

SSDs hit 800 gigabytes, but manufacturer warns of slower performance

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STEC, a solid-state drive (SSD) supplier to several large storage OEMs, is expanding its product lineup with enterprise-ready multi-level cell (MLC) drives with capacities up to 800 GB for a lower price than the single-level cell (SLC) versions currently in use for most enterprise applications.

The MLC-based [ZeusIOPS Solid State Drives](#) are sampling to OEM customers and are expected to ship by the beginning of 2010. MLC SSDs use multiple layers of NAND to pack more data into the same physical area than SLC SSDs, which use one layer per cell. Because NAND can endure a finite number of write/erase cycles, MLC devices tend to wear out more quickly. With multiple layers per cell, writes tend to be even slower on MLC devices than SLC (which can sometimes be slower than hard disk drives for writes, though with reads both MLC and SLC are multiple times faster).

Scott Shadley, STEC's technical product manager for enterprise storage, said the vendor has used its flash controller technology and wear-leveling algorithms to boost the performance and endurance of its new MLC SSDs. Some of those methods are proprietary, but "it has to do with how we manage the channel count and how we stripe data across multiple NAND cells to account for slower performance," Shadley said.

Normally, MLC drives include error correction code (ECC) engines that do parity checks on data to check for consistency. If errors are found, the drive customarily moves data to a new block immediately. That can slow performance and increase the number of writes within the drive. "We have the ability to leave the data in place and use the error correction code over and over, saving the write-amplification and wear-out," Shadley said.

Although STEC has not announced OEM deals for the new drives, its press release claims enterprise-grade MLC drives with higher capacity points have been in-demand from its partners.

But Shadley cautioned that major differences between SLC and MLC drives remain, and said he doubts there will ever be an SLC drive with MLC economics or an MLC drive with SLC performance and endurance. STEC's SLC ZeusIOPS drives have 10 times the write endurance of MLC (100,000 write/erase cycles vs. 10,000). SLC drives can have a 10-year shelf life, while MLC drives tend to last between one year and five years depending on the application. The cost differences fluctuate based on raw material supply and demand, but the cost of SLC can be up to four times the price of MLC drives.

"I don't think you'll ever see a realistic performance match between SLC and MLC," Shadley said. "There's a lot of work being done to be creative with MLC to give it more performance, but there will always be a cost gap – in fact, as MLC drives go into iPhones and iPods, that gap may increase from a supply and demand perspective."

Jeff Janukowicz, research manager, hard disk drive components and solid-state disk drives at IDC, pointed out that even as SSD density increases, the ability to pack multiple layers onto an MLC device will always keep its capacities above SLC. "There's no doubt there are tradeoffs, but having different gradients of SSDs come out is good for the industry as a whole," he said. "MLC SSDs aren't for every application, but the reality is that MLC drives are still significantly higher-performing for reads than hard disk drives." In separate announcements at the Flash Memory Summit in the US this week, STEC said it's now shipping its third-generation [4 Gbps Fibre Channel](#) and new [6 Gbps SLC SSDs](#), and that IBM is now shipping STEC [MACH8IOPS Solid State Drives](#) with IBM System x servers.