Revolutionizing Enterprise Infrastructure with Ultraconverged Performance

As enterprises grapple with increasing data demands, infrastructure complexity, and the need for rapid deployment, the convergence of VergeIO's revolutionary ultraconverged infrastructure (UCI) platform presents a transformative solution using Solidigm cutting-edge high-performance SSDs and capacity optimized QLC products.

Recent testing has shown unmatched performance capabilities, achieving over 1 million IOPS at 64K block sizes, with sub-millisecond latency. Using fewer than 10 drives, the team showcases the architectural efficiency of the combined solution with great success.

Reinventing the Stack: VergeIO and Solidigm Redefine Data Center Performance

Unlike traditional hyperconverged infrastructure solutions, VergeIO's ultraconverged infrastructure (UCI) collapses the traditional IT stack—compute, storage, and networking—into an integrated data center operating environment, VergeOS. When combined with advanced, market-leading Solidigm SSD technologies, this integrated approach delivers exceptional performance, efficiency, and resilience that exceeds conventional three-tier architectures.

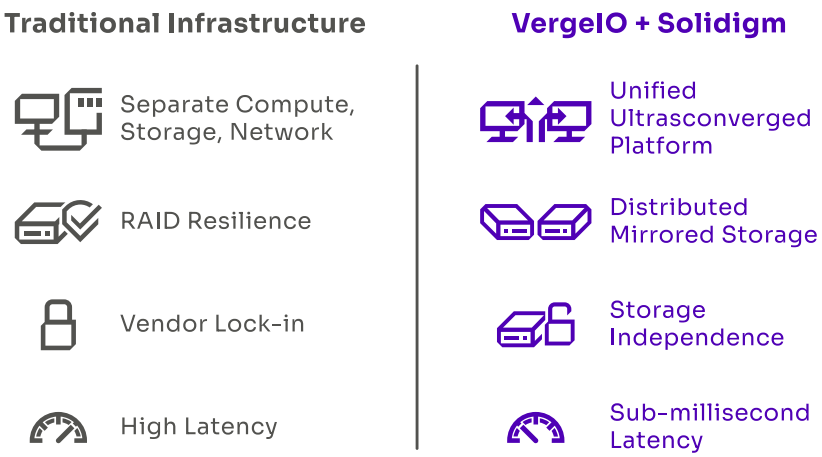

Figure 1: Traditional infrastructure vs VergeIO + Solidigm deployment.

The Challenge: Traditional Infrastructure Limitations

Enterprise IT departments are under growing pressure to keep up with evolving workload demands, but traditional architectures are holding them back. Managing separate compute, storage, and networking layers creates overhead complexities that strain IT resources. Legacy storage, with its high latency, introduces bottlenecks to performance, while hyperconverged infrastructure solutions often fall short in scaling effectively across both large enterprise environments and edge deployments. On top of that, inefficient resource utilization drives up power and operational costs, and recovery during fault conditions is slow, with extended rebuild times that further degrade performance.

The VergeOS Advantage: Ultraconverged Innovation

Unlike hyperconverged infrastructures, which don't truly eliminate three-tier complexity and can't scale effectively for enterprise or edge deployments, VergeIO's VergeOS represents a fundamental architectural shift. The platform integrates virtualization, storage, and networking into a single software-defined environment that operates independently without external hypervisors or third-party storage dependencies.

The VergeOS solution architecture delivers several key advantages that enhance performance, efficiency, and resilience. Global resource orchestration provides unified management across all infrastructure components, simplifying operations and enabling dynamic resource allocation. Advanced inline deduplication technologies reduce data footprints in real time, improving storage efficiency. Distributed mirrored storage provides built-in resilience without the limitations of traditional RAID configurations. Meanwhile, intelligent I/O scheduling—powered by native NVMe® multipathing—optimizes performance by intelligently managing data paths and balancing workloads across the system.

Solidigm Storage Excellence: Powering Next-Generation Performance

The next-generation Solidigm SSDs are built for demanding enterprise workloads and sit at the core of the VergeIO and Solidigm solution.

The Solidigm D7-PS1010 PCIe 5.0 SSDs deliver exceptional performance, with up to 3.1 million IOPS for 4K random reads and up to 14.5 GB/s sequential reads. These drives also offer up to 70% better IOPS per watt than leading competitors, enhancing operational efficiency without compromising performance.[1]

Complementing this, the industry leading Solidigm D5-P5336 high-density SSDs provide massive scalability, supporting up to 122.88TB of capacity per drive.[2]

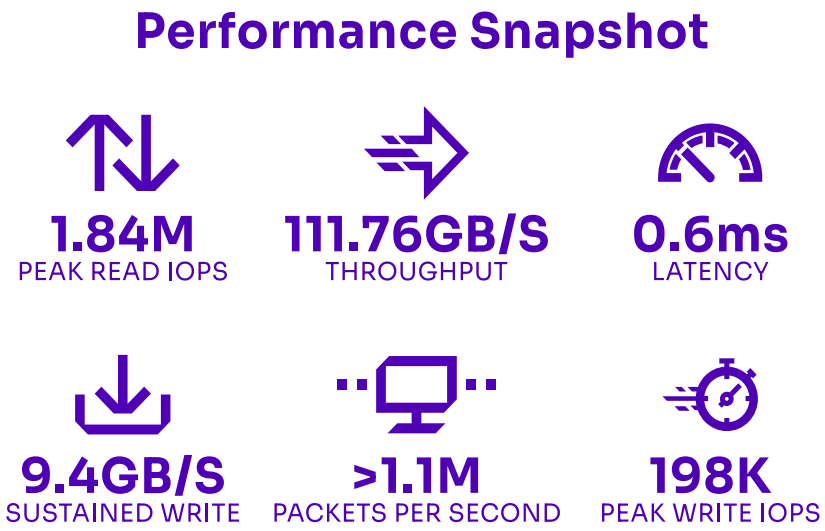

Figure 2. Performance achievements using 64K blocks.

Validated Performance Results

Solidigm and VergeIO's comprehensive testing of the VergeIO and Solidigm solution revealed exceptional performance metrics. Testing was conducted on HPE ProLiant DL380 Gen11 servers with Intel Xeon Gold 6548Y+ processors and 1TB DDR5 memory, with each server equipped with six 7.68TB Solidigm D7-PS1010 SSDs and six 30TB Solidigm D5-P5336 SSDs.

Peak Performance Achievements Using 64K Blocks

- Aggregate Throughput: **111.76 GB/s**
- Peak Read IOPS: **1.84 million**
- Peak Write IOPS: **198,331**
- Sustained Write Performance: **9.40 GB/s average**
- Read Latency: Consistently under **0.6 milliseconds**
- Network Performance: Consistently **used all available network bandwidth**

"VergeOS performance is enhanced by the low latency and consistency of Solidigm D7-PS1010 and D5-P5336 across multiple workloads," said Scott Werntz, Solidigm solutions architect. "Their reliable and consistent performance allows VergeIO's software to run optimally."

SOLIDIGM + verge.io

Efficiency Breakthrough, Real-World Resilience

The testing demonstrated remarkable architectural efficiency, achieving over one million IOPS with VergeOS's intelligent resource utilization across the Solidigm SSD array, a testament to the platform's superior optimization capabilities. During an unexpected power failure, VergeOS demonstrated exceptional fault tolerance, helped by Solidigm high-performance SSDs which allowed the OS to recover faster than traditional HDDs:

- Recovery Time: VM availability restored in under 90 seconds, with full functionality verified in under two minutes
- Data Integrity: Zero data loss through synchronous mirroring
- Continuous Operation: ioGuardian technology ensures operation during dual-fault conditions

Strategic Partnership Value

The collaboration between VergeIO and Solidigm addresses critical market needs. VergeOS's unique software abstraction layer enables almost-immediate support for new Solidigm SSD technologies, providing significant competitive advantages in bringing advanced solutions to market quickly.

"Solidigm recognizes the strategic value of enabling up-and-coming HCI vendors with the best NVMe SSDs. We want to help jointly grow the market and promote the value, performance, and reliability of our market leading SSD products," Werntz said.

By promoting server-based SSD deployments, the solution reduces dependence on traditional external storage arrays while delivering superior performance characteristics.

The collaboration between VergeIO and Solidigm opens new opportunities across several high-growth segments.

- In private cloud environments, their combined solution delivers enhanced performance and efficiency for TLC + QLC hybrid deployments.
- The combined solution enables optimized support for distributed computing environments that demand agility and resilience.
- The VergeIO component, integrated directly into VergeOS, is specifically designed to meet the low-latency, high-throughput requirements that are increasingly critical in modern inference and training applications.

Ideal Use Cases and Applications

The combined VergeIO and Solidigm solution is designed to perform in the most demanding enterprise environments. For virtual desktop infrastructure (VDI), it delivers the high IOPS and low latency required to maintain responsive user experiences, even during peak load. When it comes to backup and restoring operations, the platform accelerates data movement and minimizes recovery times, allowing for business continuity and reducing downtime risks.

Exceptional sustained write performance accelerates backup windows while advanced deduplication reduces storage requirements.

Designed for High-Density Hosting and Intelligent Edge Workloads

The VergeIO and Solidigm solution is also ideal for high-density, performance-sensitive environments such as multi-tenant hosting and edge analytics. Its efficient resource utilization allows for greater workload density without compromising performance, factors critical for service providers and colocation facilities. At the same time, its low-latency, high-throughput architecture supports real-time analytics and AI inference at the edge, enabling responsive, intelligent decision-making where data is generated.

SOLIDIGM + verge.io

Future Innovation Roadmap

Ongoing collaboration between VergeIO and Solidigm includes efforts to evaluate: VergeIO is recognized as a DCIG TOP 5 VMware vSphere Alternative. In combination with proven storage performance of Solidigm SSDs , this represents a compelling value proposition for enterprises ready to transform their infrastructure approach.

- Validations with Solidigm 122TB SSD ultra-high-capacity testing
- Evaluating impacts of long-duration high-capacity endurance testing for mission-critical applications
- Specialized AI-specific benchmarks using VergeIQ for artificial intelligence workloads

The convergence of VergeIO's ultraconverged infrastructure (UCI) platform with Solidigm advanced SSD technologies represents a paradigm shift in enterprise infrastructure design. This jointly developed solution demonstrates that eliminating traditional three-tier complexity can also deliver unprecedented performance, efficiency, and resilience, allowing organizations to meet current demands and scale for future growth.

The VergeIO and Solidigm solution exemplifies how strategic technology collaborations can drive meaningful advancements, unlocking new possibilities across industries from emergency services to industrial automation and beyond. For more information about implementing VergeIO and Solidigm solutions in your environment, contact your Solidigm representative or authorized distributor.

Appendix

1. Comparing 7.68TB, Samsung PM1743 and Solidigm D7-PS1010. Power is measured using Quarch Technology. D7-PS1010 (128KB SW QD128 MBPS/Watt 496, 4KB Random R/W 70/30 QD512 IOPS/Watt 47304), Samsung PM1743 (128KB SW QD128 MBPS/Watt 287, 4KB Random R/W 70/30 QD512 IOPS/Watt 31482), Samsung PM9D3a (128KB SW QD128 MBPS/Watt 478, 4KB Random R/W 70/30 QD512 IOPS/Watt 54958), Kioxia CM7(128KB SW QD128 MBPS/Watt 496, 4KB Random R/W 70/30 QD512 IOPS/Watt 35367). "Class" defined as in-market PCIe 5.0 16-Channel controller-based SSDs.

2. The validation testing used 30TB models, but the platform supports the full range of configurations.

SOLIDIGM + verge.io