Data Sheet

vMOS: Violin Memory Operating System

Violin Memory Operating System (vMOS) delivers hardware accelerated storage management optimized for Flash Memory. Run your storage at the speed of memory, powered by vMOS.

Violin Memory Operating System (vMOS) provides an intelligent management platform for enterprises to benefit from the memory-like performance of Violin Memory Arrays with sustained application latencies measured in microseconds. With patented algorithms to ensure flash endurance and high availability, vMOS delivers hardware accelerated storage optimization and data protection capabilities for Violin Memory Arrays.

Highlights

- Flash optimized storage operating system with patented hardware-accelerated algorithms for endurance and spike-free latency measured in microseconds
- SAN attached system management delivers shared storage
- Advanced data management features including Thin Provisioning and Snapshots
- Designed for 24x7x365 availability with built-in redundancy, automated failover and hot-swap capability of all active components
- Full ecosystem support for Unix, Linux, Windows, Citrix and VMware, with VAAI integration
- Streamlined management with a WebUI as well as support for SNMP, CLI, REST API, iPad App and vCenter

Engineered for Flash Memory

Unlike legacy storage operating systems designed for spinning disk and later retrofitted to handle SSD, vMOS is architected from the ground up to expose the full capabilities of flash memory. vMOS intelligently distributes complex flash management tasks across all components of the modular architecture of Violin Memory Arrays to ensure full scalability.

- **Maximize Flash lifetime:** vMOS actively distributes incoming I/O across the entire Memory Array to ensure that no specific flash device is worn out due to repeated I/O and that every LUN receives the full bandwidth of the array.
- **Maximize Flash protection:** All data is automatically protected with vRAID, Violin's patented flash RAID algorithm, which is implemented in hardware for maximum performance and optimization.
- **Maximize Flash performance:** Patented techniques such as Erase and Write-hiding allow the system to perform all necessary flash management operations in the background, providing latencies in the microseconds for any workload.

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Built-in High Availability

Business-critical applications have stringent service level agreements. vMOS ensures 24x7 High Availability through multiple levels of redundancy built into the Violin Memory Array.

- **Eliminate unplanned downtime:** All active components – memory gateways, power supplies, array controllers, flash memory modules – have built-in hardware-controlled redundancy and are hot-swappable. Each Violin Memory 6000 Series array has four spare VIMMs, triggered on by vMOS in the event of any failure.
- **Eliminate passive standbys:** The highly available, clustered pair of memory gateways can be used in symmetric Active/Active as well as asymmetric Active/Active ALUA mode, to meet the dual demands of performance and availability. Incoming writes are automatically wide striped at each layer of the architecture to ensure full bandwidth to every LUN and every application.
- **Eliminate unwarranted surprises:** vMOS equips Violin Memory Arrays with proactive wellness features – vMOS Call-Home and automated log uploads – to continuously monitor the health of the array and notify Violin Memory Support when preventive action is required.

Data Management and Storage Optimization

vMOS drives both storage efficiencies as well as data protection with features such as Thin Provisioning and Snapshots. Thin Provisioning drives down storage costs by increasing the effective storage utilization of Violin Memory Arrays optimization. Thin Provisioning drives up effective storage utilization by keeping allocated storage in line with what is actively used. vMOS Snapshots provides high performance data protection through point-in-time, space-optimized, instant copies of the active data, supporting up to 1024 snapshots for each LUN and up to 10,000 snapshots for the entire array.

- **Thin Provisioning:** vMOS Thin Provisioning allows administrators to extend the logical size of the array beyond its physical usable capacity based on typical storage utilization patterns.
- **Writeable snapshots:** vMOS Snapshots are read-only by default, to protect against any unintended updates to the snapshot data. However, vMOS also provides the flexibility of making any of the snapshots writeable.
- **LUN Group snapshots:** vMOS provides the ability to group several LUNs into a single LUN Group and to create a snapshot of all LUNs in this LUN Group with a single click.

Ease of Management

Violin flash Memory Arrays provide up to 1 Million I/O per second (IOPS), allowing for many racks of legacy storage to be replaced with just 3U of rack space. In addition to the savings achieved through storage consolidation, vMOS drives operational efficiencies in several dimensions.

- **Simplify deployment:** Violin flash Memory Arrays can be deployed without the need to re-architect or modify your existing storage architecture. vMOS supports all leading forms of connectivity including Fiber Channel, 10 GE iSCSI, 40 Gbps InfiniBand and PCIe direct attach as well as all major Unix, Linux and Windows operating systems. With support for VMware API for Application Integration (VAAI) and vCenter plug-in for storage management, vMOS simplifies integration into VMware environments.
- **Simplify configuration:** IT administrators no longer need to adopt complex operational practices such as RAID and striping to meet the QoS requirements of business-critical applications. With built-in vRAID and automated wide striping, vMOS eliminates these tasks and powers all applications with memory-like performance, without the need for modifications. In addition, vMOS simplifies routine storage management tasks such as provisioning LUNs, dynamic LUN resize, and LUN rename.
- **Simplify management:** vMOS offers three ways to manage the Violin flash Memory Arrays: a simple, intuitive CLI, a web interface (WebUI) and a script-ready REST API. The vMOS WebUI provides a customizable dashboard with a rich set of widgets to tailor to your needs. The REST API allows easy integration of the administration and management of the flash Memory Arrays into your existing management platforms.

Feature	Specifications
Connectivity Options	4/8 Gb/s Fiber Channel 10GbE iSCSI 40 GB/s QDR InfiniBand PCIe Gen2 x8
Reliability / Resiliency	Highly Available Hardware Configuration Automated A/A failover/failback System level hardware base vRAID Global hot spares with redundant VIMMs Distributed ECC correction for each 1K block
Client operating system support	RHEL, SLES, Windows, VMware, Hyper-V, Citrix, AIX, Solaris SPARC, Solaris x86, HP-UX, OpenVMS
Storage management	CLI: Serial, Telnet, SSH/ SNMP / Web GUI / REST XML API / iPad App / VMware vCenter
Storage optimization	Thin Provisioning** ‡ Intelligent space management with proactive monitoring** ‡
Data protection	Data-at-rest Encryption* ‡ Space-saving Snapshots** ‡ (read-only and read-write)
Automated health monitoring	Customizable dashboard in Web GUI SNMP and email alerts for issues requiring attention Call home for critical issues Automated log uploads for systematic review by Violin Memory support

* Available with vMOS-5

** Available with vMOS-6

‡ Not available with PCIe Direct Attached

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