CASE STUDY: THE ELIZABETHTOWN AREA SCHOOL DISTRICT

Samsung Solid-State Drives Help Teachers and Students Stay on the Fast Track

OVERVIEW

Customer need

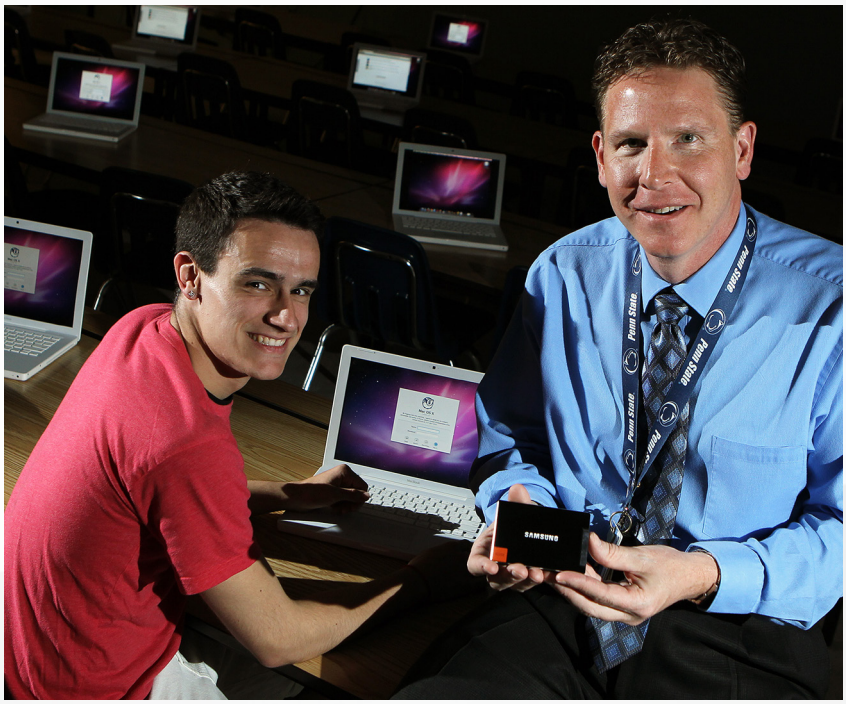
Pennsylvania's Elizabethtown school district needed to either replace the laptops used in its middle and high schools, or upgrade them to improve performance and durability, while extending their life for a few more years.

Samsung Solution

Installed 225 Samsung's 830 Series SSDs, along with new batteries and more RAM.

Results

Extended the laptops' life 3-4 years; provided more reliable, durable computers; offered higher performance for students' multimedia and science applications; accelerated laptop deployments.



Brian Lownsbery, Director of Technology at Elizabethtown School District and Austin Telenko, Senior Student at Elizabethtown Area High School

SAMSUNG

THE CUSTOMER

THE ELIZABETHTOWN AREA SCHOOL DISTRICT

As school districts across the U.S. feel the squeeze of budget cuts, keeping students and classrooms equipped with reliable computers, software and other technology resources has become an annual challenge.

The Elizabethtown Area School District is an award-winning Pennsylvania public school system located about 20 miles outside the city of Lancaster. It serves more than 4,000 students with 300 faculty and staff in the district's five elementary schools, one middle school, and one high school. For the 2012 school year, the district wanted to ensure that the schools' computers could meet the needs of today's tech-savvy students, who use a wide variety of data-intensive math, science and multimedia applications.

Instead of using its limited budget to buy new, faster computers, the district's technology group recommended a more pragmatic approach of upgrading and refurbishing its existing inventory of laptops, primarily 3-year-old Apple laptops. The main goals of the refurbishing project were to improve the overall performance and durability of the machines, and extend their life for a few more years. To optimize the performance of the computers on a budget, the district's technology staff made the case for new batteries, more RAM and high-performance solid-state drives (SSDs).

"As a technology team, we tried to get the point across that while the initial expense for SSDs would be more, there were benefits in the longevity of the project that would actually save the district over the long term," said Brian Lownsbery, the district's technology director. "Rather than penny wise, pound foolish – we want to focus on the overall picture. And at the end of the day we're getting more bang for our buck with SSDs."

CUSTOMER'S NEED

BETTER PERFORMANCE MEANS FASTER DEPLOYMENTS

As the technology group started to evaluate SSDs, they brought in drives from both Samsung and a leading competitor, and put them through their paces for several months before making a final purchasing decision. Overall performance was the primary consideration, but other variables also came into play as they tested the drives.

"We didn't want the cheapest drives, we wanted the most cost-effective and reliable," explained Austin Henderson, a district technology specialist. "We were overwhelmed by the performance advantages of both SSD drives, but the performance of the 512 gigabyte (GB) Samsung drives really stood out. The Samsung drives are also lighter and have better enclosures and packaging, which matters when you are ripping apart hundreds of drives for installation," he said.

Samsung 840 SSD

Because the students save most of their data to centralized servers, hard drive space was not an issue, so the district decided to buy 64 GB drives for the classroom computers, and 512 GB drives to upgrade the teachers' computers. In all, they purchased 225 of Samsung's 830 Series SSDs. Once installed, the new drives helped the technology team deploy its refurbished computers in record time. One of the group's most time-consuming tasks each year is loading system images onto hundreds of computers. By creating a single "image" file, they are able to install a standard set of software so that each computer is outfitted with a complete application suite for the students and teachers.

"Not having enough time to do everything is one of the single biggest challenges we have to deal with," said Henderson. "When I push out the new image file to our laptops, the install time with spinning (traditional) drives is about 15 minutes. But with the Samsung SSDs, it took less than five minutes. When you multiply that over hundreds of machines, it really adds up."

REAL-WORLD APPLICATIONS AND THE NEED FOR SPEED

To prepare students for higher education and occupations after high school, the Elizabethtown schools make a number of specialized applications available, including Adobe's multimedia programs (Dreamweaver, Photoshop, and Fireworks) and Autodesk's AutoCAD engineering software. "I want to make sure that students are using the same types of applications that they will see at college or in the workforce—the industry standards," said Lownsbery.

When students are using these data-intensive applications, frozen hard drives and restarts can eat up valuable instruction time, so having responsive, reliable machines is a high priority. Primarily, this means equipping computers with ample processing power, and hard drives that can read and write high volumes of data in a flash. Samsung's 64 GB 830 Series drives provide up to 75,000 input-output operations per second (IOPS) random read speed and 16,000 IOPS random write speed, which means that large multimedia files load and save quickly, programs run smoothly and computers stay up and running.

"Generally, the initial reaction I get is 'Wow,' " said Lownsbery. "The students and teachers really think we bought new machines, because they are overwhelmingly more responsive, faster and quicker. When an end user clicks on something and has multiple apps open and things happen at a faster pace, it creates a much better experience for them."

SPECIFICATIONS

Elizabethtown's Samsung **830 Series SSDs** featured maximum read/write speeds of:

Random reads – 80,000 IOPS
Random writes – 36,000 IOPS
Sequential reads – 520 MB/s
Sequential writes – 400 MB/s

Samsung's new **840 Series SSDs** now offer:

SSD 840 Pro
Random reads – 100,000 IOPS
Random writes – 78,000 IOPS
Sequential reads – 540 MB/s
Sequential writes – 450 MB/s

SSD 840
Random reads – 97,000 IOPS
Random writes – 63,000 IOPS
Sequential reads – 530 MB/s
Sequential writes – 330 MB/s

IOPs = input-output operations per second
MB/s = megabytes per second

KEEPING STUDENTS AND COMPUTERS AWAKE, AND READY FOR ACTION

In day-to-day use, the Elizabethtown schools' laptops are moved to different classrooms on mobile carts, and as they bounce around on the shelves, the traditional hard disk drives sometimes freeze up or fail to revive from sleep mode. When this happens, it takes several minutes to restart the machine and students and teachers are distracted from their work. Since SSDs have no moving parts, they are much more resistant to shock and vibration, and rarely freeze up or malfunction—if they do, a restart takes about 15-20 seconds.

"Durability was absolutely an issue, so students won't have to go through the pains of having hard drives die, and not having a computer during class," said Lownsbery. "Carts that normally have 32 laptops on them sometimes only have 30 because we're replacing drives. So to be able to rely on the equipment day to day is a huge factor."

Another significant factor in the district's decision to upgrade to SSDs was that the schools have to replace a large number of drives each year because students are "less than friendly to the devices," said Lownsbery. "With the SSDs and no movable parts, we are expecting a drastic reduction in the number of drives we have to replace."

Since the Samsung SSDs were deployed, there have been no drive failures, although the staff has had to replace seven traditional hard drives so far this year. On average, the traditional drives in student computers last between 2-3 years, but Henderson said he expects the SSDs to last at least 3-4 years. With fewer failed drives to replace, the technology team

should have more time to devote to other projects, and the district will reap the benefits of a longer-term technology investment.

The initial success of the SSDs in the schools' laptop carts has encouraged the technology staff to plan ahead for next year, said Lownsbery, who trades notes with technology directors in nearby school districts to keep tabs on their programs. "We have other pockets of computers and a whole suite of special education machines that will go through this same process next year. Our initial success with SSDs has served as a launching pad to ask, 'are there other areas to inject this solution and get similar results?' "