

Zappos Case Study

Zappos Zaps Complexity with the IBM High IOPS SSD PCIe Adapter

Online Retailer improves database performance and customer experience while slashing its system administration overhead with Fusion-io powered IBM device.

The Challenge

Zappos considers themselves an online services company that “happens to sell” products, so providing an optimal customer experience on its web site is a top priority.

To keep up with projected holiday traffic increases, Kris Ongbongan, Systems Administration Manager, knew Zappos would have to upgrade. He began searching for options that could ensure positive customer experience with minimal impact on his IT department’s overhead.

The Solution

During his system analysis, Kris identified two areas where Zappos needed to upgrade performance in order to handle increased loads:

- Product databases. The databases containing product information would need to be able to handle many more concurrent users.
- Web cache. Zappos cached the HTML for many pages to improve load times and by extension the customer experience. It wanted the capacity to store many more of these fast-loading pages.



SUMMARY OF BENEFITS

- 3x database performance
- 70% more database connections with half the hardware
- 25% improvement to overall page loading times
- 20x lower latency on pages loaded from the web cache
- More than halved system maintenance overhead

“The IBM High IOPS SSD PCIe Adapter allowed us to improve database and web site performance to support the increased traffic as we approach 2009 holiday peak. And the best part is that we did it while reducing our workload.”

Kris Ongbongan, Systems Administration Manager, Zappos

FUSION-IO®

Amazingly, the IBM High IOPS SSD PCIe Adapter powered by Fusion-io technology allowed Zappos to surpass its projected performance capacity needs while actually reducing maintenance.

TRIPLING DATABASE PERFORMANCE WITH HALF THE HARDWARE

Before implementing the IBM High IOPS SSD PCIe Adapter, Zappos maintained seven MySQL database instances across seven IBM x3550 blade servers. Adding a single 80GB adapter to each of its database servers tripled each server's performance.

This allowed Zappos to host up to four MySQL instances per server. Zappos installed three instances per server and repurposed four of the servers. Doing this increased its database connection capacity by two thousand connections, increased its storage capacity and reduced the number of servers Kris's team had to maintain.

Kris remarked, "The High IOPS adapters allow us to run three times the traffic per server, and cuts the number of servers we need by more than half, while improving performance."

ACCELERATING THE WEB CACHE

In addition to improving its database capabilities, Zappos also used IBM High IOPS SSD PCIe Adapters to greatly improve its customer experience. Two 160GB adapters added 320GB of RAM-like memory to its web cache. This meant many more pages loaded from cache rather than disk—and the latency from pages loaded from cache (cache "hits") dropped from 100ms to 5ms.

"The High IOPS card allows us to keep many more product and search pages in the cache," said Kris. "This about triples our cache-hit ratio and gives us a 20x improvement in cache-hit latency. Our average page load times including both cache hits and misses improved 25%."

REDUCING MAINTENANCE OVERHEAD AND OPERATING COSTS

The reduction in the number of its database servers from seven to three meant four fewer databases servers to maintain and a more reliable system with far fewer mechanical components to fail.

Kris told us, "The adapter has helped my group by reducing the number of servers we expected to manage during the 2009 holiday season from nine to twelve servers down to three."

Database System

DATABASE SYSTEM BEFORE

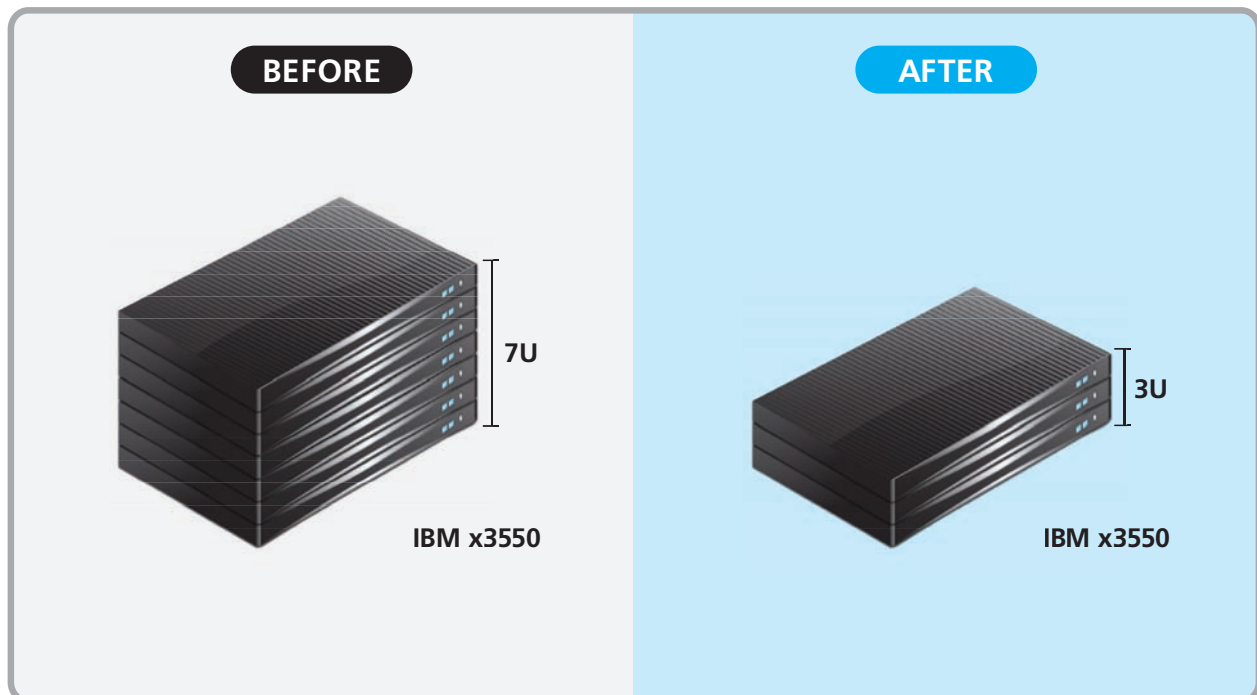
(7) IBM x3550, 2x Quad Core 2GHz,
16GB RAM

- OS: Suse Enterprise 9
- Applications: MySQL 5.1,
one instance per server

DATABASE SYSTEM AFTER

(3) IBM x3550, 2x Quad Core 2GHz,
16GB RAM

- OS: Debian 5.0
- Applications: MySQL 5.1,
three instances per server



The Results

Implementing the IBM High IOPS SSD PCIe Adapters into its IBM x3550 servers gave Zappos the following benefits:

- 3x database performance
- 70% more database connections with half the hardware
- 25% improvement to overall page loading times, improving customer experience and conversion rates
- 20x lower latency on pages loaded from the web cache
- More than halved system maintenance overhead

Needless to say, Kris is thrilled, "The IBM High IOPS SSD PCIe Adapter allowed us to improve database and web site performance to support the increased traffic as we approach 2009 holiday peak. And the best part is that we did it while reducing our workload."

About the Company

Established in 1999, Zappos.com has quickly become a leader in online apparel and footwear sales by striving to provide shoppers with the best possible service and selection. In 2008, the company's gross merchandise sales exceeded \$1 billion. Zappos.com currently stocks millions of products from over 1000 clothing and shoe brands. Zappos.com was recognized in 2009 by FORTUNE MAGAZINE as one of the "100 BEST COMPANIES TO WORK FOR," debuting as the highest-ranking newcomer to FORTUNE's 2009 list. More information about the company's customer service philosophy, unique company culture, and job openings can be found at <http://about.zappos.com>. More information about the "Zappos Insights" business membership program can be found at <http://www.zapposinsights.com>.