



## Lockerz Captures a Picture Perfect SQL Database

Photo-sharing company allows customers to load and view more photos faster, with dramatic database improvements powered by SanDisk®.

### Summary of Benefits

- **12x reduction** in average disk queue length
- **10x improvement** in database response time
- **Immediate 100% ROI**
- **4x improvement** in web server request response time
- Dramatically improved reliability
- **2x** database load capacity

### The Challenge

Lockerz is one of the top Internet media-sharing websites in the world. It draws high volumes of site traffic and gets more than 50 million requests a day.

The success of Lockerz and other photo-sharing sites hinges on site availability and accessibility. Site response time is directly related to customer return and retention.

Lockerz's SQL Server database performance faced an access pattern that presented a daunting challenge to maintaining high performance:

1. Database reads (photo views) consisted of over 50 million per day, resulting in a highly random read access pattern that forced the database to go to disk constantly.
2. Database writes (photo uploads and social interaction posts like comments), on the other hand, were sequential, and blocked read access until they completed. This resulted in deep queuing.
3. Lockerz mirrored its databases for redundancy. While necessary for reliability and high availability, this effectively doubled the queues of blocked read operations as redundant writes occurred.

Daniel Marashlian, CTO of Lockerz, knew that his challenge was to find a way to eliminate the bottleneck of Lockerz's slow disk drives.

### The Solution

As Daniel investigated the problem, he contacted a colleague who was the director of a bank's I.T. department and had vast experience with disk I/O bottlenecks. His colleague told him the bank had benchmarked SanDisk's Fusion ioMemory™ solutions against their huge SAN with "amazing results" and highly recommended Daniel check out the Fusion ioMemory ioDrive® cards.

"After a lot of research and discussions with other technology professionals, I concluded that SanDisk doesn't really have any competition," said Daniel.

#### Eliminating Disk Queuing

By implementing ioDrive cards on its database servers, Daniel was able to take Lockerz from ever-increasingly clogged request queues to a streamlined, super-fast website and database that can handle even Lockerz's global-sized request loads.

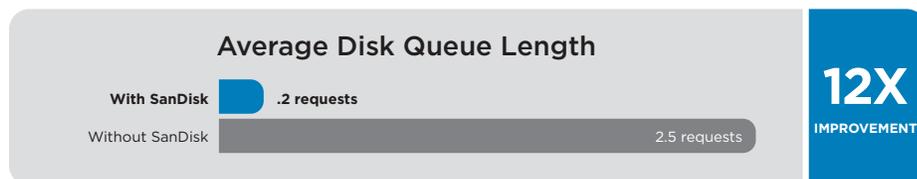
The ioDrive cards eliminated the queuing created by write operations. Disk queue length shrunk by more than 10 times—from 2.5 to 0.2 seconds. Database response time improved by 10 times on average, dropping from one second to as low as 10 milliseconds. Daniel estimated this doubled Lockerz's overall database load capacity.

*“Before we got these ioDrive cards, our database’s biggest bottleneck was disk I/O. Now that’s resolved, the web servers don’t need to wait on the database anymore. Everything just is a lot faster.”*

Daniel Marashlian  
CTO, Lockerz

Finally, the average load time for requests made from the IIS web servers was reduced by almost four times, dropping from an average of 1.8 seconds to as low as 0.4 seconds.

Daniel told us, “Before we had multiple seconds of queuing on the disk, but now the disk queue has more or less gone away. The ioDrive cards handle all the random reads almost like RAM and, at worst, write queues last about a second instead of the minute it used to take. Our performance monitoring graphs used to look like a mountain range, but now they look like the Great Plains.”



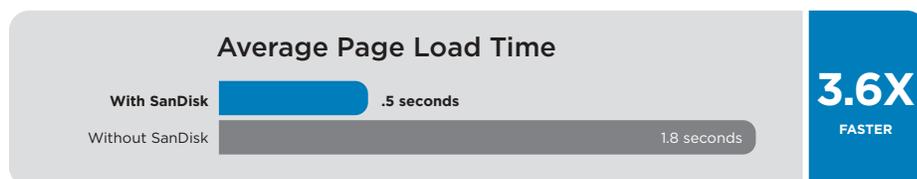
### Reliability

An additional benefit that Daniel noted was the improved reliability of Lockerz’s systems. With just two servers, Lockerz created a complete, mirrored database layer.

Daniel said, “When you have parts that move, you have a higher instance of failure. Implementing the ioDrive cards eliminated a lot of moving components in our disk arrays and improves the reliability of the system.”

### Improving Customer Conversion and Retention

For Lockerz users, any delay in viewing or uploading photos is unacceptable. The improved database performance reduced the wait time between a photo-upload request and the actual display of the photo by 2/3.



As a global site there are no real “off-business hours” in which to tune and optimize performance or work to anticipate coming performance spikes. The ioDrive cards improved both the performance and the availability of the site.

“Google and Facebook have demonstrated how critical 24x7x365 global availability is for customer retention,” said Daniel. “With SanDisk, everything on our site is just a lot faster. Data loads quickly and without perceptible slowdown under even the heaviest spikes in traffic.”

### Competitive Advantage

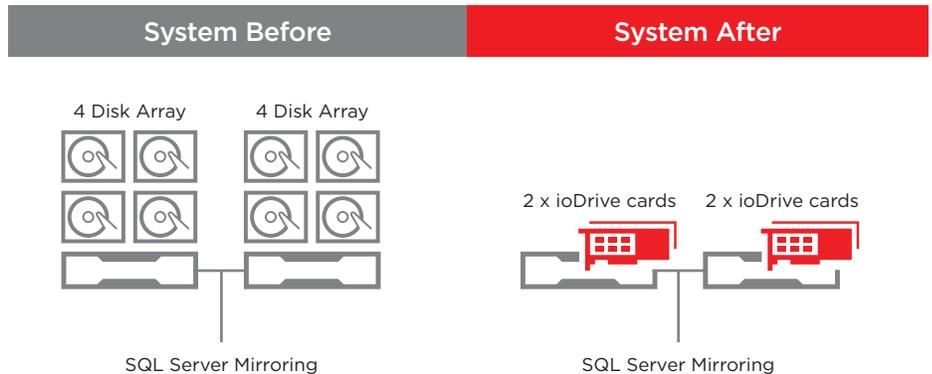
Daniel told us that SanDisk has greatly helped Lockerz in the race for competitive advantage. Installing ioDrive cards powered its performance and availability past one of its primary competitors. Another primary competitor “didn’t touch their servers for a year. They just focused on doing whatever it took to achieve peak performance to assure that their site was always accessible,” Daniel said. “We were able to match the value of that investment with the purchase of a couple ioDrive cards. Meanwhile we’ve developed the most robust photo-sharing API on the market.”

## Expert Implementation Support

Lockerz's need for the ioDrive cards was pressing, so it initially installed and moved just the database files. Once the I/O bottleneck was tamed, Daniel took advantage of SanDisk's expert services to help him move all web log files onto the ioDrive cards and optimize Lockerz's architecture for the best performance and availability.

Daniel said, "Initially, we just moved the database files to the drives, but a SanDisk solutions engineer helped us optimize our system for even greater performance and efficiency—something other SSD vendors rarely provide."

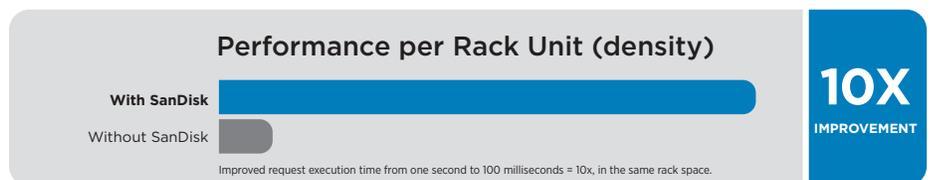
## System Overview

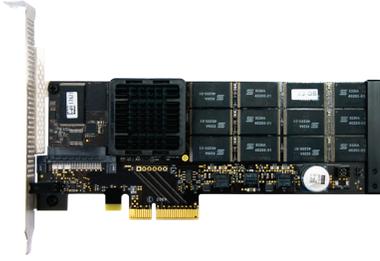


**2 x servers, Dual Intel 5500, QuadCore, 48GB RAM**

- OS: Windows Server 2008 Standard x64 Edition SP2
- Application: Microsoft SQL Server 2008 SP1 with CU7
- 4x 15k hard disks

**Replaced the two 4 disk arrays with two 160GB Fusion ioMemory ioDrive cards in each server.**





Fusion ioMemory™ - ioDrive®

## Summary

Implementing the Fusion ioMemory solution gave Lockerz the following benefits:

- **12x reduction** in average disk queue length
- **10x improvement** in database response time
- **Immediate 100% ROI**
- **4x improvement** in web server request response time
- Dramatically improved reliability
- **2x database load capacity**

“The ioDrive cards delivered the best performance and reliability for the money,” Daniel said. “Our only other option would have been to implement a SAN solution. That would have meant adding hundreds of disks and by extension, many more failure points. The cost savings on the ioDrive cards over a SAN delivered an immediate 100% ROI.”

## About Lockerz

Lockerz’ mission is to be the homepage for men and women ages 13 to 30, building a community of trendsetters and tastemakers who love to shop, play and connect on the web. As a members-only site, Lockerz has grown to nearly 19 million members worldwide, offering major discounts on the best fashions, electronics, music and more. Members earn PTZ® (“Pointz”) by watching videos, listening to music, answering daily questions, and through social commerce. Lockerz PTZ are then used to lower the prices of merchandise at will. Based in Seattle, Lockerz was founded in 2009 by former technology and retail executive Kathy Savitt. Lockerz is backed by Liberty Media Corporation and Kleiner Perkins Caufield & Byers.

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The performance results discussed herein are based on internal Lockerz testing and use of Fusion ioMemory products. Results and performance may vary according to configurations and systems, including drive capacity, system architecture and applications.

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