



SEARCH

Bringing Moore's Law to the Data Storage Market

Juergen Urbanski | Wednesday, July 1, 2009 | 8:50 AM PT | 1 comment



Are spinning disks on their way out?

As Mike Speiser discussed recently, flash solid-state drives (SSD) will enable a once-in-a-decade improvement in storage price-performance. Crucially, flash SSDs enable storage to keep up with the rapid advances in CPU speeds driven by Moore's Law. This may enable customers to dramatically scale back purchases of expensive Fibre Channel (FC) disks and, potentially, high-end FC arrays. However, some early flash SSDs implementations come with a set of limitations that customers need to be aware of, notably around usability and resilience.

Why now?

Solid-state disks have been proclaimed the "future of storage" in the past, but we are now approaching an actual inflection point because:

- SSD pricing is declining at more than 50 percent per year, and SSDs have recently become cheaper than their nearest competitor (FC disks) as measured by effectively usable capacity; the gap will continue to widen in favor of SSD, as disk prices decline just 25-30 percent annually.
- The exciting (and cost-effective) use case for SSD is as a cache for frequently accessed data that front-ends lower-cost SAS and potentially SATA disks, rather than as primary storage.
- Weaknesses of using SSDs as flash memory are starting to be addressed through smart firmware that sits in the controller.

Pace of adoption

Overall, TechAlpha believes flash SSD is one of the most disruptive trends in storage, but it will only become material to the market beyond 2010. Customers we interviewed for our GigaOM Pro research note (subscription required) tend to focus more on cost per GB in the current economic climate, and less on cost per Input/Output Operations Per Second (IOPS), which is where flash SSD excels. However, the vendor executives we interviewed agree that flash SSD is the single most disruptive trend for which their companies are preparing, causing them to completely rethink how and where data is stored.

Three developments are likely to converge in 2011 and drive broader adoption:

- Vendors will bring more robust flash SSD solutions to market.
- Customers will look beyond short-term IT cost savings toward business value enabled by technological innovation. One large bank we heard from estimated that every millisecond of storage response time reduction translates to tens of millions of dollars in incremental annual profit, because securities trades are executed faster.
- Flash SSD pricing will be comfortably below that of FC on a cost-per-effective-GB basis.

We believe flash SSD will start to replace a good share of the high-performance (i.e., FC) disk market in the next 2-3 years. Already, flash SSDs are starting to take off in the high IOPS use cases, delivering much reduced power consumption and radically better read performance. The speed of broader adoption, though, will largely depend on how well vendors address some limitations (which we describe in more detail in our GigaOM Pro note). The early adopter workloads will likely be search, video rendering, email and potentially other mission-critical applications.

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Check out Robin Harris' StorageMojo.com blog for good discussions of the future of storage.

It's also interesting to note that semiconductor analysts are now question the future of semiconductor scaling. And NAND flash in particular has some potential scaling problems, lithography for advanced nodes has a lot of issues (EUV vs double patterning, etc), and the move to larger water sizes, which has helped reduce silicon costs, has ended (I don't think 450-mm wafers will ever happen).

But overall, I agree with the premises — disk drives are not going away, but will shift to mass storage, not performance (IOW, FC drives have no future, and SAS/15K drives have a limited future), and flash (not necessarily using disk drive interfaces) will dominate high end and mobile.

Tony — 11:07 AM on July 1, 2009

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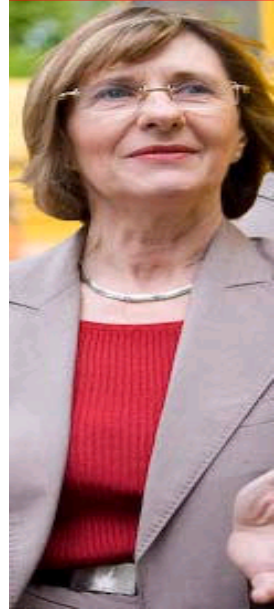
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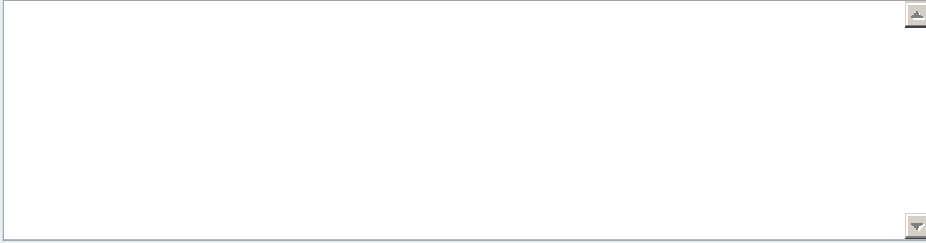
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