

# SSDs JUMP TO THE NEXT LEVEL

ION COMPUTER SYSTEMS, INTEL SHOW NEW STRIDES

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**S**ince the arrival of Solid State Drive technology into the mainstream IT market, price, capacity and availability have limited its ability to circulate into a broad market—with engineers and developers among those slow to adopt.

But that hasn't kept mainstream storage vendors from continuing to work aggressively on improving both the technical and pricing constraints that have slowed the takeoff of SSD technology. A raft of vendors, including Intel, Samsung, Western Digital, Corsair and

Seagate, have led the charge into the channel this year of drives that have come down in price, risen in capacity, and are now widely available to system builders and VARs at large.

The result: More engineers in more labs throughout the industry are working to custom-tailor these drives into enterprise-ready, differentiating technology. What we've seen in the CRNTest Center indicates

that the industry is on the precipice of a significant move here, and the real-world results are just now starting to show.

Keep your eye on Ion. That's Ion Computer Systems, a manufacturer of server/drive arrays for high-performance computing applications. Ion, Hauppauge, N.Y., employs 24 and was founded in 1992. The company impressed the CRNTest Center editors with its SpeedServer SR-71, a 2U,

two-socket, 6-core Xeon 5670-based server and SSD drive array with more whistles and bells than a one-man band. What we saw was a system that has cleared the previous hurdles of limited SSD capacity and price with room to spare, and placed it all into an elegantly engineered box.

The price shows a solution that has leapt-frogged well past the enthusiast space and well into the sweet spot of the commercial enterprise: about \$37,500.

The tested system was populated with two dozen, 48-GB SSD 2.5-inch drives, mounted in front-accessible, hot-swap bays, configured in three RAID arrays of eight drives each. They were managed by three discrete RAID controllers, leaving one additional PCIe x8 slot as well as one x4 slot available for customer options.

The unit arrived at the CRNTest Center lab with an additional pair of hot-swap boot drives at the rear, one configured to run Windows Server 2008 R2, the other CentOS Linux; the system performs equally well running either. Optionally, the drives can mirror each other, be configured as a two-drive RAID array or as single or separate volumes. They're mounted atop the SpeedServer's dual, redundant hot-swap power supplies.

On the subject of power, the SR-71

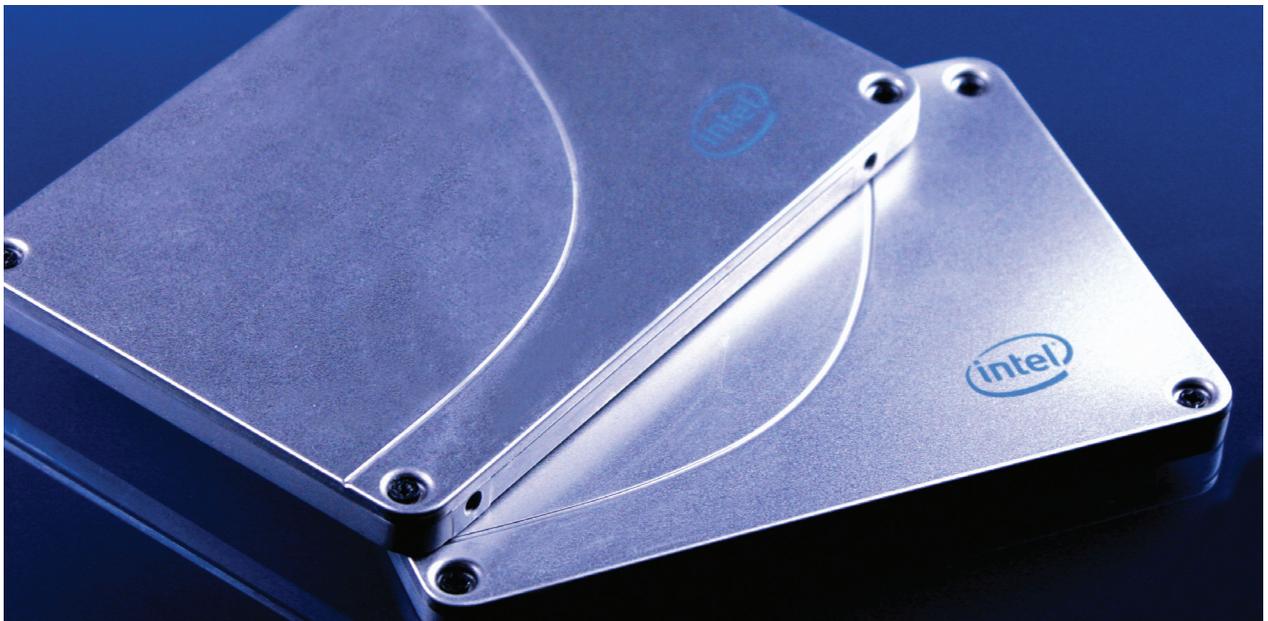


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consumes remarkably little. When running with a moderate load, the SpeedServer consumed just 191 watts, compared with 345 watts of a two-socket server tested recently by *CRN*. With all drives running at full bore, consumption increased to 335 watts, compared with an average server consumption of 453 watts according to *vertatique.com*, which follows trends in energy-efficient IT.

Credited with the unit's frugal power consumption are, of course, its solid state drives. They're also responsible for the SpeedServer's great performance.

In Geekbench 2.15 tests, the unit's peak score was an outstanding 11,762, the second highest we've seen (Dell's PowerEdge R810 still holds the record at 14,890).

Even better was its input-output operations per second (IOPS) performance. Using Intel's Iometer 2006 open-source benchmark, testers measured the read/write performance of the SpeedServer's RAID 5 array at about 250,000 IOPS, and 400,000 IOPS when performing only reads. All tests were done with SLC-type SSD drives.

That would amount to an I/O speed that's orders of magnitude greater than earlier generation mainframes, running at about a fraction of the energy consumption.

With this type of performance, the SpeedServer is being positioned as a server for streaming media, serving static Web content or as a datastore for online transaction processing, and we recommend it for such applications.

While nothing exactly like SpeedServer exists yet, according to Paul Scheremeta, Ion's vice president of marketing, the company typically comes up against similar units from Fusion I/O and others that package SSDs in external enclosures and connect with cabling.

"But when you use expanders to get there, you lose the edge of SSD," said Keith Josephson, Ion's vice president of engineering. "We tried that route at first, but we ultimately went with three internal RAID controllers instead," he said. Ion last month added support for Intel's FastPath RAID protocol, which optimizes the stack for SSD drives.

Though prices have come down along

with the commoditization of memory, SSDs are still not cheap. The list price on the system includes three years of technical support with guaranteed four-hour turnaround, as well as business continuity via a bootable USB stick and data collection utility.

The simple fact is that performance and reliability are differentiators in today's corporate enterprise IT—two traits that we believe Ion has demonstrated with this solution. But there are other considerations as well—namely lifecycle and energy efficiency—that give this generation of enterprise IT a serious boost over earlier-generation solutions. Because SSDs have no moving parts, they are less susceptible to failure and they also generate less heat (requiring, in many instances, less cooling). On paper and based on what we've seen in the *CRN* Test Center lab, the long-term benefits of SSD technology in the data center will be monumental.

When designing the SpeedServer, Ion's Josephson said that figuring out how to properly power the five-volt SSDs was among the most vexing problems. "Most off-the-shelf power supplies expect the drives to require 12 volts." But with 24 devices demanding five volts each, Josephson and his design team found the power supplies lacking, and erratic behavior was the result.

"We could do reads all day long, but when we started testing writes, we would draw too much power and have drive failures." The final result was to run power from the standard power supply through a DC/DC power converter, which ultimately supplies power to the energy-efficient SSDs.

With the exception of this proprietary drive-power solution, the SpeedServer uses standard, off-the-shelf components, including an Intel 5520HC Server Board motherboard with dual LGA1366 sockets and dual integrated Gigabit Ethernet; 12 DIMM slots with support for 96GB of DDR3 memory, video and six each of USB 2.0 and SATA ports; Intel RAID controllers; and redundant, hot-swap power supplies and fans.

It's clear that the Ion solution is out in front when it comes to delivering industry-standard, SSD-based offerings into the

enterprise. But when put into perspective, it's easy to see where this is going on a broader, industry-level perspective.

On Intel's SSD road map, the Santa Clara, Calif.-based manufacturer is set to refresh its SSD lineup in the fourth quarter of 2010—introducing capacities of up to 600 GB in its X25-M lineup. In the first quarter of 2010, Intel is set to launch its 1.8-inch SATA SSD drives in capacities of 300 GB, 160 GB and 40 GB. When these launches happen, the price-performance curve—as well as options available to custom system builders—will change dramatically.

Within a year, we should expect to see more eye-popping solutions for the data center that provide even greater I/O and price-performance. Over the course of the next 12 months, SSDs will clearly become a competitive differentiator for system builders, for VARs and for commercial enterprise IT shops.

Beyond Intel, the other manufacturers mentioned above should also be expected to provide significant improvements in performance, in capacity and in price. Those planning significant data center upgrades will now need to consider SSD technology in critical areas—making it a much different conversation for all those in the value chain.

The bottom line: Ion has clearly worked hard to deliver groundbreaking technology into the market, using groundbreaking components. For enterprises considering upgrading or consolidating their data centers, the SpeedServer's \$37,500 list price is a steal, given the advantages in energy efficiency, throughput, footprint, management and many other areas essential to maintaining an efficient operation. The next era of data center upgrades will clearly be influenced by the advantages of SSD and even HDD-SDD hybrid technology moving forward.

Over the course of the next 12 months, system builders will have more opportunities to design, build and deliver solutions for the enterprise and the data center with SSDs. It's becoming clear that RAID and SSD may be a match made in IT heaven, and the channel stands to benefit from this technology's move up the food chain. ■



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