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Better Protection for VMware Environments
Symantec Backup Exec 12.5 & Symantec Veritas NetBackup 6.5.3: VMware Environment Data Protection Performance vs. CommVault Simpana 8.0

EXECUTIVE SUMMARY

Use of virtual servers is rapidly growing as businesses recognize the cost savings that can be achieved by virtualizing their environments. Virtual environments, however, introduce a new level of complexity to backup and recovery of data.

Symantec Backup Exec and Symantec Veritas NetBackup simplify protection of virtual environments and deliver high performance in backups and recovery of data.

TEST HIGHLIGHTS

1 Symantec data protection solutions were able to backup VMware environments more than twice as fast as CommVault's new VMware agent

2 Symantec solutions were able to restore a 1GB file from the VMware backup up to 99% faster than CommVault

3 Symantec solutions were able to perform a full image restoration from the VMware backup up to 45% faster than CommVault

4 Symantec solutions were able to perform faster restorations of full Images and individual files even when CommVault's new single pass capabilities were not utilized and optimized file & folder backups were utilized

Overview

In order to quantify the performance of several backup and recovery offerings, engineers ran a series of tests on a VMware ESX 3.5 server environment configured with three virtual machines, that were connected to a Fibre Channel storage area network (SAN).

Backup Alternatives

Symantec offers a straightforward, single-step strategy for virtual server backup and recovery. A single, optimized (i.e. indexed) backup can be used as the source to restore both complete virtual machines as well as individual files residing within a virtual machine.

The latest release of CommVault Simpana 8 offers similar functionality with a new VMware agent that allows for metadata collection.

Tests show that the Symantec offerings deliver better or competitive performance when compared with CommVault while offering a simpler approach to backup and recovery.

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Test Results

Single Pass Backup

In all backup tests, the three Windows Server 2003 virtual machines totaling ~80GB were backed up to disk across a Fibre Channel SAN to provide the source data for the recovery.

Both Symantec and CommVault offer a single-pass backup. For CommVault you must enable metadata collection in the backup configuration. The backup that includes metadata can be used for full or granular restores.

Both Symantec solutions finished the test in 42 minutes or less where the single-pass CommVault backup required over 86 minutes or more than 2X as long as Symantec. (See Figure 1.)

Restore From Single Pass Backup

In this test, the three virtual machines backed up in the prior test were restored as was an individual 1GB file to one of the virtual machines.

The two Symantec solutions bested the CommVault solution in both aspects of the test. Symantec was up to 99% faster when restoring the single file and up to 45% faster when restoring the full image. (See Figure 2.)

VMware ESX Server in Disk-to-Disk SAN Environment: Backup Performance - Full Image with Metadata
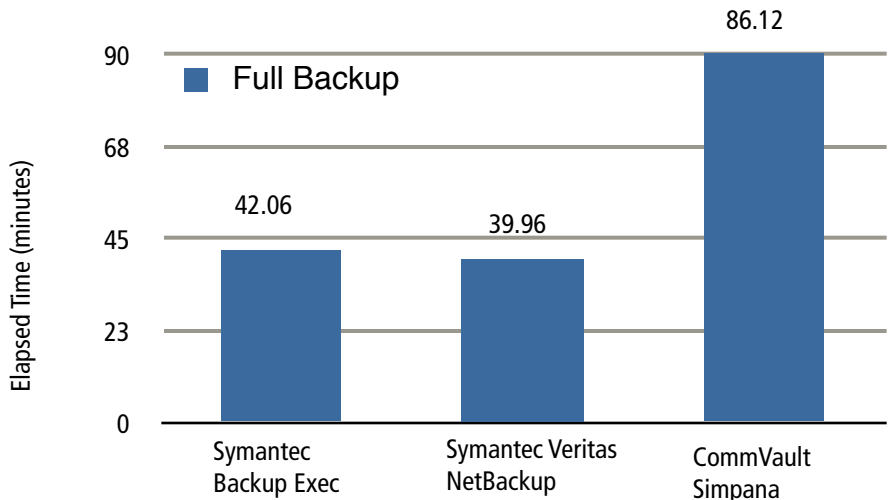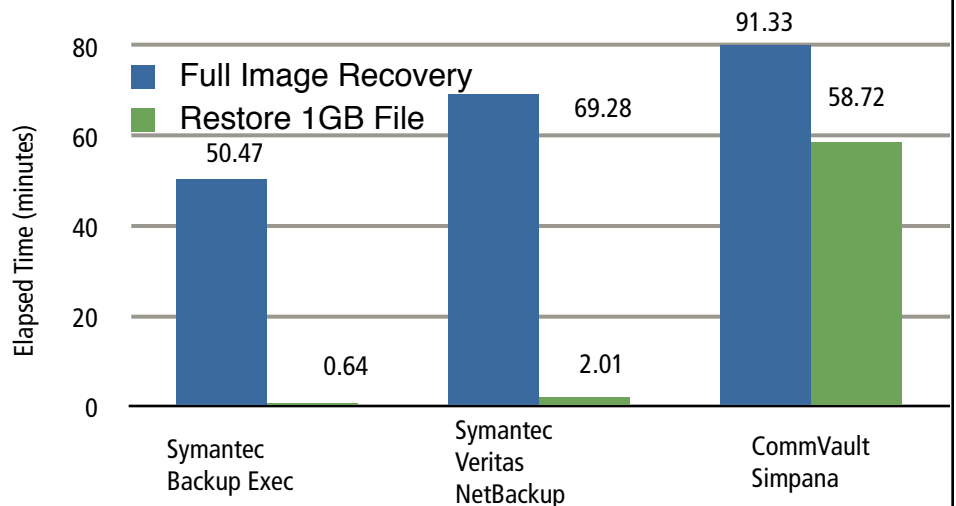
Note: This test measured the time required to create backup files optimized for both full system and granular, file-level recovery. For CommVault, this requires that metadata collection be enabled.

Source: Tolly, April 2009

Figure 1

VMware ESX Server in Disk-to-Disk SAN Environment: Restore Performance From Full Image with Metadata

Note: Symantec uses a single backup as the source for all restores. In order to allow for granular restores from a full backup, CommVault requires that metadata be backed up. The source data for this test is the backup illustrated in FIgure 1.

Source: Tolly, April 2009

Figure 2

Alternative Backup

CommVault is also enabled to perform VMware backups without metadata collection. This leverages the standard VMware Consolidated Backup process for full images of the VMware environment.. A second, granular backup is taken and used as the source when restoring at the granular folder and file level. The Symantec backup times referenced previously, the only ones needed, are referenced again for convenience.

While this CommVault full backup was significantly faster than the previous CommVault backup at ~69 minutes, it was still much slower than either Symantec solution.

The granular backup added another 37 minutes for a combined time of ~106 minutes or 2.5 times as long as Symantec. (See Figure 3.)

This additional backup requires additional disk space on an ongoing basis. This storage space adds both to capital costs for the storage solution as well as recurring maintenance and storage administration costs.

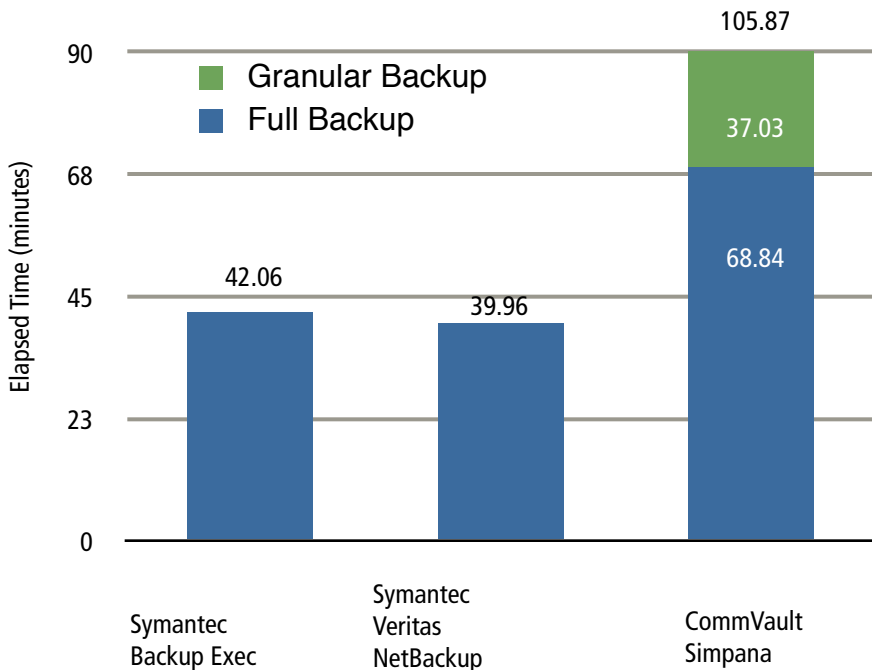**Symantec Corporation**

Symantec Backup Exec & Symantec Veritas NetBackup

Tested April 2009

VMware Virtual Server Backup & Recovery Performance

Restore From Alternative Backup

Using CommVault's alternative process, engineers re-ran the restore test referenced previously. The Symantec restore times referenced previously, the only ones needed, are referenced again for convenience.

The CommVault restore times, using a full image backup, optimized for full recovery and a second file & folder backup optimized for granular recovery were still longer than the full restore times achieved using a single Symantec backup. The granular restore time of ~1 minute ranged between the 38 second run of Backup Exec and the 2 minute run of Veritas NetBackup. (See Figure 4.)

VMware ESX Server in Disk-to-Disk SAN Environment: Backup Full Image and Granular

105.87

	Granular Backup
	Full Backup

- Granular Backup
- Full Backup

37.03

68.84

42.06

39.96

Symantec Backup Exec

Symantec Veritas NetBackup

CommVault Simpana

Elapsed Time (minutes)

90 · 68 · 45 · 23 · 0

Note: Symantec uses a single backup as the source for all restores. CommVault users can choose an approach that combines a full backup (without metadata) with a separate granular backup. That alternative is shown here.
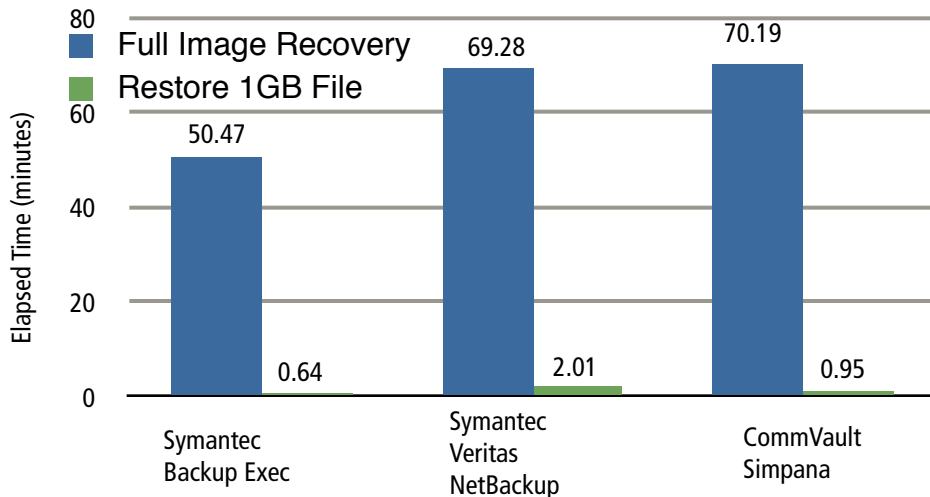
Source: Tolly, April 2009

Figure 3

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VMware ESX Server in Disk-to-Disk SAN Environment: Restore Performance from Full Image and Granular

Elapsed Time (minutes)

- Full Image Recovery
- Restore 1GB File

	Full Image Recovery	Restore 1GB File
Symantec Backup Exec	50.47	0.64
Symantec Veritas NetBackup	69.28	2.01
CommVault Simpana	70.19	0.95

Note: Symantec uses a single backup as the source for all restores. In order to allow for granular restores from a full backup, CommVault alternatively supports a "faster" full image backup without metadata for full restore and another backup for granular restore. The source data for this test is the backup illustrated in FIgure 3.

Source: Tolly, April 2009

Figure 4

Virtual Server Backup & Recovery Test Bed

Fibre Channel 4Gbps
SUT Server
SUT Media Server
VMware ESX Server 3
VMware ESX Server 2
VMware ESX Server 1
SAN Switch
15k 4x450GB SAS SAN
7.2k 4x1TB SATA SAN

Source: Tolly, April 2009

Figure 5

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Common RFP™

The test methodology used for this report relies upon test procedures, metrics and documentation practices as defined by Tolly Common RFP, #1121 Backup and Recovery: Virtual Servers.

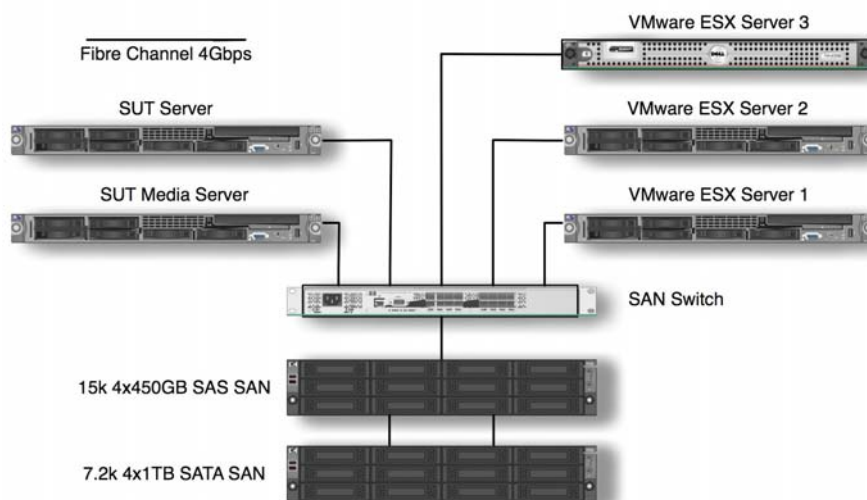To learn more about Tolly Common RFPs, go to:

http://CommonRFP.com

Test Setup & Methodology

Test Environment

In order to perform testing in parallel, three identical test environments were built. Tolly engineers verified that all hardware and software components of the base systems were identical prior to installation of the solutions under test. (See Figures 5 & 6.)

Each vendor's VMware test environment consisted of five main servers, each running Microsoft Windows Server 2008 x64 Edition SP2. Two identical HP ProLiant DL360 G5 servers served as the master server and the media server for the data protection and recovery software, and were equipped with Dual-Core Intel Xeon 5140 running at 2.33 GHz with a 1333 MHz FSB,

Backup & Recovery Solutions Tested

Vendor	Product	Version
CommVault Systems, Inc.	Simpana	8.0
Symantec Corporation	Backup Exec	12.5
Symantec Corporation	Veritas NetBackup	6.5.3

Source: Tolly, April 2009   Figure 6

4GB RAM, 72GB SAS HDD at 10,000RPM, and QLogic QLE2562 4GB dual-port Fibre Channel HBA.

In addition to the data recovery servers, two additional HP ProLiant DL360 G5 and a Dell PowerEdge 1950. All three were outfitted with 16GB RAM, 73GB 10,000 SAS HDDs, and a QLogic QLE2462 dual-port Fibre Channel HBA. Each server was running Microsoft Windows Server 2008 x64 Edition SP2 and a VMware ESX 3.5 environment. The only difference between the VMware servers is the HP ProLiant systems were configured with a dual-core Intel Xeon 5140, running at 2.33 GHz, while the Dell server was running at 2.0 GHz.

Each server was connected (via Fibre Channel) to a HP SAN Switch 408, which, in turn, was connected to an HP StorageWorks 2012fc SAN outfitted with four 480GB SAS HDDs running at 15,000 RPM.

Only one of these servers was used for the production testing. The other two were used as alternative targets to prototype the restore testing without impacting the source server.

Test Methodology

Engineers loaded VMware ESX 3.5 and configured three identical virtual machines using the VMDK disk format. Each machine consisted of a standard install of Window Server 2003. To provide a suitable file for the granular recovery test, twenty, 1GB archive (ZIP) files were loaded on each virtual machine. Each virtual machine was ~26GB making the entire backup source ~80GB.

Engineers first performed a full image level backup of all three virtual machines. For CommVault, metadata collection was enabled for the backup.

Symantec's backup technology automatically indexes all files backed up during the image level backup, allowing the user to restore either single files or the entire image from a single backup.

Next, engineers deleted the three virtual machines that were protected with an Image level backup and then performed a full, image level restore of the three virtual servers.

Engineers then deleted a single 1GB file from one of the three virtual machines. They performed a restore of this 1GB file from the Image Level backups and for CommVault, from the appropriate backup.

Finally, engineers performed a full, image level restore of the three virtual servers, completely deleting them from the VMware environment beforehand.

This process was repeated for CommVault utilizing a full image backup without metadata collection and a File & Folder backup which optimizes granular recovery.

The logs generated by the data protection and recovery solution were used to measure the time required to complete the operation.

About Tolly…

The Tolly Group companies have been delivering world-class IT services for 20 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

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Interaction with Competitors

In accordance with Tolly's Fair Testing Charter, Tolly personnel invited representatives from the competing company to review the testing. After an initial dialogue the competitor did not respond. All products were configured to use default settings.

For more information on the Tolly Fair Testing Charter, visit:
http://www.tolly.com/FTC.aspx

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