

Violin Memory 3200 Series Flash Memory Array

Game-changing technology sets new transaction processing benchmark record for blade servers

By James E. Bagley
Senior analyst
Storage Strategies NOW
June 2010

Violin Memory's new V3200, in a 3U (5 ¼" high) rack package offers scalability from 500GB to 10TB in a single appliance, and can scale to more than 140TB by adding multiple appliances in a rack. Using Single Level Cell (SLC) flash memory technology, the 3200, in a full-up configuration, has an MSRP of about \$20 per GB. This makes the 3200, which supports PCIe and 4/8Gbit/sec. Fibre Channel connectivity, price competitive with enterprise hard disk drive (HDD) systems on a cost per GB basis. Of course, we expect SLC appliances to operate at super speeds, but the architecture embodied in the 3200 supports aggregate bandwidth that trumps everything currently available.

HP posts new benchmark record for blades

Using the TPC-E online transaction processing (OLTP) benchmark for SQL servers in a simulated brokerage application, an HP Proliant BL685c G7 Blade Server recorded a TpsE of 1,464.12 at a cost per TpsE of \$302.49, a new record for blade servers. The system used four V3200 appliances each with 2.6TB of capacity. Internodal connectivity was via 20Gb/sec. Ethernet. Host connectivity used two Violin quad head 8Gb/sec Fibre Channel interfaces. This was the first time HP had used another vendor's memory system in a TPC benchmark. When compared with other top ten benchmarks that used as many as 2,000 HDD spindles to achieve throughput using RAID to spread data across HDD arrays, the HP system showed maximum response times of less than three seconds, unlike other SSD and HDD systems that had response time spikes upwards of 18 to 68 seconds. What was more impressive was that the Proliant blades were running the Violin Memory Arrays at 50% utilization, implying that other server configurations are capable of delivering almost twice the transaction rate.

How is this price performance achieved?

Violin has established a significant strategic partnership with Toshiba, and is in a position to buy chips from the world's largest volume flash manufacturer at attractive price points. In addition, Violin has serious intellectual property for switching between flash modules that allows aggregation of an order of magnitude over existing appliances with linear growth in bandwidth as additional memory arrays are added. One key to the price performance is the Violin Intelligent Memory Module (VIMM). Like a DIMM, only built out of flash instead of DRAM, a memory array supports up to 84 VIMMs, each with 128GB of SLC flash. Violin Switched Memory (VXM) technology and Violin's flash RAID provide the rest of the secret recipe. By aggregation and splitting the flash control logic between the controllers on the system board and the individual VIMMs, substantial economies of scale can be achieved when compared with drive format SSDs that need to self-contain flash control and provide drive emulation over a Serial Attached SCSI (SAS), Fibre Channel (FC), or Serial ATA (SATA) interface, all of which have individual silicon and connector hardware costs, not to mention throughput and latency penalties. Performance, flash management and reliability are enhanced by the patented flash RAID implementation that uses a four VIMM plus one (like RAID 5) to spread data across multiple devices, hide erases and even allow hot swapping of VIMMs.

Current and future connectivity

Connectivity support is wide and deep. For direct attached storage (DAS) configurations, PCIe support is offered with both SCSI and block-level drivers for Windows, Solaris and Linux. For SAN and LAN connectivity, network attached storage gateways from FalconStor, OpenFile and systems running Violin software with OpenSolaris are available that provide up to ten 8Gbit/sec. FC and up to four 10Gbit/sec. Ethernet or Fibre Channel over Ethernet options. Violin's recent acquisition of NAS filer and memcached software developer Gear6 bodes well for future NAS file connectivity.

SSG-NOW Assessment

Violin is in a position to automatically benefit from Moore's law as shrinking geometries reduce the cost per GB of flash memories. In addition, with current and future connectivity options, a one-stop shop for both block and file based systems is available. The VIMM modularity and aggregation capabilities of the V3200 are unmatched, and provide an excellent distribution of flash storage workload between the system controllers and the individual memory modules.

Violin is in a unique position to benefit from the significant dollars allocated to memory systems versus individual drives. Strong relations with HP, Microsoft and other major vendors will help drive the Violin Memory Arrays into a wide variety of high-performance applications across a number of industrial and enterprise users.

Note: The information and recommendations made by Storage Strategies NOW are based upon public information and sources and may also include personal opinions both of Storage Strategies NOW and others, all of which we believe to be accurate and reliable. As market conditions change however, and not within our control, the information and recommendations are made without warranty of any kind. All product names used and mentioned herein are the trademarks of their respective owners. Storage Strategies NOW, Inc. assumes no responsibility or liability for any damages whatsoever (including incidental, consequential or otherwise), caused by your use of, or reliance upon, the information and recommendations presented herein, nor for any inadvertent errors which may appear in this document.