VergeOS Proves Storage Leadership with Solidigm SSD Validation

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TESTING CONFIRMS PLATFORM READINESS FOR ENTERPRISE WORKLOAD

Solidigm conducted comprehensive testing of VergeIO's VergeOS platform to validate its performance, resilience, and efficiency using server SSDs. The testing positioned VergeOS as a replacement for traditional storage arrays and hypervisors while supporting rapid adoption of new SSD technologies.

This validation matters for Solidigm. VergeOS reduces customer dependence on external storage arrays and promotes server-based SSD deployment. The platform's software abstraction layer supports new Solidigm SSD technologies with minimal integration time. VergeOS also targets growing markets, including private cloud, edge computing, and AI workloads, through its VergeIQ component.

PLATFORM ARCHITECTURE

VergeOS operates as an ultraconverged infrastructure platform that integrates compute, storage, and networking into a single software environment. The platform operates independently, without the need for external hypervisors or third-party storage solutions. VergeOS features global resource orchestration, inline deduplication, distributed mirrored storage, and automated VM migration with backup and disaster recovery capabilities.

VergeOS integrates AI through VergeIQ into the core software. This enables not only chat with infrastructure functionality but also allows customers to deploy complete AI workloads "as a service" within the same platform, also managing traditional virtualized environments. From day one, customers can use VergeIQ to deliver a private, ChatGPT-like experience against their proprietary dataset without risk of data exposure.

Testing demonstrated consistent low-latency performance and high IOPS throughput across enterprise workloads that require high availability and performance.

TEST CONFIGURATION

Testing was conducted using HPE ProLiant DL380 Gen11 servers with dual Intel Xeon Gold 6548Y+ processors (32 cores, 64 threads each) and 1024 GB of DDR5-5600 memory. Network infrastructure included dual 100GbE ConnectX-6 Dx adapters for backend storage, dual Broadcom P225p NetXtreme-E 25GbE adapters for VM networks, and dedicated 1GbE management networks.

Each server contained six Solidigm PS1010 7.68 TB PCIe 5.0 TLC SSDs and six D5-P5336 30 TB PCIe 4.0 QLC SSDs. Arista 7060CX-32S switches running EOS 4.33.0F provided the network fabric. VergeOS deployment required only a single image per node for complete node-to-node replication and Virtual Data Center management.
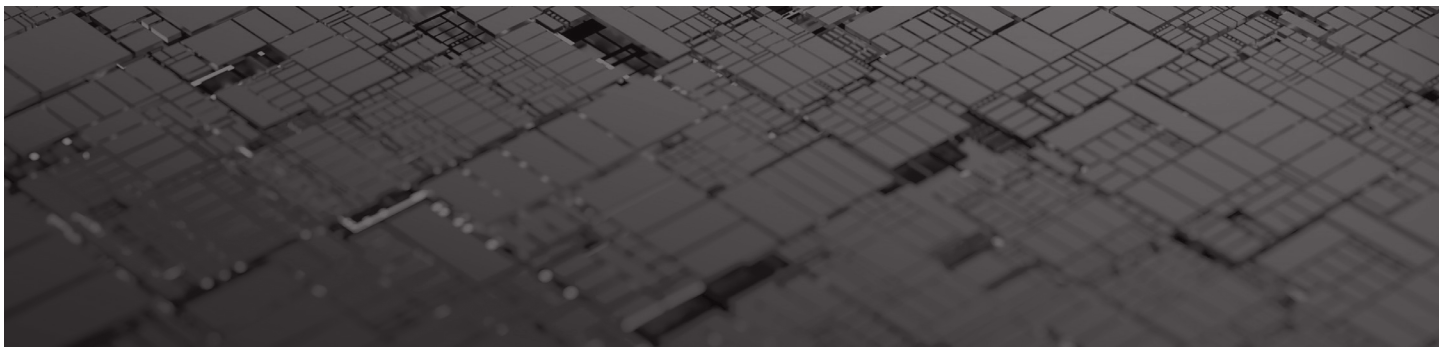
WORKLOAD VALIDATION

Testing included realistic workloads across multiple patterns. VM boot storms simulated random read operations under peak load conditions. Database workloads tested both OLTP transaction processing and OLAP analytics patterns. Sequential data ingestion validated QLC write endurance under sustained load. Mixed workloads ran simultaneously to test resource allocation and performance consistency. Each pattern demonstrated stable performance across sequential read, sequential write, random write, and random read operations.

PERFORMANCE RESULTS

VergeOS delivered more than 1 million IOPS from a six-node cluster with Solidigm SSDs, reaching peak aggregate throughput of 111.76 GB/s. The peak read IOPS reached 1.84 million, with a peak write IOPS of 198,331. Sustained write operations averaged 9.40 GB/s with read latency under 0.6 milliseconds. Network traffic exceeded 1.1 million packets per second across six interfaces.

The platform achieved over one million IOPS with fewer than ten drives, demonstrating the efficiency of Solidigm SSDs compared to traditional storage arrays, which typically require dozens of drives for similar performance. Performance scales linearly as clusters grow beyond test configurations.

VMware and Nutanix avoid publishing performance numbers publicly, claiming that benchmarks are not representative of real-world scenarios. Published test configurations allow customers to recreate results and understand performance expectations.

STORAGE ARCHITECTURE BENEFITS

VergeOS' Global Inline Deduplication is a foundational storage optimization technology that's integrated directly into the core code of the VergeOS ultraconverged infrastructure platform, rather than being a bolt-on feature added later. This integration makes the deduplication process highly efficient with minimal performance impact, eliminating what's often referred to as the "deduplication tax" that affects many other systems. It also means that all aspects of the environment benefit from deduplication, including memory, data protection, and networking.

The "global" aspect of this technology means it can check for data redundancy across multiple VergeOS instances, not just within a single site. The global nature provides significant advantages for organizations with multiple sites or edge locations, as any data redundancy across those sites is only transferred once over the WAN, making remote locations fully protected faster while reducing bandwidth costs. The technology also powers VergeOS' data protection capabilities.

VergeOS also offers live storage migration of virtual machines, addressing challenges associated with high-density drives, such as moving from high-endurance flash drives to high-density drives, for example, Solidigm's 122TB QLC NVMe drives. Organizations can move workloads between storage tiers dynamically for performance optimization and media longevity.

VergeFS automatically distributes data across all drives in a tier, eliminating hot spots. The platform provides detailed reporting on current SSD wear levels with advanced notification if levels get too high. Global inline deduplication achieves 3X to 5X ratios, reducing write amplification and extending SSD lifespan. This deduplication effectiveness is 3 to 5 times more effective than other platforms.

VergeOS supports live migration of VMs between storage tiers, enabling IT teams to move VMs to the most appropriate tier without disruption. This capability addresses QLC SSD performance characteristics while maximizing capacity benefits.

VERGEOS VIRTUAL DATA CENTER TECHNOLOGY

VergeOS Virtual Data Center technology enables the creation of fully isolated, self-contained environments that include their own compute, storage, networking, security policies, and management interfaces—all within a single VergeOS instance. Each VDC operates like an independent data center, allowing organizations to segment resources by tenant, department, project, or workload without managing separate physical infrastructure.

VDCs simplify disaster recovery by encapsulating an entire IT environment into a single, portable virtual data center (VDC). This self-contained structure enables the replication of entire data centers to a secondary site with minimal effort. In the event of a failure, the VDC can be instantly activated on the target infrastructure without complex reconfiguration or manual VM mapping.

VERGEOS INTEGRATED DATA AVAILABILITY AND DATA PROTECTION

With VergeOS, there is no need for RAID controllers or expensive external arrays. Within a site, VergeOS automatically mirrors all data through a process known as synchronous replication. Thanks to VergeOS' built-in Global Inline Deduplication, only unique segments are mirrored, optimizing space efficiency. If a drive fails, synchronous replication ensures that the data is available in real-time to VMs. If a server fails, VergeOS' built-in high availability will automatically restart the VMs on another host. If multiple drives or servers fail, VergeOS' unique ioGuardian capability still provides data access, enabling the platform to surpass even N+2 resilience.

ioReplicate, VergeOS' built-in replication technology, enables scheduled asynchronous replication of Virtual Data Centers between VergeOS environments. Unlike traditional replication tools that require external software and complex configuration, ioReplicate is fully integrated into the platform, allowing complete data centers to be replicated as a single object.

ioClone-powered snapshots enable instant, space-efficient copies of entire virtual machines, tenants, applications, or environments. Unlike traditional snapshot methods that rely on incremental chains or external backup systems, ioClone operates at the storage layer, allowing administrators to create and restore clones in seconds with zero performance impact.

These ioClone-powered snapshots are fully independent yet consume minimal additional capacity, thanks again to global inline deduplication. There is no limit to the number of snapshots that can be maintained, nor to the age of those snapshots, thereby solving the retention problems that most competing snapshot technologies face. VergeOS' snapshot capabilities enable the instant restoration of virtual machines, files, or entire Virtual Data Centers without the delays associated with the restore process of traditional backup tools.

OPERATIONAL EFFICIENCY AND SUPPORT

Operationally, VergeOS has proven to be stable and intuitive. The platform's native, secure, multi-tenant Virtual Data Center (VDC) architecture has enabled them to segment environments by district and use case, enhancing security while offering self-service without compromising oversight. Each technician can spin up isolated test environments within a VDC, which has accelerated learning and experimentation. Support from VergeIO has been "amazing"—responsive, knowledgeable, and consistent. Marsak said, "he wished all his vendors were able to provide the support that VergeIO delivers every day."

SOLIDIGM FAULT TOLERANCE TESTING

An unplanned power failure tested system resilience. VergeOS recovered automatically after power restoration with no data loss and restored VM availability within 90 seconds. Data recovery used synchronous mirroring while VergeOS ioGuardian maintained operation during dual-fault conditions.
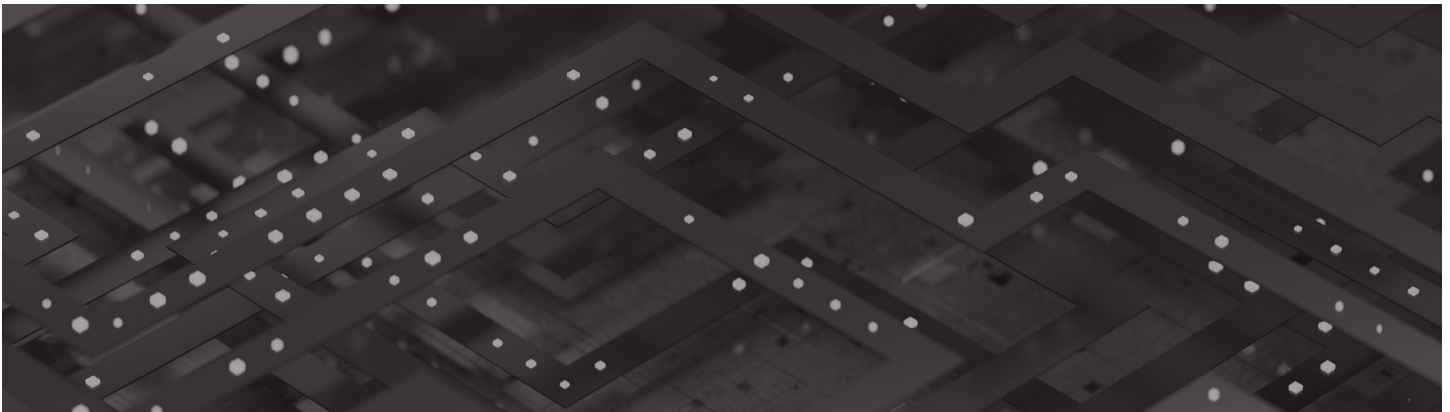
COST EFFICIENCY VALIDATION

Separate testing with consumer-grade AMD Ryzen 9 7940HX CPUs, 96GB RAM, and 25Gbps Ethernet in an 8-node cluster achieved 1.5 million random read IOPS using 64K blocks at a total cost of $10,000, equating to $ 0.67 per IOPS. Response times remained sub-millisecond throughout testing.

Customers report savings of at least 70% versus VMware or Nutanix. Larger customers report hundreds of thousands to millions of dollars in annual savings. Case studies backing these claims are available for review.

LICENSING AND DEPLOYMENT ADVANTAGES

VergeOS licenses per physical server and includes all features in a single license. VMware licenses per core and per module or feature, creating cost complexity. VergeOS includes equivalents to vMotion, DRS, and HA clustering built into a single source code. One license fee opens all capabilities.

VergeOS runs on existing hardware, eliminating hardware wait times unless customers choose to order new systems. Migration from VMware or Nutanix to VergeOS can be completed in an afternoon, regardless of VM count. The ioMigrate utility works via the VMware backup API and supports Changed Block Tracking for near-continuous VM updates during testing and finalization.

Most customers become comfortable with the solution within hours of onboarding training. The platform requires minimal professional services, though support is available if needed.

CUSTOMER VALIDATION

Production deployments demonstrate real-world success:

St. Clair RESA switched to VergeOS to address increasing VMware licensing costs, storage expenses, and server availability challenges. The migration reduced licensing costs, increased server flexibility, enhanced storage ROI, and eliminated the need for backup software licensing.

Lancaster Central School District achieved $150,000 in annual savings while improving performance and resilience by replacing VMware with VergeOS and VergeFS.

Farmaplus modernized infrastructure with VergeIO and Belite, achieving greater efficiency, reduced costs, and seamless scalability for national expansion.

InterBel, a Montana telecommunications provider, replaced its aging infrastructure with VergeIO's solution, achieving 45% cost savings, faster deployment, simplified management, and enhanced scalability, while eliminating the need for VMware.

NETdepot reduced infrastructure expenses by 80% with VergeIO's simplified licensing and denser server configurations while gaining enhanced support and security.

Additional customers, including BEAR Tech, CenterGrid, CCSI, and SkiBig3, report similar cost reductions, improved resilience, and operational simplification.

TARGET WORKLOADS

The VergeOS and Solidigm SSD combination fits Virtual Desktop Infrastructure, backup and restore operations, high-density multi-tenant hosting, and edge analytics or AI inference tasks. Testing with 64K block sizes provides an accurate representation of real-world virtualized environments that use larger block sizes for storage I/O, better reflecting modern virtualized workloads, including virtual machines, databases, and large-file applications.

AFA REPLACEMENT KIT

VergeIO and Solidigm announced the launch of The AFA Replacement Kit—an offering designed to replace traditional all-flash arrays with a simpler, more cost-effective infrastructure solution. This bundle combines VergeOS software with validated Solidigm SSD configurations to eliminate the complexity and cost of dedicated flash arrays. The AFA Replacement Kit makes this the ideal time to move forward with VergeOS and leave VMware behind, providing organizations with a complete solution that replaces both hypervisor and storage array infrastructure with a single platform.

ABOUT SOLIDIGM

Solidigm technology unlocks the unlimited potential of data for customers, enabling them to fuel human advancement. Originating from the sale of Intel's NAND and SSD business, Solidigm became a standalone U.S. subsidiary of semiconductor leader SK hynix in December 2021. Headquartered in Rancho Cordova, California, Solidigm is driven by the inventiveness of its team members across 13 locations worldwide. The company develops and manufactures solid-state drive devices for enterprises, providing SSDs suitable for real-world workloads in everyday computing and data center environments. Solidigm focuses on high-capacity storage solutions, including QLC and TLC technologies, that address growing data storage demands across industries.

ABOUT VERGEIO

VergeIO develops VergeOS, the first software-defined platform to unify virtualization, storage, AI, and networking in a single ultraconverged infrastructure solution. The platform operates independently without external hypervisors or third-party storage dependencies, providing organizations with complete infrastructure management through a single interface. Based in Ann Arbor, Michigan, VergeIO targets organizations seeking alternatives to traditional VMware and Nutanix solutions. The company's VergeIQ component integrates AI capabilities directly into the infrastructure platform, enabling private AI deployments alongside traditional virtualized workloads. VergeIO's customer base comprises educational institutions, telecommunications providers, cloud service providers, and enterprises across various industries, all seeking cost-effective infrastructure modernization.