



Connect with Experts

Many organizations with increased demands for storage performance have discovered that solid state drives (SSDs) can deliver data at phenomenal speeds while also saving energy. Since SSDs have no moving parts, they ensure great resistance to physical damage and harsh conditions. And, the fact that SSDs do not use traditional magnetic storage makes them run more quietly, have lower access time, and offer less latency than electro-mechanical discs.

In this issue of Connect with Experts, we speak with Louis Kaneshiro, Sr. Technology Manager at Kingston Technology, as he shares his expertise on solid state drive technology, the concerns every potential adopter should consider, and how SSD reliability is advancing.

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Q: LOUIS, HOW LONG HAVE YOU HAD A FRONT-ROW SEAT TO THE SSD EVOLUTION?

A: At Kingston, it's been since its inception. We started looking at it probably as far back as 2006. We had been doing USNCF and other Flash-based storage and were asked by our customers when we were going to do SSDs. The answer was, "when the adoption rate is high enough."

Q: WE'VE ALL HEARD THAT SSDs HAVE NO MOVING PARTS. THAT'S ONE CHARACTERISTIC; WHAT ARE A FEW OF THE OTHERS?

A: SSDs look just like a hard drive, essentially. But, if you take that cover off, you would see there's a bunch of flash memory, a flash controller, and a SATA controller. Another great thing is we've all grown accustomed to our hard drives and the clicking noise they make. None of that happens with SSDs. So it's very durable—as you can imagine—and very shock-proof. Kingston did a series of videos when we first launched our SSDs where we hit them with baseball bats and bowling balls. You can see there the SSDs are much, much more durable than a hard drive.

Q: WHEN SSDs HIT THE MARKET, THERE WAS SOME RESISTANCE TO ADOPTION. IS THERE STILL ANY OF THAT OR IS SSD HITTING ITS STRIDE?

A: That's a good question. If we're talking from the organizational perspective, I would say the biggest roadblock was price. That was probably the biggest objection early on. I think everyone has got a better understanding of what Flash technology can bring to the enterprise, to the consumer space, and to the mobile user as well.

Q: HOW DO SSD PERFORMANCE ADVANTAGES SHINE OVER TRADITIONAL HARD DISC DRIVES?

A: Let's take a look at bandwidth. A fast hard drive speeds at 10–15 RPM and is going to be able to do maybe in the neighborhood of 150–200MB/s, sequential bandwidth—which is not bad. That's actually a very fast hard drive. If we're looking at your typical notebook drive, we're in at probably 40–50MB/s. Kingston's entry level SSD is writing data close to 400–500MB/s.

But really, I think where SSDs shine is in random performance—and we measure that in IOPs—input output per second. SAS-class, enterprise-level drives are probably around 300 IOPS. Kingston baseline SSDs start at about 60K–70K IOPS. So, one SSD can do the work of hundreds of hard drives. Again, with no moving parts.

Q: WHERE DOES SSD TECHNOLOGY FIT INTO TODAY'S DATA CENTERS?

A: The biggest gain that we see is really more in a DAS setup—Direct Attached Storage. You'll see a lot of companies that are virtualizing—it's no longer a kind of "try it and see." When you start to stack up those VMs, you're going to need more and more IOPs out of your storage solution. And that's where Flash makes a lot of sense and where we have seen the biggest adoption—tier one storage. When the data becomes archival, and it's not going to be used any longer, then at that point we'll go ahead and put that in spinning discs.

Q: WHAT ARCHITECTURAL CHANGES NEED TO BE MADE WITHIN THE DATA CENTER FOR SSD ADOPTION AND DEPLOYMENT?

A: We used to ask these questions of corporate customers—"Is the performance of your IT solution tied to revenue?" and "Is your infrastructure set up to do this?" SSDs have really pushed companies to widen the pipe so that data can get through even quicker. I think we're seeing that now. From the customers that we're speaking with, they're already making some changes to their infrastructure to accommodate the speed.

Q: WHAT'S COMING DOWN THE ROAD FOR SSD TECHNOLOGY?

A: The biggest changes are the form factors and interfaces. When SSDs first launched, they were SATA and SAS. I think what we're going to see next is the move to PCI Express (PCIe). With SATA/SAS, SSD taps out at about 600MB/s. Some PCIe SSDs we've tested are working at nearly 2,000MB/s. I also think, in the future, SSDs will look a lot less like a 2.5" drive and more like a video card or module. For the enterprise, we will have customers that will stack SSDs with a rate controller to get speed. And, we're already talking about the next generation of notebooks with PCI Express. We'll have SSDs in there that are writing well over a 1,000MB/s.



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