Oracle ZFS Storage Appliance for Engineered Systems Backup and Restore

MORE PERFORMANCE AND LESS COST FOR ENGINEERED SYSTEMS BACKUP AND RESTORE VERSUS EMC DATA DOMAIN

Your Oracle engineered systems are designed to deliver extreme performance for your Oracle Database, but as data continues to grow—and is used by a growing number of applications and users—you can't afford to let backup and restore windows get longer.

Using third-party systems for engineered systems backup doesn't just make it difficult to hit SLAs, it adds layers of configuration and management complexity, increases downtime, exposes you to greater risk of data loss or corruption, and increases your overall costs.

Here we compare EMC Data Domain Deduplication Storage Systems with Oracle ZFS Storage Appliances—the flagship member of Oracle's Application Engineered Storage portfolio and the only NAS storage system designed specifically to deliver the performance required for the backup and restore of Oracle engineered systems.

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UNIQUE ADVANTAGES OF ORACLE'S APPLICATION ENGINEERED STORAGE

Only Oracle provides application engineered storage—systems co-engineered with Oracle Database and Oracle engineered systems to maximize performance and efficiency, simplify management, and reduce risk to your data and your business.

Oracle ZFS Storage Appliance helps lower risk, complexity, and cost by providing a high-performance backup and restore system that's developed alongside Oracle engineered systems and Oracle Database for complete integration and greater efficiency.

UNBEATABLE BENEFITS

The unique co-engineering between Oracle ZFS Storage Appliance, Oracle engineered systems, and Oracle Database deliver benefits for Oracle Database workloads that cannot be matched by EMC Data Domain systems.

EMC DATA DOMAIN SYSTEMS	ORACLE ZFS STORAGE APPLIANCE
EMC has not published Oracle engineered systems restore results since 2010. And the new DD9500 claims a native backup rate of only 28 TB/hr.	ZS4-4 delivers leading recovery time objective (RTO) speeds for Oracle engineered systems, with native backup and restore throughput rates of 42 TB/hr and 55 TB/hr respectively.
As EMC's own documentation states, "HCC is supported only on Oracle hardware".	Native support for Hybrid Columnar Compression (HCC) for 10x-50x compression ratios and 3x - 8x faster query performance.
Single-purpose backup appliance. No ability to use copies for other processes and no way to access or deduplicate HCC data in RMAN image backups.	Backups can be used for development, test, QA, or analytics with immediate and full access to HCC data from RMAN images without the need for decompression.
Risky and expensive software boost agents are required to achieve deduplication and speed backups – increasing risk, cost and complexity while decreasing host-side performance.	Maintains Oracle Database best practices without any extra software, impacting server performance, or potential security gaps.

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LESS RISK

When you need to backup and restore data, it must happen quickly and securely to get your systems back online as soon as possible, and avoid the risk of lost revenue or SLA non-compliance penalties.

ORACLE ZFS STORAGE APPLIANCE IS DESIGNED TO MINIMIZE THIS RISK, EMC DATA DOMAIN SYSTEMS CAN ACTUALLY INCREASE IT.

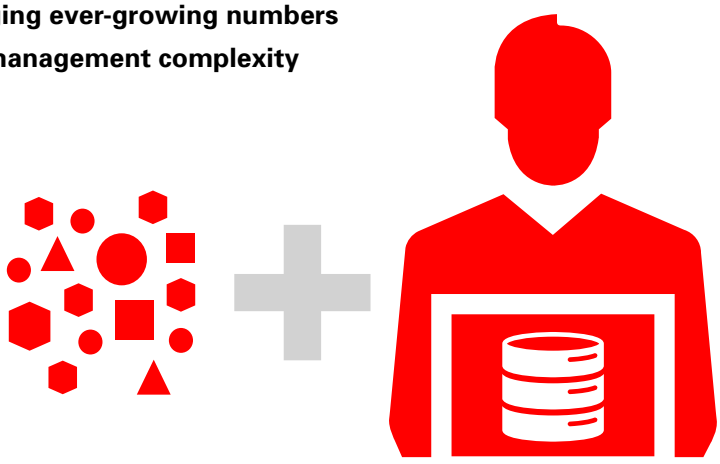
EMC DATA DOMAIN SYSTEMS	ORACLE ZFS STORAGE APPLIANCE
Long native backup and restore times for Oracle engineered systems.	Short native backup and restore windows with DRAM-centric high-throughput architecture, high-speed InfiniBand connectivity and optimized Direct NFS.
Cannot deduplicate encrypted data—so data must be encrypted outside Oracle Database, increasing risk.	HCC compression and data reduction for encrypted data mean you use less capacity and keep data more secure.
A single controller means in the event of a hardware failure or controller software upgrade you can't backup or restore and your data will be unavailable.	Two controllers and a clustered architecture mean even a planned software upgrade won't take your backup and restore system offline.

Oracle ZFS Storage also adds further layers of data protection and integrity. Triple-parity RAID provides robust protection against data loss and data at rest encryption keeps data secure, while end-to-end data integrity is delivered through checksumming and predictive self-healing features. And for long-term archiving, Oracle ZFS Storage Appliance is also integrated with Oracle's StorageTek tape products to offer a cost-effective tiered storage solution for an additional layer of data protection, or for long-term data retention to address regulatory compliance.

LESS COMPLEXITY

Adding more and more EMC Data Domain systems as business needs grow simply isn't sustainable. The complexity of setting up and managing ever-growing numbers of third-party appliances creates huge inefficiencies and management complexity while increasing costs and risk.

Because it is purpose-built for Oracle engineered systems, Oracle ZFS Storage Appliance streamlines deployment, takes advantage of your existing management expertise, and provides the scalability, performance and efficiency to reduce the amount of storage you need—and the amount of time you spend managing it.



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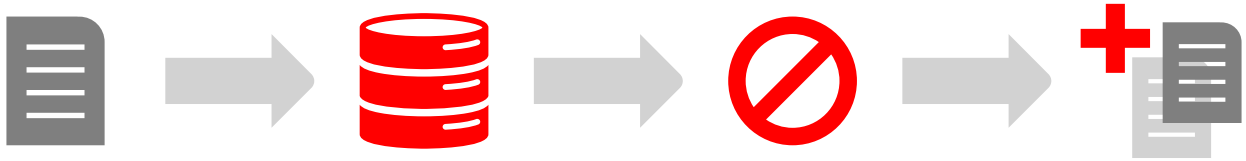
EMC DATA DOMAIN SYSTEMS	ORACLE ZFS STORAGE APPLIANCE
Inferior performance and deduplication leads to storage sprawl as more equipment is needed to meet capacity demand.	HCC 10x-50x compression and higher throughput performance reduces backup and secondary processing footprints.
By trying to emulate RMAN capabilities, additional software, boost agents, and media servers increase break-points, complexity, and risk in the engineered system environment.	Directly leverages your existing RMAN backup/restore strategies, so you can leverage your existing Oracle Database knowledge without adding further management complexity or software.
DD9500 has a maximum capacity of 864 TB; when more capacity is needed additional systems need to be deployed.	ZS4-4 scales to 3.5 PB within one system, providing ample capacity to meet your backup, dev/test, and analytics needs.

WHY EMC DATA DOMAIN DEDUPLICATION IS THE WRONG FIT FOR ORACLE DATABASE BACKUP

One of the key features of a relational database is that it only stores data once, but deduplication only works if the same data block is backed up multiple times.

That means a single full database backup won't deduplicate—deduplication will only work for unchanged data that's backed up multiple times. EMC's answer is daily full backups. Deduplication also doesn't work on encrypted database data, or on incremental backups and archive logs, because they're unique data blocks. EMC's answer is turn off Oracle Database encryption. Are you willing to take the risk?

Restore rates are also much slower with deduplication, since you may have to rehydrate the data, read and restore the full backup and then apply all incrementals to restore complete information—requiring a lot of additional processing, and without the speed of InfiniBand connectivity available on the Oracle ZFS Storage Appliance.



WHY ORACLE ZFS STORAGE APPLIANCE AND ORACLE RMAN MAKE MORE SENSE

With Oracle ZFS Storage Appliance you can maintain RMAN best practices to minimize your storage footprint and accelerate backup/restore rates. Oracle RMAN is database-aware, operating an "incremental forever" approach to only backup changed data blocks—optimizing storage space and database performance.

RMAN also works with encrypted data, and restores quickly through a full backup and incremental merge, with no additional processing required and no performance impact on production databases.

The combination of RMAN and HCC data compression provides remarkable reductions in storage footprint and costs—with 3x - 5x savings achieved by customers. The HCC advantage is available only on Oracle storage systems, not on any third-party storage, including EMC Data Domain systems.

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LESS COST

Slower performance, less capacity, increased management complexity, and poor compression capabilities mean that using EMC Data Domain systems on Oracle Database workloads can lead to higher capital and operating costs for engineered systems backup.

EMC DATA DOMAIN SYSTEMS	ORACLE ZFS STORAGE APPLIANCE
Storage sprawl and numerous integration points add up to higher CapEx and OpEx.	Superior performance and efficiency mean fewer systems and software components are required—lowering capital and operational costs.
Limited storage analytics visibility restricts ability to resolve bottlenecks and improve system performance—and get costs down.	DTrace Analytics provides unparalleled visibility into all backup and restore activities and provides Oracle Database 12*c* detailed visibility even into pluggable databases.
Need to add more storage systems for secondary processing.	Snap Management Utility for Oracle Database and Enterprise Manager Cloud Control 12*c* integration simplifies the snap/clone process and enables backups and HCC compressed data to be used for secondary processing.

MORE COMPRESSION MEANS LOWER COSTS

The unmatched data compression on Oracle ZFS Storage and engineered systems significantly reduces the amount of capacity you need to purchase for your Oracle Database workloads and backup/restore operations saving you time and money.

Oracle ZFS Storage Appliance delivers further cost savings in many ways, since:

- You can leverage existing management skills—no special training required
- You can maintain Oracle Database and RMAN best practices for encryption, backup and restore
- DBAs can manage the entire system through Oracle Enterprise Manager 12*c*—no third-party software needed
- Direct connection to engineered systems via InfiniBand means faster backup/restore operations, and fewer systems and networking components to manage
- No deduplication overhead means you can maximize database and application performance
- You don't need to purchase database server-based software agents, reducing complexity, cost, and risk
- You can extend the value of your multi-function Oracle ZFS Storage Appliance and your backup copies – using them for development, test, QA, analytics, and more.

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IT'S TIME TO RETHINK YOUR ORACLE DATABASE AND ENGINEERED SYSTEMS BACKUP STRATEGY

It's a simple choice—do you want slower systems that increase business risk and data center costs? Or do you want high-performance, deeply co-engineered, multi-function systems that enhance data protection and integrity, and support secondary processing while reducing storage overheads and costs?

With Oracle ZFS Storage Appliance you get:

- **Lower risk:** Faster performance dramatically reduces backup/restore windows and system downtime, and end-to-end security is maintained
- **Lower complexity:** Fewer storage systems eliminate sprawl, and advanced storage analytics means you can understand and optimize your systems
- **Lower TCO:** No agent software to purchase, superior storage efficiency, re-use of backup data for secondary processing, and streamlined systems management significantly reduce capital and operating costs

LEARN MORE

Discover how Oracle ZFS Storage Appliance can help you better and more cost-effectively protect your Oracle Database data and gain even more business value from your Oracle engineered systems. Visit **www.oracle.com/zfsstorage** to learn more.

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