

## **EMC Flashes into Solid-State Storage**

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By Tim Stammers

EMC is set to become the first major storage player to add an option for so-called tier-zero flash memory to its disk arrays.

The company says that later this quarter it will ship devices made by a third-party supplier that feature solid-state flash memory, and will plug into the same slots as 3.5in disk drives in its high-end Symmetrix disk arrays.

The 73GB and 146GB flash drives will provide fast and low-power data storage, but will cost around thirty times as much as equivalent Fibre Channel disks. Until that price falls, the devices are only going to be used only to store data for the most select applications, EMC said.

"This is for the Fortune 1000, and for one or maybe a few applications in each company," said EMC senior marketing director Bob Wambach.

Per database transaction, flash drives can provide storage consuming and generating 98% less energy than disk drives, with one flash drive typically replacing 30 disk drives, EMC said.

But that advantage is heavily outweighed by the boost to application response that the drives will deliver, Wambach said. As a result the applications for which flash is most likely to be used are in some financial trading systems where millisecond improvements to response times can deliver six-figure profit increases.

Although the transaction throughput of systems using disk storage can be increased by adding disks, response times cannot be improved by adding disk, Wambach said.

"But now with these solid-state drives we can reduce response times by an order of a magnitude," he said, adding: "Almost every industry has a sweet spot. In retail it would be in online inventory management. Oil and gas has critical small footprint databases, so does the pharmaceutical industry. Every large enterprise has applications that are ultra sensitive to performance."

Enterprise Strategy Group analyst said that EMC's move could give it a major temporary advantage -- as long as it delivers the performance advantage that it promises.

"If it creates as big a gap in real life transaction processing shops as it does on paper, this could very well be one of those killer advantages that only appear every 10 to 15 years," he said.

EMC would not say how many customers have been beta testing its flash drives, or name any of them. But it claimed significant interest from "speed-is-money Fortune 1000 companies."

EMC's high end storage rival Hitachi hinted that it may make a similar move. "We're not seeing very many requests from customers to support this technology at the moment, and we believe EMC is really serving the needs of the few here. However, this is something that we are investigating," said Hitachi product management director Roberto Basilio.

Alongside its high cost, flash has other drawbacks, such as a relatively limited life in terms of the number of times that data can be written to each flash memory cell, and questions over its performance when writing data.

Ovum analyst Carl Greiner said: "Like SATA did, this technology will have to prove itself. But the technical issues are not anything to be frightened about," he said.

EMC's flash drives will be made by STEC, which until has mostly sold flash memory devices to the telecoms and networking industry.

STEC claimed that its drives will last for five years even if writing data non-stop at their maximum throughput, using the most life-consuming small block I/Os.

That life has been achieved through a combination of techniques such as wear leveling and the use of standby or spare memory cells, and a D-RAM front end cache, STEC said.

While other suppliers say that their flash devices only offer a performance advantage over disk when reading data and not when writing data, STEC claimed that the drives it will supply to EMC will provide thirty times faster random I/O throughput than disk drives.

The memory used in the EMC drives is the same NAND flash used in mobile phones and cameras. Because of the production volumes driven by sales of those consumer gadgets, the cost of NAND flash has been tumbling.

In the last four years the per-Gbit price of NAND flash memory has plummeted from just under \$30 to around \$1, according to research iSuppli. By 2011 it will have fallen to about \$0.13, iSuppli predicts.

That has prompted EMC and others to forecast that within the next five or so years the use of flash to create a top level of tier-zero storage will spread into mainstream applications and mid-sized customers.

Greiner said: "It won't happen tomorrow, or even in a couple of years' time. But it will definitely happen, even if it's not going to be ubiquitous for quite a while."

While tier-zero storage will complement rather than replace disk in enterprise systems, flash is expected to replace in disk some servers, and some laptops. Intel plans to ship flash-based solid state drives for servers this year, while Seagate has already announced a hybrid laptop drive that mixes flash with magnetic disk, and says it is developing all-flash drives for laptops.

IBM began offering flash drives for its blade servers last year. But it said then that it was doing so only for a minority of customers who were prepared to suffer the cost in order to run diskless blades, without having to adopt the architecturally better but tricky process of booting blades remotely over an iSCSI SAN.