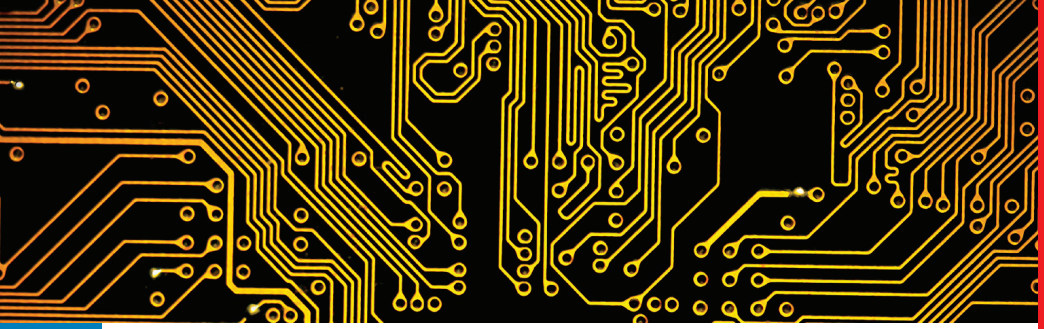

CASE STUDY

Leading Semiconductor Fabricator Forges a High-Performance Solution with Fusion ioMemory™ PCIe Application Accelerators

Solution Focus

- Semiconductor industry
- GPFS file system with Fusion ioMemory technology
- High-performance cluster configuration

Summary of Benefits

- Reduction of number of clusters from 11 to two
- 50% reduction in runtime for typical workloads
- Easy installation of Fusion ioMemory drives, with outstanding performance

Summary

Faced with slow-running workloads and increasing business demands, the largest semiconductor fabricator in China needed a better-performing IT infrastructure. After partnering with SanDisk® and implementing Fusion ioMemory products, the company business now handles semiconductor simulation, designing, and modeling workloads 50% faster, with a highly available data configuration.

Background

This SanDisk customer is one of the leading semiconductor fabs in the world, and the largest and most advanced fab in mainland China. They provide integrated circuit (IC) fab and related technology services. Listed on the Hong Kong and Nasdaq indexes, the customer has sales operations all over the world, with a revenue of more than $2 billion U.S. last year.

The Challenge

To keep up with current business growth, the customer needed to purchase a new server cluster and set up a parallel file system based on high-performance storage devices.

The SanDisk Solution

The customer formed a large cluster by merging their existing servers with 400 new additional servers. Lenovo implemented a new General Parallel File System (GPFS), based on the Fusion ioMemory adapters, on the cluster. GPFS supports concurrent access from 200 client servers, and the entire configuration provides exceptional random and sequential access performance.

The General Parallel File System (GPFS) provides high performance and reliability with scalable access to critical file data. GPFS distinguishes itself from other cluster file systems by providing concurrent high-speed file access to applications executing on multiple nodes of an AIX, Linux, or heterogenous cluster. In addition to providing file storage capabilities, GPFS provides storage management, information life cycle tools, centralized administration and allows for shared access to file systems from remote GPFS clusters.

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"The key components of the new cluster are Fusion ioMemory™ adapters and GPFS, the parallel file system. All the data is saved with two replicas, spread across eight storage servers, which provides high availability and great performance. Our productivity has doubled."

System x HPC Solution Architect, Lenovo

Lenovo and SanDisk Products

- Lenovo 1.2TB High IOPS MLC Mono Adapter
- Fusion ioMemory PCIe drives

The Fusion ioMemory PCIe drive is a NAND flash storage device whose performance typically exceeds that of a fibre channel drive. The drives are installed in open PCI slots on a host server with the SanDisk Virtual File System providing wear leveling and general control of the Fusion ioMemory drives.

The resulting architecture included eight Lenovo System x3650 M4 servers with 16 1.2TB High IOPS Adapters (based on Fusion ioMemory PCIe drives). Each server is equipped with two Fusion ioMemory PCIe cards, and connected by one 10Gb ethernet network. The GPFS file system was configured to replicate, such that all data and metadata would be saved with two replicas.

Results

After the configuration was consolidated, the customer realized the following benefits:

- 11 clusters had been reduced to two, a large reduction in complexity. Simplifying computing infrastructure is a huge win for a fab.
- The storage architecture was simplified from a NAS server and storage with GPFS to just NAS storage and GPFS.
- Resource utilization and management efficiency were improved, which increases support for large workloads in the future.

The new file system, based on Fusion ioMemory PCIe cards, performs much faster than the distributed storage cluster. For a real-world customer workload, the new file system typically saves up to 50% in runtime on the Mentor Graphics® application.

"Installing the Fusion ioMemory PCIe cards was easy and we get stunning, high performance out of the cards," said a System x HPC Solution Architect at Lenovo. "The Fusion cards really complement GPFS for the high-performance requirements for workloads such as semiconductor simulation, designing, and modeling."

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At SanDisk, we're expanding the possibilities of data storage. For more than 25 years, SanDisk's ideas have helped transform the industry, delivering next generation storage solutions for consumers and businesses around the globe.

The performance results discussed herein are based on internal customer 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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