



▶ Commvault® Snapshot Management Technology: Capabilities and Benefits

Enterprises today increasingly turn to array-based snapshots and replication to augment or replace legacy data protection solutions. The challenge is that native array snapshot tools have varying degrees of functionality, automation, scripting requirements, hardware support and application awareness. **Commvault streamlines snapshot management and exponentially accelerates data protection and recovery operations.**



▶ Executive Summary

Enterprises today increasingly turn to array-based snapshots and replication to augment or replace legacy data protection solutions that have been overwhelmed by exponential data growth. The challenge is that native array snapshot tools — and alternative third-party solutions — have varying degrees of functionality, automation, scripting requirements, hardware support and application awareness. These approaches can add administrative complexity and make it more difficult to realize the full potential of snapshots — especially in heterogeneous storage environments.

Commvault solves this problem with IntelliSnap® snapshot management technology. IntelliSnap technology streamlines and simplifies snapshot management for nearly all of the industry's top storage arrays; centralizes snapshot management across heterogeneous storage platforms; automates object, application and database recovery; and links snapshots to backup processes. The tight coupling of managed snapshots with data protection and recovery operations enables Commvault software to provide a complete view into data across applications, devices, operating systems and locations, cutting administrative overhead and improving access, availability and IT efficiency. This paper provides an in-depth exploration of IntelliSnap technology's technical capabilities and business benefits.





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▶ TRENDS IN DATA GROWTH, PROTECTION AND SNAPSHOT USAGE

The data center trends of virtualization, cloud and big data are paralleled by data-specific trends that include explosive data growth, more demanding service level agreements (SLAs), demands for higher application availability and increasingly problematic backup and recovery — all of which are driving greater adoption of snapshot and replication technologies:

- According to InformationWeek’s State of Storage 2014 report,¹ a majority of organizations are experiencing exponential rates of data growth (73% of respondents indicated total amount of data to store and manage growing 10–49% annually)
- 451 Research² reports that “Backup windows are shrinking, and users often find it difficult — or even impossible — to complete their backups in the allotted time.” Furthermore, “IT professionals consistently complain about increasingly stringent recovery time objective (RTO) and recovery point objective (RPO) requirements.”
- While 65% of organizations have deployed snapshots, according to InformationWeek, only 35% report they “use [snapshots] widely.”
- Commenting on a shift in data protection technology, 451 Research says, “It’s possible that within a few years, some larger IT organizations will forgo traditional backup applications altogether and make array-based snapshots their primary form of data protection. However, we think that will, in almost all cases, include the use of both replication and traditional backup functions such as indexing and cataloging to manage the snapshots.”

▶ SNAPSHOT MANAGEMENT CHALLENGES

Despite increasing adoption, persistent challenges remain for snapshot management, snapshot-based recovery and policy management across snapshots, backup and archive operations:

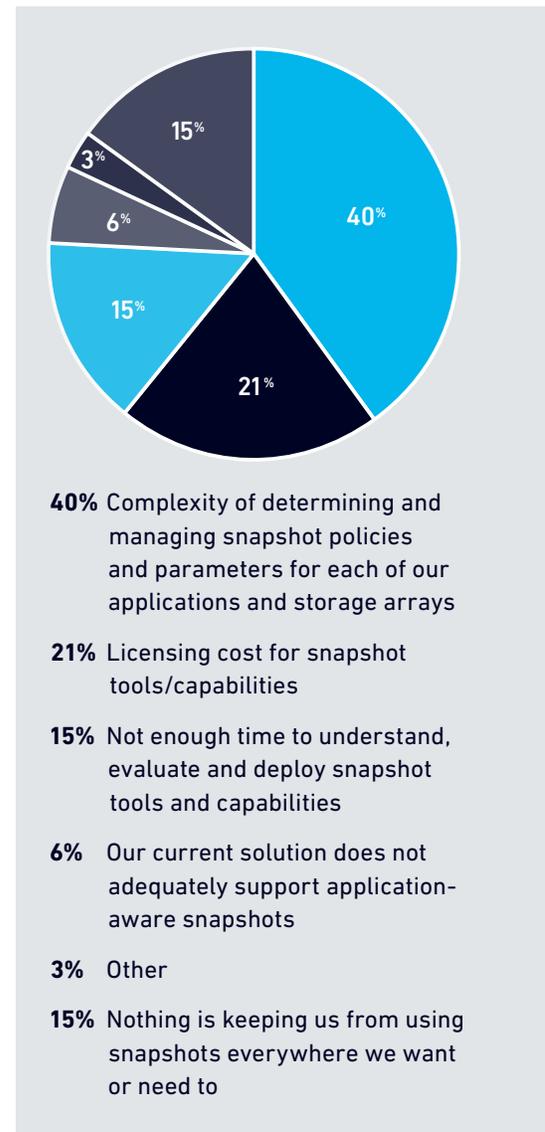
1 SCRIPTING REQUIREMENTS

Managing snapshots has typically meant relying on tools from the disk array vendors, which can often require extensive scripting, monitoring and maintenance, both in general and specific to individual applications.

2 LACK OF APPLICATION AWARENESS

Historically, array-based snapshots have not been application aware, simply capturing data blocks as of a point in time and requiring labor-intensive manual transaction playback during recovery — labor-intensive operations with less than optimal success rates.

Figure 1: Top Snapshot Adoption Barriers



1 InformationWeek Reports’ “State of Storage 2014” report, by Kurt Marko. February 2014.

2 451 Research, “Backup to the Future” report, by Dave Simpson, April 2014.

3 LACK OF HYPERVISOR AWARENESS

Server virtualization adds a layer of storage abstraction that array-based snapshots are often unaware of, making coordinating snapshots with hypervisors a complex process.

4 LACK OF MULTI-VENDOR MANAGEMENT CAPABILITY

Array tools are limited to vendor-specific arrays, i.e., they cannot be used across arrays from multiple different vendors, leading to increased cost and complexity.

5 MANAGEMENT COMPLEXITY

Lack of integration between array-based snapshot tools and legacy backup solutions results in multiple interfaces and management silos that lack coordination, alignment and central monitoring capabilities.

6 FILE RECOVERY

Recovering a specific file from a snapshot often requires time-intensive manual searching within each individual snapshot due to a lack of comprehensive catalog, index and search capabilities.

7 APPLICATION RECOVERY

Recovering an application or database from a snapshot is often a completely manual process, from restoring the core data itself to a manual replay of the log files and manual restart and consistency checks.

8 LACK OF INTEGRATION BETWEEN SNAPSHOTS AND BACKUP

Creating a backup from a snapshot can be problematic, as the links between the backup and the production system are often broken, losing application awareness and forcing a complex manual restore of the backup copy before the data is available to the production system for recovery; furthermore, large numbers of snapshots and backups make it difficult to manage and enforce consistent policies and to locate specific data copies from among various storage tiers.

Commvault IntelliSnap technology combines snapshot protection with backup management, including support for tape and cloud.

▶ COMMVAULT SNAPSHOT MANAGEMENT LEADERSHIP

Commvault addresses these challenges with IntelliSnap snapshot management technology. IntelliSnap technology centralizes snapshot management across heterogeneous storage platforms; automates file, object, application and database recovery; links snapshots to backup and archive processes; and simplifies data protection management while making it more comprehensive. This paper details IntelliSnap

technology's capabilities and benefits, but we will briefly summarize here the key reasons for Commvault's leadership in the snapshot management space.

- 2016 Magic Quadrant for Data Center Backup and Recovery Software, "Commvault offers the industry's broadest support for integrating with and exploiting storage hardware platform snapshots, directly supporting over two dozen of the top-selling storage arrays."³
- IntelliSnap snapshot integration supports a wide range of the top selling SAN/NAS storage arrays from Dell, EMC, Fujitsu, HDS, HP, Huawei, IBM, INFINIDAT, NetApp, Nimble, Oracle, Pure Storage and even software storage virtualization solutions such as DataCore, providing greater storage platform coverage than all leading competitive alternatives. Commvault continues to expand the list of supported platforms and vendors.
- IntelliSnap provides extensive coverage for file systems, applications and hypervisors.
- IntelliSnap combines snapshot protection with backup management, including support for tape and cloud.

Commvault and NetApp storage solutions are integrated, enabling customers to significantly improve the speed, efficiency and simplicity of their backup and recovery operations. Discover more about the Commvault and NetApp joint solution here:ⁱ

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451 RESEARCH ON COMMVAULT AND SNAPSHOTS

Among backup/recovery vendors, Commvault was first to recognize the need for snapshot management software that worked across heterogeneous arrays. In 2011, the company inked an OEM agreement with long-time reseller partner NetApp, under which the two integrated elements of [Commvault's] data-protection software with NetApp arrays and software, including SnapMirror and SnapVault.

IntelliSnap includes a number of snapshot management features, including execution of snapshot and clone calls, indexing, cataloging, re-syncs, mounts, dismounts, application integration, tape backup/management and other functions. The software integrates with disk arrays via vendor APIs. For snapshot management and recovery in heterogeneous environments, Commvault offers IntelliSnap Recovery Manager software, which, unlike previous implementations of IntelliSnap, does not require use of [Commvault's] software — end-users' existing backup software can be used in conjunction with IntelliSnap snapshot management software.

We consider Commvault to be well ahead of other vendors in terms of backup software tailored to snapshot-based data protection in heterogeneous environments — particularly in terms of the breadth of its platform coverage (which includes virtually all major arrays).

ⁱⁱ 451 Research, "Backup to the Future," April 2014.



[Download the full report.](#)



▶ **INTELLISNAP TECHNOLOGY — CORE CAPABILITIES**

STORAGE AND APPLICATION INTEGRATION

Commvault IntelliSnap technology integrates with native storage array snapshot engines to provide consistent point-in-time recovery copies for large data sets and enterprise applications. IntelliSnap technology quiesces applications or file systems, triggers the storage array-based snapshot, and returns the system to a fully operational state within minutes. By incorporating and linking snapshots with backup and archive operations, software makes more online and offline copies available for recovery while reducing data protection's impact on production systems. IntelliSnap technology harnesses the power of array-based snapshots to accelerate backup and recovery.

IntelliSnap technology harnesses the power of array-based snapshots to accelerate backup and recovery.

CROSS-PLATFORM, STANDARDIZED SNAPSHOT MANAGEMENT

IntelliSnap technology integrates with array-specific APIs in order to execute snapshot management functions.⁴ These functions include configure, create, retire, mount, mine, dismount, monitor, retain, revert and restore — and are managed and executed in the same way regardless of hardware platform. Thus, IntelliSnap technology can consolidate and standardize snapshot management and snapshot-based recovery across nearly all leading storage platforms.

AUTOMATED, APPLICATION-AWARE SNAPSHOT MANAGEMENT

IntelliSnap technology enables a modernized approach to data protection by merging storage system hardware snapshots directly into the data protection process. IntelliSnap technology integrates tightly with both host applications and with the system software specific to each hardware array. As the central orchestration point between the two, the IntelliSnap feature drives snapshot creation, indexes the contents and can then push application-consistent and deduplicated backup, archive or DR copies to secondary storage, tape or cloud. IntelliSnap technology normalizes snapshot operations so they look the same and operate the same way regardless of application or storage platform. For longer-term retention copies, Commvault software offloads deduplication, backup and encryption to a separate (proxy) host to minimize impact to production systems.

⁴ Commvault can also supply APIs and SDKs to enable additional array vendors to integrate with IntelliSnap technology through the IntelliSnap Connect Program.

By automatically integrating application intelligence with hardware snapshots, Commvault software is able to reach through the application and file systems into the storage array, discover volume/disk configurations for the snapshot operations, and coordinate these operations with proper application awareness and log management, minimizing administrative configuration and eliminating any scripting requirements.

SIMPLIFIED SNAPSHOT OPERATIONS

The Commvault snapshot menu enables granular retention options, such as hourly snapshots retained for a day or daily snapshots retained for a week. The snapshot menu is also enabled with an option to retain a set number of snapshots on disk, which can help eliminate the days/cycles conversation with storage and application administrators. These indexing and retention changes help align storage snapshot retention with standard data protection operations, and are available for all applications and storage platforms. Smart use of IntelliSnap technology to manage native snapshots should ensure the creation of more recovery points for fast recovery without adding complexity.

SNAPSHOT VALIDATION

A Commvault proxy server can mount and validate snapshots as part of a secondary process to confirm that every snapshot represents a valid, application-consistent recovery copy. Automatic rules for proxy validation and other maintenance tasks, such as log management or snapshot aging, can further simplify management. This establishes a foundation of confidence when replacing selective and infrequent backups with multiple snapshot-based recovery points throughout the day.

APPLICATIONS, FILE SYSTEMS, HYPERVISORS Supported by IntelliSnap Technology	HARDWARE ARRAYS AND STORAGE SOFTWARE Supported by IntelliSnap Technology			
DB2, DB2 Multinode	 SANsymphony-V	 Compellent, EqualLogic	 where information lives® Celera, CX, DMX, Isilon, Symmetrix, VMAX, VNX	
Lotus Notes				
Microsoft Exchange Server				
Microsoft SharePoint Server	 ETERNUS DS	 AMS, HUS-VM, USP/VSP	 3PAR, EVA, XP	
Microsoft SQL Server				
Oracle, Oracle RAC				
SAP	 S2600T, S5500T, S5600T, S5800T, S6800T	 DS Series, N-Series, SVC & XIV	 E-Series, FAS	
MySQL				
Microsoft Hyper-V				
VMware	 CS Series	 Oracle ZFS	 InfiniBox	 FlashArray
Microsoft Windows File Systems				
Linux and UNIX File Systems				

▶ **INTELLISNAP TECHNOLOGY
APPLICATION HIGHLIGHTS**

MICROSOFT SQL SERVER

IntelliSnap integration with SQL Server allows you to protect large databases (even those in the extreme TB size range) within a few minutes. The SQL software agent provides consistent backups by quiescing the database for a few seconds while taking the snap. Multiple point-in-time snapshots enable you to recover the database to any specific point in time.

Rapid recovery is available using an application-aware revert operation. By keeping the recovery within the storage array there is no need to transfer blocks over the network and through a backup server. This provides far faster restores. In addition, many revert operations are delta-block based, meaning only the changed blocks need to be restored to return a volume to a previous state.

IntelliSnap technology takes advantage of SQL Server capabilities and provides advanced features, such as taking snapshots simultaneously on multiple databases; opening or mounting database snapshots on other clients without actual restore; and performing multistream restore operations from snapshots.

IBM DB2

The Commvault DB2 software agent detects the LUNs and paths on which the DB2 database files are hosted, makes hot backup-mode calls to the DB2 engine, and places the selected databases in hot backup mode. At that point the DB2 agent and the Commvault MediaAgent work together with IntelliSnap technology to create a snapshot of the entire LUN(s) on the array. The snapshot becomes a point-in-time recovery copy. The IntelliSnap-managed snapshot can be used to recover the entire database or set of databases, or to restore a single database in a copy-out fashion. It can also be leveraged for array-based replication processes.⁵ A proxy server can be used to create backup copies of both databases and log files on non-production storage for longer-term retention.

IntelliSnap technology normalizes snapshot operations so they look the same and operate the same way regardless of application or storage platform.

LOTUS NOTES ON WINDOWS

The Commvault software Lotus Notes agent flushes the DB cache for all loaded databases as a function of the Windows VSS framework call prior to executing array-based snapshot commands. This ensures that all Notes databases are consistent for the creation of snapshot-based recovery copies on the storage array. The snapshot copies can be leveraged for database restores and for off-host backup, and provide database-level granularity for browse and recovery, including recovery of an entire Domino Instance, a set of mail files or a single .nsf mail file.

MICROSOFT EXCHANGE

The Commvault Exchange software agent leverages IntelliSnap technology to create consistent snapshot-based recovery copies. Commvault software supports off-line mining for Exchange to enable granular object-level (message, note, calendar item) recovery from the application image at restore time.

IntelliSnap technology works with Commvault's Virtual Server Agent (VSA) to provide message-level protection policies for Exchange servers running inside VMs. This enables separate retention and granular recovery for individual messages, as typically messages have longer retention requirements than databases or VM images. This makes it unnecessary to store full VM images for extended periods of time just to provide granular message recovery. Message-level protection

⁵ Arrays that support IntelliSnap-managed replication currently include NetApp FAS systems using NetApp SnapMirror and SnapVault.

policies allow messages to be extracted from snapshots and retained for extended periods while the backup images can “age out” more quickly. Messages can then be recovered in native format, without any dependency on hypervisor or Exchange version.

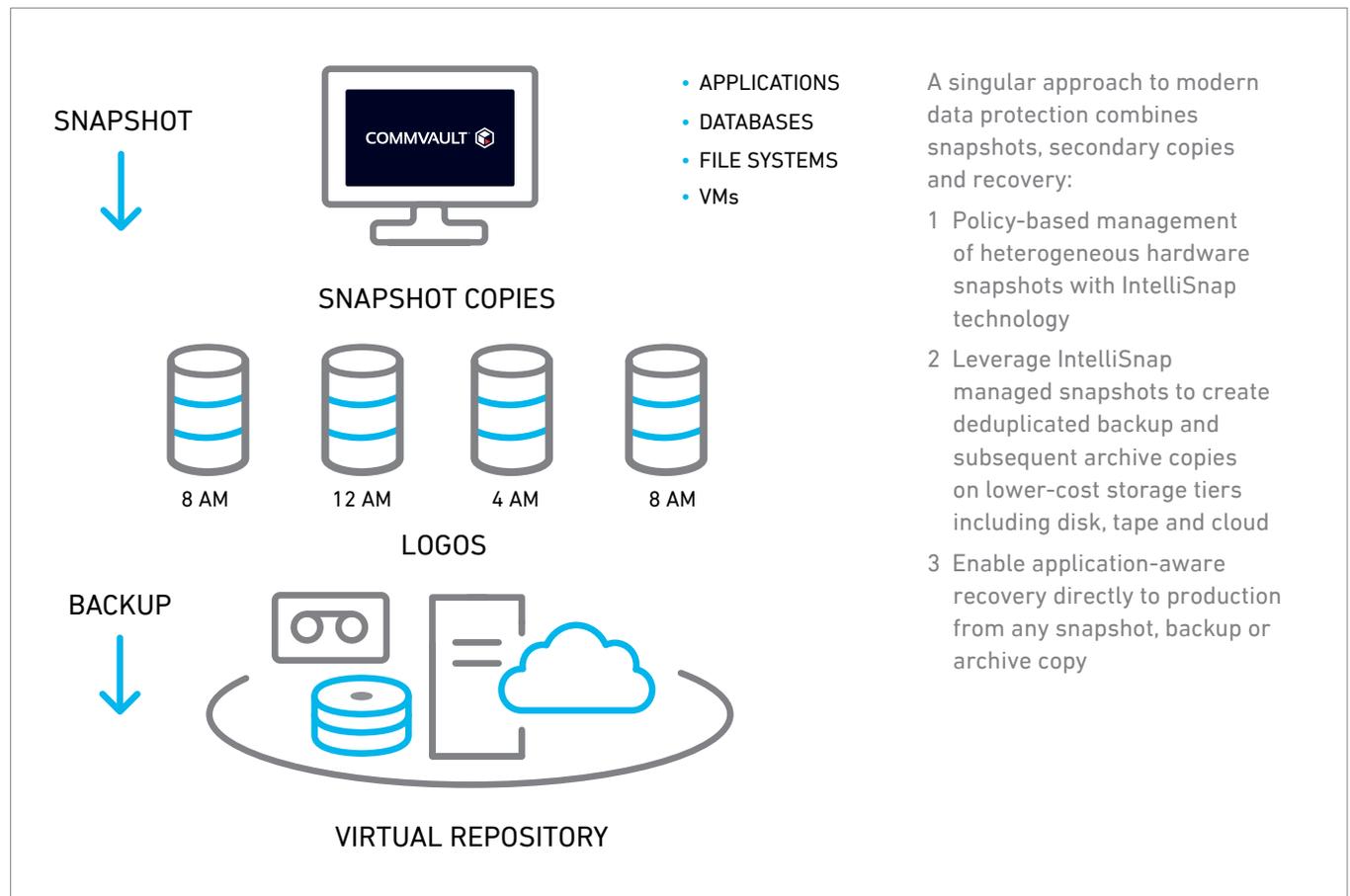
IntelliSnap for VSA performs automatic log truncation for VMs running Exchange (including Exchange DAG).

ORACLE

The Commvault Oracle software agent leverages IntelliSnap technology to create snapshot-based recovery copies. There are slightly different capabilities for physical and virtual environments.

In physical Windows, UNIX or Linux environments, IntelliSnap technology creates a recovery copy by taking snapshots of both the database itself and the Archive REDO logs volume. The Oracle data agent determines the type of storage the database is provisioned on, puts the database in hot

Figure 2



backup mode, communicates with the storage array to execute a snapshot, and finally takes the database out of hot backup and forces a log switch. Hot backup allows for snapshot operations to take place with no downtime: the database is still up, active and open for full SQL statement access. Once the database snapshot is complete, IntelliSnap technology takes a snapshot of the Archive REDO logs volume, preserving the logs for replay or recovery. The content of the database snapshot is an inconsistent copy of the database that can be made consistent by the application of the REDO logs.

If Oracle is provisioned inside a VM on an NFS mount, IntelliSnap technology can put the database in hot backup mode and snap database and REDO logs as above. The subsequent snapshot can be cloned, mounted to a proxy server and recovered to different (physical or virtual) server. This allows you to quickly build a storage efficient copy of the database for testing, auditing or working through technical issues.

Using Commvault software, you can mix and match RMAN-based streaming backups with snapshots. If the snapshot is taken, and an RMAN catalog is configured, then Commvault software records a "DATAFILECOPY" in the catalog, and the DATAFILECOPY is always recorded in the database control file. If the database tables get overwritten or corrupted for any reason, this enables you to revert to the snapshot copy of the database just before the corruption.

RMAN cataloging of the Oracle database files will persist and a proxy server may be used to create secondary copies of database and/or log files for longer-term protection. Backups made from the snapshots eliminate the impact of backup operations on the production database host, and provide more flexibility in terms of scheduling and running the actual backup jobs. DBAs can schedule log backups in between snapshots. IntelliSnap technology also permits the pruning of archive REDO logs off of archive log snapshots. Integrated log management within the snapshot operation reduces the number of Oracle-related jobs and minimizes administrative overhead.

▶ INTEGRATING SNAPSHOTS WITH BACKUP AND DEDUPLICATION

IntelliSnap technology seamlessly links native storage array-based snapshots with the next-generation data management capabilities of Commvault software for backup and archive operations. As described above, the software can recover applications and databases using a mix of snapshot-based database images and traditional backups of the log files. In addition, the software can leverage IntelliSnap-created snapshots to create hardware-independent, content-aware, deduplicated backup copies, minimizing backup impact on production hosts.



When creating backup copies, Commvault source-side deduplication software eliminates all duplicate data regardless of source, data type or platform, minimizing both network traffic and the ultimate storage footprint. The deduplication database compares the digital signature of each segment against all other segments in the global storage policy, maximizing deduplication across all backup data. Commvault software maintains data deduplication even on tape, without the need to rehydrate data back to full form. It also integrates software-based compression and encryption to increase storage efficiency and security when writing data to disk. Selective, granular restores can be made from the deduplicated data set, and deduplicated data is restored directly from any storage tier. In addition, post-backup processes can be applied to truncate logs on select database servers. Backup copies made from snapshots can also be leveraged as, or to create additional, long-term archive copies, to satisfy regulatory requirements and maintain retention compliance. In this way, Commvault software combines snapshots with backup and archive to create a comprehensive and holistic data protection and data management strategy.

IntelliSnap technology eliminates multiple tools, processing and complex scripting to reduce risk.

▶ INTELLISNAP TECHNOLOGY AND VIRTUALIZED ENVIRONMENTS

Commvault software and IntelliSnap integrate closely with applications and virtualized infrastructures to minimize impact on production systems, storage and networks, and to optimize the backend storage footprint. IntelliSnap technology works with the VSA to provide off-host protection for VMs. IntelliSnap technology reduces the impact of protection on both VMs and the physical hypervisor by leveraging native hardware snapshots to rapidly create application-consistent recovery copies. IntelliSnap technology can take snapshots containing hundreds of VMs in minutes, fully integrated with applications running inside VMs to ensure application consistency and log truncation.

Commvault software also provides automatic discovery rules: when new VMs are created that meet these rules, the VMs are automatically assigned to the appropriate protection policy. Furthermore, in virtualized environments, Commvault preserves the ability to link backup and archive to snapshots and to leverage snapshots to create cataloged, deduplicated retention copies on secondary storage. This copy process has no impact on production virtual servers and production hosts.

Commvault and Hitachi Data Systems have had an OEM relationship to deliver truly unified data protection solutions to the market. Learn more about the Commvault and HDS partnership here:ⁱⁱⁱ

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Large VMs and VMs with high I/O rates can drop connectivity or cause hypervisor-based snapshot processes to hang when held too long in backup mode under vStorage API for Data Protection (VADP). IntelliSnap technology avoids these issues by limiting VM backup mode to a few seconds. It is also helpful to leverage IntelliSnap managed snapshots in environments that configure vSphere VMs using RDMs that cannot be protected using VADP.

Commvault software provides VM provisioning and management options that allow VM owners to create and manage their own VMware software snapshots. This is especially relevant for test/dev environments where VM owners need to create temporary point-in-time versions of their VMs. VM owners can perform these tasks within the GUI, without having to access the vCenter interface.

vCLOUD DIRECTOR INTEGRATION

Commvault software and IntelliSnap technology also support secure multi-tenant environments. Commvault software integrates with VMware vCloud Director to capture tenant metadata associated with a VM. This allows the VM to be recovered directly into the tenant's vCloud environment without vCenter admin intervention. Commvault also allows tenants to self-select protection policies that apply to their VMs — these policies will apply to subsequent auto-discovered VMs. This capability is particularly useful in IT-as-a-Service (ITaaS) shops or MSP-like environments.

KEY BENEFITS OF INTELLISNAP TECHNOLOGY IN VIRTUALIZED ENVIRONMENTS

- Granular indexing within snapshots, enabling wildcard search and restore of files within VMs within a snapshot
- Auto-discovery of new VMs and datastores, and automatic protection under existing protection policies
- Leveraging snapshots to create retention copies to off-production and/or off-site media, and maintaining application understanding for application-consistent recovery back to the original source from any copy
- Automation of all snapshot management functions to eliminate snapshot-based scripts
 - Protection policies and workflows created in the Commvault GUI for databases and virtualized databases can be captured as scripts that DBAs can run for themselves, preserving DBA independence while still consolidating protection operations under the Commvault umbrella
- Reduced administrative overhead by enabling VM owners and end-users to perform their own file and VM recoveries and test/dev snapshot management

▶ ACCELERATING RECOVERY

The distinguishing capability for Commvault software is that it provides a consistent recovery experience regardless of recovery source; i.e., primary snapshot, secondary replica, deduplicated disk, near line cloud or offline tape. Commvault software works transparently to choose the correct tier and perform the necessary recovery operations. If the data is to be recovered from a snapshot or a replica copy, Commvault software automatically mounts the snapshot, identifies the VM from which the data is to be recovered, and uses the appropriate APIs to recover the data. The user performing the recovery does not need to know the intricacies of mounting and accessing snapshots to recover data. Similarly, if the data is being restored from a disk or tape, the software automatically picks the best path to the media and performs a direct restore with the same user experience. The recovery experience is the same whether it's a full VM restore or a granular file-level recovery.

Quickly restore entire file systems and databases within moments of failure, without administrator intervention using IntelliSnap technology.

GRANULAR RECOVERY

Commvault software's index spans all snapshot copies under management, enabling quick, intuitive search and granular recovery within and across all snapshots — whether on a single array, multiple arrays or on arrays from different vendors. Commvault software offers full application recovery or individual, granular file recovery without the need for manual steps to make the data available to the application, database or file system. The software's indexing and recovery intelligence ensures that a) data recovery takes place from the nearest available copy, meaning that it enables the fastest recovery possible, and b) each copy is recovery-ready: data can be restored directly to the production system or application from any copy, even if the snapshot or the storage array itself is not available.

ORCHESTRATED RECOVERY

IntelliSnap technology also automates database and application recovery across snapshots and secondary copies. It delivers automated, application-aware recovery from any storage tier, across multiple arrays and data management architectures. For example, to recover a database that is snapped every six hours, with log backups every 30 minutes and a backup to secondary storage once a day: once the database and recovery point in time are selected, Commvault software will intelligently decide whether to copy back from a secondary copy or to revert to the snapshot — and then automatically replay the logs to bring the database back in a consistent state to the selected point in time. As noted earlier, Commvault software can replay the logs even if they were created with traditional, streaming backup. The software orchestrates the entire process between hardware and host.

RECOVERY IN VIRTUALIZED ENVIRONMENTS

IntelliSnap technology offers multiple different recovery capabilities in virtualized environments, including full volume revert, as well as full VM and file-level recovery. “VirtualizeMe” capability provides for a full physical image recovery of a VM with a single click. In addition, Commvault software includes an automated restore option that allows select critical VMs to be automatically recovered to an alternate location. This option can be used for DR or to provide a sandboxed environment outside production systems. Commvault software can also enable registered VM owners to view snapshot and backup details and recover files from their own VMs. This empowers end-users and shifts the burden of recovery from administrators.

WORKFLOW AUTOMATION

Commvault software's workflow automation capabilities let you automate what would otherwise be repetitive or highly complex manual data management tasks. If your environment has non-standard configurations that aren't covered in the pre-built IntelliSnap recovery workflows, the workflow automation tool allows you to create your own custom workflows using an intuitive graphical user interface. Using these advanced tools, administrators can automate business tasks by bringing together sets of individual tasks in a specific order or decision tree.

► SIMPLIFYING DISASTER RECOVERY/ACCELERATING TEST/DEV OPERATIONS

For select arrays,⁶ IntelliSnap technology can go beyond snapshot management and snapshot-based recovery to integrate with array-based replication and clone engines. Today, this functionality applies to NetApp environments, where IntelliSnap technology can manage array-based replication and clone creation via NetApp Snapshot, SnapVault and SnapMirror. IntelliSnap technology also maintains granular indexing information and application awareness across all snapshot and replication copies under management — i.e., across Snapshots, SnapVault and SnapMirror — to streamline disaster recovery operations and to accelerate file and application recovery from any NetApp snapshot or replica.

⁶ Currently, replication and clone management functionality is available only with NetApp FAS storage systems.



IntelliSnap technology can also leverage the snapshot copies on the production array or on the vault or mirror copy to automate a NetApp FlexClone and present the point in time copy directly to defined host or hosts. Creating test/dev clones (writeable snapshot copies) at the DR site offloads test/dev from the production environment and eliminates the need for manual, labor-intensive refreshes and scripts — significantly reducing overhead and accelerating test/dev operations. This process can be automated so that test/dev environments can be refreshed on an hourly, daily or weekly schedule.

In short, IntelliSnap technology's snapshot, replication and clone management capabilities consolidate NetApp data management operations under a single command view, simplify DR, accelerate test/dev cycles, reduce administrative overhead and drive more value from core NetApp functionality.

INTELLISNAP TECHNOLOGY AND NETAPP SNAPPROTECT

IntelliSnap technology is available directly from NetApp: NetApp is an OEM supplier of IntelliSnap technology under the "NetApp SnapProtect" brand name. NetApp SnapProtect differs slightly from IntelliSnap technology in that a) SnapProtect does not manage snapshots on non-NetApp arrays; and b) SnapProtect does not offer the ability to create retention (backup or archive) copies to non-NetApp disk media. SnapProtect is designed to focus exclusively on NetApp snapshot, replication and clone management, with the additional capability to leverage snapshots to create cataloged backups to tape using NetApp's NDMP protocol.

In contrast, IntelliSnap can create retention copies to disk, tape or cloud, with application consistency maintained across all copies and full leverage of Commvault's deduplication and DASH-copy capabilities.

INTELLISNAP TECHNOLOGY AND HITACHI DATA PROTECTION SUITE

IntelliSnap technology is available directly from Hitachi Data Systems. Hitachi is an OEM supplier of IntelliSnap technology under the name Hitachi Data Protection Suite (HDPS). The full suite of Commvault functionality is available under HDPS, or users can license only IntelliSnap functionality.

▶ COMMAVAULT INTELLISNAP TECHNOLOGY — KEY CAPABILITIES

- Create and manage snapshot-based recovery copies in application, database and file system environments, whether physical or virtual, on a wide range of supported storage arrays without any customization or scripting
- Standardize and normalize snapshot management operations in heterogeneous storage environments
- Catalog each snapshot to enable intuitive search and granular file, message, image or object restore in the source context
- Link snapshots to backup and archive processes to create multiple recovery options with different retention settings on different storage tiers, including disk, tape and cloud
- Meet more stringent SLAs and more rigorous application-specific recovery point and recovery time objectives
- Recover directly to production systems from any storage tier with minimal administrator intervention
- Centralized, unified management control — works in tandem with popular storage array-embedded snapshot technologies to unify management and recovery operations across systems, applications and sites
- Quickly restore entire file systems and databases within moments of failure, without administrator intervention
- Leverage embedded deduplication to improve backup storage utilization and store more recovery copies on disk for longer periods

Recover applications faster to increase business uptime using IntelliSnap technology.



▶ RESOURCES

- i <http://commvau.lt/1UHblhr>
- ii <http://commvau.lt/1OrPYyJ>
- iii <http://commvau.lt/1PPgd88>

- ▶ IntelliSnap technology is at the heart of Commvault's integrated snapshot management solution. To learn more about bringing simplicity, integration and control to the way you handle snapshots, visit commvault.com/intellisnap.

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