

# Server Flash and Flash Hypervisor solution lowers application latency and increases server consolidation



“ The Pernix Data-Kingston acceleration solution allowed us to extend the service life of our existing SAN solution by two to three years. It’s been an economical alternative to buying a new array and was easy to install, configure and manage remotely at our international locations. ”

*Tran Phan*

*Senior Storage Administrator,  
Kingston Technologies*

## Business challenge

Privately owned Kingston Technology Company, Inc. (Kingston) designs, manufactures and distributes DRAM and Flash products. Businesses and consumers use its memory solutions for desktops, notebooks, servers, printers and consumer electronics. The firm’s 4,000+ employees work in multiple worldwide locations to support manufacturing, engineering, distribution, service and sales operations. Kingston’s IT department oversees the operations of six discrete data centers around the world. In order to increase the firm’s IT operational efficiency, along with network security, managers implemented server consolidation and disaster recovery initiatives. The projects both leveraged the existing storage area network (SAN) infrastructure to support workloads running everything from database applications to file and print servers to email systems in a virtual machine (VM).

Soon after starting the projects, the IT team experienced storage performance concerns. “Our SAN was over committed which resulted in high application latency times and performance issues,” recalls Tran Phan, senior storage administrator for Kingston in Fountain Valley, CA. “That led to a lot of incident calls, with people complaining that they couldn’t finish their work or process customer orders.”

## SUMMARY

**Workload acceleration delivered the I/Os necessary to:**

- **Implement cost-saving server consolidation project along with the virtualization of production environment.**
- **Cut application latency:**
  - Boosted employee productivity.
  - Eliminated customer-order-processing delays.
  - Silenced angry user help-desk calls.
- **Stronger disaster-recovery solution lowered risk to business.**
- **Extended service life of existing SAN by “two to three years” at 50 percent less cost than alternative.**
- **Significantly improved SAN performance.**
  - Slashed latency by 83 percent, from 30ms to 5ms.
  - Lowered server CPU utilization by 35 percent.
  - Cut legacy disk array utilization by 45 percent.
- **Dramatically reduced SAN upgrade time-to-deployment.**
  - Can install solution in 15 minutes.
  - Remote administration from HQ frees on-site IT staff to work on other projects.

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"By leveraging the Pernix[Data]-Kingston solution to accelerate our SAN workloads, we reduced our CPU utilization by 35 percent and lowered our disk array utilization by 45 percent. We now have a cost-effective SAN upgrade solution for our sites along with a very fast time to implement"

**Tran Phan**

Senior Storage Administrator  
Kingston Technology



Phan's team weighed its SAN upgrade options. "It would have been too expensive for us to just purchase another array," says Phan. "So, we looked at ways to leverage server-side flash solutions to accelerate virtualized server workloads and prolong the service life of our legacy storage systems."

## Technology solution

Phan's research revealed several alternatives. "Some vendors use hardware-based flash acceleration while others use a combination of software and server flash to accelerate workloads. We went with the latter approach."

Phan's team implemented the PernixData FVP solution to aggregate server-side flash for several locations. The combination of Kingston enterprise-class SSDs with the PernixData Flash Hypervisor allows Phan to scale out a data tier to accelerate the primary storage at corporate sites.

"We went with Pernix[Data] because the application operates at the host extension level," explains Phan. "Other reasons were that it doesn't require a virtual appliance to manage the software, and it's certified for interoperability with Kingston SSDs."

The software-based solution — leveraging existing SAN infrastructure — had the added advantage of being very easy to deploy. "We are able to install and implement the Pernix[Data] solution quickly and remotely to international locations without the hassle of having to travel there or procure and ship hardware," recalls Phan.

After a total installation time of 15 minutes, Phan was able to aggregate his server-side Flash devices to increase the performance of his VMs. While the PernixData solution accelerates both reads and writes caching at the host level, Kingston's environment is much more write centric. Consequently, "We needed to use enterprise-class SSDs because they have the endurance to support our write-intensive environment."

The use of Kingston enterprise-class SSDs gives Phan's SAN solution longevity. They deliver up to 10 times the endurance of client SSDs, with up to 30,000 program/erase cycles versus the 3,000 that consumer-grade SSDs typically offer.

## Business results

The implementation of the PernixData hypervisor software in conjunction with the Kingston enterprise-class SSDs delivered a number of benefits to the company.

### Boosted I/O headroom to cut costs and reduce risk

The PernixData-Kingston solution solved the company's storage over-commitment problem. "Before, we could only accommodate 50 of the 150 virtual servers that our production environment needed," explains Phan. "The SAN solution gave us the needed I/Os to handle the total allotment."

As a result, Phan's team was able to complete a cost-saving server consolidation project leveraging VM technologies. That in turn allowed the implementation of a DR-upgrade project multiple fail-over site options.

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### SAN solution performance promotes employee productivity

The PernixData-Kingston solution lowered application latency by 83 percent, from 30 ms to five ms during peak load. “We get a lot fewer service desk calls now because users no longer wait on applications and they can now promptly process customer orders.”

The combined solution improved two Kingston SAN performance indicators as shown in figures 1 and 2 below.

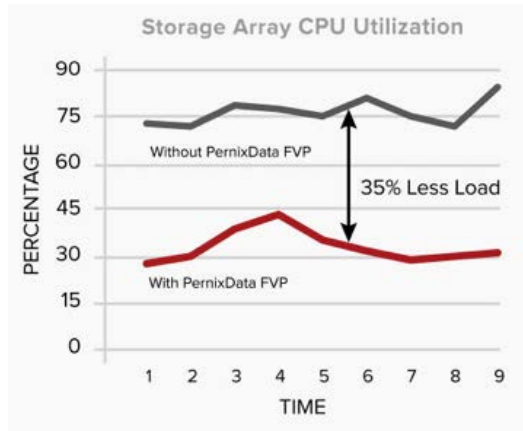


Figure 1: PernixData Flash Hypervisor software works with Kingston SSDs to lower SAN CPU utilization.

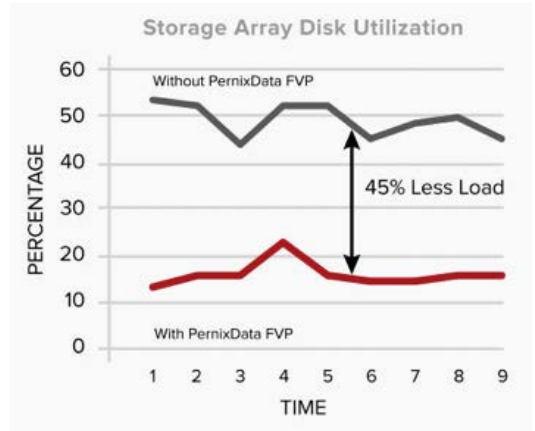


Figure 2: Disk array utilization fell by 45 percent with the PernixData-Kingston solution.

### An economical SAN upgrade strategy for other locations

“As other sites outgrow their storage platforms, we have a template to quickly and easily deploy the same solution at their locations,” says Phan. “The ability to administer the solution remotely helps me reduce the workload of local admins who wear enough hats as it is.”

Another benefit is the ability to optimize Phan’s back-end storage independently of each VM. That eliminates the need to profile each VM to utilize server-side Flash as some other caching products require. “I had a ‘wow’ moment, when I learned that I didn’t have to touch individual VMs to optimize them,” recalls Phan. “All I have to do is add a VM to the server-flash cluster and the Pernix[Data] solution automatically optimizes it.”

The solution’s boost in I/Os also helps the corporate balance sheet because, “It allowed us to extend the service life of our legacy SAN solutions by two to three years,” explains Phan. “And we were able to do that at about half the cost of a new array.”

To learn how enterprise-class SSDs from Kingston Technology can help your organization, visit [www.kingston.com](http://www.kingston.com)

To learn how the PernixData FVP solution can help your organization, visit [www.pernixdata.com](http://www.pernixdata.com)



Please note: Some of the listed capacity on a Flash storage device is used for formatting and other functions and thus is not available for data storage. As such, the actual available capacity for data storage is less than what is listed on the products. For more information, go to Kingston’s Flash Memory Guide at [kingston.com/flashguide](http://kingston.com/flashguide)

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