



# All-Flash Hyper-Converged SQL Private Cloud

## High Performance, Low TCO

Gridstore offers the only affordable All-Flash HyperConverged Appliance that delivers predictable high performance to SQL Server databases running in a Microsoft Cloud-Inspired Data Center. The ability to deliver precise and predictable IOPS per VM allows enterprises to confidently consolidate physical servers into a SQL private cloud that minimizes cost of ownership through consolidation of infrastructure and that maximizes flexibility, availability and scalability.

### Benefits

- Consolidate SQL server infrastructure
- All-flash high performance for SQL I/O
- Deliver predictable and precise IOPS per SQL VM
- Increase availability, agility and scalability

### Microsoft Partner

Gold OEM

“ESG LAB HAS CONFIRMED THAT GRIDSTORE OFFERS PREDICTABLE SCALABILITY WITH LOW RESPONSE TIMES WHILE PROVIDING EXTREMELY SCALABLE CAPACITY....”

– ESG Research Report  
ESG Lab Validation Report: Gridstore 3  
January 2014

### Affordable All-Flash Performance

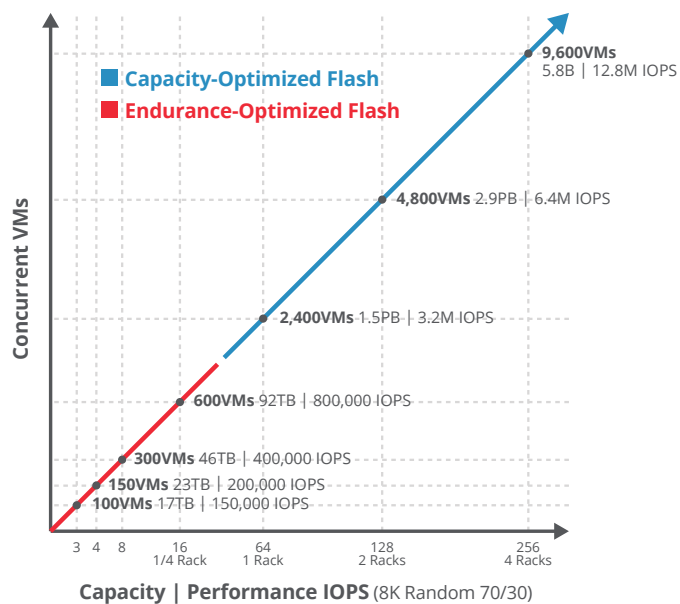
Gridstore leverages a patented architecture to deliver an all-flash hyper-converged infrastructure at 50% lower cost than alternatives. Reducing the required infrastructure footprint translates directly into higher consolidation ratios and lower SQL Server licensing costs.

Gridstore All-Flash HyperConverged Appliances put flash performance as close to the workload as possible. Unlike hybrid storage solutions where latency spikes to spinning disk levels with a cache miss, an all-flash SQL private cloud guarantees high IOPS and low latency for 100% of your I/O. Gridstore's unique end-to-end flash architecture delivers:

- **Low-latency elastic flash cache.** One or more SSDs in each HyperConverged Node can be allocated to provide a server-side read cache that delivers micro-second latency for reads
- **Per-VM cache control.** SQL admins have complete control over which VMs (SQL database) are utilizing the flash cache to minimize latency. OLTP workloads can maximize use of flash cache while OLAP workloads can maximize data throughput and fast table scans from flash storage
- **Fast writes to flash.** Flash cache offloads reads from storage and frees resources to maximize write performance with lower latency

*Gridstore HCA performance scales linearly as you add nodes to the grid. Start with as few as three nodes and scale to 256 with 5.8PB of capacity and 12.8M IOPS.*

*Average server VM = 3.5GB RAM, 2 vCPUs, 250GB disk*



## Lower TCO with SQL Private Cloud

The performance impact and unpredictable performance when SQL Server is virtualized has been a major barrier to enterprises trying to consolidate SQL workloads in virtual environments. SQL Server sprawl across physical servers drives higher costs due to low utilization of servers sized for peak workloads and licensed per-core. Gridstore is purpose-built for virtualized environments and allows enterprises to virtualize SQL server while delivering precise and predictable high performance I/O to each SQL workload.

- **Precise and predictable performance for virtualized SQL workloads.** Gridstore per-VM I/O control leverages a patented architecture to deliver precise and predictable IOPS per VM. SQL admins can dial in a minimum or specific amount of IOPS at VM granularity to ensure that virtualized SQL workloads perform optimally and are never impacted by other VMs.
- **Minimize infrastructure sprawl.** With Gridstore's per-VM I/O control, you can confidently build a SQL private cloud that maximizes core utilization from a shared compute pool and minimizes infrastructure through both physical server consolidation and resource management for virtual servers. SQL workload performance is not impacted when it is virtualized and it allows enterprises to maximize the utilization of their compute pool and SQL instances.
- **Increased flexibility, agility and availability.** A SQL private cloud provides the ability to easily increase shared compute and storage resources incrementally while pay as you scale provides greater flexibility and agility to enterprises.

### Linear and Independent Scaling of Performance and Capacity

Gridstore's unique ability to control I/O per-VM in n SQL private cloud allows you to run both OLTP and OLAP applications in the same cloud without impacting, limiting or compromising each other. This unique architecture also allows each of these workloads to be scaled independently as required.

Gridstore HyperConverged Appliances allow you to mix and match up to four nodes in each 2U appliance. The node can be either Compute and/or Storage-Only and starts with a minimum of three nodes, and can scale to 256. Single-pane-of-glass management is with the Gridstore UI or Microsoft System Center.

### Recommended SQL Server (OLTP) Configurations

For optimal performance, starting SQL Server environments should consist of at least two Compute/Storage nodes. This provides clustering and 24 CPU cores per server with 256GB of memory and 5.76TB of raw SSD storage. One or two additional Storage-Only nodes can be added to provide an additional 5.76TB of raw SSD storage each. With four nodes comprised of two Compute/Storage and two Storage-Only, there will be a total of 48 CPU cores, 512GB of memory, and 23TB of raw (15TB usable\*) flash storage.

Alternately, for additional server power for your most demanding environments, all four nodes can be Compute/Storage, each with 24 CPU cores, 512GB of memory and 5.76TB of raw storage. This totals 96 CPU cores, 2048GB of memory, and a total of 23TB of raw (15TB usable\*) flash storage.

### Recommended Data Warehouse (OLAP) Configurations

Starting data warehouse environments should consider having a minimum of two Compute/Storage nodes and one Storage-only node in the Hyperconverged Appliance. This provides a clustered server environment for running applications and 9.9TB of usable SSD storage that can be used for storage or local flash caches to accelerate performance. . Optionally, customers can choose higher capacity drives that are well-suited to a read-intensive environment, either 1.92TB or 3.84TB each. A minimum configuration of two Compute/Storage nodes and one Storage-only node would offer either 46.08 or 92.16TB total in a single appliance, that can be granularly scaled up to 256 nodes in a single pool of approximately either 3PB or nearly 6PB of storage capacity.



All-Flash  
HyperConverged  
Appliance

\* Usable capacity excluding file system, metadata and conversion from TB to TiB

## Leveraging SQL Server 2014 Features for Backup and DR



### Enhancements to AlwaysOn Availability Groups

Due to Gridstore's tight integration with Windows and Hyper-V, SQL Server AlwaysOn functionality is leveraged by the Gridstore solution. In order to provide disaster recovery as well as read access for local SQL server databases on Microsoft Azure in SQL Server 2014, Microsoft has enhanced AlwaysOn integration with Windows Azure AlwaysOn integration. This new integration feature enables you to create asynchronous availability group replicas in Windows Azure for disaster recovery. In the event of a local database outage, you can run your SQL Server databases from Windows Azure VMs.

### SQL Server Managed Backup to Windows Azure

With SQL Server Managed Backup to Windows Azure, you do not have to specify the type or frequency of the backups for a database. Specify the retention period, and SQL Server Managed Backup to Windows Azure determines the type and frequency of backups for a database, then schedules, performs and maintains the backups on Windows Azure Blob storage service. SQL Server Managed Backup to Windows Azure can be configured at the database level or configured with default settings for an instance of SQL Server.

## Key Highlights

### ■ Deliver high performance precisely where you want it

Gridstore's All-Flash HyperConverged Appliance is purpose-built infrastructure for virtualized environments that delivers precise and predictable high performance to SQL Server VMs. Gridstore puts flash storage as close to the workload as possible to drive the best performance with the lowest latencies. Through a patented architecture, Gridstore uniquely controls I/O from VM through to storage to deliver storage IOPS with per-VM granularity. SQL application performance can be prioritized on a per-VM basis to deliver highest levels of service to the most business-critical applications and limits the impact of noisy and low-priority applications running in a private cloud environment.

### ■ Lower TCO and simplify infrastructure with a hyperconverged private cloud

A Gridstore hyper-converged private cloud radically simplifies the infrastructure by combining the compute and storage layers into a single, scalable building block. These simple, hyper-converged building blocks allow you to pay-as-you-grow

your SQL private cloud. This eliminates the upfront capital cost, as well as the ongoing operating cost and complexity of multiple layers of loosely integrated infrastructure that requires constant management and tweaking to scale. Eliminating separate infrastructure layers also greatly simplifies management of the private cloud infrastructure by consolidating and generalizing management skills to reduce operating costs even further.

### ■ SQL private cloud lowers costs and increases performance, agility and efficiency

Consolidating physical SQL environments into an SQL private cloud can reduce costs significantly through lower per-core licensing costs while improving IT agility to respond to business demands. A Gridstore All-Flash HyperConverged Appliance-based SQL private cloud can uniquely deliver precise performance to SQL VMs to ensure business-critical apps run optimally while taking advantage of the economic efficiencies of the private cloud.



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