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SanDisk unveils metric for solid-state drives

Industry wants endurance spec, but unclear if LDE is it

[Rick Merritt](#)

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SAN JOSE, Calif. — SanDisk will announce today (July 24) a metric that reduces to a single number the expected lifetime of a flash disk, hoping the industry will adopt its Longterm Data Endurance (LDE) approach as a de facto standard for solid-state drives.

All sides agree the relatively low number of write cycles on flash memory is a limiting factor for the adoption of flash drives that are just beginning to gain market traction. The industry currently lacks a standard measure for endurance for the devices at the drive level, an issue a subcommittee [announced Monday](#) (July 21) by the [Jedec](#) standards group said it aims to address.

"I am told [the SanDisk approach is] aligned with our direction" in Jedec, said Steffen Hellmold, a manager in Seagate Technology's server group who was aware of LDE but had not yet been briefed on it.

Seagate, the world's largest hard disk drive maker, has announced it will start shipping flash drives, also called solid-state drives (SSDs) in early 2009, initially aiming at products for servers. The company is leading the new Jedec effort that aims to set a wide variety of test standards for flash drives, including metrics for endurance, reliability, performance and how long data can be stored.

"We need these specs now so we need to develop them as soon as possible," said Alvin Cox a standards manager at Seagate who co-chairs the Jedec JC-64.8 group, launched quietly late last year. "Without test standards people can make claims—even truthful ones—but they may not work in your application," he added.

The Jedec group is currently reviewing the various use scenarios for flash drives in computing to better determine what test standards it needs to set.

The limited number of write cycles for flash drives is not significant for PC users whose applications typically have a relatively low number of re-writes on low capacity drives used over the short lifespan of consumer products. However, the issue will be critical for high-capacity solid-state drives that vendors such as Seagate hope to sell for server applications such as caching database transactions or speeding searches on a Web server.

Vendors generally know how to measure the number of so-called program write/erase cycles for a single NAND flash memory chip used on a flash drive. What has yet to be determined is how to make the same measurements on a solid-state drive, given drive makers use a wide variety of controllers, each with its own scheme for optimizing write endurance.

"The translation of a chip-level endurance metric to a drive-level metric requires some work," said Hellmold.

"This is a good time to get involved [with the Jedec subcommittee] and still have a voice in what we define," Cox said. The group hopes with its new test specs "you will be able to determine on a level playing field the differences between various SSDs as well as differences between solid state and hard drives," he said.

Meanwhile, SanDisk claims it has a key piece of the solution with LDE, a measure of the total number of Terabytes written (TBW) a solid-state drive likely can handle. "Our customers want a gas gauge to measure endurance in real time," said Don Barnetson a senior director of SSD marketing at SanDisk, speaking of LDE.

SanDisk is leveraging in part work by the Bapco group that sets performance standards in computing. That group has defined a typical memory-write profile for a professional PC user at 87 Gbytes/week.

It's unclear exactly how SanDisk arrives at its TBW measures and how readily it applies to other drive makers using different

controllers. Barnetson said SanDisk has tested its approach in its labs and shared the results with PC and operating systems makers under non-disclosure.

So far SanDisk has no supporters publically committed to the concept. However, "everybody said they like the concept of an endurance gas gauge," Barnetson said.

"We want to make this a standard in the industry," he added. "We are trying to figure out what might be the appropriate committee to standardize this--maybe it's Jedec."

On analyst briefed on the approach said it could fill an important role.

"It's a great step in the right direction of characterizing drives," said Bob Merritt, memory analyst at Semico Research (Phoenix). "We have all become aware of this issue [of the lack of an endurance metric for flash drives] and we think if it does not get resolved it could be a big problem over the next couple years."

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