Dell PowerProtect Data Domain All-Flash Appliance with Commvault

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White Paper

Abstract

This white paper describes the Dell PowerProtect Data Domain All-flash appliance with the Commvault platform.

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Executive summary

Overview

The Dell PowerProtect Data Domain All-Flash appliance (DD9910F), integrated with the Commvault platform, delivers a powerful and modern cyber resilience solution. This integrated offering is engineered to handle demanding backup and recovery workloads while strengthening cyber recovery and vaulting strategies.

Leveraging the performance advantages of an all-flash Data Domain architecture, the combined solution delivers high restore throughput. Its elevated read throughput also drives high-velocity replication and accelerates cyber recovery operations across the environment. With these capabilities, the Data Domain All-Flash appliance and Commvault together provide efficient performance, and robust security, enabling organizations to restore critical data faster and protect it with confidence.

The whitepaper highlights how the Data Domain All-Flash appliance, paired with Commvault, delivers high restore performance at scale, showcasing its ability to accelerate, optimize, and reliably recover data for modern enterprise workloads.

Revisions

Date	Part number/ revision	Description
March 2026	H04667	Initial release

We value your feedback

Dell Technologies and the authors of this document welcome your feedback on this document. Contact the Dell Technologies team by email.

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Note: For links to other documentation for this topic, see the PowerProtect Data Domain Appliances InfoHub and Commvault Version 11 Documentation.

Highlights and Key Benefits

Dell PowerProtect Data Domain All-Flash appliance (DD9910F) and Commvault as a joint validated solution for Cyber Resilience offers a plethora of benefits:

Performance-Driven Recovery

The integration of the All-Flash appliance with Commvault delivers a significant advancement in performance, enabling substantially faster restore throughput up to **51 TB/hr**, validated through joint, large-scale testing by Dell Technologies and Commvault. This proven acceleration empowers organizations to rapidly recover high-volume, mission-critical datasets—significantly compressing recovery windows, reducing operational downtime, and helping enable uninterrupted business continuity even in high-pressure recovery scenarios.

Backup Performance

When using Commvault to back up to the All-Flash appliance, it delivers high backup performance. The faster backup speeds minimize downtime, helps enable business continuity, enhances data protection, and reduces operational costs.

Enhanced Replication Performance

Powered by the ultra-fast all-flash read performance of the All-Flash appliance, the integrated All-Flash appliance + Commvault solution accelerates replication to a refined performance level shrinking Recovery Point Objectives (RPOs), lowering data-loss risk, and enabling faster recovery during outages or cyberattacks. This performance foundation is designed to help organizations maintain a more resilient, responsive, and secure cyber resilience posture, even in the face of rapidly evolving threats and operational demands.

Cyber Recovery

The high-velocity read performance of the All-Flash appliance accelerates replication workflows, effectively narrowing the air-gap synchronization interval and further reinforcing the security of the cyber vault. Its enhanced read capability also enables faster scanning operations within the vault environment, improving responsiveness and enhancing the efficiency of cyber recovery workflows.

Comprehensive Workload Protection

Integrating Data Domain with Commvault ensures robust protection for diverse workloads, including virtual environments, databases, applications, file systems, etc. This combination delivers seamless backup and recovery, enhancing data availability and reliability across IT landscapes.

Security Reinforcement

With the All-Flash appliance as the foundation, the joint All-Flash appliance + Commvault solution delivers enhanced platform security through integrated hardware anchored protection mechanisms. The DD9910F secures the system startup sequence by leveraging Secure Boot and a Hardware Root of Trust, ensuring that only authenticated and unaltered Data Domain Operating System (DDOS) components are loaded. This hardware verified chain of trust also prevents unauthorized BIOS level modifications, strengthening resilience against low level compromise attempts.

The DD9910F platform further supports a modern security architecture with features such as Multi-Factor Authentication (MFA), Single Sign-On (SSO), and built-in Zero Trust principles. To maintain data fidelity and eliminate the risk of tampering, the solution incorporates advanced safeguards including immutability, end-to-end encryption, secure

and encrypted transport protocols, and multiple tamper-resistance controls. These include recurring and consecutive Secure Period capabilities, which define protected operational windows to mitigate cyber-attack exposure and reinforce data integrity.

Resilient Data Architecture

The combined DD9910F–Commvault solution strengthens enterprise data resiliency through the DD9910F's Data Invulnerability Architecture (DIA), which delivers true end-to-end data verification—an industry-exclusive capability. By continuously validating data throughout its lifecycle, this architecture ensures that all information stored, managed, and recovered through the solution remains accurate, uncompromised, and highly dependable. Together, DD9910F and Commvault provide a trusted, corruption-resistant foundation that safeguards critical datasets and reinforces the reliability of the entire data-protection environment.

Testing Framework

The goal of the testing effort was to jointly conduct performance benchmark testing between Dell Technologies and Commvault. The primary objective was to validate restore performance using the Commvault backup application.

Testing Scope

Includes Full, Incremental, and Synthetic Full backups and restores for VM, SQL, and NAS workloads.

Test Execution Strategy

The following sequence was executed to validate the restore performance:

Full Backup of all workloads (VM, SQL, NAS).

Full Restore of all workloads at the same time.

Incremental Backups for 30 consecutive days with defined change rate.

Restore (out-of-place) of all workloads after incremental backups.

Synthetic Full backup of all workloads.

Restore workloads after Synthetic Full Backup.

Testbed Environment Summary

This section provides a comprehensive overview of the complete environment and workload configurations used for testing. This includes hardware specifications, virtualization setup, software versions, and dataset characteristics designed to simulate realistic production scenarios.

Overview

This table outlines the complete physical and virtual infrastructure used in the test environment. It includes server hardware specifications, operating systems, Commvault version details, ESXi host configuration, and the specifications of both Linux and Windows virtual clients. This information provides a clear view of the compute and virtualization setup utilized in the test environment.

Note: All testing leveraged the native Data Domain Boost integration between Commvault and the PowerProtect Data Domain All-Flash appliance, providing a fully optimized, client-side accelerated data path for backup and restore operations.

Category	Attribute	Value
Data Domain	Hardware Model: DD9910F	Capacity: 544TBu
Physical Hardware for Commvault	Hardware	4× PowerEdge R660
	CPU	2× Intel Xeon Gold 6548N (32 Cores / 64 Logical CPUs per server)
	RAM	512GB per server
	OS	Linux for Comm Serv & Media Agents
	Commvault Version	11.42.70
Storage (Physical) for Backup & Restore	NAS Array	PowerStore 5200T
Hardware for VM Clients	ESXi	VMware ESXi 8.0.3, Build 24674464
	Hosts	9× PowerEdge R740
Physical Hardware for SQL Client	SQL Server	PowerEdge R760 (2× Xeon Platinum 8462Y+, 64 Cores / 128 Logical CPUs, 1024GB RAM)
	SQL OS	Windows Server 2025
Virtual Clients (Linux)	Count	54 Linux VMs
	Specs	4 vCPU, 8GB RAM, Rocky Linux 9.5
Virtual Clients (Windows)	Count	54 Windows VMs
	Specs	4 vCPU, 8GB RAM, Windows Server Core 2019

Infrastructure Components

The following table provides an overview of all core infrastructure elements deployed for the Commvault environment. It outlines the CommServer, Media Agents, VSA Nodes, and Access Nodes allocated for both VM and NAS workloads, offering a clear breakdown of the components involved in data protection operations.

Component Type	Quantity	Description
CommServer (Physical)	1	Commvault Central management server
Media Agents	3	For handling data movement & storage operations
Total VSA Access Nodes (VMs)	16	Virtual Server Agent nodes

Component Type	Quantity	Description
VSA Access Nodes – VM Workload	12	Access nodes dedicated for VM operations
VSA Access Nodes – NAS Workload	4	Access nodes dedicated for NAS operations

Workloads

The table below outlines the different workloads selected for evaluation, detailing their data sizes and attributes to simulate diverse operational scenarios.

Workload	Data Size	Characteristics
VM	90 VM's (5.5 TB)	Multiple virtual machines
SQL	10 DB (1 TB each)	Simple
NAS	10 TB	4 File shares 2.5 TB each with mixed file sizes

A dedicated storage unit was provisioned for each of the three workloads.

Evaluation results and Observations

This section provides a consolidated view of the restore performance outcomes, along with key observations derived during testing under ideal conditions.

Peak Restore Performance – All Workloads

Restore Type	Peak Restore Speed (Max.TB/hr)
Full	51 TB/Hr
Incremental	50 TB/Hr
Synthetic Full	50 TB/Hr

Key Settings for VSA Nodes and Media Agents (VM Workload)

The following table lists the configuration parameters that were applied to all VSA nodes and Media Agents to ensure optimized performance for VM workloads. It captures key settings such as VM assignment behaviour and parallel stream limits that influence backup and restore efficiency.

Setting	Value	Notes
bDynamicVMAssignmentAllowed	FALSE	Disables dynamic VM assignment
bStaticVMAssignmentAllowed	TRUE	Enables static VM assignment

Setting	Value	Notes
MaxRestoreStreams	100	Increase parallel restore reads (setting done for 90 VMs)

VM Group Configuration

This section explains the VM Group–level configuration guidelines that help enhance read throughput. It highlights to align the number of readers with the total number of disks on all VM's as a best practise to ensure optimal parallel processing during data protection operations.

Parameter	Configuration
Number of Readers	Equal to the total number of disks on all VM's

Additional System-Level Settings on Commvault

This table outlines systemwide settings and policy requirements that were configured at the CommServer and storage levels. It includes parameters such as Storage Accelerator fallback behaviour, deduplication, and compression settings to maintain performance consistency and storage efficiency.

Setting	Value / Action	Location and Notes
Name: bAllowSAFallbackGlobal **Category:**CommservDB.GxGlobalParam	FALSE	Manage → System → CommCell → Add > Commcell Settings Used to allow Storage Accelerator fallback
Name:VSACreateSeperateAFForEachDisk **Category**: CommServDB.GxGlobalParam	TRUE	Manage → System → CommCell → Add > Commcell Settings Create separate archive file for each disk
Deduplication	Disabled	Ensure deduplication is off on Commvault
Compression	Disabled	CommServ: Storage > Disk > Storage-Unit>Config> Disable Compression Disable compression on Storage Units pertaining to the workloads on Commvault

Conclusion

Extensive benchmarking across different workloads such as VM, SQL, and NAS restore workflows, executed under a wide range of data-change-rate profiles, validates the robustness of the solution's advanced architecture. The test results consistently underscore its ability to deliver strong restore performance up to 51 TB/hr, reinforcing the DD9910F and Commvault combination as a high-efficiency, enterprise-ready platform optimized for the demanding needs of modern data-protection environments.

This combination leverages the advanced capabilities of both technologies to streamline data protection processes, enabling faster backups and restores. The All-Flash architecture of the DD9910F enhances data throughput and reduces latency, while Commvault's robust management features optimize resource utilization and simplify operations. Together, they help minimize downtime, strengthen data security, and significantly cut operational expenses. This integration not only boosts overall performance but also supports business continuity and scalability, making it the solution for modern data centers aiming for peak efficiency and reliability.

References

Documentation

The following documentation provides other information related to this document. Access to these documents depends on your login credentials. If you do not have access to a document, contact your Dell Technologies representative.

- PowerProtect Data Domain Appliances
- Commvault Version 11 Documentation