SSDs for the New Data Super Highway

By Arthur Cole, IT Business Edge
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Arthur Cole spoke with Scott Stetzer, vice president of technical marketing, STEC, Inc.

SSDs continue to increase capacity, endurance and other critical attributes, leading many to believe they will in fact encroach heavily on the storage tiers currently dominated by hard disks. STEC, Inc. has made endurance a top priority in the new ZeusIOPS XE device with an eye toward expanding the line's role in both storage and server architectures. The company's Scott Stetzer explains how improvements to the device itself and supporting software will expand its role in the data center.

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Scott Stetzer
VP of Technical Marketing, STEC, Inc.

Cole: Solid-state technology is becoming increasingly common in the enterprise. Is it destined for a Tier 0 future or will we start to see designs aimed at more general-purpose storage?

Stetzer: Solid-state drives are becoming a mainstream feature in most data centers especially as auto-tiering applications are proliferating to take advantage of an SSD's ability to accelerate access to data. Tier 0 storage is just the starting point for SSDs in the data center and has become one of the killer applications for enterprise storage platforms. Further adoption of enterprise SSDs is emerging across a wider range of applications not only in storage but in server platforms as well.

For example, using enterprise SSDs as a cache memory layer inside a server is becoming a new approach for accelerating access to data for applications that include databases, email, OLTP/e-commerce and business intelligence, where performance is critical. To address this need, STEC introduced its EnhanceIO™ SSD Cache Software in August 2011 to provide the same type of killer application for server platforms as auto-tiering is to storage platforms. EnhanceIO is server-side caching software designed to accelerate application performance and access to data and enables server scalability to support the growing number of users and data volumes in the enterprise. Rather than continuously adding more servers to accommodate growth in users or data, simply adding SSD caching can deliver 2X to 10X the performance from an existing server, which saves time and money.

As SSDs continue to gain acceptance in the data center, it is important to understand

the differences between consumer-grade SSDs and enterprise-class SSDs. How well a controller manages the flash memory will determine whether the SSD can be used in enterprise storage and server applications that require 24/7/365 uninterrupted operations under heavy read and write workloads.

Cole: The new ZeusIOPS XE aims for higher endurance. What changes have been made to the drive to accomplish this?

Stetzer: Endurance is the main concern for most data center managers. The less drives fail, the less money in replacing them and restoring data. The best way to save money and information is to engineer drives that take the malfunction out of the equation. MLC flash-based SSDs offer greater value for the given capacity of the SSD, but endurance can be a challenge for write-intensive applications. ZeusIOPS XE SSDs start with STEC's proprietary CellCare™ Technology to extend the life of each drive while enabling a new ultra-high endurance class of SSDs that rivals SLC flash-based media in terms of endurance. Through additional over-provisioning and applying CellCare Technology, we increased performance capabilities and made this drive the highest endurance enterprise MLC-based SSD available.

One of the most important features of STEC's CellCare Technology is its unique ability to measure and manage the wear of the drive using adaptive flash management algorithms and advanced signal processing techniques. MLC flash will wear out faster over time if not properly monitored and managed. CellCare Technology dynamically and proactively manages the way the flash wears throughout the life of the drive. The additional use of advanced error correction code (ECC) techniques enables higher protection against media errors and improves SSD endurance for write-intensive workloads without limiting the performance.

To further improve MLC SSD reliability, ZeusIOPS XE SSDs incorporate STEC's Secure Array of Flash Elements™ (SAFE) technology that prevents data loss associated with MLC flash. It provides the ability to recover from NAND flash page, block, die and chip failures while maximizing the Mean Time Between Failure (MTBF) and Mean Time To Data Loss (MTTDL).

Cole: You're showing the drive as a server-side cache solution with the latest SSD Cache Software release. Is this the future of SSDs in the enterprise, and what does it say about the future of the SAN?

Stetzer: Server side caching is just one emerging application for SSDs in the data center with broad applications across servers and enterprise software. The caching software from STEC (EnhanceIO SSD Cache Software) enables the server to take full advantage of the SSD's performance in a server environment and can accelerate application performance and access to data anywhere from 2X to 10X faster than traditional storage solutions.

EnhanceIO SSD Cache Software integrates into any existing server infrastructure and

works with all commercially available SSD devices — SAS, SATA, FC, PCIe, etc. — to accelerate enterprise applications running under Windows, Linux or VMware operating systems. It integrates the SSD device below the server's application layer so that the host CPU and memory resources are not significantly impacted and the full I/O capabilities of the SSD device itself can be realized in a manner that is easy to implement and is transparent to the server OS, applications and underlying storage.

STEC SSDs are spawning new "all SSD-based storage" arrays that break free from the limitations of spinning HDD media and address high-performance transaction processing applications. For these applications, service level agreements are incredibly demanding and users want what they want, when they want it — which is now or sooner. If the data center is traveling on a two-lane gravel road, modernize it with a high-speed highway supported by enterprise SSDs and caching software.