Business white paper

HP Data Protector software

Guide to virtual server protection

Contents

Today's virtual server backup challenges

"We can't lose more than 30 minutes worth of our most critical data. So we use HP Data Protector to automate the copying of our critical production data and logs on our HP [HP EVA P6000] systems every half hour."

– Tone Kavcic, Head of IT, Iskratel Group
Iskratel develops technology solutions for telecommunication providers, and uses HP Data Protector to back up and restore more than 150 physical and virtual servers

One of the biggest information management challenges is meeting increasingly stringent service-level agreements (SLAs) in virtual environments

How do you manage growth of virtual server environments while maintaining recovery objectives?

Tiered recovery requirements
For many applications, acceptable downtime is now measured in terms of seconds—not minutes. But not all data needs the same level of protection. As a result, IT organizations are applying tiered data management strategies to their virtual servers, and utilizing different backup and recovery methods for different classes of data. To meet increasingly stringent service-level agreements, IT staff must be able to apply a variety of recovery techniques across virtual servers—from single-item recovery to advanced snapshot functionality.

Multiple tools
Some organizations are leveraging virtualization-specific backup tools to protect virtual environments. Dealing with multiple tools to protect physical and virtual environments leads to complexity, frustration and inefficient use of IT staff's time.

Virtual server sprawl
Enterprise organizations are experiencing "virtualserver sprawl", as the creation and movement of virtualmachines has become fast and simple—especially in VMware environments. The VMware administrator may not be in communication with the backup administratorto make sure that all data is protected in such a dynamic environment.

Centralized management
In addition, many organizations are deploying more than one hypervisor to suit their needs. VMware is often deployed in the data center, while Microsoft® Hyper-V is often seen in remote or branch office (ROBO) environments. Citrix XenServer is also seen in the enterprise, and Citrix is driving the next virtualization wave—desktop virtualization. The ability to manage backup and recovery operations centrally for all hypervisors is critical to meeting recovery objectives.

Performance
Server performance and application performance can be impacted when virtual machines compete for host-server resources during the backup process. In mission-critical environments, where IT staff are typically running 10 to 20 virtual machines in a physical server, it's essential to minimize the performance impact of virtual server backup. While some hypervisors have addressed this issue through the introduction of new applications and tools, it remains an issue in some virtual environments. One of the biggest information management challenges is meeting increasingly stringent service-level agreements (SLAs) in virtual environments.

Cloud services
IT organizations are looking to enhance their virtual environment to deliver self-service catalogs of infrastructure and application services to their users. In order to fully leverage the benefits of self-service deployment strategy they need to ensure data protection is automatically deployed as part of the service.

Comprehensive virtual environment protection with HP Data Protector

HP Data Protector software backs up and restores any virtual server across a wide variety of platforms and hardware, and simplifies physical and virtual server backup from one easy-to-use interface.

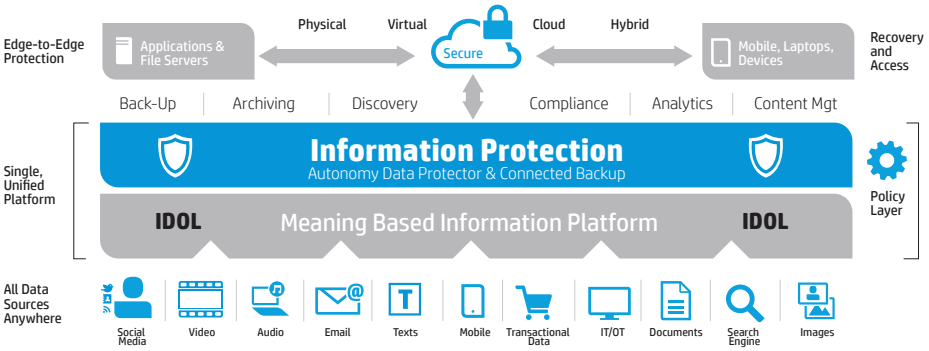

Figure 1: Meaning Based Information Protection powered by Autonomy's IDOL technology.

Together with HP Storage, Data Protector offers a powerful and unique data protection solution for VMware and Microsoft Hyper-V environments in particular. Data Protector delivers advanced snapshot-based functionality with integrated application protection, including fully automated down-to-the-second recovery, without scripting.

The HP Data Protector Zero Downtime Backup (ZDB) agent automates the creation and management of snapshots on HP and non-HP disk arrays to protect virtual machines. Backup is performed on the snapshots—not the production environment—without impact to the application or virtual machine. Snapshot-based backup enables IT staff to eliminate the backup window and protect virtual machines as often as they like—any time of day or night. This is ideal for critical enterprise applications such as Microsoft Exchange, SQL Server, Oracle, SAP, and others.

In addition, snapshots are maintained on the disk array for use by HP Data Protector Instant Recovery (IR). Together with HP 3PAR StoreServ, HP StoreVirtual, HP EVA P6000 and HP XP P9000 disk arrays, HP Data Protector IR can recover data in mere seconds—automating the entire process to meet even the most demanding recovery-time objectives (RTOs). Unlike other solutions, all of these tasks can be managed from the same, easy-to-use HP Data Protector interface without the need for scripts or other utilities.

HP Data Protector software helps manage the growth of virtual infrastructures while maintaining recovery-point objectives (RPOs) and RTOs through:

- Automated application of backup policies to new virtual machines and databases as they change or come online
- Centralized management of various backup and recovery methods across nearly any hypervisor—including snapshots and replication in VMware vSphere 4.x and vSphere 5, VMware Virtual Infrastructure 3.x, Microsoft Hyper-V, and Citrix Xen environments
- Down-to-the-second recovery of applications in a virtual environment without scripting
- Complete system recovery from physical-to-virtual or virtual-to-physical across dissimilar hardware
- Simplified snapshot support across HP 3PAR StoreServ, HP StoreVirtual, HP EVA P6000 and HP XP P9000 arrays as well as non-HP arrays, including EMC, Network Appliance and others

Simplifying virtual server backup for VMware

VMware protection

HP Data Protector	+ VMware Backup	Recovery
Online agent in virtual machine	Easiest method, but impacts server performance	Application data consistency
VMware vSphere 4.x, 5.x with VADP	Minimal performance impact, offloads processing to backup server	Application data consistency
Data Protector array-based snapshots	No server performance impact	Recover to the second of your choice without scripting Application data consistency

VMware backup methods

All VMware backup and recovery methods can be executed through the Data Protector console, which allows administrators to simplify data protection processes by using one tool regardless of the VMware hypervisor version. HP Data Protector software automates the protection of VMware environments via its one-touch backup policy configuration. With a single click you can select the entire virtual environment and Data Protector will automatically identify and apply your backup policies to new virtual machines as they come online.

HP Data Protector software is tightly integrated with the VMware infrastructure and provides a variety of methods for protecting VMware virtual machines to meet your own unique RPOs, RTOs, and other priorities. It provides support for any VMware hypervisor version and fully integrates with vStorage API for Data Protection(VADP) to backup VMWare environment.

Data Protector supports traditional online backup (agents inside the virtual machine), the VMware VADP in VMware vSphere environments, and array-based snapshots. HP Data Protector also supports legacy VMware Virtual Infrastructure and VMware Consolidated Backup environments from the same console.

HP Data Protector is the first and only enterprise backup and recovery application on the market that delivers fully integrated, native data protection for VMware vCloud Director environments.

With one-touch protection, you can reduce the risk of data loss exposure as business critical backup policies are automatically applied to new virtual machines and vApps within a highly dynamic virtual data center.

Traditional online backup agents inside the virtual machine

Installing an online agent in each virtual machine, just as you would in the physical world, is probably the easiest way to back up VMware servers, simply because it's the method with which backup administrators are most familiar. This approach delivers consistent backups, so data is synched with the application upon restore, as the HP Data Protector backup agent communicates directly with the application.

However, with all the other virtual machines on that physical host competing for resources, server performance can be impacted.

Restoring data from a virtual machine is no different to restoring data from a physical machine. The backup administrator browses for desired objects in the HP Data Protector console and retrieves information through a simple mouse click.

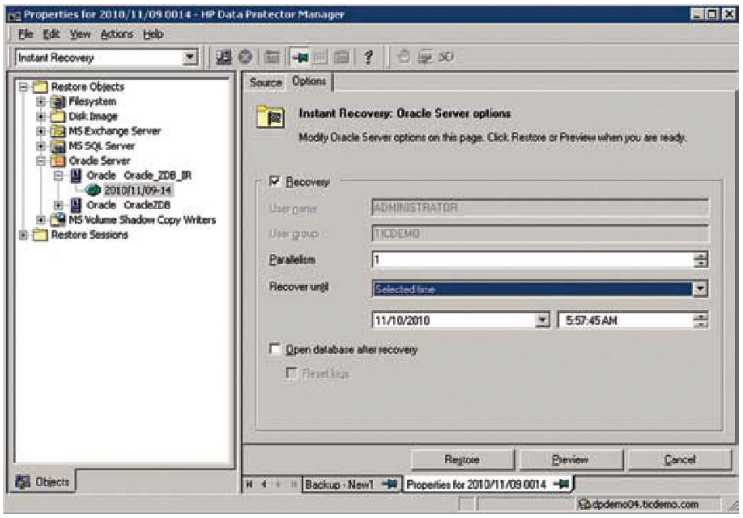

Figure 2: Recover applications and data down-to-the-second. Simply enter the hour, minute, and second into the Data Protector console and automatically synchronize the last snapshot with any data recorded in the application transaction logs.

VMware vStorage API for Data Protection backups
VADP is a framework for vSphere to enable backup products to provide protection for VMware vSphere environment. VADP ensures application-consistent backups of Windows virtual machines and Windows applications through support of Microsoft's Volume Shadow Copy Service (VSS). It also allows backup software to back up and restore incremental, differential, and full-image backups; and VADP resolves the server performance issue by offloading backup from virtual machines. VADP also protects Linux machines. However, since VSS is a Microsoft invention, this capability is not available on Linux Servers. On the Linux servers, this method can only achieve crash consistent backups.

Data Protector automatically discovers VMware virtual machines to make sure that all data is protected, and supports change block tracking in VMware environments. To restore a backup, the administrator browses for the desired object in the HP Data Protector console, and restores with a single mouse click.

Simplify snapshots with Data Protector ZDB
In a VMware environment, HP Data Protector's ZDB agent can dramatically speed recovery times, and virtually eliminate the backup window. With the Data Protector ZDB extension, Data Protector provides snapshot support for both physical and virtual servers on HP and non-HP arrays, including the HP MSA P2000, HP StoreVirtual, HP 3PAR StoreServ, EVA, HP XP P9000, EMC CLARiiON and Network Appliance.

To simplify the protection of virtual servers, Data Protector automatically detects new VMs prior to beginning a backup. With a single click in the console, Data Protector makes sure that the snapshot configuration you've deployed to protect your virtual machines is automatically applied to new virtual machines as they come online. In fact, no matter what backup method you're using, Data Protector automatically detects the hypervisor and, depending on the hypervisor, selects the related backup method.

HP Data Protector ZDB utilizes array-based snapshots to move the processing load off the virtual machines and onto the array, where a copy of the data is created at very high speed. HP Data Protector then performs backup operations on the copy, rather than on the original data. This staged backup process allows you to keep your business applications online 24x7 without impacting server performance. The HP Data Protector ZDB agent is also application-aware, so it provides you with consistent backup in VMware environments where traditional backup methods (an online agent in a VM) or VADP are not being utilized. ZDB allows you to perform backups more frequently than once a night on an unlimited number of virtual machines and, in fact, expands your backup window to all day, every day.

In addition, HP Data Protector maintains snapshots on the disk array for use by HP Data Protector Instant Recovery (IR), which can recover data in mere seconds— automating the entire process to meet even the most demanding RTOs.

All of these tasks can be completed from the same, easyto-use HP Data Protector interface. For more information on HP Data Protector ZDB and HP Data Protector IR, see page 9.

VMware vCloud Director integration

VMware vCloud Director is a software solution that enables organizations to build secure, multi-tenant private clouds by pooling infrastructure resources into virtual data centers and enables users to consume these resources through automated, catalog-based services. HP Data Protector's fully automated, policy driven integration with VMware VCloud Director enables the protection of mission critical applications in a multi-tenant cloud environment. Through this integration, protection services can be automatically deployed through the vCD provisioning process to ensure business application data is fully protected.

Simplifying virtual server backup for Hyper-V

Hyper-V protection
In a Microsoft Hyper-V environment, backup administrators can install the online backup agent in two places: the child partition (virtual machine) and the parent partition (the root partition on which the virtualization stack runs). Both sit logically on top of the hypervisor.

HP Data Protector software leverages this infrastructure to support a variety of methods for protecting Hyper-V virtual servers, all of which can be centrally managed from the HP Data Protector console:

- Traditional online backup agents inside the virtual machine
- Hyper-V server-based snapshots
- Offline backups
- HP Data Protector ZDB (array-based snapshots)
- Instant Recovery Hyper-V backup methods

HP Data Protector + Hyper-V	Backup	Recovery
Online agent in virtual machines	Easiest method but impacts server performance	Application data consistency
Hyper-V server-based snapshot	Impacts server performance; limited point-in-time recovery	Application data consistency
Offline backups	Server and application performance impact	Application data consistency
HP Data Protector ZDB and Instant Recovery	No server performance impact	Application data consistency, and recovery to any point in time

Table 2: Options for protecting Microsoft Hyper-V virtual machines using HP Data Protector software

Hyper-V backup methods

All Hyper-V backup and recovery methods can be executed through the Data Protector console, which allows administrators to simplify data protection processes by using one tool regardless of the hypervisor version. HP Data Protector utilizes auto-discovery to make sure that all virtual servers are protected.

There is tight integration between Microsoft Hyper-V and the Volume Shadow Copy Service (the VSS framework provides application data consistency in a Hyper-V environment). All of these methods can be executed through the HP Data Protector console, which allows administrators to simplify data protection processes by using one tool to protect both physical and virtual servers.

Traditional online backup agents inside the root partition

Administrators install an HP Data Protector online backup agent inside each virtual machine (or child partition) and, while this approach delivers consistent backups, it impacts server performance.

In a Hyper-V environment, restoring data from a virtual machine is very similar to restoring it from a physical machine. The backup administrator browses for the desired objects in the HP Data Protector console and retrieves information with a few simple mouse clicks. By using the in-guest agent for application protection, all advanced DP restore options including down-to-second restore and Microsoft Exchange Availability Group awareness are enabled and can be utilized.

Hyper-V server-based snapshots

Data on child partitions can also be protected by executing sever-based snapshots. In this case, an HP Data Protector agent is installed directly in the parent partition.

Hyper-V provides tight integration with the VSS framework, which enables snapshots to be taken directly from the parent of one or more child partitions.

When the snapshot is complete, HP Data Protector backs up the snapshot image to the desired target. Because of the integration between Hyper-V and the VSS framework, these backups will be application-data consistent. However, this method can still impact performance because all backup operations are being performed on the server.

When restoring server-based snapshots in a Hyper-V environment, the administrator can use HP Data Protector to restore one or more child partitions within a Hyper-V server. If the physical host goes down, you would also need to restore the parent partition, which contains Hyper-V configuration information. Partitions can also be restored to another physical Hyper-V server.

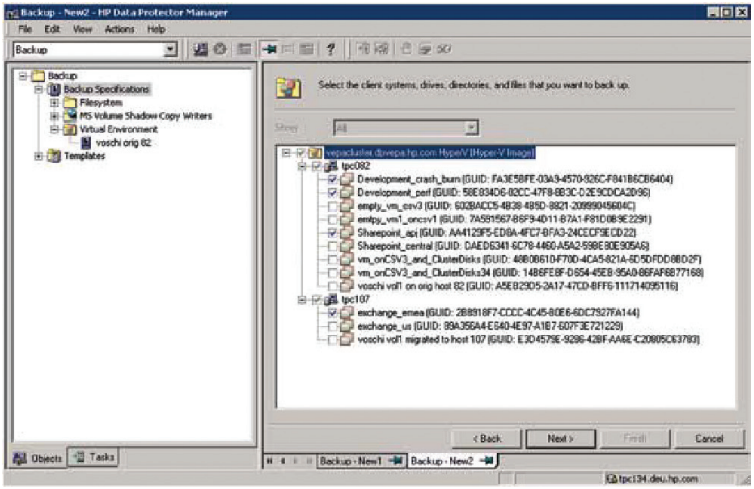

Figure 3: Backing up Hyper-V virtual machines. When selecting a backup specification object in the HP Data Protector console, select which source virtual machines to back up within the Hyper-V server.

Hyper-V only allows restoration of an entire child or parent partition, regardless of whether you're restoring to the same or a different physical server. During a restore, Hyper-V stops the partition being restored (if it's still running), deletes it, and restores the entire partition from the desired backup target. After the restoration, the partition is always offline and needs to be restarted by the backup administrator.

Offline backups

To use the server-based snapshot method, the child partition needs to be online and based on a VSS-aware operating system (OS). If the child partition is offline, or based on a non-VSS-aware OS, the Volume Shadow Copy Requestor component is unavailable. In this case, Hyper-V only allows offline backup. HP Data Protector automatically detects the configuration and, as appropriate, executes a saved state (or offline) backup.

To restore data, you simply use the HP Data Protector console and follow the same restore process described for Hyper-V server-based snapshots.

Maintain performance with HP Data Protector ZDB

All of the above methods consume Hyper-V host resources to run the backup, which impacts server and application performance. In addition, the offline backup method yields only crash-consistent data. HP Data Protector Zero Downtime Backup ZDB is currently the only way to avoid server performance degradation in a Hyper-V environment and recover to the second of your choosing—all from one console.

The concept behind HP Data Protector ZDB is the same for both Hyper-V and VMware. In a Hyper-V environment, you have two options for installing HP Data Protector ZDB. You may install the ZDB agent in the parent partition, which would oversee execution of snapshots on all the child partitions in that server. Or, you may choose to install the agent in one or more child partitions and thus utilize ZDB functionality for specific applications only. As with the server-based snapshot example above, in this case all the child partitions must be running in Microsoft Windows and the applications must be VSS-aware.

In addition, HP Data Protector maintains snapshots on the disk array for use by HP Data Protector IR, which can recover the data in mere seconds—automating the entire process to meet even the most demanding RTOs.

More power with HP Storage

Together with HP Storage and HP 3PAR StoreServ arrays, HP Data Protector software delivers some of the most advanced disk-based data protection capabilities available for physical or virtual servers. And HP Data Protector is the only backup software, which provides such sophisticated integration with HP arrays.

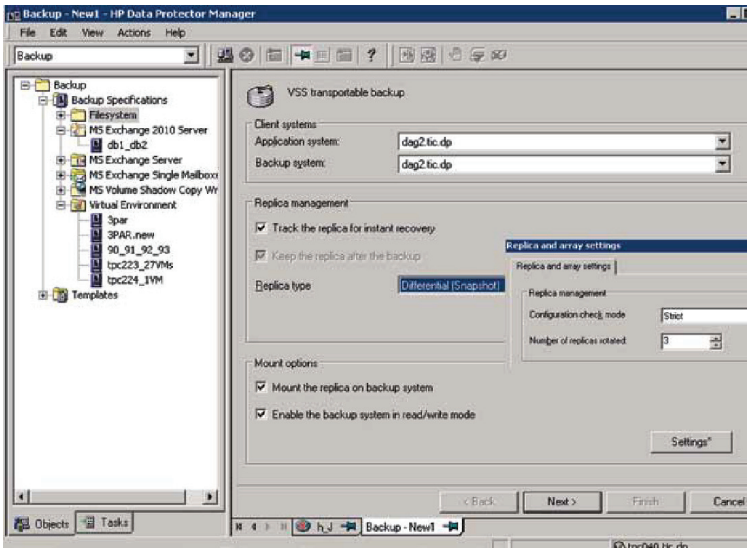

Figure 4: HP Data Protector ZDB reduces server overhead and improves restore time In this screenshot of Data Protector ZDB backup options, the administrator is rotating three hardware copies for instant recovery.

"The combination of HP Continuous Access XP and HP Data Protector gives us the dependable, low-maintenance mirroring and backup we need to protect the information that is at the heart of our operation."

– Gerald Scharding, Chief Technology Officer, National Emergency Operations Center, Switzerland

HP Data Protector ZDB and Instant Recovery

HP Data Protector avoids performance load on the server and VMs by facilitating array-based snapshots, which virtually eliminate backup windows in a virtual environment. Data Protector also automates snapshot management, and instantly retrieves data directly from one of multiple replicas stored on disk at either local or remote sites.

HP Data Protector ZDB performs backup operations on a copy of the data, with the option to duplicate or move backup data to disk. Unlike alternative solutions, HP Data Protector ZDB is a fully automated process with an integrated and easy-to-use console, so no additional scripting is required.

HP Data Protector IR takes this a step further, ensuring information availability during disasters and other potential data-loss scenarios. IR allows you to keep multiple snapshots on disk and automatically retrieves the correct version based on your own individual RPO/RTO needs, allowing you to recover critical data in minutes rather than hours.

HP Data Protector software has the ability to access application transaction logs (where all of the application's transactions are recorded before they've been processed and/or written to the data file) and fill in the data gaps between snapshots. Data Protector then synchronizes the application with the data, and restarts the application to the exact point in time requested by the backup administrator. Unlike most other solutions, HP Data Protector does it all without scripting—which saves valuable time and resources, and avoids the possible errors associated with manual solutions.

Integration with HP 3PAR StoreServ storage systems

Building a converged infrastructure to support cloud and self-service computing models requires a high degree of virtualization that places new demands on storage. With their distinct architectural advantages, thin hardware capabilities, and superior performance, HP 3PAR StoreServ P10000 Storage is purpose-built to meet the demands of highly virtualized environments. HP 3PAR StoreServ P10000 Storage gives enterprises and service providers the agility to respond quickly to changing business needs while maintaining the resiliency that "always-on" businesses demand.

HP Data Protector Zero Downtime Backup and Instant Recovery are both supported with HP 3PAR StoreServ storage systems. Using 3PAR array based snapshots, you can quickly preform all forms of ZDB and Instant Recovery using the HP 3PAR StoreServ Storage Systems VSS hardware provider in combination with the Microsoft Volume Shadow Copy Service technology.

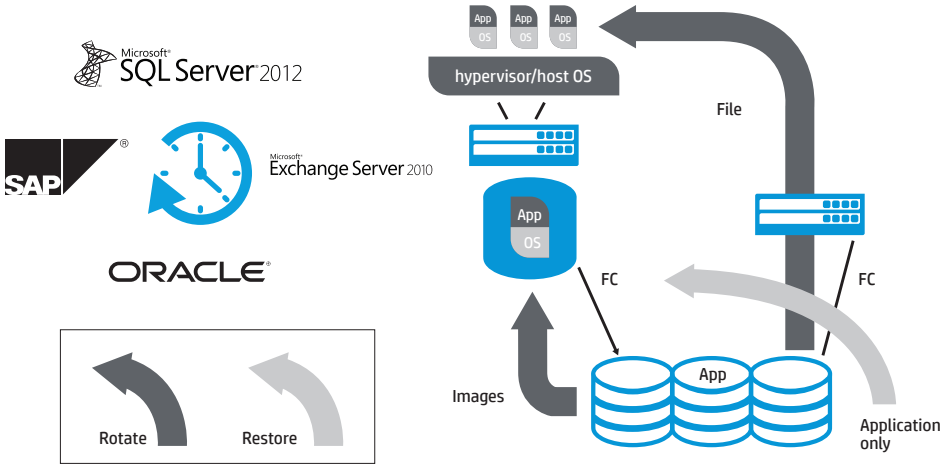

Figure 4: HP Data Protector ZDB reduces server overhead and improves restore time In this screenshot of Data Protector ZDB backup options, the administrator is rotating three hardware copies for instant recovery.

HP Data Protector and 3PAR provide a tightly integrated protection solution for highly virtualized environments with the most demanding expectations. With the added capability of automated protection in VMware vCloud Director environments the combination of Data Protector and 3PAR is the perfect choice for self-service cloud computing models.

Integration with HP EVA P6000 and HP XP P9000 disk arrays

HP Data Protector ZDB and IR are tightly integrated with the HP EVA family and the HP XP P9000 disk array family. In addition, HP Data Protector is fully aligned with the local and remote replication array software, which runs on the arrays (HP Business Copy and HP Continuous Access software).

Business Copy software takes snapshots (replicas) of data to be stored locally on the HP XP P9000 or HP EVA P6000, while HP Continuous Access software enables array-to-array replication for remote protection. HP Data Protector utilizes this functionality to automate the execution, movement, and overall management of snapshots—plus management of physical and virtual backup operations in the rest of your environment—from a single console.

HP Data Protector starts the virtual server backup process at the VM level, which is facilitated through close integration of HP Data Protector agents with VMware and Microsoft Hyper-V solutions. Then backup occurs at the application level as HP Data Protector ZDB initiates HP EVA P6000 or HP XP P9000 array-based snapshots (or replicas) of application data. HP Data Protector automatically directs Continuous Access to replicate the snapshots locally or on an HP Storage array at a remote location, depending on your organization's configuration and recovery needs. Snapshots can be taken frequently, without impact to server performance, to meet even the most stringent recovery objectives.

For recovery, HP Data Protector can restore data from either tape or disk. However, restoring data from tape is a more time-consuming process better suited to noncritical business data. For business- or mission-critical applications, taking replicas on the HP XP P9000 or HP EVA P6000 using HP Data Protector IR enables you to get your application up and running again in mere seconds in both physical and virtual environments.

With just a few clicks in the HP Data Protector console, HP Data Protector IR automatically retrieves the appropriate snapshot, synchronizes the snapshot and application log file, restores the data to the VM, and then restarts the application—all according to your pre-defined backup parameters.

If you are using an application-specific VSS agent inside the virtual machine you also have the option to restore your application using the HP Data Protector "No recovery" option.

Whether you're running Microsoft Exchange, SQL, Oracle, or a variety of other applications on a VMware virtual machine or Hyper-V child partition, HP Data Protector IR, together with HP XP P9000 and HP EVA P6000 arrays, delivers data protection for even the highest RTO and RPO demands.

Integration with HP StoreVirtual SAN solutions

HP Data Protector also provides robust backup and recovery functionality with the iSCSI-based HP StoreVirtual SAN solutions through Microsoft VSS integration.

HP StoreVirtual SAN solutions are optimized for virtual server environments, and are based on a clustered architecture with integrated replication capabilities and an enterprise feature set. Together with VMware and Microsoft Hyper-V, HP StoreVirtual SANs can offer simple and seamless high availability for virtual machines across servers, storage, and sites.

HP StoreVirtual snapshots offer space-efficient data recovery, and can be mounted on any server that accesses the SAN. This process is very useful for recovering files, creating test environments, or mounting to a backup server for a centralized backup environment.

HP Data Protector ZDB and IR can be deployed with the HP StoreVirtual to improve backup efficiency, and this lets you execute, manage, and move snapshots to suit your organization's availability needs. With ZDB, HP StoreVirtual snapshot functionality can be easily managed via the HP Data Protector console, which runs on any Microsoft Windows or Linux machine connected to the network.

The combination of the HP StoreVirtual with HP Data Protector and ZDB achieves a highly cost-effective, full-featured and tightly integrated backup and recovery solution, ideal for mid-market deployments of applications such as Microsoft SharePoint, Microsoft Exchange, and SQL Server. It also provides an ideal solution for situations in which backups take too long and use too many resources, recovery from tape is difficult and time-consuming, or traditional snapshots waste capacity.

HP Information Management Solutions—delivering complete protection

HP Autonomy Information Management solutions, powered by the Intelligent Data Operating Layer (IDOL 10), provide a common Meaning Based Computing platform that allows organizations to understand and act on all forms of information in real time. The ability to index over 1,000 file types, 400 data sources, and content in any language enables a company to maximize its content management investment across all applications. With over 500 embedded functions, IDOL provides the ability to understand the context, relevance, and trends within information.

For more information

Get technical documentation—white papers, installation manuals, and integration guides. Learn more about the latest product enhancements and new features. Participate in community discussions—share your knowledge and learn from peers.

hp.com/go/dataprotector

How much time do you spend restoring single items from VMware, SharePoint, or Exchange?

Too much, right? Now the application administrator can restore single items directly via the VMware vSphere, Microsoft SharePoint, and Microsoft Exchange administrator's console—without ever calling the backup administrator.

See for yourself how it works. Watch the demo of HP Data Protector Granular Recovery Extension for Microsoft Exchange under Trials and Demo button at **hp.com/go/dataprotector** page.

Advanced snapshot functionality in both virtual and physical environments with HP Data Protector software.

To know more visit, **hp.com/go/dataprotector**

As the industry's first unified, meaning-based data protection solution to use an intelligent data management approach, HP Data Protector seamlessly protects and harnesses data wherever it resides—from the edge of the network to the datacenter, and across on-premise, hybrid, and cloud environments. (See Figure 1)

More than 45,000 customers around the world, and nearly half of the Global 500, rely on HP Data Protector software to protect their critical applications and data. Data Protector simplifies application protection through unified recovery and advanced automation. Global, one-touch backup configuration and a wide range of disk-based recovery options across HP and non-HP arrays, help you meet any SLA.

HP Data Protector software supports virtually any hypervisor, including VMware vSphere 3.x, 4.x and 5, VMware vCloud Director 5.1, Microsoft Windows® Server 2008 Hyper-V and Hyper-V R2, Microsoft Windows Server 2012 Hyper-V, Microsoft Virtual Server, Citrix XenServer, Sun Solaris Zones, HP Integrity Virtual Machines and more.

In addition, Data Protector delivers advanced snapshot functionality in virtual environments with HP arrays, including HP 3PAR StoreServ, and HP StoreVirtual, and non-HP storage devices such as EMC CLARiiON, and Network Appliance.

HP Data Protector software—from one console can protect every virtual machine and the information your business relies on.

Make sure your backup software delivers a variety of disk-based recovery options for virtual environments

Unlock the power of HP

Don't let virtual server backup challenges stifle your organization's data protection goals. HP Data Protector software unlocks powerful disk-based backup and recovery solutions to help you realize all the benefits of server virtualization.

About HP Autonomy

HP Autonomy is a global leader in software that processes human information, or unstructured data, including social media, email, video, audio, text and web pages, etc. Autonomy's powerful management and analytic tools for structured information together with its ability to extract meaning in real time from all forms of information, regardless of format, is a powerful tool for companies seeking to get the most out of their data. Autonomy's product portfolio helps power companies through enterprise search analytics, business process management and OEM operations. Autonomy also offers information governance solutions in areas such as eDiscovery, content management and compliance, as well as marketing solutions that help companies grow revenue, such as web content management, online marketing optimization and rich media management.

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