SanDisk’s STAR SSD Upgrade Program Reduces IT Labor Costs and TCO

SanDisk SSDs Offer Optimal Performance and Extend Employee Laptop Lifecycles by 33%

By

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The Benefits of Upgrading Employee Laptops with SSDs While Reducing TCO

Chief Information Officers (CIOs) can achieve impressive business outcomes by upgrading their laptop fleets from slow Hard Disk Drives (HDDs) to high performance Solid State Drives (SSDs).

Having learned valuable lessons from its own internal upgrade, consisting of 4,600 employees worldwide, SanDisk launched the SanDisk Tech Assisted Refresh (STAR) program to offer its experience and expertise to other companies. This laptop upgrade service helps CIOs radically reduce IT labor costs by substantially extending business laptop lifecycles while improving the user experience and driving increased employee productivity.

How the SanDisk STAR upgrade program works:

- Simply arrange a time for the upgrade and let your employees know when to drop off their laptops at your location.
- SanDisk specialists can upgrade multiples of 50 laptops per night using the latest cloning technology.
- Technicians will safely and securely transfer unencrypted and encrypted data without re-configuring programs and applications.
- It takes 15 minutes per encrypted laptop to transfer data to the SSD.
- Employees can pick up their SSD-accelerated laptops the next morning.
- Hard drives are retained by the customer for secure recycling.

SanDisk’s STAR SSD Upgrade Program Reduces IT Labor Costs and TCO

SSD Upgrade Highlights*

- Laptop lifecycles increase by 33%, from 3-4 years to 4-5 years
- Annual IT labor costs decline by 86%
- Employee productivity increases by 35%
- SanDisk IT Help Desk hardware related service tickets declined by 59%
- Total Cost of Ownership: Annual cost reduction and deferred savings of up to $610 per laptop

*Based on IDC findings plus SanDisk estimates.

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SanDisk Employees Enthusiastic About Upgrade

After the internal SSD upgrade program, SanDisk measured its success with employees.

- 93% reported overall satisfaction with the improved performance of their laptop.
- 98% of employees reported that the SSD upgrade process was easy.
Many companies are already using the STAR program to seamlessly migrate data and hardware overnight to SSDs in hundreds of business laptops.

**The Lattice Semiconductor Upgrade**

Development engineers at Lattice Semiconductor, a major provider of Field Programmable Gate Arrays (FPGA), were frustrated with the slow response times of their laptops. But instead of allocating precious budget dollars for a fleet of 400 new laptops, they wisely turned to SanDisk’s STAR program. The program exceeded all of Lattice’s expectations. Click [here](#) to learn more about how Lattice implemented SSDs into their workforce.

**The Lending Tree Upgrade**

Lending Tree needed to make better use of their developers’ time. They realized that the rate at which they were coding was limited by laptop responsiveness. The answer was not new laptops, however. Slow hard drives were the root cause of the problem, so they transitioned to SanDisk SSDs.

**Total Cost of Ownership (TCO)**

SanDisk IT documented an overall lower TCO after verifying the benefits of deploying SSDs in all of its corporate laptops. SanDisk estimates that the total cost reduction and deferred savings is up to $610 per laptop when HDDs are replaced by SSDs. This amount is achieved by extending SSD-equipped laptop lifecycles by one year, from three years to four years, resulting in deferred spending of approximately $400 per laptop per year (See Table 1). With 4,600 corporate laptops, SanDisk was able to defer spending on laptops alone by approximately $1.84 million per year. Due to the longevity of SSDs, the devices can easily be erased by IT and re-used, resulting in additional savings. For a company with 1,000 employees, an SSD deployment could result in an annual cost reduction and deferred savings of up to $400 per laptop, or $400,000 by deferring laptop purchases for one year.

<table>
<thead>
<tr>
<th>Cost of a laptop¹:</th>
<th>SSD cost minus value of HDD</th>
<th>Total deferred spending/laptop²:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,500/3 = $500/year</td>
<td>$100</td>
<td>$500 - $100 = $400</td>
</tr>
</tbody>
</table>

Table 1: Deferred IT Spending³

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¹ Assumes 3-year lifecycle
² Assumes refresh delay of one year
³ Approximate figures based on SanDisk estimates

“The response has been incredible. I just spoke to one of our developers who had a SSD put into his laptop and he said his productivity has increased drastically.”

“By moving to SanDisk SSDs, our employees are happier...and our IT department is extremely happy because they don’t need to deal with as many problems...”

--Nikul Patel. Chief Product Officer
Furthermore, a 2011 IDC study cites an annual savings of up to $210 per SSD-equipped PC due to lower failure rates, lower power consumption, longer battery life (20% longer), and 15x higher performance (See Figure 1, next page.)

### Annual Savings per PC with an SSD

- **Lower failure rates**: $70
- **Higher performance**: $93
- **Longer battery life**: $45
- **Lower power consumption**: $2

**$610 Total Savings**

**Figure 1: Annual Savings Breakdown**

Increased SSD I/O performance can also reduce reimaging and OS deployment time. Since imaging takes 30 minutes less with a SSD than the same machine using a HDD, SanDisk IT estimated that it saved approximately 3,000 productive hours in 2012\(^4\) for imaging alone. In addition, the faster performance of SSDs reduced encryption time by about 60%. Because reimaging and encryption were accomplished at the same time, end users were only without their laptop for 1.5 hours. In Contrast, the same process would have taken at least three times longer on a HDD\(^5\).

Because SSDs use less power and generate minimal heat, a laptop battery will hold its charge longer and will need to be replaced less frequently than with a HDD. Consequently, this lowers replacement costs and reduces the amount of work IT Help Desks have to perform. The benefit for the end-user is the ability to work longer without interruption and with less down-time, which is especially important for mobile employees, who travel frequently for business.

With no moving parts, SSDs have much lower failure rates and can withstand jarring movements. Laptop reliability is therefore enhanced dramatically. Unlike HDDs, which are prone to mechanical wear and failure, SanDisk IT observed that the likelihood of SSD data loss and failure is remote. In fact, the measured failure rate of SSDs in use at SanDisk is < 0.1\(^6\).

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\(^4\) Based on performing 6000 re-images and new OS deployments

\(^5\) SanDisk benchmark results

\(^6\) SanDisk benchmark data
SanDisk internal testing demonstrates that performance is greatly enhanced when comparing a SanDisk X210 SSD with a 512 GB HDD. This optimized and fine-tuned upgrade process, developed within SanDisk, set the stage for the company to offer the STAR program to customers.
System Performance

SSDs have clear system performance advantages over HDDs, including dramatically faster access to data and application loading times. To verify these performance advantages, SanDisk IT used industry-standard benchmarking tools to compare the performance of the SanDisk X210 SSD against 7200 RPM 512 GB HDDs. SanDisk IT ran manual and automated performance tests using the PCMark benchmarking tool on machines with HDDs. It then ran the identical set of tests on the same machine, after cloning the HDD contents to the SSD (see Table 2).

<table>
<thead>
<tr>
<th>Performance Benchmark</th>
<th>HDD 7200 RPM</th>
<th>SanDisk X210 SSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reboot time (Sec)</td>
<td>96</td>
<td>26</td>
</tr>
<tr>
<td>Zip 4.3GB folder</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Copy 4.3GB folder</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>PCMark Overall score</td>
<td>8,107</td>
<td>15,569</td>
</tr>
<tr>
<td>PCMark gaming score</td>
<td>4,680</td>
<td>9,449</td>
</tr>
<tr>
<td>PCMark storage score</td>
<td>3,712</td>
<td>53,826</td>
</tr>
<tr>
<td>Reboot time (Sec)</td>
<td>96</td>
<td>26</td>
</tr>
<tr>
<td>Zip 4.3GB folder</td>
<td>23</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 2: Performance Comparison

SanDisk IT tested several laptop models with different processor types, RAM size and HDD models. In most tests—overall workloads, productivity workloads, and I/O workloads—the SSD-equipped system significantly outperformed the HDD-equipped system (see Figure 2).

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**SSDs Accelerate Application Loading**

![SSDs Accelerate Application Loading](image)

Figure 2: Application Loading Comparison

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7 Using SanDisk X210
Reliability and Endurance

Aside from mechanical wear from repeated use, HDDs are also susceptible to crashes due to vibrations caused by jarring motions or being dropped. Because employees are highly mobile, traveling for business and taking their laptops home, the risk of damaging HDDs increases.

In stark contrast, with no moving parts to wearout or breakdown and little or no loss in performance over time, SSDs can often outlive the usefulness of an older corporate laptop. In such cases, the SSD can be reused in a next-generation laptop with faster processors and improved graphics capabilities. This, of course, would have an additional positive impact on TCO.

Top 5 Reasons to Reach for the STAR

1) Reduce Total Cost of Ownership
2) Improve user satisfaction and productivity
3) Reduce IT labor costs
4) Boost application performance
5) Upgrade simply and cost effectively

By signing up for the STAR program, CIOs can help to improve security, performance, reliability, and employee productivity while preserving precious budget resources.

For more information on the STAR program, visit http://www.sandisk.com/star, or email us at upgradeSSD@sandisk.com.

SSD Deployment Performance Highlights*

- Outperforms HDDs by 15x
- Improved battery life by 20% over HDD
- Encryption process is >60% faster than HDD
- SSD measured failure rate <0.1%
- SSD boot time is 20 seconds vs. 44 seconds for HDD; a 46% improvement
- SSD shutdown time is 12 seconds vs. 21 seconds for HDD; 58% faster
- OS deployment is 30% faster
- Virus scan was 306% faster with SSD vs. HDD
- File write was >400% faster with SSD vs. HDD
- Microsoft Excel took 11.6 seconds to load with SSD vs. 19.77 seconds with HDD
- Re-image time was reduced by >30%

*Based on average benchmark scores

SanDisk SSD Characteristics

- Thin, rugged, and lightweight mass storage device
- Small form factors for slim and lightweight laptops, ideal for mobile workforce
- No moving parts to break down, enabling much higher reliability rates
- Faster boot times, application loading, and lower read/write latency for improved employee productivity and satisfaction
- Extremely power efficient, extending battery life
- Operates silent and cool, extending life of laptop
- Sustained performance, even as more data is stored