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Solving the Challenges of Virtual Machine Backups with Acronis Backup & Recovery 10

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Introduction

Server backup, restore and disaster recovery are critical operations for any IT team. As environments continue to become more diverse, the complexity of managing these environments adds more challenges to the process. Almost every company is deploying one, if not multiple, virtualization technologies and in most cases companies retain some servers in physical configurations. This can lead to a very diverse and puzzling combination of backup products, strategies, management tools and processes.

Acronis® Backup & Recovery™ 10 provides a full range of backup configurations and options for Windows and Linux servers and various virtual machines, all manageable from a single management console.

Backup Approaches for Virtual Machines (VMs)

There are four distinct ways to approach backups on virtual machines (VMs), each has its advantages and disadvantages. The following section details how Acronis® Backup & Recovery™ 10 provides new and expanded choices for meeting backup and recovery requirements.

1: Backup Agent in Virtualized Server

The most traditional and currently most common way to backup virtual servers is to load a backup agent in each and every virtual environment. The advantages of this approach are straightforward, the process is similar to backup on physical servers and is easy and familiar for administrators to deploy and manage. Another benefit of this approach is retention of all backup solution features and functionality. Years of development and advancement are in backup solutions and using native backup technology provides a much more feature-rich and flexible management environment for the administrators. One exceptionally important feature is deduplication. Deduplication greatly minimizes the amount of storage for backups and contains the overall cost of ownership for data protection.

The disadvantage is the total cost. Backup agents in every virtual environment is costly from a licensing standpoint; virtualized machines seem to multiple more easily than physical machines and the agent licensing increases quickly. This approach is also costly in server performance; the overhead in processing during a backup operation is high. When multiple virtual machines are performing resource intensive operations such as backups at the same time on the same server processing can grind to a halt. It is also costly from a management perspective. Without overarching tools, it's necessary to manage agents as separate machines.

Agents in Virtual Environment	
Same process physical servers	Yes
Virtualization support	Most support several
Single management console physical and virtual servers	Depends on backup solution
Backup agent license cost	**High**
File level & backup features	Yes
Overall manageability	**Difficult**
Deduplication	Depends on backup solution
Backup storage used	Lower than snapshot
Backup & DR capabilities	Depends on solution
Server Performance	**Significant Impact**

2: Virtual Machine Snapshots

Some virtual machine technologies offer snapshot technology. The snapshot technology makes a complete copy of a virtualized server or virtual machine (VM) at a specific point in time, similar to a Windows restore point. The file is basically a replication of the initial VM, and it is not compressed or optimized in any way for storage. The benefit of this approach is that it's a complete image for fast restoration, perfect in a disaster recovery situation.

The tools provided with snapshot technology are rudimentary, in some case limited to command line. Snapshots on different devices may have different requirements and recovery implications, so they may be difficult to manage as well. Even the process of accepting new snapshots can be troublesome; the process merges images and can require significant resources to accomplish the task. Another disadvantage is that although a snapshot process may be relatively short, it does render the source inaccessible, so the server is subjected to some amount of downtime. Also, snapshots are stored locally on the same physical server, if that server fails, recovery is difficult.

Snapshots are an 'all or nothing' approach to data protection. Snapshots are limited on single file capabilities. It is impractical for the backup tasks that may be required on a small or day to day basis. Many organizations pair the snapshots with a traditional backup agent to get adequate data protection. This multi-vendor approach is effective; however, it's an added layer of process. Even if an organization is currently taking disaster recovery images on physical servers, they cannot use the same software for virtual machines, so now potentially three different solutions (or more) are used for data protection.

Snapshots	
Same process physical servers	No
Virtualization supported	Vendor- specific
Single management console physical and virtual servers	No
Backup agent license cost	n/a
File level & backup features	No
Overall manageability	Difficult
Deduplication	No
Backup storage used	High
Backup & DR capabilities	DR only
Server Performance	Limited window of downtime

3: VMware Consolidated Backup

VMware Consolidated Backup (VCB) is a management tool specific to VMware technology. It attempts to address the challenges seen with the common approach of deploying backup agents in virtual environments. VCB offloads the backup processing onto a separate server. VCB uses the centralized backup proxy server that houses third party backup software. Offloading the processing frees up the server resources and minimizes the impact of the backup.

A primary advantage of VCB is minimizing the performance impact on servers while they undergo a backup procedure. VCB also eases high backup agent costs as backup vendors have provided specialized pricing to accommodate the fast growth seen with VMs. It also provides a more cohesive approach to managing snapshots and backups, making data protection on both the file level and at a disaster recovery level easier to manage.

The disadvantages of this approach include the complexity of the solution. It adds an additional layer of complexity to the backup process and there is a substantial learning curve, especially on larger deployments and more diverse environments. Administrators could potentially be using the same backup agent for physical and virtual servers, but VCB only manages VMware, requiring another process for other virtualization technologies. File level backup is only available with Windows VMs, only image level backups are available with other operating systems, requiring different processes for Windows and Linux VMs.

VCB	
Same process physical servers	No
Virtualization supported	VMware
Single management console physical and virtual servers	No
Backup agent license cost	Improved
File level & backup features	Yes
Overall manageability	Improved
Deduplication	Depends on backup solution
Backup storage used	Improved
Backup & DR capabilities	Both
Server Performance	Improved, limited downtime window

4: Third Party Alternatives

Vendors such as esXpress, PlateSpin, Vizioncore and others have external solutions that leverage the VMware API to provide additional options for both backup and snapshots for disaster recovery. Some of these solutions may be managed centrally from VCB, while others utilize the background processing and server offloading capabilities. Deploying these solutions may add an additional management tool into the process. While some of the solutions provide capabilities on physical and VMs, they are often inconsistent.

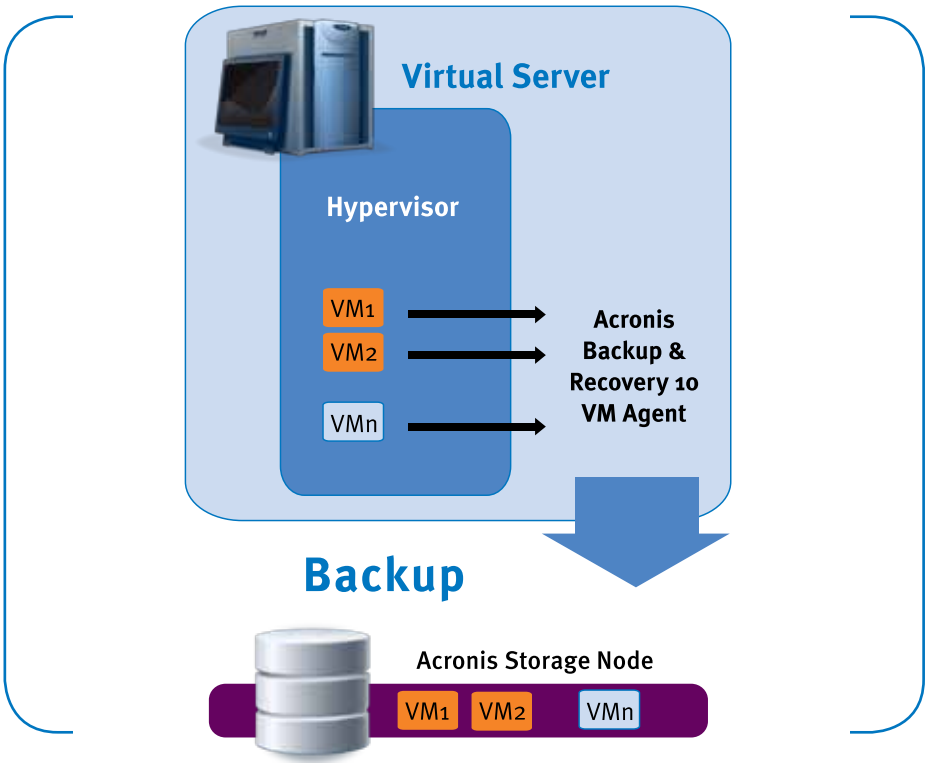
For example, providing both backup and system images on virtual machines and only images on physical servers. The majority of the tools provide an alternative to using VMware for snapshots, with limited additional backup functionality or capability.

The main advantages of these solutions are their ease of use and compatibility with VMware solutions. Many of the solutions have fuller feature sets, such as support for incremental and differential backups. None of the solutions have a complete offering, covering all environments well and other virtualization technologies. In the end, while these solutions may solve some the specific issues with VCB, they don't provide the complete data protection coverage and often add in additional management complexity.

Third Party Alternatives	
Same process physical servers	Depends on solution
Virtualization supported	VMware
Single management console physical and virtual servers	No
Backup agent license cost	Improved
File level & backup features	Depends on solution
Overall manageability	Tools easier to use, but additional tools required
Deduplication	Depends on solution
Backup storage used	Depends on solution
Backup & DR capabilities	Depends on solution
Server Performance	Improved, limited downtime window

Acronis® Backup & Recovery™ 10 - Backup and Recovery for Virtualized Environments

Every deployment is different, and the approach for managing backups varies widely depending on internal goals and requirements. Acronis Backup & Recovery 10 can be deployed to meet your internal goals. An Acronis backup agent can be loaded into each virtual environment. For this straight forward approach, Acronis supports many virtualization technologies including VMware, Microsoft, Citrix and Parallels. Acronis is also fully integrated with VCB. In Acronis Backup & Recovery 10, the deployment choices expand; Acronis now offers a complete backup and recovery framework for virtualized and physical servers. Licensing also becomes simpler. With Acronis Backup & Recovery 10 Advanced Server Virtual Edition, the Acronis Virtual Machine agent can support an unlimited number of VMs on a single server, reducing the backup licensing costs.



The new Acronis agent-less configuration, available in Acronis Backup & Recover 10 Advanced Server Virtual Edition, is depicted to the right in the diagram. For VMware, one Acronis agent is loaded in its own virtual environment on a server with several virtual environments. For Microsoft Hyper-V, the single agent is installed on the physical server. In both cases, the single agent executes and manages the backup process for all virtual machines on that server.

Acronis Agent-less VM Backup	
Same process physical servers	Yes
Virtualization supported	VMware, Microsoft
Single management console physical and virtual servers	Yes
Backup agent license cost	Improved
File level & backup features	Yes
Overall manageability	Very Easy
Deduplication	Yes
Backup storage used	Smaller, especially if using dedupe
Backup & DR capabilities	Both
Server Performance	Greatly Improved

The backup process itself does not affect the performance of the VMs. The agent takes a temporary snapshot of the virtual machine and stores it on the Acronis storage node. The backup is performed using that snapshot as the data source. Acronis replaces VCB in this configuration; it manages and offloads the processing to minimize the performance impact on a server. The key backup capabilities and enhancements are retained; features including incremental, differential and deduplication are available in this configuration.

There are many benefits to this approach. Overall, Acronis provides the most consistent and manageable solution for mixed VM and physical server environments. All physical and virtual servers can be managed using the same management console. The management console itself was designed for ease of use, most administrators learn immediately or with minimal training.

VCB is not required so the backup process is completely consistent between these of nodes. Capabilities including grouping and policies also apply to all environments and behave the same across every node. Groups of VMs may be created so that grouped machines can be managed holistically. As with physical server groups, policies defining backup plans can be applied to those groups. For example, it is possible to set up a policy that backs up all disks, and apply that to both physical and virtual machines. Acronis Backup & Recovery 10 is the only backup solution that provides that consistent manageability across nodes. The archive format is the same for both physical and virtual machines. This allows seamless operations between mixed physical and virtual environments- backup a physical machine and restore it as a virtual machine.

The key features of the backup solution are retained. Acronis provides a full range of capability. The incremental and deduplication technologies help control the requirements for backup storage. Acronis Backup & Recovery 10 is the only backup and recovery solution for VMs that retains the ability to manage on a policy basis. The source data for the backups may be designated in one of many ways: complete VMs, a group of VMs or selected volumes in a VM.

The backup itself is a regular Acronis compressed backup file. The backup can be stored as a full image backup, an incremental or differential backup.

The recovery options with Acronis Backup & Restore 10 are very extensive. A complete VM, volume or file can be restored. It is also possible to restore a virtual machine from an archive, this may be also be completed on a physical server, without concern to the hardware configuration. The functionality goes both ways, virtual machines may also be restored on physical servers.

Backup Source	
	Complete VMs
	Single VM or VM Group
	Host Volumes/folders/files (Hyper-V)
Recovery	
	Complete VMs
	VM Volume
	File level
	I2V (create VM from archive)
	P2V (physical to virtual)
	Host volumes/folders/files (Hyper-V)

Customer Scenario

A large real estate company has a mixed environment of servers and backup and recovery methods. The administrative team is small, they haven't had the time to implement VCB for VMware. They see an increasing internal trend of deploying Hyper-V environments so they are looking for a solution that can manage both types of environments.

Challenge:

Find a single backup solution to meet the requirements of this mixed environment with one consistent process.

Physical Servers	Backup Process
11 Windows	Backup Agents on physical servers
3 Linux	Managed as one group, with one overriding backup plan policy

VMs	Backup Process
VMware ESX: 5 Servers with 12 Windows and 8 Linux VMs	Backup Agents Deployed in Each VM, same vendor as physical backup agents
Microsoft Hyper-V: 3 Hyper-V servers each with 4 VMs	Managed as 32 separate machines, deploying both virtual machine snapshots and regular incremental backups using three different solutions

Solution: Acronis® Backup & Recovery™ 10

The real estate company deployed Acronis Backup & Recovery 10. They loaded the backup agents on the physical servers and deployed the agent-less backup configuration on the virtualized machines. The system administrator grouped all of the Windows and Linux servers and all of the VMs. A policy was created for a system-wide backup plan that was applied to all groups. Now all backups are created consistently system wide and manageable from a single console. Hardware becomes irrelevant as all VMs and physical machines may now interchangeably be restored from archive. The time to manage the environments and errors in backup are greatly reduced as processes are streamlined. The real estate company also has massive storage savings as they deploy deduplication on their weekly images, reducing storage requirements over 90%.

Conclusion

There are many different ways to configure and approach backups for virtual machines. Each approach has its pros and cons, although after many implementations most organizations seek a way to minimize management complexity between physical and virtual machines, retain backup capabilities and standardize on procedures and tools used for deployment. Today the most complete solution covering physical and VMs is Acronis Backup & Recovery 10. The Acronis solution retains backup functionality, while offering a consistent approach and management console across physical and virtual machines from different vendors. Acronis Backup & Recovery 10 is the only solution that has the management and process consistency to the group and policy level of backup management. The same archive format for both physical and virtual machines allows unlimited flexibility for restoration in a mixed physical/virtual environment. Acronis Backup & Recovery 10 provides the most comprehensive and flexible backup solution for mixed environments.

More Information

Please take advantage of the many available resources for Acronis® Backup & Recovery™ 10:

- Try out a test drive of Acronis® Backup & Recovery™ 10 at http://www.acronis.com/enterprise/download/backup-recovery/advanced-server/
- Visit the Acronis website for more information on deduplication and Acronis® Backup & Recovery™ 10. http://www.acronis.com/backup-recovery/
- For more information, please contact your reseller or send an email to sales@acronis.com.

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