STORAGE CAPACITY AND PERFORMANCE FOR VMWARE VSAN™ PLATFORMS

SOLUTION BRIEF

The VMware vSAN™ (formerly Virtual SAN) software platform enables systems architects to build private clouds with a hyper-converged, scale-out storage model. This model removes the need for a costly and high-latency external SAN, but it places the burden of storage design and performance management on the administrator. By using HGST's Ultrastar® SSDs for performance and Ultrastar HDDs for capacity in a hybrid approach, or using Skyhawk™ NVMe SSDs with Ultrastar SAS SSDs for an ultra-performance, all-flash configuration, administrators can tune storage performance and capacity for individual needs.

HGST's Ultrastar HDDs and SSDs coupled with Skyhawk Ultra NVMe™-compliant SSDs from the SanDisk® brand can meet the needs of vSAN architects by providing storage for everything from cost-effective, high-capacity hybrid clusters to ultra-performance, all-flash rollouts.

What HGST- and SanDisk-brand storage devices can do for your business

- Enable cost-effective hybrid vSAN storage solutions, combining the best of SSD and HDD
- Turbocharge all-flash vSAN clusters for database and performance-sensitive applications
- Provide pre-built virtualization solutions via major OEM partners

SanDisk®

VMware vSAN 6 is a software-based storage solution for VMware® hyper-converged systems. Integrated with the VMware hypervisor, it provides a scalable, tunable storage subsystem for on-premises virtualized clusters. Each node provides storage to a shared pool, as well as CPU resources for running virtual machines. Depending upon customer needs, this storage can be configured as a hybrid subsystem, with a relatively smaller flash caching tier fronting a much larger hard-drive-based capacity tier; or it can run completely on flash for the highest performance and lowest latency. The hyper-converged aspect effectively moves the storage control from a traditional storage administrator and places it in the hands of the virtualization team.

This transfer of responsibility from traditional SAN administrator to virtualization team is generally a good thing and allows for more dynamic and responsive storage provisioning. Unfortunately, it also makes the virtualization team responsible for things traditionally out of their domain of concern, such as storage performance and capacity.

Pain Point: Cost-Effectively Scaling VM Storage Capacity

In most data centers, it's a fact of life that data grows to fill all available space. Unfortunately, it's also a fact of life that the available power budget and rack space are a fixed quantity. Scaling out servers just to meet storage requirements is wasteful, or even impossible in many cases.

Scaling storage capacity while maintaining an optimum footprint requires the highest-density hard disk drives available to provide maximum storage in a minimum footprint. HGST's Ultrastar He10 and He12 hard drives with HelioSeal® technology provide the densest HDD storage available to help meet this challenge. (Note that VMware vSAN 6.5 or later is required to support these 512e high-capacity drives. Earlier releases cannot support drives of this technology generation.) Because fewer high-density hard drives are needed for capacity, there is also an urgent need for a flash caching tier to speed up access to this higher capacity. VMware vSAN can natively use a high-performance, write-optimized SAS SSD, such as HGST's Ultrastar SS200, to enable seamless caching in the cluster.

Pain Point: Unpredictability and Low Performance for Virtualized Databases

As organizations embrace virtualization, more and more applications move from individually managed, bare-metal hardware to virtual instances on vSAN clusters.

In doing so, application administrators gain great benefits, among them fault tolerance and high availability at the instance level. For example, when compared to an expensive, flash-based SAN, a database run on bare metal may need a cold standby to guarantee service continuity in the case of hardware failure. This doubles the hardware cost and doesn't allow the standby server hardware to be used productively in normal operations. Migrating that bare-metal server to a virtual instance in a vSAN cluster can allow you to seamlessly migrate it elsewhere should maintenance or hardware failure occur, and it removes the need for a SAN.

Why aren't more databases virtualized, then, if the cost savings and ease of administration are so great? The reason is simple: performance. While it is possible to configure the virtualization infrastructure to guarantee CPU performance for a virtual database instance, without an all-flash backing SAN these instances could end up waiting on disk I/O. VMware vSAN, thankfully, provides just such a mode of all-flash operation. In this case, capacity SSDs are fronted by an even faster set of lower-capacity, higher-write-endurance and higher-performance SSDs. A combination of HGST's read-intensive Ultrastar SS200 SAS drives for capacity, with an even higher-performance, write-optimized Skyhawk Ultra NVMe SSD from the SanDisk brand as a caching tier, can provide exceptional performance and minimal latency to database and other latency-sensitive applications.

Pain Point: Rolling Your Own Private Cloud Is Too Complicated

VMware's product portfolio comprises nearly a hundred tools and solutions, so choosing among them can be daunting for experienced system architects, let alone newcomers. Since software requires hardware to run on, the architect must also specify a set of servers, network, and storage from a trusted vendor and integrate software and hardware into a virtualization solution. VMware vSAN simplifies this task somewhat, yet it's still a significant investment in time and effort to create and maintain this home-built cloud.

VMware identified this problem early and created the VMware vSAN ReadyNode™, which allows major OEMs and systems integrators to build pre-configured nodes, networking, and storage that are guaranteed to work seamlessly with VMware vSAN. Instead of worrying about the nuts and bolts of specific storage, compute, and network components, systems architects can simply decide if they need all-flash or a hybrid solutions and let OEMs worry about configuring things properly. HGST- and SanDisk-brand products have been certified and are available at major OEMs such as HPE, Supermicro, Lenovo, and Huawei, among others.

Summary

VMware vSAN provides a platform for implementing virtualization on a hyper-converged infrastructure, but it needs proper storage components to work best. HGST-brand HDDs combined with HGST- and SanDisk-brand SSDs can provide the capacity and cost savings of a hybrid approach for many vSAN clusters. For the highest-performance applications, such as databases, consider an all-flash vSAN cluster powered with HGST- and SanDisk-brand SSDs.

	HGST SSD	SanDisk SSD	HGST HDD
Pain Point	**Ultrastar® SS200 SAS**	**Skyhawk™ Ultra NVMe**	**Ultrastar® Helium SAS**
Cost-effectively scaling VM storage capacity	★★		★★★
Unpredictability and low performance for virtualized databases	★★	★★	
Rolling your own private cloud is too complicated	★★	★★	★★
	Legend: ★Good ★★ Better ★★★ Best		

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