VM Backup: Veeam vs. Physical Backup Tools
Top 10 Reasons to Choose Veeam

Veeam Backup & Replication™ isn't the only way to back up your virtual environment… but it is the best way.

While many physical backup tools can now perform image-based backups of virtual machines (VMs), only Veeam® fully leverages the virtual environment to reduce the cost and increase the value of backup – not just a little, but a lot.

#1 VM Backup

That's why so many organizations have said, "Enough!" to the shortcomings of "single solution" backup, and moved to best-of-breed backup with Veeam.

It's a wise move. Virtualization isn't going away. In fact, the majority of server workloads are now virtualized. What was once niche is now the mainstream… and it demands a new approach to data protection.

Powerful, Easy-to-Use and Affordable

Whether you have thousands of VMs or just a handful, Veeam's purpose-built backup is the best choice for your VMware, Hyper-V or mixed-hypervisor environment.

Veeam provides fundamental and far-reaching advantages over physical backup tools. The chart below summarizes the top 10 advantages (and the pages that follow describe them in greater detail).

SearchServerVirtualization.com BEST OF vmworld 2011 GOLD AWARD NEW TECHNOLOGY

Veeam has won more VMworld awards than any other vendor, and Veeam is the only twotime winner of the VMworld award for New Technology

Best of WINNER TechEd North America 2013 Product Awards Produced By: Windows IT Pro

Veeam Backup & Replication v6.5 won Best of TechEd 2013 for Backup and Recovery.

"A major reason that organizations still hit these bumps on the backup and recovery road: They use the same products for both physical and virtual server backup, when we all know that virtualization requires a fundamentally different approach."

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What the competition says about Veeam

Veeam's leadership in VM backup is undisputed. Since bursting onto the scene in 2008, Veeam has shaken up the backup world with innovation after innovation. So you probably won't hear that Veeam's functionality is lacking – that would be a difficult argument to make.

Instead, you'll likely hear that Veeam is virtual only and can't back up physical machines.

It's true – Veeam is virtual only! It's how we can do what we do. And with more server workloads being virtualized every day – and with fewer organizations willing to compromise VM backup for the "single solution" approach – it's exactly the right place to be.

Solving the 3C problem

Physical backup tools suffer from the "3C" problem: lack of capabilities, complexity and cost. But Veeam uses virtualization – and Veeam innovation – to solve the 3C problem.

Issue	Veeam solution	Examples
Capabilities	Powerful	Verify the recoverability of every backup, and restore an entire VM or an individual file or email in 2 minutes – all from the same image-based backup
Complexity	Easy-to-use	No agents to deploy, monitor or maintain
Cost	Affordable	Deduplication, Microsoft Exchange recovery, storage snapshot support3 and more included at no extra charge

Built for Virtualization

Most backup tools were built for the physical world and simply retrofitted for virtualization. Their roots are in the physical world, which constrains what they can do for virtual machines.

But Veeam is different – Veeam is Built for Virtualization, and it shows. For example:

Physical backup tools…	Veeam…	
Require agents inside each VM for granular recovery and proper application backup and recovery.	Is completely agentless – agents are not used to perform or assist with backups, and agents are not used for recovery either.	While others claim to be agentless for certain types of backups/restores, only Veeam is agentless in every circumstance.
Difficult to find VMs or navigate the virtual infrastructure.	Is intuitive and easy-to-use. Veeam feels like it was built for virtualization because it was!	As one Veeam customer put it: "Our legacy backup tool felt like a bolt-on piece of equipment – like protecting the virtual environment was an afterthought. Veeam feels like it was built specifically to support VMs."
Often take months to provide support for new VMware and Hyper-V releases – and even then, support is often just basic compatibility.	Provides the best support for VMware and Hyper-V.	Because virtualization is all we do, Veeam can provide better, faster and deeper hypervisor-specific support.

Veeam doesn't simply tolerate the virtual environment – we embrace it. By harnessing the disruptive power of virtualization, we provide data protection beyond anything you could have imagined. One Veeam customer calls it "science fiction come true." We call it Virtualization-Powered Data Protection, and it changes what you should expect – and what IT stakeholders and regulators will ultimately demand – from backup.

Of course, we can't take all the credit. It's virtualization that makes what we do possible… Like recover a virtual machine in 2 minutes from a backup. Automatically test the recoverability of every backup. And eliminate agents – even for advanced application recovery.

Look closely

Most backup tools have their roots in the physical world, and some capabilities are not available with image-based VM backups. For example, some physical backup tools might offer synthetic full backups for traditional file-based backups, but don't have this capability for image-based VM backups. Likewise, OS-level replication or log-based replication for select applications might be available, but not image-based VM replication. In addition, compression and deduplication might be available, but not recommended in VMware environments.

Veeam vs. physical backup tools

When it comes to VM backup, Veeam provides numerous advantages – both technical and commercial – over physical backup tools. Here are the top 10 advantages according to Veeam customers and partners:

	Veeam Backup & Replication	**Physical Backup Tools Symantec,** CommVault, Avamar, AppAssure, etc.
1. Agentless	✓	✗
2. Support for VMware and Hyper-V	Deep, including true incremental backup with Change Block Tracking	Basic
3. Instant VM recovery	✓	✗
4. Instant file-level recovery	Any OS and file system	Windows, maybe Linux
5. Instant application-item recovery	Any application, on any OS	Select applications only
6. Automated recovery verification	✓	✗
7. Built-in, source-side compression & deduplication	✓	✗
8. Simple offsite backups	✓	✗
9. Storage agnostic	✓	✗
10. Easy to deploy and configure	15 minutes to self-setup	Weeks of expensive deployment

1. Agentless

Physical backup tools rely on agents, and they apply this approach to VM backups as well. Some can do a basic crash-consistent, image-based VM backup without an agent (for example, using VADP, the vSphere APIs for Data Protection). But they still require agents inside VMs for essential functions like granular recovery and application-consistent backups.

Even if agent licenses are included "for free," agents add cost to backup and recovery. Worse yet, they introduce risk.

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Considerable time is required to deploy, monitor and maintain agents in every VM. Backup agents in VMs can also create compatibility issues and complicate troubleshooting for "real" VM workloads.	The time required to maintain agents translates to real costs. Agents also consume server resources and can reduce savings from server consolidation.	Agents don't protect: • Powered-off VMs • Newly provisioned VMs • VMs with outdated agents or missing prerequisites • VMs whose agents can't communicate with the backup server (for example, due to network isolation)

Veeam eliminates all these issues by eliminating the need for agents. How do we do it? By fully embracing virtualization, which itself eliminates the need for agents:


VADP (for VMware) and standard Windows APIs (for Hyper-V) eliminate the need for data mover agents inside VMs.
Image-based backups (which capture the entire VM) eliminate the need for application and file system indexing and the agents that perform it.
If properly designed, the remaining guest processing can be done by a lightweight, non-persistent run-time process, eliminating the "maintenance nightmare" and other problems associated with agents.

Veeam performs advanced backup and recovery without the use of agents in VMs. This doesn't mean that Veeam lacks features – such as application-aware backup and recovery, application log truncation, granular application-item recovery, Windows guest file searching, or in-place restores – that physical backup tools require agents to deliver. Veeam provides all these features and more without agents in VMs.

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2. Support for VMware and Hyper-V

VM backup sounds simple enough on paper, but in practice it's more complicated.

VDDK: For example, VMware provides a powerful toolkit (VDDK, the Virtual Disk Development Kit) for backup vendors, but how a vendor integrates with VDDK has a big impact on the reliability of their backups and restores. Veeam carefully architected its VDDK integration to ensure the highest reliability.

VSS: Another example of Veeam's deep hypervisor expertise and attention to detail is our VSS integration. VSS (Windows Volume Shadow Copy Service) is the mechanism provided by Microsoft to quiesce (or "quiet") Windows applications prior to backup. Rather than relying on VMware Tools like most backup vendors do, we built our own integration to VSS to ensure application-consistency of Veeam backups. Our advanced VSS integration also performs specific backup and restore steps for Microsoft Exchange and Active Directory, as per Microsoft's requirements.

Changed block tracking: By focusing on virtualization, Veeam is able to provide the best support for VMware and Hyper-V, including change block tracking for Hyper-V that works even for VMs on CSVs (cluster shared volumes).

Deep expertise in a single solution

Veeam's hypervisor expertise runs deep – for both VMware and Hyper-V – and Veeam supports both hypervisors from a single console and with a single backup infrastructure. Veeam even offers the flexibility to move Veeam licenses between VMware and Hyper-V hosts at no charge. So as your virtual environment changes, Veeam has you covered.

With millions of VMs protected, there isn't much we haven't seen. We sweat the details so you don't have to.

As agile as virtualization itself

Our focus on VM backup also keeps us agile. So Veeam is able to provide better and faster support for new hypervisor releases.

Many physical backup tools are large, complex systems that attempt to cover a lot of bases – physical and virtual, and often data protection, data management and data archiving, too. Because VM backup is just one part of a much larger system, it can be quite some time before the physical backup vendors support new hypervisor releases… and longer still before customers are able to upgrade their production deployments of these complex systems.

When new hypervisor support is finally available, it tends to be simple "checkbox" compatibility.

Veeam, on the other hand, is specifically *Built for Virtualization*. As a result, Veeam typically provides new hypervisor support months before the physical backup vendors. For example:

October 2009	Veeam was the first to support VADP with the release of Veeam Backup & Replication 4.0.	Some physical backup vendors took more than a year to add support for VADP.
November 2012	Veeam was the first to support both vSphere 5.1 and Windows Server 2012 Hyper-V, including the new VHDX virtual hard disk format and VMs on SMB3.	Some physical backup vendors claimed support for Windows Server 2012 Hyper-V, but didn't support VHDX or SMB3.

Veeam Backup & Replication also has fewer moving parts, so it's much easier for customers to upgrade. As a result, Veeam customers are often on the latest versions of VMware and Hyper-V a year or more before their peers who are encumbered by their organizations' decision to apply old tools to the new (and fundamentally different) environment.

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3. Instant VM Recovery

Veeam's vPower technology runs a VM directly from a compressed and deduplicated backup file on regular backup storage. This patent-pending, groundbreaking technology eliminates the need to extract the backup and copy it to production storage – you simply start the VM from the backup (that's why it's called instant). So if a VM goes down, you can restart it on any host in a matter of minutes. Users can keep working why you troubleshoot the problem.

Back in a snap

In an independent lab test commissioned by Veeam, it took under 1.88 minutes to do an instant recovery of a 200GB VMware VM, compared to 2.4 hours for standard VM recovery from an image-based backup on disk using a physical backup tool. That's 77 times faster!

Furthermore, the time to do an instant recovery with Veeam remained under 2 minutes, *even as the size of the VM increased*.

An instant recovery of a 16GB Hyper-V VM took just 7 seconds, compared to 9.95 minutes for standard VM recovery from an image-based backup. That's 85 times faster! And once again, the time to do an instant recovery remained essentially unchanged even as the size of the VM increased.

Back to normal

Veeam Instant VM Recovery is like a "temporary spare" for your VMs. To complete the recovery, Veeam will migrate the VM running from the backup to production storage for you, using the best method available (VMware Storage vMotion, Hyper-V Live Migration, SCVMM migration, Veeam migration, etc.). Depending on the method, full recovery can happen in the background, with no interruption in service or impact on users.

Not even close

Physical backup tools have no equivalent instant recovery capability. They may try to expedite recovery with "live recovery" of data volumes or "CBT restore", but they still operate within the conventional "restore then restart" paradigm. Furthermore, CBT restore:

! Doesn't work in many common recovery scenarios, including VM deletion and loss of a complete LUN.

! Introduces additional risks due to not restoring blocks that are "known" to vSphere as unmodified, but that might have been corrupted on storage by the incident precipitating the restore.

! Doesn't support Hyper-V.

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4. Instant file-level recovery

Unlike traditional file-based backups, image-based backups allow for quick recovery of an entire VM on any host, without having to rebuild the system from scratch. But recovery of individual guest files can be a challenge.

Given that file-level recoveries are the most common recovery scenario – often occurring on a daily basis – this challenge must be overcome in order for organizations to adopt image-based backups.

First to market

From the very beginning, Veeam has provided file-level recovery from image-based backups. In fact, Veeam invented Instant File-Level Recovery (IFLR), which allows IT admins to restore guest files directly from a compressed and deduplicated image-based backup, without having to restore the entire VM first (that's why it's called "instant").

IFLR was initially available for Windows and then for Linux, Unix and Mac file systems using patent-pending Veeam technology based on an IFLR helper appliance.

Extending the lead

With support for 17 different file systems, Veeam already holds a substantial lead over other backup tools. And with vPower, Veeam has extended its lead, with the ability to restore individual files from any guest OS and file system, without restoring or starting up the VM at the desired restore point.

1-Click File Restore

Veeam further extended its lead with 1-Click File Restore, which allows organizations to securely delegate Windows file restores to help desk operators. 1-Click File Restore:

v Leverages guest interaction APIs

v Requires no agents in VMs

v Requires no additional permissions for help desk operators

v Can be limited to direct restores only (so operators never have access to sensitive files)

v Can be limited to specified file types

Good enough?

Some physical backup tools offer file-level recovery for Windows (and in some cases, Linux) VMs, but special indexing of each backup is typically required.

! If you forget to enable the special indexing, file-level recovery is not possible.

! If your environment can't tolerate the additional processing, file-level recovery is not possible.

! File-level recovery for many OSs and file systems is not possible at all.

! In-place restores, if available, typically require agents in VMs.

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5. Instant application-item recovery

Veeam's vPower technology enables recovery of individual objects from any virtualized application, on any OS, without restoring the entire VM first (that's why it's called instant). For example, you can recover:

v Individual items from your corporate email system

v Individual rows and tables from an Oracle database running on Solaris

v Individual customer records from a Unix-based CRM system

We call it U-AIR®, or Universal Application-Item Recovery. It's an innovative, patent-pending solution to the age-old problem of what to do when users accidentally delete important emails or scripts incorrectly update records.

How it works

The idea is actually quite simple: Since it's easy to start up a VM on the fly, what if you could run the application from the disk-based backup (in an isolated environment, of course) and retrieve the items you need? That way, you could perform granular recovery for any virtualized application, any time, without special agents or backups.

It sounds simple enough—it is easy to create VMs, and it's relatively straightforward to configure an isolated virtual network. But what about the time it takes to provision storage and extract the backup? And what happens if the VM running from the backup interferes with the VM running in production?

This is where Veeam takes a deceptively simple concept and turns it into a powerful new reality.

Veeam's vPower technology runs a VM directly from a compressed and deduplicated backup file. There's no need to provision storage or extract the backup – you simply run the VM directly from the backup file on regular backup storage, but without making any changes to the backup file itself.

And Veeam's Virtual Lab technology creates an isolated environment where backup VMs can run without risk of interfering with the production environment. Veeam even provides a proxy appliance to make it easy to copy items from the isolated environment to your production environment.

What it means for you

U-AIR addresses the limitations of existing object-level recovery methods. U-AIR is:

- **Inexpensive:** doesn't require agents, additional backups or additional software tools.
- **Universal:** works with any virtualized application and the application's native management tools and permissions.
- **Durable:** not tied to application internals so is easy to maintain and works seamlessly with new application patches and releases.

The alternative

Some physical backup tools offer object-level recovery, but:

- Object-level recovery is available for only a few specific applications.
- Special agents are required. In many cases, separately created backups or special metadata collection is also required.
- The additional backup processing can be quite resource-intensive and/or slow, so customers often limit their use of object-level backup and recovery – for example, only do granular backups of executives' mailboxes.
- If the special processing fails for any reason (even if the backup job reports success), you cannot recover application items at all.

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6. Automated recovery verification

Of course, you can't do any sort of recovery – instant or otherwise – if your backup is bad. But how do you know if your backup is bad? Even if a backup job completes successfully and the backup file passes its integrity check, you might not be able to recover from the backup. For example:

! The system you're backing up may be in an unbootable state – for example, a critical configuration file or registry key might have been deleted or corrupted.

! There might be installation, update or system reconfiguration tasks pending reboot.

! A hot backup might have captured the system or application data in an inconsistent state.

The only way to be sure that you can recover from a backup is to do a test restore. All the backup vendors know this. But testing every backup is simply not possible… unless you have Veeam.

Veeam SureBackup

Veeam SureBackup allows you to verify the recoverability of your backups – not just a few selected backups, but every backup, of every VM, every time.

This patent-pending technology:

v Automates the recovery verification process

v Uses available resources in the existing production or test environment

v Does not affect your backup window

During recovery verification, SureBackup:

v Creates a VM in an isolated Virtual Lab (which Veeam automatically creates and then removes for you).

v Runs the VM directly from the backup file using vPower.

v Starts the VM, boots the OS and confirms that applications inside the VM are running normally.

v Can even test a group of dependent VMs (such as a DNS server, domain controller and Exchange server)

Virtual Lab for Replicas

Not only can you verify recoverability of your backups with SureBackup, with Virtual Lab for Replicas, Veeam has extended its virtual lab capabilities beyond the local backup environment and to disaster recovery sites as well. This powerful capability allows you to:

v Perform automated replica verification to ensure that your replicas are available if needed

v Create isolated test environments that are exact copies of your production environment, but that use DR site resources – not production resources – so that you can try out software updates, OS patches, or other changes before applying – and without impacting – your production environment

How many other backup solutions increase the value of your existing idle resources by putting them to productive work?

Don't settle for less

You no longer have to settle for backups that "might work" or "should work"— instead, you can rest easy knowing that your backups – whether local or remote – actually do work and are available when needed.

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7. Built-in source-side compression & deduplication

While many backup vendors offer various ways to reduce your growing data footprint, most of the time these solutions require agents and/or do not work as well in virtual environments.

Veeam offers built-in source-side compression & deduplication that was specifically designed with virtual servers in mind. With Veeam, you don't have to treat your virtual servers as if they were physical servers by installing an agent in each of them in order to deduplicate your data.

Veeam's multi-pronged approach to reduce the size of backups (as well as network bandwidth consumption) includes the following:

Deduplication	Many VMs have the same operating system and/or applications installed, making image-based backups ideal candidates for deduplication. That's why Veeam included deduplication from the beginning – in fact, Veeam was the first vendor to implement deduplication in a VM backup product. Veeam's inline source-side, block-level deduplication typically results in a 10x reduction in network traffic and backup storage consumption. And it's included at no charge.
Compression	To further reduce backup size, Veeam can also compress backup files.
Whitespace removal	VM disks often contain empty blocks, and Veeam excludes these from backups to save space.
Swap file exclusion	Data contained in swap files isn't necessary when recovering VMs or VM data, so Veeam excludes them from backups.
Single backup	With Veeam, you only ever need one backup – regardless of what kind of recovery operation you might need to perform. Full VM recovery, granular application-item recovery and instant file-level recovery are all available from the same image-based backup for any virtualized application and any guest OS.
"Forever incremental" backups	Synthetic full backups eliminate the need for periodically running and transferring the data of complete full backups by creating new, synthetic, full backups from incremental backups. This "forever incremental" approach to backup is both proven and desirable because it reduces load on the production environment. In fact, forever incremental is the only way to protect very large VMs that would otherwise take the better part of a day – or even longer – to back up (even with the fastest and most efficient backup tool). Likewise, forever incremental is essential when backing up offsite over a WAN. Synthetic full backup can also reduce backup storage requirements by 60 percent or more. For example, say you have a 100GB VM and your organization's policy requires you to keep 30 days of backups on disk. Assuming 5 percent of the data changes daily, if you were to take weekly full backups and daily incrementals, you would need 655GB of backup storage. But with a single synthetic full backup and reverse incrementals, you need only 250GB of backup storage – a savings of 62 percent.

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8. Simple off-site backups

When it comes to protecting your data, many customers struggle with maintaining a proper disaster recovery site. Often, it can be costly and time-consuming to get backups offsite.

To help mitigate this impact, Veeam Backup & Replication offers some key features to make it faster, easier, and more cost-effective to get your backups offsite.

Built-in WAN Acceleration

One way customers often attempt to speed up their offsite backups is through a WAN accelerator. While general purpose WAN accelerators can do an excellent job, however, by definition they have limited content awareness and are not able to take advantage of all of the traffic reduction capabilities that a purpose-built WAN accelerator can.

For this reason, Veeam Backup & Replication includes built-in WAN acceleration capabilities with functionality specifically tuned for Veeam data transfers across the WAN. What this means is that when you need to copy your backups to an offsite location, Veeam can determine what data blocks are already there and as a result send less data across the WAN connection. Veeam's Built-in WAN Acceleration includes global caching, variable length data fingerprinting, traffic compression, and more – and it's up to 50x faster than a standard file copy.

Backup Copy jobs

Built-in WAN Acceleration can be used with Veeam's Backup Copy jobs feature. This feature provides an automated way to copy VMs to either local or remote storage locations. It also enables proper backup and retention policies (e.g., grandfather/father/son) to help meet long-term retention requirements. Together, Built-in WAN Acceleration with Backup Copy jobs provide an easier, simpler way to get your backups off-site.

With the combination of Built-in WAN Acceleration and Backup Copy jobs, along with the ability to send your backups offsite to disk, cloud, or tape, Veeam Backup & Replication offers a flexible, simple way to more easily and cost effectively get your backups off-site.

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9. Storage agnostic

Veeam is storage-agnostic, so you can use it with any mix of production and backup storage across data centers, remote offices and disaster recovery (DR) sites. Customers appreciate this flexibility, which:

- Avoids vendor lock-in
- Optimizes storage spend
- Makes it easy to integrate acquired companies
- Allows old storage to have a new life as backup storage

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10. Easy to deploy and configure

With a product as powerful as Veeam Backup & Replication, it must be expensive and time consuming to install, right? After all, the typical legacy physical backup solution requires weeks to deploy, even with a team of expensive consultants, and often just to upgrade from one version to the next!

But the power and elegance of Veeam Backup & Replication extends beyond its feature set such that installation and deployment can occur in a fraction of the time and expense. With Veeam Backup & Replication v7, individual IT administrators reported 60 minutes to download, install, configure, and complete a full backup of 25 VMs!

Compare that to legacy agent-based physical backup solutions.

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Summary

Physical backup tools are typically considered for VM backup by organizations already using those tools. While it might be convenient to back up everything – both physical and virtual – with one tool, what is the cost of doing so? What do you lose by choosing "single solution" over best-of-breed?

As this document illustrates, you lose a lot.

Virtualization offers the opportunity to significantly enhance data protection and reduce costs, but you need the right tool to turn the opportunity into reality. Already, Veeam has made powerful, easy-to-use and affordable Modern Data Protection a reality for so many customers. Isn't it time you made the move to Modern Data Protection?