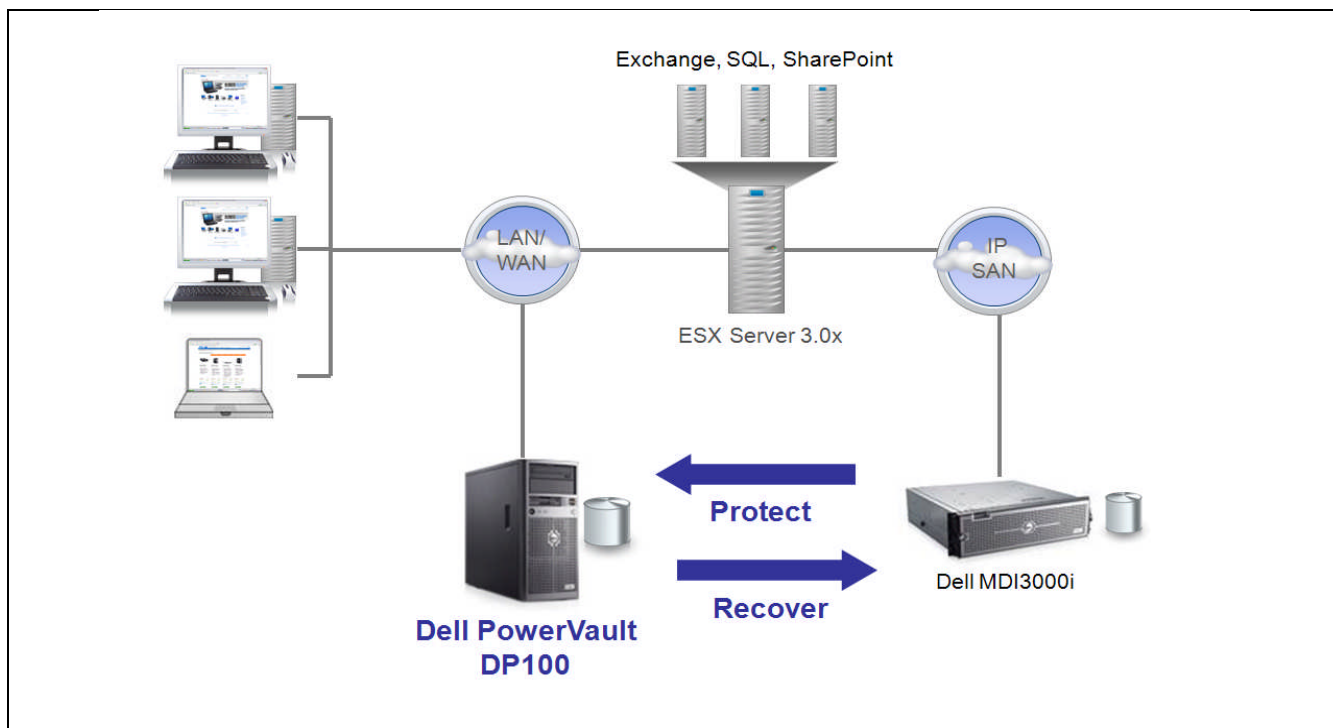
ESG Lab Validation

ESG Lab evaluated a Dell PowerVault DP100 as part of an IT consolidation project currently underway at our corporate headquarters in Milford, Massachusetts. 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 Exchange, SharePoint, Microsoft SQL Server and Microsoft Business Contact Manager and Office Accounting.

Server virtualization was used to consolidate eight physical servers down to two during the first phase of the consolidation project. The next phase of the project focused on improving ESG's data protection and recovery processes. Backup procedures needed improvement and were virtually non-existent for remote users. Data growth and complexity was driving increased usage of a part time IT consultant. Lowering recovery point and recovery time objectives (RPO³ and RTO⁴) is a strategic goal for ESG. For key applications including Microsoft Exchange, the goal is to recover from an accident or corruption in minutes instead of hours and to never lose more than 15 minutes of data.

The test bed used for the ESG Lab Validation is shown in Figure 3. Desktop and laptop users access key applications including Microsoft Exchange, SQL Server and SharePoint over a corporate LAN or WAN. The Dell PowerVault DP100 was plugged into the LAN and configured to protect and recover data residing on an iSCSI attached Dell MD3000i disk array.

FIGURE 3 REDESIGNING ESG DATA PROTECTION



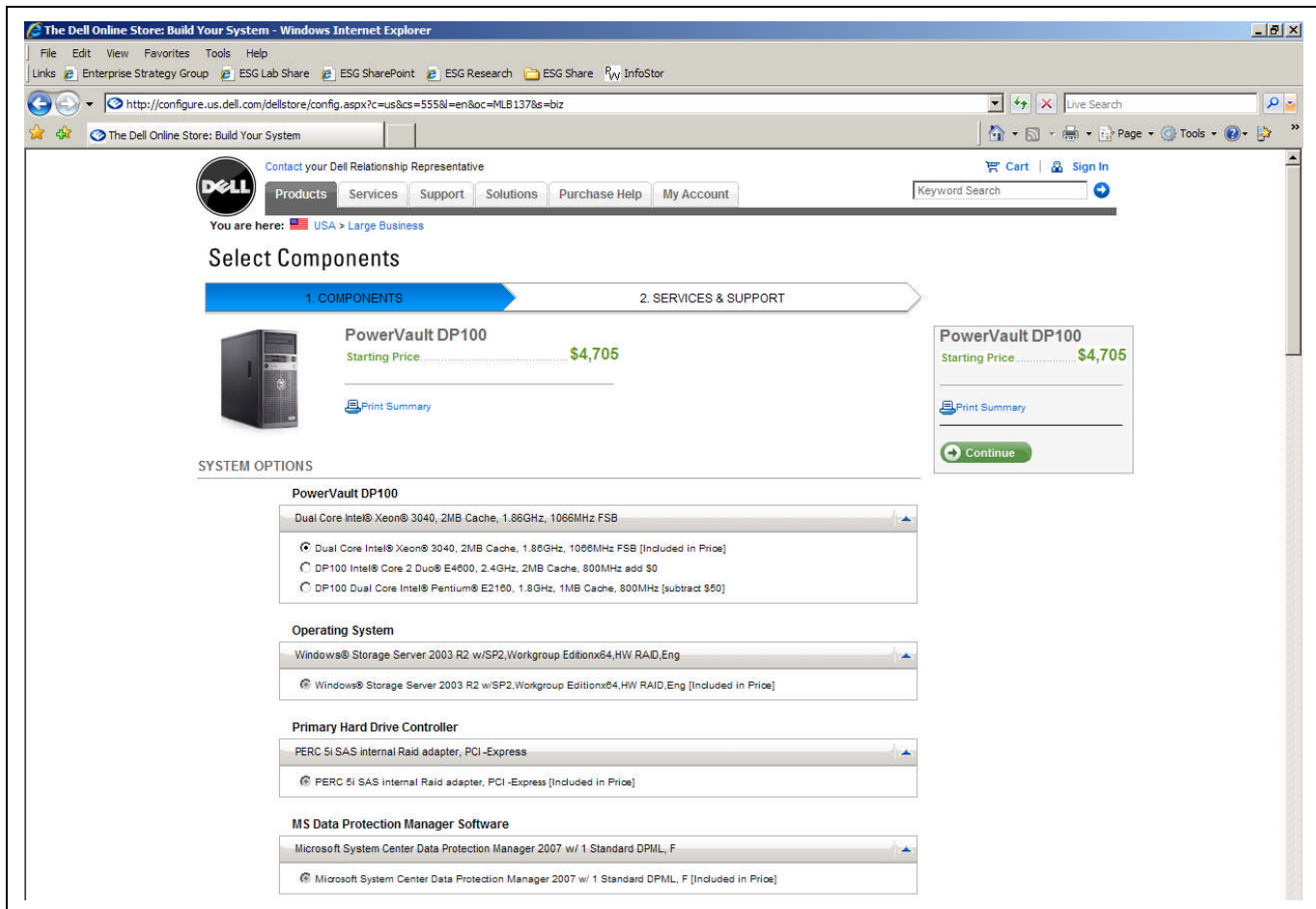
³ **Recovery Point Objective (RPO):** The point in time to which data is restored in the event of an outage or some type of disaster. In other words, the amount of data loss (e.g., '15-minutes' worth, an hours' worth, two days' worth, etc.) an organization can tolerate.

⁴ **Recovery Time Objective (RTO):** A measurement of how quickly data needs to be restored in the event of an outage or some type of disaster. In other words, the amount of the time an organization can be without data (e.g., minutes, hours, days, weeks, etc.).

Getting Started

A PowerVault DP100 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 to customize the DP100 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 DP100



The Dell PowerVault DP100 network-attached storage system arrived pre-configured and pre-installed with Microsoft Windows Storage Server 2003 R2 according to ESG's specifications.⁵ The Dell DP100 was pre-configured for hardware-level RAID-5 disk protection and with Microsoft Data Protection Manager (DPM) 2007 installed and pre-configured.

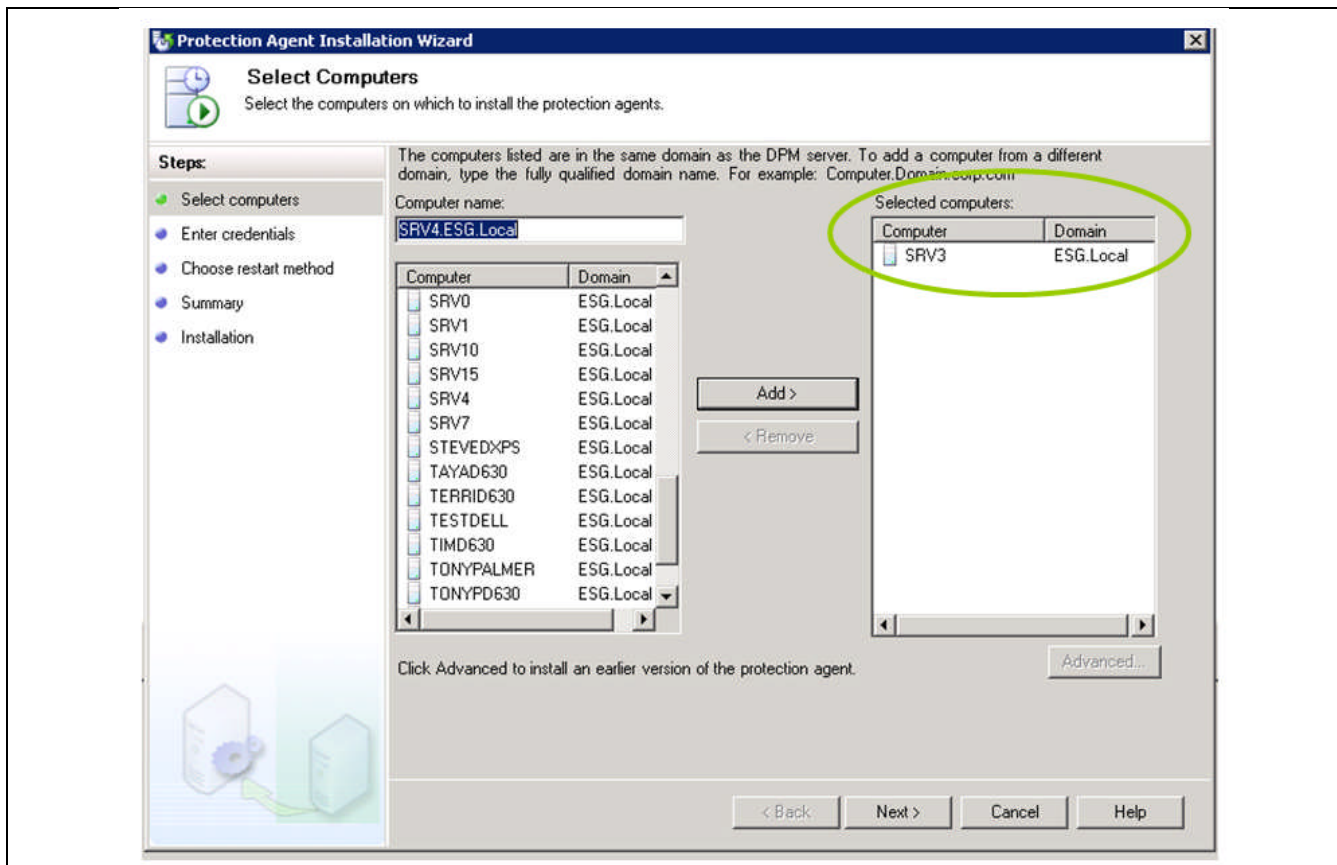
ESG Lab began the validation by un-packing the DP100 and connecting a keyboard, monitor, and mouse. Next, the server was connected to the ESG network. ESG powered on the server, and configured the server's Network IP address settings.

⁵Configuration details are listed in the Appendix.

Once the Dell configuration process was completed, the Microsoft Data Protection Solution (DPS) Configuration Wizard was used to configure the system to run Microsoft DPM software. It was launched automatically after logging onto the system as an administrator. The wizard was used to verify the system, software, and network prerequisites as well as verify user account settings and configure the systems firewall. Once this was completed the wizard was used to add available disks to the DPM storage pool.⁶

Once the configuration process was completed, ESG Lab used the Microsoft DPM software on the Dell DP100 to install the DPM protection agent on the ESG Exchange, SQL and MOSS (SharePoint) virtual servers running VMware virtualization software. The protection agents took less than a minute to install (8 MB file) and required a system re-boot after completion. Figure 5 shows the DPM protection agent installation wizard.

FIGURE 5. INSTALLING DPM PROTECTION AGENT

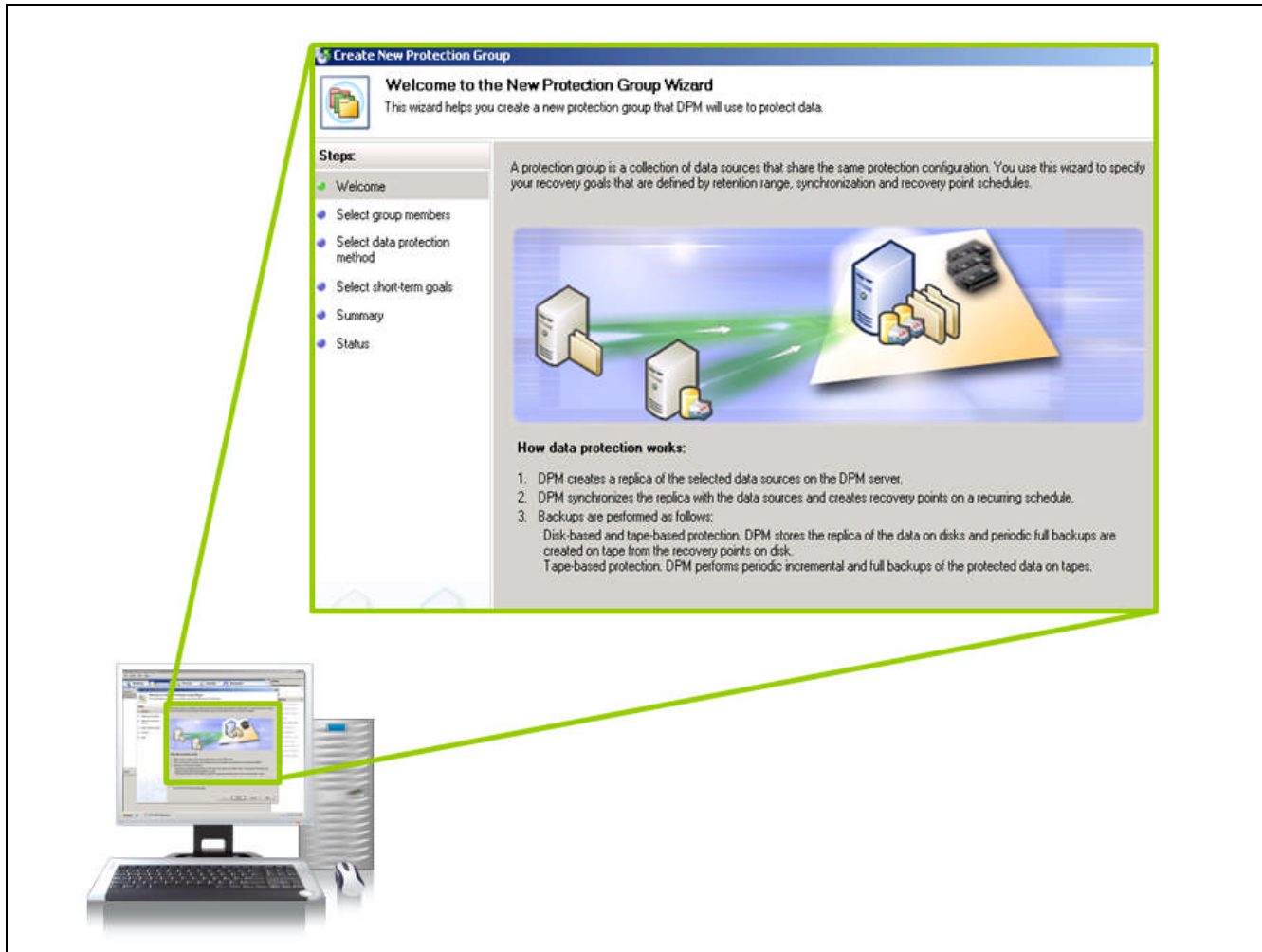


The DPM protection agent is installed on a computer to track changes of the defined protected data and transfers the changes from the protected computer to the Data Protection Manager server, in this case the Dell DP100. The protection agent also identifies data on a computer that DPM can protect and recover. Once the protection agents were installed and the protected servers re-booted, ESG created a DPM protection group for each ESG server.

⁶ A DPM storage pool is a set of disks on which the Data Protection Manager server stores replicas and recovery points for protected data.

A DPM protection group is a collection of data sources that share the same protection configuration. Data sources within a protection group are referred to as protection group members or simply members. ESG Lab created a separate group for each of the servers being protected (Exchange, SQL and MOSS) as depicted in Figure 6.

FIGURE 6. CREATING DPM PROTECTION GROUPS



During the creation of the protection group, DPM generates a protection plan using short-term recovery goals. DPM protection groups provides for different schedules, snapshot frequencies, and retention ranges. For each protection group, a replica and recovery point volumes were created. ESG Lab set each servers protection policy to synchronize every 15 minutes and recovery points at 8:00AM, 12:00PM and 6:00PM daily. A recovery point is a snapshot or point-in-time copy of the data sources that are protected by your DPM server.

After each protection group was configured, the DPM system performs an initial one-time full backup to the Dell DP100 system. Once this was completed, the DPM automatically synchronized each protection group every 15 minutes as defined by ESG. An example of the synchronization process is shown in Figure 7.

DPM Administrator Console contains five task areas: Monitoring, Protection, Recovery, Reporting, and Management. The components that were in the process of synchronizing are circled in Figure 7.

FIGURE 7. PROTECTION STATUS AND MONITORING

The screenshot displays the DPM 2007 Administrator Console interface. The top navigation bar includes tabs for Monitoring, Protection, Recovery, Reporting, and Management. The left pane shows a tree view of protection groups and their members. The right pane shows a table of protection jobs, with some entries circled in green.

Protection Group: Exchange

Protection Group Member	Type	Protection Status
Second Storage Group	Exchange Data	OK
First Storage Group	Exchange Data	OK
D:\	Volume	OK
Computer\SystemState	System State	OK
C:\	Volume	Synchronizing ...
\\SRV2.ESG.Local\Resources\$	Share	OK
\\SRV2.ESG.Local\MTATempStore\$	Share	Synchronizing ...
\\SRV2.ESG.Local\ExchangeOAB	Share	OK
\\SRV2.ESG.Local\CertEnroll	Share	Synchronizing ...
\\SRV2.ESG.Local\Address	Share	OK

Protection Group: SQL & MOSS

Source	Computer	Protection Group	Type
SRV8\WSS_Search_SRV8	srv8.esg.local	SQL & MOSS	Recovery point
C:\	srv2.esg.local	Exchange	Synchronization
D:\	srv2.esg.local	Exchange	Synchronization
First Storage Group	srv2.esg.local	Exchange	Recovery point
Second Storage G...	srv2.esg.local	Exchange	Recovery point
SRV8\SharePoint...	srv8.esg.local	SQL & MOSS	Recovery point
C:\	srv8.esg.local	SQL & MOSS	Synchronization
SRV8\WSS_Content	srv8.esg.local	SQL & MOSS	Recovery point
SRV8\SharePoint...	srv8.esg.local	SQL & MOSS	Recovery point
SRV8\model	srv8.esg.local	SQL & MOSS	Recovery point

Why This Matters

ESG's research indicates that organizations continue to struggle with a diverse range of data protection challenges that ultimately lead to (or are caused by) ineffectual processes, higher costs and increased levels of business risk. Small businesses in particular are struggling with the complexity and cost of data protection. ESG Lab found that once a fast, wizard-based setup had been completed, the Dell DP100 was automatically capturing data changes as they occur – in real time every fifteen minutes.

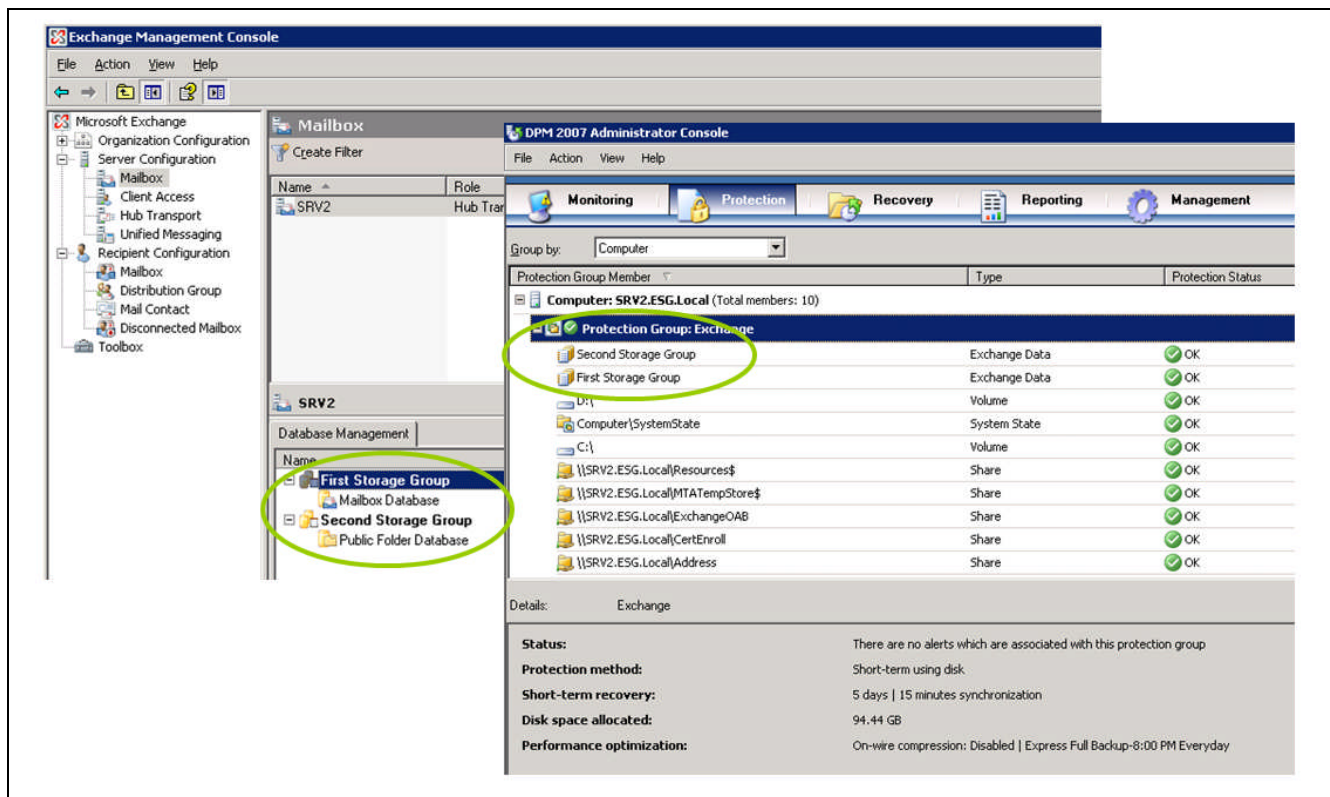
Backing Up Microsoft Exchange

As e-mail has evolved from an alternative communications medium to an indispensable business tool, enterprise messaging applications such as Microsoft Exchange have been appointed mission-critical status in most IT organizations. With that status comes the need for high-availability solutions characteristic of other core enterprise applications. Dell's DP100 with built-in Microsoft continuous data protection (DPM) software is designed for specific Microsoft applications such as Microsoft Exchange server. The DP100 can be used to recover an individual mailbox, storage group or an entire Exchange database.

ESG Lab Testing

ESG Lab began testing the Dell DP100 disk-based appliance by installing the DPM protection agent on the ESGs Exchange server and creating a DPM protection group. After an initial baseline backup was performed (Express Backup), all Exchange components were continuously being protected and synchronized every 15 minutes automatically as depicted in Figure 8.

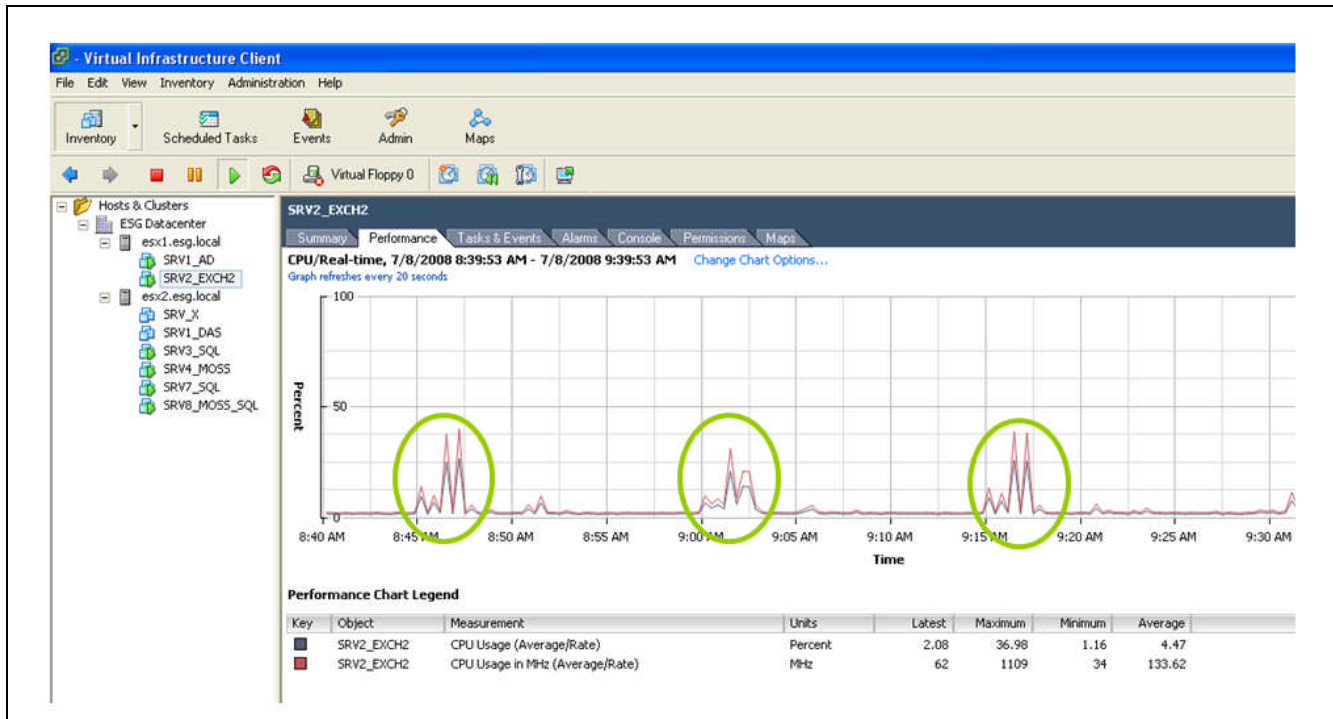
FIGURE 8. PROTECTING EXCHANGE SERVER COMPONENTS



As shown in Figure 8, all Exchange components are being protected by the DPM software including and Exchange transaction logs which are continuously synchronized to the Dell DP100 server every 15 minutes. ESG noted that DPM protection groups can be created for different groups in an organization (e.g. executives, finance, etc).

ESG Lab investigated the impact, if any that occurs when Exchange server components are being synchronized. As displayed in Figure 9, minimal performance impact was observed on the Exchange server virtual machine as the Dell DP100 synchronized the database every fifteen minutes.

FIGURE 9. PERFORMANCE IMPACT



As shown in Figure 9, a small increase in CPU utilization that lasted approximately three minutes was observed during each synchronization operation. Unlike traditional backup software, DPM tracks and sends only changed blocks to the DP100 appliance, thus significantly reducing the overhead and network bandwidth required to create a recoverable image.

Why This Matters

E-mail growth, availability requirements, requests for e-mail as evidence – none of these trends are going to ease over time. Consolidating your Exchange server and storage infrastructure, ensuring continuous availability through new backup and restore technologies, and making sure you are in compliance with e-mail retention and retrieval regulations lead to a number of benefits: happier users, lower capital and operational expenses, not to mention peace of mind for you and your boss.

ESG Lab confirmed that the combination of Dell DP100 hardware and Microsoft CDP software provides and automated “set and forget” solution for the reliable recovery of Microsoft Exchange data. ESG Lab had the DP100 configured and protecting Exchange data in less than ten minutes.

Protecting Microsoft SharePoint and SQL Server

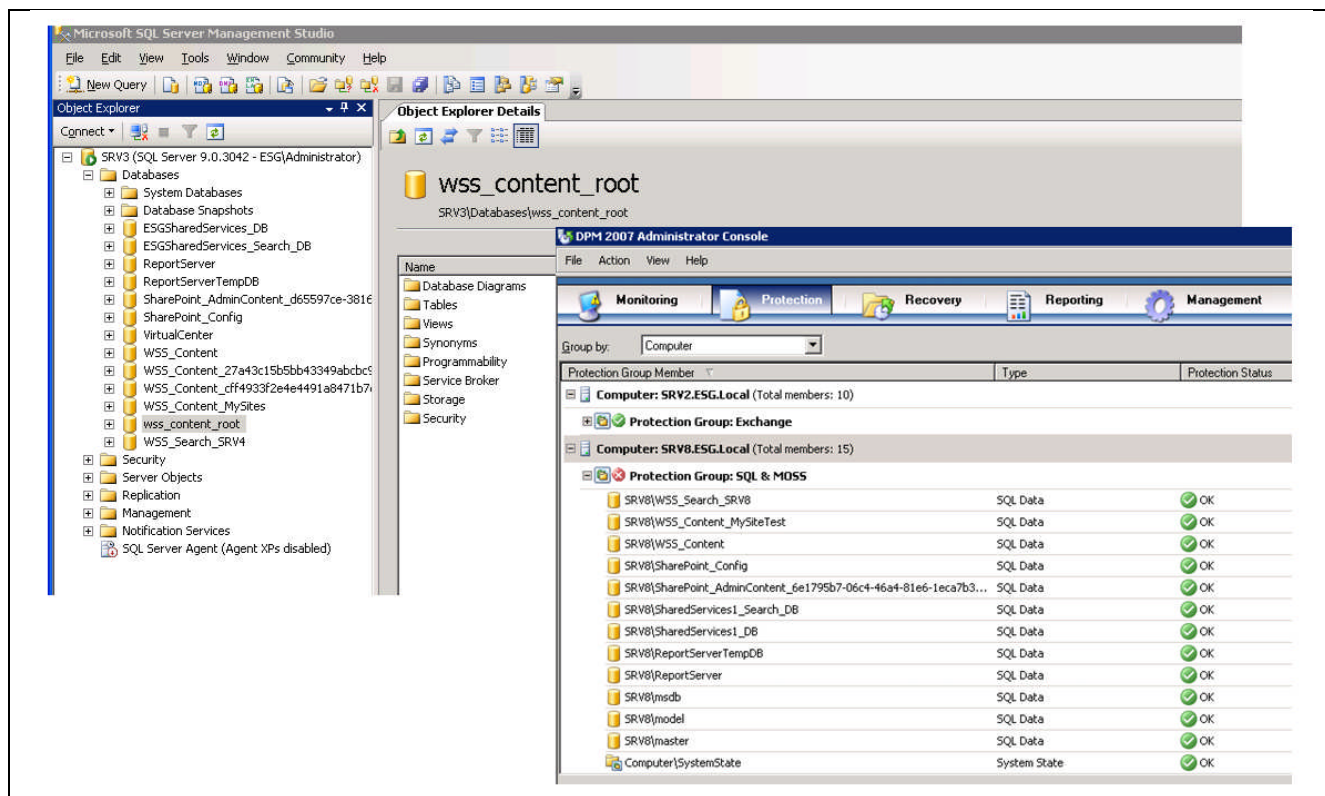
Microsoft SQL Server and Microsoft Office SharePoint Server (MOSS) are being adopted by a growing number of small to medium sized businesses. Data protection for these applications has gotten a lot more complex over the past few years, as recovery, not backup, has become the focus of most organizations' data protection strategy. And rightfully so. After all, what is the point of backing up data – in this case, databases and shared files - if you can't recover lost or corrupt data?

Disk-based data protection solutions are a growing alternative to tape backup solutions for applications including Microsoft SQL Server and MOSS. A low-cost and reliable disk-based data protection solution, like the DP100 tested by ESG Lab, provides a number of benefits when compared to traditional backup to tape including automated protection up to every 15 minutes, easy recovery and better use of network bandwidth.

ESG Lab Testing

Testing began with installation of the DPM agent on ESG's SharePoint MOSS server and creating a DPM protection group. For SharePoint content databases, DPM automatically created two volumes for each content database in each protection group. Initial synchronization of the SQL server was performed to complete an Express Full backup. Figure 10 displays the ESG SharePoint components protected by the Dell DP100 disk-based appliance.

FIGURE 10. SHAREPOINT - SQL SERVER



After the Express full backup had completed, the DPM software automatically synchronized SharePoint databases every 15 minutes as defined by ESG when configuring the protection group.

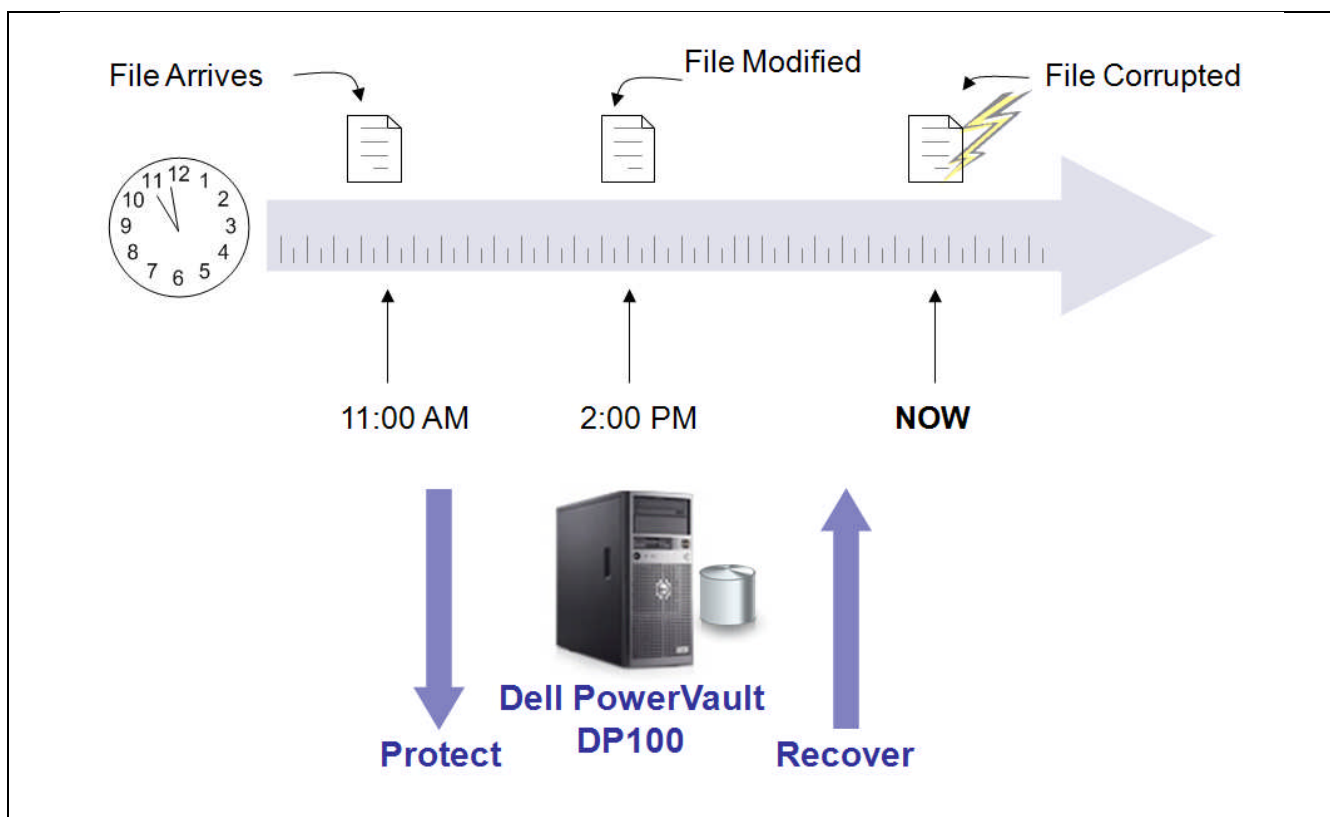
How DPM Protects SQL Server

The DPM agent, which consists of a block-level filter (to monitor changes) and a Microsoft VSS requester (VSS is used to ensure that the snapshots are application consistent), takes an initial snapshot of the full protected volume and then updates every 15 minutes thereafter to the Dell DP100. These updates are logged in a journal, and in a recovery situation, are automatically applied to the last "15-minute" snapshot. This process allows for continuous data protection of application servers, minimizes CPU and storage capacity requirements, and ensures application consistency.

Restoring SharePoint Content

ESG Lab used the Dell DP100 to recover a SharePoint file after simulated file corruption. To demonstrate this capability, ESG Lab set up a scenario where a file that was placed in SharePoint, modified and at some point in time got corrupted, was restored using the Dell PowerVault DP100 as show in Figure 11.

FIGURE 11. FILE CORRUPTION SCENARIO



To set up this test case, ESG Lab uploaded a new Microsoft Word file (Version A) to the SharePoint server at 10:50 AM. At 12:00 PM, ESG made a modification to the Word document (Version B) and checked it back into SharePoint. A changed file was checked in to simulate corruption at 5:00 PM.

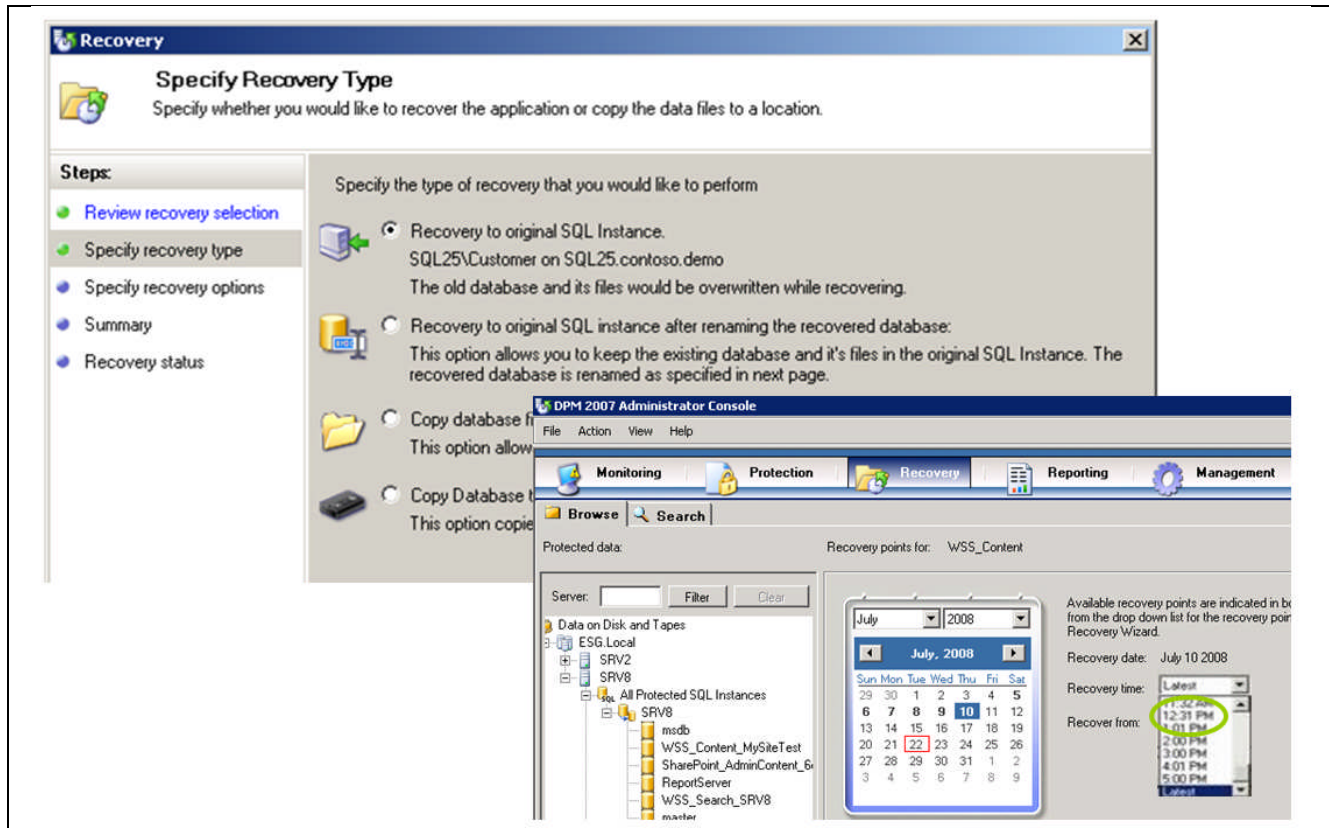
In most cases, the time of file corruption is usually not known. With DPM continuous data protection, IT administrators can simply dial-back the clock to find the correct version of the data and recover from a single file to an entire database, depending on the situation.

In this example, ESG Lab used the DP100 to recover the Word file back to Version B which was checked in at 12:00 PM. Since DPM has been synchronizing the SharePoint server every fifteen minutes, ESG Lab used the 12:31 PM recovery point to perform an individual file restore.

Recovery with Microsoft DPM for Exchange or SQL server is a two step process. For example, in Exchange you recover to an alternate storage group and then restore a mailbox. With SharePoint, you restore to a SharePoint recovery farm⁷ and then recover the selected object. The two step restore process used during ESG Lab SharePoint testing is shown in Figure 12.

To recovery process began by selecting the Recovery Tab from the DPM administrator console. After selecting the SharePoint protection group, the "Restore to original SQL instance" recovery option was chosen and the intuitive calendar interface shown in Figure 12 was used to "Recover from" the 12:31 recovery point.

FIGURE 12. SQL RECOVERY OPTIONS



Once the database had been restored and the search indexes rebuilt, ESG was able to navigate the SharePoint contents. The recovered file was opened and confirmed via inspection to be exactly as it was before the simulated corruption. The version history was correct as well. As shown in Figure 13, the SharePoint version history shows three versions (A, B and the corrupted C) before and only two (A, B) versions after recovery.

⁷ A SharePoint farm is a group of servers that is logically administrated as part of the same organization or group.

FIGURE 13. VERSION HISTORY MAINTAINED

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Title ESG Lab

During ESG Lab testing, the DP100 was used to browse restore points and select a known good version of a corrupted document in a SharePoint repository. The wizard-driven restore operation, from beginning to end, completed successfully in only two minutes. Compared to a traditional tape-based recovery, ESG found that a DP100 restore of a Word file was very, very fast. As a matter of fact, the restore was done in less time than it usually takes to launch a backup application and get a tape loaded.

Why This Matters

There is a great deal of value to be gained from using SharePoint as a centralized, easy to use, highly collaborative and web-enabled content repository. However, as the usage of SharePoint increases and the value of the data being stored on it rises, the implications for backup and recovery of SharePoint data becomes critical.

ESG Lab has confirmed that the Dell PowerVault DP100 appliance can be used to provide a continuous, predictable and consistent recovery point for SharePoint and SQL Server data. With a simple and easy to understand restore interface, the Dell DP100 can optionally be provided to end users for self-service restores. This is especially useful in small to medium sized businesses where full time IT staff is non-existent.

ESG Lab Validation Highlights

- ☑ Ordering and configuring a DP100 using the Dell Website was quick and easy.
- ☑ The DP100 arrived with pre-configured RAID protection and Microsoft Data Protection Manager.
- ☑ The storage server and DPM was protecting data in less than 15 minutes from deployment.
- ☑ Deploying, configuring and protecting servers was straightforward and intuitive.
- ☑ A single DP100 appliance provided a centralized platform for hands-free continuous data protection.
- ☑ In less than ten minutes the DP100 was configured and protecting Exchange data.
- ☑ Restoring an individual file from a SharePoint database was completed in less than two minutes.

Issues to Consider

- ☑ The Dell PowerVault DP100, as tested by ESG lab, is an entry-level model of the PowerVault DP family of continuous data protection appliances that is well suited for small businesses. Disk capacity and performance planning is recommended when sizing a PowerVault DP solution to meet the needs of your business. It is recommended that two to three times the size of the protected data be available in the storage pool to accommodate the capacity required for a landing zone for recovery data and a log of changes collected during each hands-free backup operation. ESG recommends using the Dell DP Solutions Advisor tool for selected the correct Dell DP solution according to sizing requirements.
- ☑ DPM provides an excellent solution for short-term protection and recovery of file server data. However, it does not eliminate the need to archive your file server data for long-term storage and disaster recovery. In other words, DPM can be used to compliment an existing disk-to-tape backup strategy (D2T) turning it into a disk-to-disk-to-tape (D2D2T) environment with the best of both worlds – automated hands-free backup to disk up to every 15 minutes for quick recovery from accidents and corruption and tape for less frequent long term archival and disaster recovery. With its tape backup support, the PowerVault DP appliance can be used with existing tape drive - at any time without impacting performance of the production server.

ESG Lab's View

Good things often do come in small packages, but for small and medium-sized businesses (SMBs), this hasn't always been the case for data protection solutions. For years, small organizations — particularly those with limited or no designated IT resources (i.e., people or dollars) — have struggled to find products that enable them to easily and cost-effectively protect their data as well as meet today's new regulatory requirements.

As a result, many SMBs have either ended up implementing data protection solutions over the years that have been too big for their environments, with the hope that they will grow into them, or that have been grossly inadequate, given today's increasingly demanding business climate. And, as unwise as it may seem, still others have had no real data protection strategies in place, putting their critical business applications and data at potentially significant risk in the event of a corruption, virus attack or some type of regulatory or legal inquiry.

The Enterprise Strategy Group (ESG) is a typical small business with 30 employees including a number of remote and mobile users. Existing process for backing up and restoring data had become inefficient and unreliable. ESG needed an easy-to-use solution that would reduce the time, resources, and budget required to manage backup and recovery processes. ESG Lab confirmed that a factory configured Dell DP100 appliance provides hands-free automated protection of Microsoft Exchange, SQL Server, SharePoint and file data. Backup windows were eliminated and recovery was improved from hours to minutes. We can sleep well at night knowing that that no more than 15 minutes of vital corporate data will be lost after an accident or corruption.

The bottom line with the Dell DP100, DP500 and DP600 is cost-effective simplicity and hands-free continuous data protection. With no fee for client licenses and starting at less than \$5,000, the DP100 provided ESG with a centralized platform for disk-based backup and recovery. ESG Lab is pleased to report that the DP100 lives up to its reputation as a convenient and cost effective storage server that makes data protection simple and trouble-free for applications including Microsoft Exchange, SQL Server and SharePoint.

Appendix

Table 1. TEST CONFIGURATION

Dell PowerVault DP100 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 OpenManage Server Administrator Version 5.3.0
	VMware – ESX Server 3.0
	Microsoft Exchange 2007
	Microsoft SQL Server 2005
	Microsoft SharePoint 2007



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