Microsoft SQL Server

Datrium®

Highlights

- Deploy production level, virtualized SQL database solutions with Always-On Availability Groups (AOAG)
- Support mixed SQL database workloads (OLTP/OLAP) with lower latency and higher performance
- Simpler, VM-centric, database storage management with vDisks – no LUNs to manage
- Faster development alternatives with vStorage API for Array Integration (VAAI) cloning and a common shared datastore
- Isolated host workloads and extensive VM-level analytics improve monitoring and troubleshooting
- Blanket Encryption provides enhanced data security throughout the infrastructure
- Built-in backup and disaster recovery (DR) provide additional protection options
- On-demand DR to the public cloud leveraging VMware Cloud

With the Datrium Automatrix platform and Microsoft SQL Server Always-On Availability Groups, IT and SQL Server administrators have the right mix of performance, availability, manageability, and economics to meet the demanding needs of database applications in today's modern virtualized data centers. Datrium DRaaS with VMware Cloud delivers failproof DR for SQL. It enables enterprises to leverage the cloud for their DR needs and only pay when disaster strikes.

The Challenge

With the latest Microsoft SQL Server versions, using features like AOAG to support production-level databases has made Microsoft SQL Server an incredibly robust relational database platform for virtualization. However, with traditional LUN-based storage solutions, IT and database administrators still face increased complexity when virtualizing applications such as Microsoft SQL Server. Performance troubleshooting is a challenge because the application VM, ESX host, and storage are typically managed separately. That configuration lacks VM awareness at the storage level, and there's no simple workload isolation to the host or application VM. Data growth or consolidation of databases is often more problematic with LUN-based solutions because they need to consider sizing, placement, and performance. Scaling performance and ensuring application availability in a mixed workload environment is often unpredictable or hard to control.
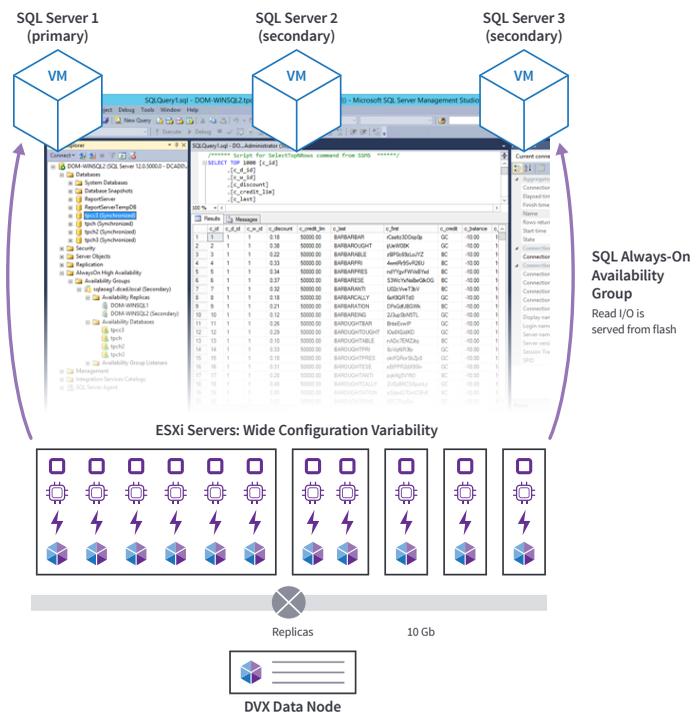

Figure 1 – Microsoft SQL Server Always-On Availability Groups on Datrium DVX

DR is an additional challenge for organizations using SQL Server. Traditional DR is expensive, complex, and unreliable, yet DR has never been more important given the rising threat of ransomware attacks, power outages, and other natural disasters.

The Solution

The key components of a Datrium DVX solution with Microsoft SQL Server are shown in Figure 1. Depending on your specific needs for data center virtualization storage and data protection, you can deploy a single DVX for local site configuration (as shown) or leverage a secondary DVX site as you scale. This solution leverages a single shared data store across hosts and VMs at each site while servicing the bulk of the I/O workload from flash in the hosts.

DRaaS with VMware Cloud provides on-demand DR that you only pay for if disaster strikes. It includes cloud backup, DR orchestration, and VMware Cloud as fully managed services from Datrium. It eliminates the need for costly physical DR sites, keeps data safe and secure, and enables users to execute failover and failback confidently.

Key Benefits

World-Class Performance for Microsoft SQL Server

With DVX, application I/O performance is accelerated, and latency is reduced by leveraging abundant and affordable local flash on the host. I/O processing and active data resources are server-based, which means the solution gets faster as you add servers – providing more compute and local flash capabilities to the overall system. Your servers deliver I/O processing resources, and reads stay local on host flash for maximum speed. VM performance benefits from flash-resident transactions now have 50-80% lower latency and up to 5x faster SQL queries than traditional SAN-based alternatives. The DVX architecture provides the ultimate server and flash placement flexibility for applications and performance improvements where needed. Easily consolidate virtualized SQL Server OLTP (transactional) and OLAP (analytical) databases into a single virtualized solution and never deal with complex and time-consuming LUN provisioning or LUN tuning again.

VM-Centric Management

The DVX user interface is integrated into vCenter, so you can focus on your application VMs and get real-time VM analytics. Spend more time managing your VMs and database applications instead of managing the storage. DVX is simpler to manage at scale compared to LUN-based storage solutions. Host workloads are isolated from other hosts and allow for the application VMs on those hosts to take full advantage of the local resources. That means you can consolidate diverse workloads across hosts without risking SLA compromises. Get more predictable performance and visibility with real-time VM analytics.

Built-In Capacity Efficiency Delivers Improved Economics

With DVX, capacity efficiency is leveraged through always-on compression and deduplication. DVX supports up to 32 TB per host of raw flash capacity. That translates to 30-100 TB of effective capacity after deduplication and compression, and it addresses the majority of your database applications on each host. With this amount of capacity and host flexibility, you can easily scale out your databases or availability groups as your application data grows.

High Availability and Predictability

DVX helps eliminate single points of failure for enterprise applications such as Microsoft SQL Server. When deployed with AOAGs, each host server keeps the same deduplicated and compressed data in its local flash through typical SQL Server Always-On activities. If the primary host fails, the secondary host picks up immediately, and its local flash is completely up to date to take over processing at the same level of performance and efficiency as the primary. Figure 2 shows two SQL dual node clusters and the Datrium VM performance information associated with the current configuration.
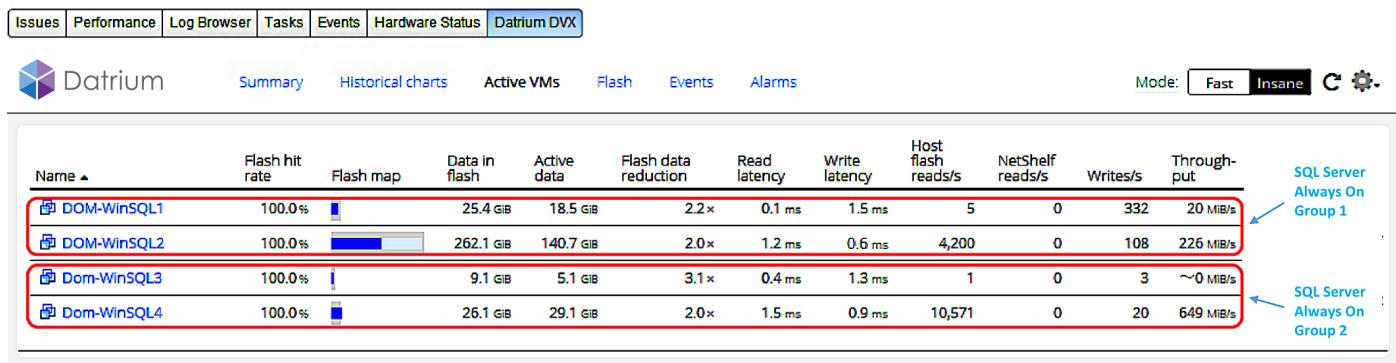
| Issues | Performance | Log Browser | Tasks | Events | Hardware Status | Datrium DVX |

Datrium Summary Historical charts **Active VMs** Flash Events Alarms Mode: Fast Insane

Name ▲	Flash hit rate	Flash map	Data in flash	Active data	Flash data reduction	Read latency	Write latency	Host flash reads/s	NetShelf reads/s	Writes/s	Through-put	
DOM-WinSQL1	100.0%		25.4 GiB	18.5 GiB	2.2×	0.1 ms	1.5 ms	5	0	332	20 MiB/s	**SQL Server Always On Group 1**
DOM-WinSQL2	100.0%		262.1 GiB	140.7 GiB	2.0×	1.2 ms	0.6 ms	4,200	0	108	226 MiB/s	
Dom-WinSQL3	100.0%		9.1 GiB	5.1 GiB	3.1×	0.4 ms	1.3 ms	1	0	3	~0 MiB/s	**SQL Server Always On Group 2**
Dom-WinSQL4	100.0%		26.1 GiB	29.1 GiB	2.0×	1.5 ms	0.9 ms	10,571	0	20	649 MiB/s	

Figure 2 – Datrium VM-Centric Management

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Security Without Compromises

DVX enables data encryption at the host, network, storage, and backup levels without sacrificing the economics of data reduction services or performance impact.

Backup, Recover, and Share Data More Efficiently

Protection Group capabilities with Volume Shadow Copy Service (VSS) provide another level of data recoverability and sharing beyond the basic AOAG features. With efficient VSS capabilities and converged primary and backup data on the same system, administrators and developers have easier access to the current and previous copies of critical application data sets.

DRaaS with VMware Cloud

On-demand DRaaS delivers up to 10x more cost-efficient DR. It enables failover from low-RPO VM backups in S3 to an on-demand SDDC in VMware Cloud using DR plans managed by ControlShift. This functionality allows you to store backups in S3 at low cost, and pay for the DR sites only when you need to test or run DR plans.

You can recover from recent snapshots or backups from months or years ago. With converged backup and DR, you can choose from millions of point-in-time consistent recovery points. This functionality is critical for ransomware attacks, which often only become apparent months after the initial event.

With DRaaS, you can be sure your DR is going to work when you need it most. ControlShift automatically checks your plan every 30 minutes for health and compliance. You can efficiently fail back with minimal AWS egress charges by transferring only changed and globally deduplicated data. Similar to failover, failback is fully automated.

Simplify the management of your on-premises and DR sites. DRaaS maintains VMs in their native vSphere format and eliminates the need for brittle and time-consuming VM disk format conversions. Manage both your cloud DR site and primary site with vCenter and retain access to familiar abstractions such as clusters, resource pools, data stores, virtual switches, and port groups following a failover.

With DRaaS, you get a complete solution that delivers comprehensive support, simplified purchasing, and billing. Eliminate the cost and friction caused by multiple point products. You get everything you need for failproof, on-demand DR to the public cloud in one solution.

In addition to DRaaS with VMware Cloud on AWS, Datrium offers products to enable failover to a secondary physical site. Datrium ControlShift delivers one-click failover and failback between sites. It provides instant RTO and RPO, so you can restart your critical data in minutes, and minimize downtime.