Mozilla Slashes Power Draw and Operating Expense While Increasing Compute Density and Reliability with the SeaMicro SM10000

Mozilla is a public benefit, non-profit organization responsible for the popular Firefox browser. Mozilla is built from a global community of people who believe that ***openness, innovation, and opportunity*** are key to the continued health of the Internet. Firefox, Mozilla's flagship product, is free and open source software, with approximately 40 percent of its code written by volunteers. Today, more than 400 million people around the world use Firefox.

Justin Fitzhugh leads the team responsible for the engineering and infrastructure that supports this global user base. Mozilla's business depends on a compute infrastructure that is available to Mozilla's own engineers, to open source developers around the world, and to millions of end users each day.

"The primary challenges of managing a large compute infrastructure are power and space. They are my dominant concerns," said Fitzhugh. "Power determines how many servers you can fit in your facility, which in turn determines how many users or engineers you can support. Inside your power envelope, server density determines how many servers can fit in a given facility and how many facilities you require. At the end of the day, the power and space used by servers dominates the total cost of ownership in a data center."

Mozilla had long known that the traditional blade servers they were purchasing were ill suited for their workload but saw no alternative. Like most Internet companies, Mozilla runs Linux, PHP and Apache. Their workloads were comprised of millions of relatively small, independent jobs, like an individual Firefox end user checking for an update or adding a plug in. Traditional servers were built for a very different workload — workloads that were large, interrelated, and complex. While Mozilla recognized the mismatch between the blade servers they were purchasing and their LAMP stack workload, there were no alternatives in the market.

"Innovation in the server space has been rare. In SeaMicro, we saw something transformative. A company committed to slashing power draw and dramatically increasing compute density, while remaining standards based," said Fitzhugh. "We saw engineers attacking problems that other companies had refused to tackle. We knew they were on to something special."

SeaMicro servers are optimized for the Internet workload that dominates Mozilla's infrastructure. The SM10000 integrates 512 Intel® Atom™ low power processors, traditionally used for mobile devices and the smallest laptops. The SeaMicro architecture links these processors together with a super-compute style fabric transforming the system into a high density, low power, single-box cluster computer, optimized for Internet traffic. SeaMicro further improved total cost of ownership and reduced power use by integrating the functionality traditionally found in an entire data center rack — compute, storage, networking, server management, and load balancing – into a single, low-power system.

Mozilla Case Study

Mozilla performed extensive testing prior to deploying the SeaMicro SM10000. Mozilla's priorities were performance/unit power, ease of use and operation, and reliability. Mozilla tested and compared the SeaMicro system to their existing blade enclosures and discovered enormous compute per unit power advantages at all CPU utilizations.

Today, when an end user running Firefox wants to download an update, addon or persona, the browser sends a URL request to Mozilla's download cluster. The servers running Linux, Apache, and PHP run a query to the backend database/memcache cluster and return an HTTP Redirect URL (also called an HTTP 302 return) back to the browser so that Firefox can fetch the desired file from the network of donated download resources.

Mozilla compared performance on the SeaMicro SM10000 with their incumbent system - an HP C7000 Dual Socket Quad Core L5530 Xeon Blade and found SeaMicro to be dramatically superior on all of the competitive dimensions: Capital expense per unit compute, HTTP requests serviced per/Watt, and HTTP requests serviced per Rack Unit. These advantages combined to produce dramatic savings in both capital expense and operating expense. On the operating expense side, the SeaMicro SM10000 used less than 1/5 the power per request, and took less than 1/4 the space of the HP C7000 for small transaction, high volume workloads.

In addition, while handling HTTP requests, each Atom server in the SeaMicro SM10000 provided dramatically more consistent response time to user requests than the Quad Core Xeon processors in the HP C7000, ensuring a uniform and positive customer experience.

"Each time you download one of the 10,000 Firefox plug ins, you are traversing SeaMicro equipment. The SM10000 was easy to deploy, improved compute per unit power, and simplified our infrastructure by eliminating Ethernet switch ports and reducing management overhead," said Mathhew Zeier, Director of Operations.

SeaMicro SM10000 *high density, low power server.*

Today SeaMicro's SM10000 is an important part of the Mozilla infrastructure. Said Fitzhugh, "Our investment in SeaMicro has already paid tremendous dividends. We are drawing on the order of 1/5 the power per HTTP request, and using less than 1/4 the space. This has freed room in our power envelope, and space in our cages to increase the compute footprint, providing additional CPU cycles for our different users, while dramatically reducing our operating expenses."

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