



## CASE STUDY

# PlentyOfFish and SanDisk: A Perfect Match for Engineering Love

### Solution Focus

- Microsoft SQL server
- Online dating

### Summary of Benefits

- Low latency; high performance
- 4x improvement in compute power over hard disk drives\*
- Cost containment
- Reliability and ease of use
- Consistent Quality of Service (QoS)

\* Based on proof of concept tests and production environment tests by PlentyOfFish

*"As a partner, SanDisk has been awesome. I know that we can trust SanDisk to be there for us as we need them and as we grow. Today, PlentyOfFish has over 100 million users, tomorrow 200 million, and to get there, I know we're going to be using Fusion ioMemory PCIe cards. When the rubber hits the road, they're there for us."*

**Owen Morley,**  
Director of Infrastructure, PlentyOfFish

### Summary

PlentyOfFish is the world's largest online dating site, with more than 100 million registered users. At any given moment, there are as many as 700,000 members online, with as many as 30,000 messages being sent between members every minute. The PlentyOfFish team understands the importance of being able to serve content—including profiles, images, messages—instantly to millions of users. Through their deployment of Fusion ioMemory™ PCIe application accelerators, PlentyOfFish is able to support their members' needs, and improve the user experience overall with only 30 database servers.

### Background

In 2003, Markus Frind started PlentyOfFish (POF) as a personal side project to learn a new programming language. He managed the site solo for the first five years and increased the membership to more than 10 million users. He hired his first employee in 2008.

On average, each time a member logs in, he or she views 22 pages over a 15-minute period. With more than six billion page views and 50 million visitors per month, the company has successfully managed to provide their services for free by selling advertising based on the huge number of potential impressions. Users can also upgrade for a fee to access additional site services and functionality.

"PlentyOfFish is the world's largest dating site," said Owen Morley, Director of Infrastructure, PlentyOfFish. "On the Internet, the faster you respond, the longer users are going to stay online. That's very important for us, because the longer you're online, the more likely you're going to message and find the person you're going to leave the site with. It's our job to get you off our site as fast as possible, so you can tell all your friends about how great we were and they can join up as well."

### The Challenge

While PlentyOfFish continues to serve 100 million users, it also remains a predominantly free service. As a result, the company must manage their costs and resources as efficiently as possible while also maintaining high response times for its users. Speed and reliability are crucial to the success of PlentyOfFish. When the company first deployed traditional hard disk drive storage, and could not keep up with user demand, Morley knew they needed help. The company identified three key areas of concern during their years of explosive growth:

- Data consistency
- Cost containment
- Latency and performance

**SanDisk®**

*“When we used traditional hard disk drives in our environment, we were often hours behind. The data just was not consistent across the SQL environment. Now that we have moved to Fusion ioMemory™ SX300 PCIe cards, it’s real time. We are also seeing a 4x increase in workload processing on our servers which allows us to get a lot more out of our computers today than we could with traditional storage. We save money on licensing and compute power, while significantly improving our performance and user experience.”*

**Owen Morley,**  
**Director of Infrastructure, PlentyOfFish**

With respect to the deployment of hard disk drives, Morley commented, “When we were using traditional spinning disks, our data wasn’t consistent across the environment. There were often hours of delays. A user browsing the website might see information that was hours old.”

Morley also mentioned the “hockey stick” growth that the company was experiencing. “We needed to scale our infrastructure without breaking the bank. I had to make the most out of what I had and make it go faster and harder without revamping or building an infrastructure from scratch.”

The PlentyOfFish environment, one of the largest Microsoft SQL environments in Canada, executes more than 500,000 SQL statements per second over the course of the day, engaging more than 30 servers. On a typical server, storage was their biggest performance bottleneck. “As a web application we live and die by latency,” said Morley. “We need to respond to requests as soon as possible, so that users don’t notice how much time has passed. We can’t wait seconds or milliseconds for a response. We need it in microseconds.”

### **The Solution**

PlentyOfFish is now an all-flash environment. “We learned the hard way that we can’t trust hard drives or spinning disks,” said Morley. “It’s a lot easier to go with enterprise flash, and that’s where the Fusion ioMemory PCIe cards come into play.”

PlentyOfFish tested many of the PCIe cards on the market before settling on Fusion ioMemory PCIe cards for deployment. “When it comes to performance, SanDisk is the most consistent,” said Morely. “We had an old PCIe card, which was really fast, but every month it would break. SanDisk’s Fusion ioMemory PCIe cards have the best performance and are the most reliable.”

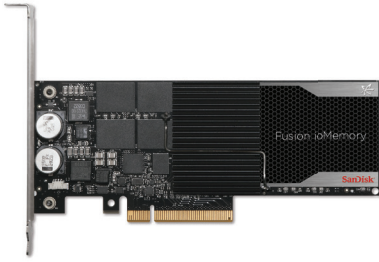
With the deployment of Fusion ioMemory PCIe cards, PlentyOfFish has realized up to four times the compute power from their servers without changing anything else in the server. “We’ve learned that not all flash is created equal. I’ve got an all-flash environment here at PlentyOfFish. We use the Fusion ioMemory SX300 PCIe application accelerators to make the most of our environment. I need speed. I need reliability. I can’t have jitter. I can’t question if it’s going to perform consistently. I need to trust my infrastructure. These are cards that we can trust, and that’s why I keep spare stock for growth.”

The PlentyOfFish environment is never static: it is always changing and growing, with new servers coming in and old servers going out. “The Fusion ioMemory PCIe cards help make that easier. We’re not moving trays of disks. We’re just moving single servers with a single card in them. We get all the performance with a single PCIe card. I don’t have racks of spinning disks. I don’t have to get a forklift to install our storage. I’ve got one guy that rolls down to the data center and plugs it in.”

### **The Result**

By installing a Fusion ioMemory SX300 1.6TB\* PCIe application accelerator in each server, PlentyOfFish is able to get more performance out of its servers. The infrastructure is now able to respond to database requests faster and more efficiently. Instead of waiting a full second for a page to load, the environment can serve query responses in milliseconds. “Since deploying Fusion ioMemory PCIe cards, I sleep better at night. I know the systems are going to be stable and perform consistently. Before we deployed flash, we were losing a hard drive on one system every two weeks. However, I haven’t lost a single Fusion ioMemory PCIe card yet, and we’ve had them deployed for years. It just works.”

In addition, the deployment of Fusion ioMemory PCIe cards has helped PlentyOfFish with their cost containment challenges. The team is getting more out of their servers than they did with traditional storage. They have saved money on licensing and compute resources, while significantly improving performance and user experience. “Flash saves money. Compared to legacy storage, the ROI is ridiculous. The ROI for flash is about two weeks when you factor in licensing and systems costs, because we get over four times the performance out of our host. These cards pay for themselves in just two weeks.”



Fusion ioMemory™ SX300 PCIe Application Accelerator

## A Partnership for the Future

When Morley began working at PlentyOfFish three years ago, the company had fewer than 40 million users. Today, the company boasts more than 100 million members and anticipates continued exponential growth. The closely-held company is on a run rate to reach \$100 million in revenue in 2015.

Morley has been pleased with the partnership forged between PlentyOfFish and SanDisk. During a recent system problem, the PlentyOfFish team called the SanDisk team to help out. "As a partner, SanDisk has been awesome. We had cards on site the same day to get us through the weekend. I know that we can trust SanDisk to be there for us as we grow. Today, PlentyOfFish has over 100 million users, tomorrow 200 million, and to get there, I know we're going to be using Fusion ioMemory PCIe cards. When the rubber hits the road, they're there for us."

PlentyOfFish touts the consistency, performance, and reliability of Fusion ioMemory PCIe devices as the reasons why they keep coming back and why they can continue to serve their online members. "By deploying flash, pages load fast enough to hold your attention, which means you're going to find the person—you're going to find love."

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\* 1 GB = 1,000,000,000 bytes. Actual user capacity less.

The performance results discussed herein are based on internal PlentyOfFish 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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