

# Commentary

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## Violin Memory Plays a Melodious Tune in All-Flash Storage

*Enterprises are being barraged by claims that flash storage is the wave of the future and that primary storage (i.e. the traditional hard disk drive (HDD)-based storage on which most businesses are built) will quickly transition to all-flash arrays. Some vendors, including Violin Memory, even go so far as to say that "disk is dead." What is the truth of the matter? In what role might a vendor, such as Violin Memory, play in driving another nail in disk's coffin?*

### Is Disk Dead

Disk technology has had a long and successful run. It is actually a marvelous technology and would deserve a top spot in the IT Technology Hall of Fame if such an institution existed. But Winchester disks are complicated electro-mechanical devices that are magnetically-based. Contrast that to flash devices that have no moving parts to break and are transistor-based. All things being equal (although they are not), which would you choose? The answer is flash storage; the only question is not if but when.

Now, disk is not really dead. In some sense no technology ever dies; you can even buy a buggy whip if you like at Amazon. In terms of data storage, vendors annually make and sell billions of dollars of tape storage systems and media which preceded disk. IT organizations are not adverse to change, but they will not replace their legacy investments in disk-based systems until the need arises and that may be at a refreshment or replacement cycle.

However, in the sense of representing high-end storage as the choice for primary storage, disk is dead. The conversation on primary storage is about flash as the new target for primary storage, not disk-based solutions. Flash storage wins on the hardware front including performance and environmental impact (such as lower electrical costs). Flash also wins on the evolutionary front (silicon-based systems are likely to evolve more rapidly than magnetic-based systems). Are we at a tipping point, inflection point, or turning point (whatever you want to call it), where this new and irreversible development will forever change the way that we think about and act towards storage? The answer would seem to be yes.

Disk-based storage is on the defensive. Point by point, objections to flash storage are dissolving. Endurance concerns have gone away. The issue of capacity cost still arises, but has been addressed by the advent of in-line de-duplication and compression. Additionally, flash storage has already made

a compelling case from a TCO perspective. And even if the cost of flash is a little higher, many enterprises may decide that the tipping point has been reached and flash storage is the way to go. In fact, the bottom has fallen out of the market for high performance HDDs with roughly a 90% drop in sales over the last two years and customers buying flash instead.

So we move on to a higher order objection. Can all flash arrays support the necessary data services that disk-based arrays provide? Violin Memory's Flash Storage Platform (FSP) powered by Concerto OS 7 illustrates that it can be done.

## Flash and Necessary Data Services

Storage systems are not just about the media — HDDs versus flash — but also about software. Disk-based systems have long provided the necessary data services software to manage primary storage that supports all of the enterprise's key, business-critical operational data. All flash arrays have to measure up on this front in order for IT organizations to be able to seriously consider replacing disk-based arrays. Violin Memory understands this and delivers comprehensive data services software with its FSP 7300 and 7700 offerings.

- Data services come in several categories: Business continuity is about disaster recovery (DR), addressing how enterprises must protect against the temporary or permanent loss of data at a primary on premises data center. Data must be protected at a remote DR site. For localized disasters, a relatively nearby DR site (often called "Metro") is adequate, but for regional disasters, a truly remote site anywhere outside the region is imperative. FSP arrays cover both bases.

Violin Memory provides replication — both synchronous and asynchronous — as data services for business continuity. Synchronous replication is a process typically used at local/Metro sites. This provides for fast failover to the alternative site to keep applications and their data running without interruption. Remote asynchronous replication is available for truly distant sites. Violin Memory also provides key features as part of the replication process. For example, it provides consistency groups for replication. This means that applications can be brought back properly at a remote site.

- Data protection is a related category to business continuity, but here the focus is on activities at the primary site. Concerto OS 7 provides both application and crash consistent snapshots as well as continuous data protection, which is a means for fast recovery of data without having to rely upon backups.
- Data efficiency is a set of capabilities that is of particular importance for flash arrays given the higher cost of the underlying media. The list begins with broadly available storage virtualization capabilities, including thin provisioning, space efficient snapshots, and snapshot derived clones. In-line de-duplication and compression are also required to drive down the effective cost of capacity in selected workloads. Concerto OS 7 delivers these features as well as the ability to seamlessly convert and migrate LUN types, offering users the greatest level of choice and flexibility.

- The data scaling category is about capacity management and includes capacity pooling across the shelves in an array as well as the online expansion of capacity.

## Violin Memory's Flash Storage Platform (FSP)

Storage architecture is also important. Violin Memory builds the FSP on what it calls Flash Fabric Architecture (FFA) which uses raw flash rather than solid-state disks as the hardware building block. The flash is integrated as Violin Intelligent Memory Modules within a switched storage fabric. Violin Memory believes that the FFA enables the FSP to deliver the consistent sub millisecond latency, read and write concurrency, and sustained high IOPS performance that is necessary to handle mixed, heavy workloads.

The FSP 7300 supports storage densities of 70 TB raw (i.e., without deduplication or compression) in only three rack units, which is very good for enterprise class data centers. Plus, the FSP 7700 supports scale-up expansion that can raise the total capacity up to 700 TB raw. All FSP-based arrays are designed for long flash life with array-wide orchestration of flash management, wear leveling and vRAID.

## Mesabi Musings

What will be the technology for primary storage in the future? Disk may not be dead yet, but the future belongs to all flash arrays. How long the transition period will take is subject to discussion,

but the tipping point has been reached and discussions have turned to what all-flash arrays can deliver. With the data services available through its Flash Storage Platforms, Violin Memory believes the barriers to adoption of its all flash arrays in enterprise class storage environments have evaporated.

Violin Memory faces a strong competitive landscape in all flash arrays from both established vendors and startups. But along with its software, Violin Memory believes that its well-accepted hardware architecture enables it to be a contender. Continue to follow the flash storage Gold Rush as it should be exciting and we will get to see how the "disk is dead" scenario really plays out. Stay tuned!

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