CASE STUDY

Lenovo and SanDisk® Solve Analytics Hang-ups for Telecom Company

Solution Focus

- Telecom industry
- Hadoop analytics
- Data mining

Summary of Benefits

- 5x improvement in database query processing
- 500% improvement in I/O performance per server
- 80% cost reduction in maintaining servers
- Reduction in server footprint

SanDisk Products

- Fusion ioMemory PCIe cards
- Lenovo System x3650, x3755, x3850 servers

Summary

This Lenovo/SanDisk customer is one of the leading mobile services providers in mainland China and one of the leading telecom companies in mainland China, with revenue of about $500 million (U.S.) per year. Deploying Fusion ioMemory™ PCIe cards, in conjunction with Lenovo servers, has enabled this enterprise to improve database performance by 5X, speed database queries by 5X, and reduce data center operating costs by 80 percent.

Challenge

The SanDisk/Lenovo telecom customer services nearly 50 million mobile subscribers. Each customer phone call, and all data service records, are kept in the Hadoop Distributed File System (HDFS), which is designed to reliably store very large data sets and stream those data sets at high bandwidth to user applications. This data is frequently used to analyze data-consuming behavior of customers or to determine the effectiveness of marketing programs.

As the customer's business grows, a fast or real-time query would be a huge advantage to business decisions. Therefore, the customer needed to increase IOPS performance and innovate their IT infrastructure in order to maintain leadership in the market in China.

Solution

The customer chose a highly effective solution consisting of the following components:

- 200 Lenovo System x3755 M3 servers
- Four Lenovo System x3850 X5 servers
- Eight Lenovo System x3650 M4 servers, each with 12 2TB HDDs and eight Lenovo High IOPS adapters (365GB each, powered by Fusion ioMemory PCIe technology)

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Based on customer requirements, the solution is divided into three tiers:

a. The x3755 servers form a joint resource pool base in Linux KVM, which handles the outbound access pressure.
b. The x3850 and x3650 are the core servers, hosting the hot analytic data with the High IOPS adapters and 10Gb Ethernet. An application stores hot (current-month) data on the High IOPS Adapter so it can analyze recent data from customer phone bills. Each month, this data is archived from the High IOPS Adapters to HDD.
c. HDFS is the core inner file system, with Hbase running on top to process queries. Data is spread across the core servers in order to solve the bottleneck of data transactions.

The server-attached High IOPS Adapters powered by Fusion ioMemory technology deliver a high- performance, low-cost solution for data analysis. This architecture also fits well in the current IT strategy, which is focused on using in-server flash storage to replace HDDs, where possible.

Results

A database query that used to take five hours now only needs one hour to complete, and I/O performance per server was measured at a 500% percent improvement. Additionally, there has been an 80 percent cost reduction in maintaining servers, with the new architecture using only one-fifth the server footprint. The reduction in servers also provided substantial cost savings through reduced datacenter footprint and cooling requirements.

By using Fusion ioMemory PCIe technology in conjunction with Lenovo servers, the customer has been able to increase the scope of their analytic dataset. They have done this while maintaining a reasonable response time for their data-mining jobs. This solution has helped the customer address long-standing issues with old clusters and storage reuse.

The Lenovo/SanDisk architecture helped speed up the construction of our efficient, green data center to enhance computing performance while reducing infrastructure and administrative overhead.

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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 and cost savings discussed herein are based on internal 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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