Case Study

Accelerating Online Advertising

Violin's 3200 Flash Memory Arrays Speeds Service Delivery and Enables Cost Effective Growth In the multi-billion dollar world of online advertising, leading the pack requires extraordinary speed, without compromising reliability.

The Customer

Large brand advertisers – consumer packaged goods, retail, quick serve restaurant, pharmaceutical, entertainment, finance, automotive and telecommunications companies – advertise across a variety of media to move hundreds of billions of dollars of product each year. While the Internet accounts for 30% of U.S. advertising media consumption, 95% of US retail sales continue to occur offline in brick and mortar stores.

The Challenge

Brand.net, headquartered in Silicon Valley, was founded specifically to address this challenge. By delivering innovative online marketing solutions, Brand.net has become the leading driver of offline sales through online advertising for the world's largest advertisers. The company's pioneering Media Futures PlatformTM (MFP) provides scalable media forecasting, buying, and delivery management capabilities directly to advertising agencies and their clients. Quality and cost of impressions, delivery, reach, and audience composition are guaranteed in writing up to a year in advance, and every Web page is proactively filtered for inappropriate text or images.

Providing this level of technology and service in real-time requires extraordinary information technology (IT). Brand.net has a variety of server processes running for ad serving operations, including the ad, content categorization, and frequency management servers, as well as ecosystem support servers that provide monitoring, guidance delivery, communications, and synchronization within its production data centers. Brand.net uses the CentOS/Linux operating system (OS) with Java and C application environments. The requirement for speed requires such extremes of system performance and low latency that the company does not use databases in its ad serving production operations – they are far too slow.

A critical IT challenge for Brand.net is to maintain acceptable response times (worst-case latency records access) from a very large data set. This challenge is amplified by a critical component of the company's solution, tightly managed "frequency". As Aram Compeau, Brand.net's Vice President of Engineering, explains, "In the ad serving world, 'frequency' refers to how many times you show a particular ad to someone. Ideally, you want to avoid showing the same ad to the same person, and instead to show it to someone who has never seen it before. This decision needs to happen in real time to satisfy the tight response times of online ad calls. Solving the problem with just memory and servers creates relatively complicated persistence, restart, and recovery problems, so we opted for solid state drive (SSD) technology and fewer servers. Our first SSD solution, which used discrete Flash storage for each individual data server, provided unacceptable worst case latencies at higher throughput. We needed a solution that would allow us to read from anywhere on disk with a relatively low worst case latency of access, robustness in the face of discrete disk failures, and high throughput."

In addition to these performance challenges, growing rapidly, Brand.net experienced dramatic increases in data center traffic. The traditional solution of "adding more servers" in each data center was costly, inefficient and unacceptable.

The Solution

These performance challenges let Brand.net to Violin Memory Systems, a pioneer in enterprise data center Flash memory solutions. Violin Flash Memory Arrays accelerate business critical applications and enable companies to virtualize and optimize their IT infrastructures. They are specifically designed for sustained performance with high reliability and serviceability, scaling to hundreds of terabytes and millions of inputs/outputs per second (IOPS) with low, spike-free latency.

Brand.net chose the Violin 3200, a redundant, modular, enterprise-grade 3U Flash memory array that scales from 500GB to 10TB SLC NAND Flash and provides the industry's best price/performance attributes. It is the first in the Violin 3000 series of memory arrays to scale to more than 140TB in a rack with performance over two million IOPS. The enterprise-grade Violin 3200 includes hardware-based Flash RAID across hot-swappable memory modules to provide robust data protection and spike free latency of less than 100 microseconds.

Violin worked closely with Brand.net to install and optimize the system. "After we first installed the units it became clear the OS was not setup for storage with this kind of performance," says Compeau. "We contacted Violin support and they quickly determined that we had not properly configured some of the OS settings. They suggested changes that resulted in excellent performance gains and we have been running with them ever since."

The Results

Brand.net is highly satisfied with the improved robustness and reduction of peak latency spikes Violin 3200 provides. At a mixed read/write rate of 5,000 operations per second, the application response latency averaged 77 milliseconds (ms), with maximum spikes of only 336ms. For read only requests, the average latency was 23ms, with worst case of 210ms. Most importantly, when traffic rates doubled to 10,000/s, the average read response latency rose only to 51ms, with worst case to 270ms.

The Violin Memory Arrays also allowed a dramatic reduction in Brand.net's required server volume. "Violin allows us to rapidly read and write frequency data for any of one billion records using only two servers; without Violin it would have taken about twenty."

The result for Brand.net and its customers: extremely fast responses with page loads not noticeably slowed by ads, and a more efficient and cost-effective solution, in terms of development, deployment, and operations.

Violin MEMORY

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