

When Flash Makes All the Difference: A Look at 3 Common Use Cases in Education



WHITE PAPER

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Administrators and IT leaders in K-12 and higher education are increasingly using all-flash storage to address challenges in virtual desktop infrastructure, application performance and distance learning. By using the right all-flash solutions, educational institutions are not only getting the performance they need, they are also simplifying operations, improving reliability and reducing total cost of ownership. Here's how.

The importance of technology in education has never been more pronounced, whether in K-12 or higher education environments. Educators rely on IT to enhance the student experience and drive innovation, enabling distance learning or the flipped classroom model, where students access their core lectures through video at home to maximize collaboration in the classroom. Additionally, administrators rely on IT to address a wide range of issues, including student welfare, class registrations, back office operations, finances and course curriculums, among many others.



The changing nature of technology in education is putting enormous pressure on the underlying infrastructures at educational organizations. Simply put, most legacy data centers are not capable of delivering the performance required for today's workloads and learning environments, particularly as organizations embrace important new initiatives such as virtual desktop infrastructure (VDI) or high-definition video.

The performance gaps are most often rooted in legacy storage systems, where hard-disk-based solutions are running up against the physical limitations of their capabilities, creating issues around bottlenecks, latency and affordable scalability. Because of the need for improved performance, many IT professionals in education have successfully turned to all-flash storage.

However, while the initial driving factor has typically been to improve performance, educational organizations have been surprised to discover that all-flash storage can also lead to reductions in total cost of ownership (TCO). Cost savings are vital in today's environment, where funding for education is constricted and IT investments must demonstrate clear value in order to get approved.

In this white paper we examine the positive impact of all-flash storage within three of the most critical use cases in education—VDI, application performance and distance learning. We also provide examples of successful deployments and discuss some of the features and functions you should look for in an all-flash solution to ensure success and reduce TCO.

Use Case No. 1: Virtual Desktop Infrastructure

K-12 and higher education are environments where VDI offers significant advantages. With VDI, educational organizations can reduce costs and simplify management by using zero and thin clients. They can also improve security and support mobility; deliver a broader range of applications to students and teachers; enable bring your own device (BYOD) initiatives; and centralize administrative functions such as patching and updates.

As many schools, districts, colleges and universities have discovered, however, a successful VDI deployment is wholly dependent upon the underlying storage infrastructure. With applications, data and even operating systems centralized in the data center, the storage solution

needs greater capacity and performance. Educational environments are subject to boot storms, which come about when many users are simultaneously logging on or doing other activities. Legacy hard disk drive “spinning disk” solutions are simply not up to the task.

For example, when the Judson Independent School District in San Antonio first deployed VDI, the spinning disk storage system buckled under the pressure. It would take as much as 15 minutes for a student to log in to a lesson application, a totally unacceptable lag time given that class periods only run for 45 minutes. By moving to a Pure Storage FlashArray, the district reduced application login time to 36 seconds.

The Waxahachie Independent School District in Waxahachie, Texas, experienced similar problems with spinning disks. During login storms, latency would increase to the point where students couldn’t access their virtual desktops. With spinning disks, virtual desktop uptime was in the 80% range. Since moving to a Pure Storage FlashArray, uptime is at 99%, and any downtime is associated with end-user error instead of storage system latency.

All-flash arrays also make it simpler and more cost effective to deploy VDI. One of the reasons the Waxahachie Independent School District turned to VDI was to manage multiple machines with a small staff. The district was able to benefit by moving to a Pure Storage FlashArray that offers a simplified management system, rather than the legacy SAN that required significant expertise and proprietary software.

Use Case No. 2: Application Performance

IT infrastructures in educational environments support a wide range of databases and applications for teaching and administration. Even at a relatively small school, such as the all-girls Castilleja School in Palo Alto, California, the IT infrastructure must handle back-office and administrative tasks; teacher records and resources; and instructional tools such as language labs and music composition software.

Until a recent upgrade, Castilleja was using a hybrid storage system that used spinning disk fronted by cache memory using flash. Applications were running slowly, impacting administrative tasks as well as the learning experience for students and teachers. The poor performance had other negative effects as well. For example, the IT team had to perform system backups at night, making the school more vulnerable to data loss. In addition, the hybrid solution was not very efficient, with only a 15% data reduction with compression.

By moving to a Pure Storage FlashArray, Castilleja has been able to address the challenges caused by the previous hybrid solution. With compression and deduplication, Castilleja is achieving a consolidation of about 3.5:1, significantly reducing the storage overhead prior to deploying the Pure array. In addition, the all-flash solution has eliminated application latency issues and is enabling multiple daily backups without affecting application performance.

The Judson Independent School District in San Antonio has been even more effective in using all-flash to improve its storage efficiency, achieving a 10:1 reduction. This is not only saving the district money, it is also enabling it to use the storage for many more applications than were initially intended, including back-office financial systems, Microsoft SQL Server and network monitoring. IT leaders in the district praise the all-flash solution for simplicity of management, software upgrades with no downtime, proactive support and more efficient use of storage resources.

Use Case No. 3: Distance Learning

Distance learning and online education continue to grow in importance. The proportion of chief academic leaders reporting that online learning is critical to their long-term strategy reached a new high of 70.8% in 2014, according to the 2014 Survey of Online Learning.¹

1 “2014 Survey of Online Learning Grade Level: Tracking Online Education

Distance learning and the flipped classroom, where students primarily access content at home through online video, are both groundbreaking advances in education, and yet they also place huge demands on the storage infrastructure for performance, capacity and scale. As courses have become more sophisticated, the importance of digital content and delivery has grown exponentially. Content has moved from books and PDFs to online videos and streaming services, where application performance is paramount.

With online enrollments rising, and innovations such as the flipped classroom growing in popularity, storage solutions in distance learning environments must be able to scale quickly and easily, with IT being able to add capacity and accelerate performance to satisfy the needs of growing numbers of users and increasingly data-intensive applications. Addressing these challenges is critical because a quality experience is necessary to retain students and expand the number of courses they take. According to the 2014 Survey of Online Learning, more than 44% of academic leaders said it is more difficult to retain students studying online than those on campus, a significant increase in concern versus 10 years ago when technology was less sophisticated.²

All-flash storage solutions are important to the success of distance learning environments because they deliver a dramatic and necessary improvement in performance, as well as a much more predictable cost structure for scalability. In addition, the right solution will help to reduce costs through a less frequent refresh cycle, simplified manageability and reduced energy consumption. Better performance and availability of applications and coursework should also drive revenue growth through better courses and higher levels of user satisfaction.

What to Look for in an All-Flash Solution

One of the reasons many educational organizations are turning to Pure Storage FlashArrays is because of their unique “evergreen” architecture, which is a new model for storage that leverages a modular, stateless design. Whereas typical storage cycles require forklift upgrades every three or four years, the Pure model eliminates the need for these types of upgrades, with no downtime, data migration or performance loss.

Under the Forever Flash maintenance program, the FlashArray platform is regularly modernized with the latest technology for no additional charge. You pay for additional capacity as you need it, but every internal component that impacts performance – such as controllers, host connections and internal buses – can be upgraded online without having to shut down applications, incur any performance degradation or migrate any data.

The Pure Storage Evergreen Storage model brings significant value to educational organizations, enabling them to upgrade storage performance and reliability while also reducing total cost of ownership (TCO). The economic benefit of this approach has been estimated at more than \$230,000 over a three-year period in another industry where VDI and applications performance are issues.³

The Evergreen Storage model is just one TCO benefit of Pure Storage solutions. In a separate Forrester Research Total Economic Impact™ study, the positive economic impact of using Pure Storage FlashArrays was estimated at more than \$1.9 million, driven by business benefits, improved productivity, simplification of deployment and management, data center rack unit cost avoidance and software licensing savings, among others. Even when

2 Ibid, footnote #1

3 “The Total Economic Impact of Pure Storage FlashArray FA-400 Series Storage Solutions,” Forrester Research, May 2015

subtracting the cost of the storage, the net value of utilizing the solution was estimated at more than \$960,000 over the same three-year period.⁴

In addition to TCO reductions, Pure FlashArrays offer a variety of other advantages to customers in the education market. As described in this article, the Judson Independent School District and Waxahachie Independent School District were able to successfully deploy VDI and, because of ease of management in storage, are able to handle their environments with small staffs. Judson and Castilleja have been able to improve the performance of all applications, eliminating latency and using the storage for more applications than originally intended.

In contrast to disk or hybrid storage solutions, Pure solutions deliver the highest levels of performance required for your most challenging applications. Additionally, they are simple to install, manage and scale for future growth.

⁴ "The Total Economic Impact of Pure Storage FlashArray FA-400 Series Storage Solutions," Forrester Research, August 2014

Conclusion

Is your organization ready to modernize its infrastructure? If you are considering VDI, having issues with application performance or trying to upgrade the user experience in distance learning, your efforts may be being held back by the limitations of your existing storage solution.

Flash storage is a breakthrough technology for the education market. As the price of flash has come down, market leaders such as Pure Storage have been able to deliver all-flash solutions at TCO that is now lower than traditional spinning disk storage.

With Pure Storage all-flash solutions your organization can take important steps forward in improving the learning experience, lowering costs, supporting mobility and BYOD, improving operations and building a technology infrastructure that will be the backbone of your future.

Learn more about Pure Storage from Gartner's 2015 Magic Quadrant for Solid-State Arrays or visit our web site at www.purestorage.com.