

Advancing VMware-based Data Resilience

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Building Data Resilience into VMware

Backup and recovery of IT systems, applications, and data has always been a core IT requirement for enterprises of all sizes. As a result, enterprises already have established backup and recovery processes. While storage administrators may not be happy with their ability to backup all data within the enterprise, functional processes are in place. Enter VMware.

Backup and recovery of physical servers and their associated data stores can be reasonably straightforward when compared to delivering the same level of protection to virtualized servers. Implementing VMware forces storage administrators to at least modify these processes and in many cases, to do things in new ways in order to extend the data protection umbrella to virtualized servers.

Not only is there the requirement to backup an entire virtualized server, one also has to address backup and restore objectives—recovery time objectives (RTO) and recovery point objectives (RPO)—for each individual virtual machine (VM) and/or application running within each VM. The ease and speed at which new VMs can be deployed can quickly add complexity and cost to protecting mixed physical and virtual server environments. The importance of data resilience for virtualized apps is increasing as more business important (tier 2) and mission critical apps (tier 1) are virtualized.

Over the last few years, both VMware and a growing list of storage hardware and software vendors have stepped forward to address the rising cost and complexity introduced by implementing VMware into the data protection and recovery functions. To its credit, VMware understood early on that it had to deliver help or risk alienating IT administrators, application owners and end users alike. For backup and recovery assistance, it began by delivering the VMware Virtual Consolidated Backup (VCB) framework that worked with established backup and recovery solution to provide a centralized data protection environment for VMware-hosted applications and data. However, while VCB was a good first step, VMware went a step farther with the introduction of VMware vStorage APIs for Data Protection (VADP).

VMware Data Protection and Recovery 2.0 (VADP)

When VMware delivered VADP, VMware administrators could enable their backup and recovery solutions to perform centralized, LAN-free backup of vSphere VMs. It also provided the ability for storage vendors to more deeply integrate their data protection solutions with their VMware environments.

With VADP, no backup processing within VM guests is required as there was with VCB, nor is there the need on the part of the backup solution vendor to deploy host-based agents, or is there the requirement to download and install additional VMware software. VADP supports a single-step, source to target, copy process—no proxy required. Whereas VCB only supported backup of an entire ESX server, VADP supports incremental VM backups using change block tracking. Incremental and full restoration of VMs is also supported.

VADP is an example of a continuing effort by VMware to develop APIs for the VMware storage environment (vStorage) that enable supporting storage vendors to make VMware storage faster, more efficient, and more manageable. The release of VAAI in vSphere v4.1 can also be seen in this light.¹

VMware vCenter Site Recovery Manager 5

VMware vCenter Site Recovery Manager 5 (SRM 5) includes a newly introduced replication and automatic failback functions. The intent is to provide VMware administrators with simpler and more reliable disaster recovery capabilities.

VMware vSphere Replication

VMware vSphere Replication in SRM is a hypervisor-based data replication function that VMware administrators can use to manage replication at the VM level from the vCenter console. Storage in this environment does not have to be homogeneous (i.e. all from a single vendor). Replication in SRM will also support storage based replication product from VMware partners like HDS. Now VMware administrators will be able to choose the most appropriate replication strategy for a given application or circumstance. However, Evaluator Group continues to believe that, for performance reasons, mid-scale to larger enterprise VMware administrators will opt for storage-based replication. This has historically been the case when storage administrators have been given this choice due to the performance, functionality and resiliency benefits storage-based replication solutions provide.

Fully Automated Failback and Planned Migration

Under SRM 5, VMware administrators can automate a site recovery and migration process. SRM 5 will automatically recover all applications with limited or no manual intervention via a new automatic failback capability that can automatically reverse replication between primary and secondary sites. VMware administrators can automatically failback to the primary site when the disaster condition is resolved. This capability can dramatically improve Recovery Time Objectives (RTO) depending on the environment while greatly reducing or all but eliminating manual intervention and the potential for human error.

SRM 5's Planned Migration function allows VMware administrators to perform an application-consistent migration of VMs to another site by executing a staged shutdown of protected VMs at the primary site, synchronize data between primary and secondary sites, then recover the VM at the secondary site. This capability can be used to automate planned migrations and execute load balancing over geographic distance.

Hitachi Data Protection Solutions for VMware (HDPS)

Hitachi's Data Protection Suite for VMware environments supports VADP. The portfolio, which consists of Hitachi Data Protection Suite (CommVault Simpana) and Symantec NetBackup, integrate backup and

¹ For more information on Hitachi and VAAI see Evaluator Group paper entitled "Storage Performance for Virtualized Tier One Applications", August 2010.

recovery, archiving, and storage resource management tools into a common data protection and archiving platform for VMware environments.

These VADP-enabled products provide:

- Auto-discovery of new VMs
- Data deduplication (when Hitachi arrays are used as backup targets and/or content archival storage)
- Block-level incremental backup
- Restore granularity—server, VM disk (VMDK), file and ability to assign RTOs
- Synchronous and asynchronous local, metro and remote replication

The result is a more efficient, easier to manage, and more fully integrated backup and restore environment for VMware. Both Symantec and CommVault also provide enhanced data protection capabilities for VMware such as enabling enhanced VM load balancing, remote office protection, network bandwidth optimization and recovery.

Beyond Data Protection to Automated Data Recovery

As mentioned, VMware has taken a holistic approach to business continuance and disaster recovery by supporting the integration of its automated application failover and data recovery facility (SRM) with solutions from outside storage vendors. SRM allows vCenter administrators to automate the failover and recovery of virtual machines using data replication features supplied by participating storage vendors including HDS. And with SRM 5, a vCenter administrator can automate a VM recovery by restoring a VM image directly using a supported storage array-based replica without having to coordinate the process with an array-based management console.

The values to IT administrators of vCenter SRM integration with the supporting storage environment are twofold:

1. The number of manual, error-prone tasks associated with VM recovery is greatly reduced if not eliminated.
2. The ability to deliver cost effective disaster recovery and business continuance capabilities across the enterprise by IT administrators is greatly enhanced because the solution leverages functionality built-in to VMware and supporting storage arrays.

Hitachi Storage Replication Adapter, available at no additional charge from VMware, provides management integration of Hitachi TrueCopy, Hitachi TrueCopy Extended Distance, and Hitachi Universal Replicator with SRM such that a vCenter administrator using SRM can manage Hitachi's synchronous and asynchronous data replication solutions between Hitachi storage arrays supporting VMware-based applications. This adapter is offered for Hitachi VSP and AMS 2000 Series. The functionality delivered in SRM 5 is presently supported for the synchronous versions of Hitachi Universal Replicator and TrueCopy with the adapter.

As we have previously noted, Hitachi's VSP supports attachment and virtualization of third party arrays. VMware administrators can therefore use the VSP to extend the new vCenter 5 data resilience features to these arrays, even if those attached arrays don't support APIs like VADP natively.

Conclusion

We fully expect that VMware will continue to develop and refine its support for storage-based data resilience capabilities and to help storage and software vendors partners like HDS to add their own value to the protection and manageability of the VMware environment. By supporting these new capabilities in vSphere and vCenter, Hitachi has so far demonstrated proficiency in integrating its storage-based value-add services with VMware facilities as well as those of its partners. Hitachi has also made it clear it is committed to continue building on its nearly decade-long alliance with VMware.

We therefore expect that Hitachi will continue to integrate their solutions with management platforms like vCenter, and develop unique VMware-centric solutions as a result of their partnership. We note that integration of SRM 5 functionality with Hitachi True Copy and Universal Replicator offers VMware administrators the ability to improve and automate their data resilience capabilities by combining the strengths of both product sets.

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