

Eight Reasons to Use One Backup Solution for Virtual and Physical Machines

**Why one backup product is
better than two for cost, uptime
and innovation**

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Introduction: The Big Question

If your IT organization is like most today, you plan to run on a blend of “physical” and virtual machines for the next several years. Virtualization reduces costs, but not all applications are suited for virtualization.¹ And as an IT professional, you know that backup and recovery are just as critical for data on virtual servers as for data on physical ones. So you have probably asked this question:

“Should we use a single backup and recovery solution for all servers – physical and virtual – or should we also pay for a separate product for virtual machines?”

We think the answer is crystal clear: Use one backup solution for virtual and physical machines.

First, having two backup solutions instead of one can be worse than carrying around two mobile phones. It can introduce high costs and negative consequences such as:

- Higher storage and infrastructure costs, because separate backup solutions require separate hardware and storage.
- Higher deployment and management costs, because there are fewer opportunities to optimize storage and deduplicate redundant data.
- Lost productivity and lost revenue, because it takes longer to recover virtual and physical servers in the event of a problem.
- Inability to respond to compliance requirements, because virtual-only products provide little support for long-term archiving on tape, disk or cloud storage, and have limited capabilities to recover individual emails and files.

Second, the developers of comprehensive backup and recovery solutions have been just as innovative in the virtual world as the “point product” vendors. In fact, industry leaders have introduced many of the key innovations in backup and recovery for virtual environments, and today offer key features that are still not available in virtual-only products.

In this paper, we will look at eight reasons to use one backup and recovery solution for blended virtual and physical environments. The first four reasons address why it is better to have one integrated solution rather than two point products. The remaining four relate to the advantages of using a comprehensive, fully featured solution versus a point product, even if your environment is predominantly or entirely virtual.

The eight reasons are:

- 1. Lower storage, infrastructure and staffing costs**
- 2. Faster recovery and increased uptime**
- 3. Support for migrating applications from physical to virtual servers**
- 4. Better ability to respond to compliance requests with tape archives**
- 5. Fast recovery of individual files and folders**
- 6. One-pass backup of applications, and fast recovery of individual emails and application objects**
- 7. Better deduplication across virtual machines**
- 8. Best track record of innovation in the virtual world**

Note: This paper includes information about products from various companies, gathered from reliable public sources. However, the accuracy of the information cannot be guaranteed, and details may change over time.

1. Lower Storage, Infrastructure and Staffing Costs

One infrastructure for backup, not silos

One of the motives to adopt virtualization is to reduce unused capacity on multiple single-purpose systems. Wouldn't it be ironic to adopt virtualization and then divide backup and recovery into two silos, each with its separate pool of storage devices and its own unused capacity?

A comprehensive backup and recovery solution can back up virtual machines to physical servers and physical servers to virtual machines. This flexibility means that backup servers can be handled as a single pool of resources, with less redundancy and unused capacity.

One set of servers for recovery

With two backup solutions, organizations need one set of systems on warm standby configured to recover virtual machines, and a second set to handle recovery from physical systems.

A comprehensive solution eliminates this redundancy, because it can recover applications backed up from virtual machines to physical servers, as well as applications backed up from physical servers to virtual machines. You can have one set of backup servers using whatever hardware and software is available and most economical for your organization.

And what if a solution allowed administrators to recover applications backed up from VMware® vSphere® systems to Microsoft® Hyper-V® machines, and vice versa? This flexibility would eliminate the need to have separate backup and recovery silos for those two virtual environments.

Better deduplication for less storage and bandwidth

A single, comprehensive solution can also provide dramatic gains in the area of deduplication.

Deduplication can reduce storage needs by up to 90% by eliminating the need to store more than one copy of a file or software program (or more precisely, more than one copy of a block of data or code). Source deduplication, which deduplicates data on the source system before it travels to the backup server, has been shown to reduce the amount of backup traffic traveling over the WAN by a factor of more than 32.²

But if deduplication is split into virtual and physical silos, many files (and potentially databases) will be stored on two backup servers. The storage inefficiency will be even greater if the backups are replicated to off-site systems or archives.

Moving duplicate files around also requires bandwidth and affects network performance.

In contrast, a single comprehensive backup product can deduplicate blocks of data and code across all virtual and physical servers, reducing storage costs and loads on the network.

Many virtual-only point products are also limited to deduplicating on individual VMs, making them even less efficient (see No. 7 below).

Lower workload and staffing costs

Managing two backup and recovery solutions increases staffing costs and takes administrators away from other important tasks. With two overlapping solutions, staff members need to:

- Purchase two different products
- Learn two different products
- Install and configure two products
- Set up the same policies in two systems
- Manage two systems
- Update and support two systems

Over time, the cost of the extra workload and staffing can far exceed the original cost to license the software.

Also, when it comes to troubleshooting problems, forecasting capacity requirements and other administrative tasks, it is far more efficient to have one dashboard and one set of reporting tools rather than trying to correlate details across two systems.

In fact, a recent survey on backup and recovery practices found that a majority of companies with a single backup solution for blended virtual and physical environments reported that using a single solution made it easier to staff and train; easier to alert, troubleshoot and report; and easier to search for and recover items.³

2. Faster Recovery and Increased Uptime

Fast and reliable recovery is arguably even more important than easy and economical backup. That is because fast recovery increases application availability, which translates to higher employee productivity.

In the case of customer-facing applications, increased application availability can translate directly to higher revenues and better protection of the company's reputation. This applies to restoring applications after a local system or disk failure, as well as to full-blown disaster recovery scenarios.

No wait to find or configure suitable machines

With a single, comprehensive backup solution, you can restore applications backed up from a virtual machine to a physical server, and vice versa. You can also restore files backed up from one virtual environment to another. This flexibility allows administrators to recover immediately to whatever machines are at hand. They don't have to wait to find the right machine, or to set up an available system with the right software configuration.

Faster data transfer from offsite backup

In the event that applications and data need to be recovered from off-site, more complete deduplication (available with comprehensive solutions) means less data needs to travel over the WAN. Given that some applications today can involve hundreds of gigabytes or even terabytes of files and data, this can significantly speed up recovery time.

Faster recovery of individual files, emails and application objects

Fast, simple recovery of individual files, emails and application objects can also provide a major benefit to productivity. This is relevant when employees accidentally delete files or lose a local storage device. A fully featured, comprehensive solution provides faster and easier recovery of emails and application objects compared with virtual-only backup and recovery products. Details are included in sections 5 and 6 of this paper.

3. Support for Migrating Applications from Physical to Virtual Servers

Is your organization migrating applications from physical to virtual servers?

If so, a comprehensive backup and recovery solution can help by backing up applications and data from physical servers, then restoring them to a virtual machine. This eliminates some of the steps you would otherwise need to take to move the applications and data across.

For example, a comprehensive solution could:

- Automatically convert physical servers to virtual machine replicas (P2V).
- Perform automated backups of physical servers to virtual machine replicas (B2V).
- Perform ad hoc or on-demand conversions of physical server backups to virtual machine replicas.

These capabilities not only help IT professionals and contractors solve the problem of moving physical servers to a virtual environment, but they also give administrators unique tools for leveraging virtualization technology for disaster recovery.

4. Better Ability to Respond to Compliance Requests with Tape Archives

Companies in regulated industries face compliance requirements for storing backups off-site for periods ranging from months to decades. Other organizations must be prepared to face legal discovery requests for specific documents, often thousands of them, ranging over years. Still others must be ready to locate files that touch on how information has been used or accessed – for example, to satisfy auditors about requirements related to SOX, Basel III, HIPAA, PCI DSS standards, as well as privacy and data breach laws.

Tape archiving is the standard solution for these requirements, due to the low cost per gigabyte of storage, established processes for securing tapes for years and decades, and sophisticated tape library management systems.

Of course, companies in regulated industries are not the only ones that want to archive data to tape. Many others also want to take advantage of the low storage costs, transportability and established procedures for secure off-site storage.

Most virtual-only backup products do not provide any support for tape archiving.

Other virtual-only backup products provide very rudimentary abilities to archive a complete backup to tape. But these do not allow organizations to take advantage of tape library management systems to find and recover specific documents and files.

In contrast, the best comprehensive backup solutions support flexible and efficient archiving to tape, from virtual as well as physical machines, using a wide range of tape library management systems and software products. These are efficient for satisfying long-term archiving requests and for retrieving individual files from long-term archives.

5. Fast Recovery of Individual Files and Folders

Backup and recovery solutions are absolutely necessary to protect against system failures and potential disaster scenarios.

But on a day-to-day basis, 90% of user requests to help desks and systems administrators are for the recovery of a single file, folder or application object, usually because that item was accidentally deleted.

Unfortunately, most virtual-only backup products cannot “see” individual files or folders within a VMDK (virtual machine disk) or VHD (virtual hard disk). To recover a single file or folder, the administrator must mount and restore the entire VMDK or VHD and then search for the file or folder. Only then can the item be recovered for the end user.

This process is time-consuming, requires “spare” storage space, and is error prone. In a large organization, requests to recover individual files can tie up an administrator for hours or even days.

In contrast, the best comprehensive recovery solutions offer easy and fast one-click restore for files and folders. For example, the unique Symantec™ V-Ray technology captures metadata properties about files and folders during backups. After the backup, administrators can search for files and folders immediately using the file or folder name, file type, creation and modification date, and other properties. There is no need to restore the VMDK or VHD when all you need is one item. A single click recovers the file or folder for the end user.

6. One-Pass Backup of Applications and Fast Recovery of Individual Emails and Application Objects

None of the virtual-only backup products on the market today can “see” individual emails in VMDKs and VHDs, or application objects such as SharePoint® documents, Active Directory® user accounts and SQL Server® databases.

This presents your IT administrators with a painful dilemma.

They could employ separate backup tools to back up Microsoft Exchange and each individual application. That would allow them to recover individual emails and application objects using the appropriate tool. However, this requires licensing, implementing and managing multiple backup tools. Also, running multiple backups on the same virtual machines can cause performance problems.

The alternative of using only the general backup and recovery product is not much better. To find and recover the email or application object, the administrator not only needs to mount the VMDK or VHD containing the email or object, but he or she must also start up the application – and make sure it doesn’t conflict with the “real” production instance of the application.

An example

Let’s look at how this might work using a virtual-only solution like Veeam Backup & Replication™ 6.1 to recover a single Exchange email.

The administrator would need to:

1. Set up a “virtual lab,” logically separated from the production environment by a proxy server.

2. Recover and restart the virtual machine containing the version of Exchange used to create the email.
3. Start up a domain controller with Active Directory to provide credentials to authorize access to the Exchange email boxes.
4. Recover and mount the virtual machine containing the desired email (or several virtual machines if it were not clear which one contained the email).
5. Search for the email.
6. Recover the email for the end user.

The virtual lab is needed because without one, systems on the network might become confused between the real production servers and the ones with the same characteristics being used for recovery.

Essentially the same process would have to be followed to recover an individual SharePoint document or SQL Server database, except that the domain controller might not be necessary.

With Backup Exec™

Recovering individual emails and application objects with a fully featured solution like Symantec Backup Exec is dramatically simpler.

Backup Exec can use a single pass to back up host virtual machines, guest virtual machines and applications like Microsoft Exchange, SharePoint, SQL Server and Active Directory. During that pass, Symantec's V-Ray technology picks up metadata properties of the virtual machines, files, folders, emails and application objects.

Backup Exec then provides one-click restore for the application objects. Administrators can search for emails and application objects immediately using a variety of criteria, then click on the name of the email or object to restore it to the end user.

In fact, Symantec's V-Ray technology and single-pass backups give administrators the choice of simple and quick recovery of:

- Individual emails and application objects
- Individual files and folders
- Complete virtual machines
- Complete physical servers, including host and guest virtual machines

No other product offers simple recovery at all four of these levels.

Backup Exec also supports Oracle Recovery Manager (RMAN), making it much easier to back up and recover Oracle databases.

7. Better Deduplication Across Virtual Machines

Earlier we discussed deduplicating files (actually data blocks) across physical and virtual servers, pointing out that eliminating backup silos increases the effectiveness of deduplication.

The effect can be equally or even more important across virtual machines. That is because different instances of virtual machines usually each have a very similar set of large operating system files. In fact, in environments where VMs are cloned, they have exactly the same operating system files, meaning that deduplication should be able to save a tremendous amount of storage space.

Yet many virtual-only backup products cannot deduplicate across all the VMs being backed up. For example, Veeam Backup & Replication allows deduplication only within an individual backup job. In environments with many virtual machines, administrators usually create several backup jobs so they can run in parallel. But if there are, say, five backup jobs, then each is treated as a silo from a deduplication perspective, and the same VM files might be stored five times.

Comprehensive solutions like Symantec Backup Exec provide unified deduplication across all virtual machines, regardless of how backup jobs are configured. This can greatly reduce storage costs.

8. Best Track Record of Innovation in the Virtual World

There are some areas of IT where point product vendors come out with new technologies first or form deeper relationships with key technology vendors. But that is demonstrably not true for backup of virtual systems. We will outline below a few of Symantec's technology firsts for virtual machines, as well as other evidence of the company's leadership role in the virtualization arena.

First products on the market from a major backup vendor

Symantec first offered backup, deduplication and recovery for VMware environments in 2006, before many of today's virtual-only backup vendors were founded.

In 2008, Symantec's Backup Exec became the first product from a major backup vendor that offered backup, storage and replication for Microsoft's Hyper-V environments.

Symantec was the first major backup vendor to have a backup solution certified for VMware vSphere 5.

Patents

Symantec is an innovator. The company spent almost \$1 billion on research and development in fiscal 2012.⁴ In 2011, it was granted 199 patents by the U.S. Patent Office, making it one of the top 130 companies in the world for U.S. patents approved.⁵

Symantec has filed many patents for concepts related to backup, recovery and replication for virtual environments, based on research started before the virtual-only backup vendors were founded.⁶ Examples include:

U.S. Patent No. 7,093,086: Disaster recovery and backup using virtual machines (Filed March 2002, granted August 2006)

U.S. Patent No. 7,669,020: Host-based backup for virtual machines (Filed May 2005, granted February 2010)

U.S. Patent No. 8,032,351: Running a virtual machine directly from a physical machine using snapshots (Filed November 2006, granted October 2011)

U.S. Patent No. 8,099,391: Incremental and differential backups of virtual machine files (Filed March 2009, granted January 2012)

First with key new features

Symantec has been first to market with many key features for virtual machine backup and recovery, including:

- The first host-based backup and recovery of virtual machines from a major backup and recovery vendor – 2008
- The first capability to back up a virtual machine that moves between clustered Hyper-V hosts – 2008

- The first capability to perform a one-pass backup of files and applications, then recover individual Exchange, Active Directory and SQL database objects (granular recovery of application objects) – 2010
- The first granular recovery of SharePoint files – 2010
- The first deduplication of data inside a virtual machine – 2011
- The first incremental backup support for Hyper-V environments – 2012

Deep relationships with VMware and Microsoft

As the largest player in the backup market and a major vendor in other technology sectors, Symantec has extremely close working relationships with VMware and Microsoft, developers of the vSphere and Hyper-V platforms, respectively.

Symantec and VMware

Symantec and VMware have worked together to create an unprecedented 100 points of integration between their products. This cooperation covers technology areas like backup, recovery and archiving; security and compliance; and storage and availability management. ⁷

“We have been working closely with Symantec to deliver enterprise solutions that increase the security, compliance and availability of virtualized business-critical applications while reducing costs.”

– Paul Vasquez, Strategic Alliance Manager, VMware

“Symantec demonstrates an ongoing and consistent commitment to supporting VMware cloud infrastructure...Smart integrations in security, backup and storage solutions create an opportunity for organizations to securely pursue the benefits of virtualization and cloud computing.”

– Bogomil Balkansky, Senior Vice President, Cloud Infrastructure Products, VMware



Symantec and VMware also have an extremely close business relationship. For example, the two companies have joined in an SMB Advantage Program to jointly market technology solutions for virtual environments to small and medium business customers.

Symantec and Microsoft

The Symantec Backup Exec engineering team has maintained a collaborative relationship with Microsoft for many years and participates in weekly meetings with the Microsoft Windows Server team.

Symantec has long been in the forefront of providing backup and recovery solutions for Microsoft's Hyper-V environments. The company introduced backup, storage and replication for Hyper-V in 2008 – four years before Veeam and other vendors. As noted earlier, Symantec was the first major backup vendor to introduce capabilities to back up virtual machines that move between clustered Hyper-V hosts, to recover individual Exchange, Active Directory and SQL database objects, and to incrementally back up Hyper-V environments.

The Symantec Backup Exec engineering team participates in weekly meetings with the Microsoft Windows Server team.

Symantec was the first major backup vendor to recover individual Exchange, Active Directory and SQL database objects, and to incrementally back up Hyper-V environments.

Industry recognition

From 2007 to 2012, Symantec has had more VMworld Award winners or finalists in the “Business Continuity and Data Protection” category than any other company.

In the Microsoft world, Symantec products won the Best of TechEd 2012 award in the backup and recovery category, and the 2012 MSEchange.org Readers Choice Award for backup and recovery, the ninth consecutive year for this award.

Summary

Reason	Explanation
1. Lower costs	<p>Organizations can have a single pool of servers for backup and on standby for recovery, using whatever systems are available and economical. This is possible because the solution can back up and restore from virtual machines to physical servers and vice versa.</p> <p>Deduplication across virtual and physical environments can greatly reduce the cost of storage and network capacity.</p> <p>A single solution reduces staffing costs, because there is only one product to learn, manage and update.</p>
2. Faster recovery and increased uptime	The ability to restore virtual machines to physical servers and other virtual platforms speeds up recovery, which translates to more uptime, higher productivity and potentially higher revenues.
3. Support for migrating applications from physical to virtual servers	A comprehensive solution can help migrate data from physical to virtual environments and give administrators tools for leveraging virtualization technology for disaster recovery.
4. Better ability to respond to compliance requests with tape archives	<p>Support for tape library management systems can help meet regulatory requirement for long-term storage.</p> <p>Fast recovery of individual files and emails dramatically simplifies complying with legal discovery processes and audits of SOX, Basel III, HIPAA, PCI DSS and other standards.</p>
5. Fast recovery of individual files and folders	Symantec Backup Exec provides fast, simple, one-click recovery of files and folders, a critical feature missing from most virtual-only products.



Reason	Explanation
6. One-pass backup of applications and fast recovery of individual emails and application objects	Symantec Backup Exec provides fast, simple, one-click recovery of emails and application objects, a critical feature not available from any of the virtual-only backup vendors.
7. Better deduplication across virtual machines	Most virtual-only products have restrictions on deduplication across machines. Symantec Backup Exec provides deduplication across all VMs, which can greatly reduce storage and bandwidth requirements
8. Best track record of innovation in the virtual world	Symantec has introduced many firsts in the virtual industry and works very closely with the VM platform vendors. Customers get new features and support for new virtual platforms faster.
The Bottom Line	
Comprehensive features, integration, flexibility, experience and R&D budget all point to the value of a single solution for backup and recovery across all server environments.	

73% of companies using separate products for backup and recovery would consider switching to a single platform. ⁸

See why at: www.backupexec.com



Footnotes

- ¹ Surveys indicate that most IT organizations are using virtualization, but very few have moved all work to virtual machines. For example, one survey shows 52% of IT decision-makers spending at least 25% of their budgets on virtualization projects this year (Quest Software Virtualization Management Survey, December 2011, http://www.quest.com/Quest_Site_Assets/WhitePapers/VM-survey-results.pdf), and another indicates that 64% of small and medium businesses are using some form of virtualization (State of SMB IT 1H 2012, Spiceworks, <http://marketing.spiceworks.com/download-the-state-of-smb-it-report---may-2012>), but in organizations that employ virtualization, only about 39% of all servers are virtual (Virtualization Penetration Rate in the Enterprise, Q3 2011, <http://www.v-index.com/virtualization-penetration-rate.html>).
- ² For an excellent overview of deduplication see: Data Deduplication Deep Dive, an InfoWorld Special Report, <http://www.infoworld.com/d/data-management/download-the-data-deduplication-deep-dive-report-502>.
- ³ Symantec 2011 Backups in a Virtual Environment Flash Poll, <http://www.slideshare.net/symantec/symantec-2011-backups-in-a-virtual-environment-flash-poll-global-results>.
- ⁴ Symantec Corporation Form 10-K for Fiscal 2012.
- ⁵ Patenting by Organizations 2011, U.S. Patent Office, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/topo_11.htm.
- ⁶ The patents cited here can be viewed on the U.S. Patent Office website at: <http://patft.uspto.gov/netahtml/PTO/srchnum.htm>.



- 7 Symantec and VMware Accelerate Business Critical Virtualization and Help Customers and Partners Confidently Transition to the Cloud, Symantec press release, August 27, 2012, http://www.symantec.com/about/news/release/article.jsp?prid=20120827_01. See also Symantec and VMware Partner to Deliver Extensive Protection for Virtual and Cloud Environments, http://www.symantec.com/about/news/release/article.jsp?prid=20120228_02.

- 8 Symantec 2011 Backups in a Virtual Environment Flash Poll, <http://www.slideshare.net/symantec/symantec-2011-backups-in-a-virtual-environment-flash-poll-global-results>