Accelerating the mobile web experience

CloudMosa counts on Dell cloud servers and green technology from Samsung to deliver a 'wicked fast' experience for mobile users.

Challenge

CloudMosa needed a scalable, highly efficient computing infrastructure to provide cloud-based processing power for its Puffin web browser.

Solution

The company deployed Dell™ PowerEdge™ C5220 microservers, equipped with Samsung green DDR3 and solid state storage (SSD), in its colocation data centers.

Benefits

- Enabling mobile users to have extremely fast web experiences
- Reduced power consumption to contain operational costs
- Ease of scalability to keep pace with dramatic business growth

Application areas

- Mobile browser
- Cloud computing

CloudMosa CEO
Dr. Shioupyn Shen
discusses the technology behind a faster web experience.

Dr. Shioupyn Shen
Chief Executive Officer, CloudMosa

When it comes to the web, speed is everything. Users want web pages and video streams to appear quickly, even instantly. That can be a problem for users of mobile devices. With their limited processing power and memory capacity, many mobile devices deliver a sluggish web experience. At least that's the way it has been.

Today, CloudMosa solves this mobile web problem by shifting the workload from mobile devices to cloud data centers running Dell™ PowerEdge™ C5220 microservers, equipped with Samsung Green Memory (Solid State Storage, or SSD, and Green Double Data Rate Three, Synchronous DRAM, or DDR3, memory). This offloading process works in tandem with the company's Puffin web browser to enable resource- and memory-hungry web applications to run quickly and smoothly on smartphones and tablets.

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Puffin Browser

The fastest mobile browser ever, brings a totally new Internet experience.

Available on the iPad/iPhone
App Store
ANDROID APP ON
Google play

"We developed an automatic installation program, so as we put in new servers, all we have to do is connect the network and everything configures itself. It starts to serve live traffic in about a half-hour after we turn on the power."

Dr. Shioupyn Shen, founder and CEO, CloudMosa

The roots of a new solution

What some see as a problem, others see as an opportunity. That's the case with the mobile web experience and Dr. Shioupyn Shen, founder and CEO of CloudMosa. As the number of mobile devices in use skyrocketed, the way in which consumers used their devices was also shifting. Dr. Shen recognized that many consumers were using mobile devices for interactive information retrieval and multimedia content consumption—activities most commonly done through the web browser. What's more, Shen knew that people tend to perceive web browsing as a fairly simple computing task, so they assume if web browsing is all they need it is OK to use lower-end devices.

"That's where the reality and the perception distinctly differ," Shen says. "Web browsing is actually the most resource-intensive application on your mobile device in terms of CPU and memory usage." While most users have no concept of what it takes to render a web page on a mobile device, they do understand that the mobile web experience can fall far short of the experience they enjoy on desktop systems.

"When I looked at this situation, I said, 'I can fix this problem. I can put data centers on the cloud and use the data center servers to accelerate web browsing, so that the majority of the work is no longer done on the mobile device. The resource intensive work can be done in the data center.'"

With that vision, Shen launched CloudMosa, a company that is redefining the web browsing experience for mobile users.

Unlocking the potential of the web

CloudMosa's flagship product, the Puffin web browser, is designed to unlock the potential of the web for mobile users by rendering a full web experience on smartphones, tablets and notebooks. By leveraging CloudMosa's massive cloud data center to render web pages on the cloud servers, the Puffin browser is able to achieve unparalleled page-loading speeds, Shen says.

In CloudMosa tests that used the SunSpider JavaScript Benchmark,

Technology at work		
Hardware		
Dell PowerEdge C5220 microservers		
Samsung Green DDR3 memory		
Samsung Green SSDs 100gb SM825, emlc		
Software		
CloudMosa Puffin web browser		

DELL

the Puffin browser proved itself to be:

- 550 percent faster than the built-in browser on iPad 3
- 1600 percent faster than Chrome and other alternative browsers on the iOS platform
- 500 percent faster than the latest version of Chrome on Nexus 7

"Puffin is wicked fast," Shen says. "When people first use it, they can't believe web browsing on a mobile device could be this fast."

With its high-speed Puffin browser, CloudMosa is rewriting the rules of mobile web browsing. The Puffin browser encapsulates Flash technology to allow mobile users to watch Flash videos, play Flash games and tap into countless Flash applications available on the web, all by running Flash on CloudMosa's servers.

The Puffin browser uses intuitive technology on which touch screen users have come to depend. This includes a virtual mouse to bridge the gap between mobile and desktop experiences. This virtual mouse enables users to activate a finger-driven trackpad that works like the trackpads on notebooks.

The backend view

In preparation for the launch of its Puffin browser, CloudMosa rented capacity from public cloud providers. This approach minimized setup time, reduced initial investment requirements and allowed CloudMosa to bring its product to market quickly.

Puffin launched, and the company's use of these cloud services was $1,000 a month initially. Just six months later, as the number of Puffin users exploded, CloudMosa's cloud server fees had risen to more than $50,000 per month and threatened to go higher as the user base grew.

In order to remain profitable in the long term, CloudMosa needed to invest in its own data centers, Shen says. As a first step in this direction, the company purchased a few fully loaded Dell™

PowerEdge™ R610 rack servers, installed with Samsung Solid State Drives (SSDs) and Samsung Green DDR3 memory, and deployed them in a colocation data center operated by Hurricane Electric. A year after the launch of Puffin, CloudMosa's data center had grown to about 100 servers. At two years past launch, CloudMosa worked to boost the performance of its cloud environment by upgrading to the high-density Dell PowerEdge C5220 microserver, again with Samsung Green SSD and DDR3 technology inside.

The PowerEdge C5220 was developed for the demands of dedicated and virtual hosting, content delivery networks and Web 2.0 applications, so it was a natural fit with CloudMosa's needs. With its highly dense architecture, the microserver packs 8 or 12 nodes into a 3U shared-infrastructure form factor. In addition to this density, Shen was attracted to the PowerEdge C5220 for its reliability, cost, power efficiency and ease of installation.

"This particular server allows us to do a so-called headless installation," Shen says. "We never hook up a keyboard, mouse and monitor. We developed an automatic installation program, so all we need to do is put in the server, connect the network and everything configures itself. It starts to serve live traffic in about a half-hour after we turn on the power. This model is very important. It allows us to deploy fast. Our latest $1M data center deployment was live in one week, by one person."

Cutting power costs

To cost-effectively meet wide-ranging service-level requirements, the PowerEdge C5220 offers a mix of performance and power efficiency options. In CloudMosa's case, the chosen components included highly efficient Samsung SSDs and Samsung Green DDR3—the new generation of high performance, ultra-low-power memory interface technology used in high performance servers, desktops and notebooks.

Dell PowerEdge C5220 server

Designed for environments in which maximizing power efficiency and compute density are critical, Dell PowerEdge C5220 servers fit up to 12 server nodes in a 3U form factor. A shared power and cooling infrastructure in the PowerEdge C5000 chassis enhances energy efficiency and helps reduce operating costs. The chassis includes dual hot-plug redundant 1,400W power supplies and N+1 redundant cooling fans.

Each individual, hot-swappable and serviceable server node includes one Intel® Xeon® E3-1200 processor, four green DDR3 unbuffered dual-inline memory modules (UDIMMs), two 3.5-inch or four 2.5-inch hard disk drives, and two Gigabit Ethernet (GbE) ports.

Samsung Green DDR3

Samsung DDR3 memory brings new levels of performance to notebooks, desktops and servers, while pushing the envelope in key areas like power consumption, speed and bandwidth. The company's recent 30nm class(*), 1.35V, 4Gb DDR3 is the world's first ultra-low-power memory technology, with more than a 76 percent power savings over traditional DDR2 at twice the bandwidth. Samsung DDR3 supports data rates of 800 to 1600Mbps, with clock frequencies of 400 to 800 MHz and voltage ranges down to 1.35V. Memory densities range from 1Gb to 4Gb, for use in modules from 1GB up to 32GB.

Samsung Green SSDs

The solid state drive is a next-generation storage device that overcomes the shortcomings of the mechanical parts in rotating media, which reduce performance and reliability. SSD drives provide many benefits over rotating media, including low latency, low power consumption, high reliability and high data integrity. When comparing IOPS per watt, the 4th Generation Green SSD SM843 is 1.8 times more efficient than the previous generation, while cutting power consumption by 33 percent. Server systems also see impressive results when Green SSDs are compared to standard HDD configurations. Web servers with SM843 SSDs use 13 percent less power, and application/database servers will use 20 percent less.

(*) Samsung is now actively marketing the latest 20nm-class generation of Green DDR3.

"With Dell's microserver environment, the server is really, really lean in power consumption," Shen says. "So we just want to make sure the components we put in the servers also have very lean power requirements, so everything matches very well."

Shen notes that CloudMosa liked the performance and reliability of the Samsung SSDs and DDR3 memory. "On top of that, with Samsung's memory, the power consumption is low. It's more green, more environmentally friendly. But the most important thing is that Samsung devices save us a great deal of money."

He notes that the power efficiency of Samsung DDR3 memory allows CloudMosa to deploy more servers per power circuit and to operate within a tighter power envelope. For each 208V/20A circuit, it can power three PowerEdge C5220 servers comfortably, but Shen squeezed in four PowerEdge C5220 servers by optimizing the power usage. "As a result, the cost for power usage is cut by 25 percent," he says.

"Our overall expense is about 80 percent on data centers and 20 percent on everything else," Shen says. "Even though the Dell servers are the No. 1 data center investment, power usage is a close No. 2. So if we use power more efficiently, it makes a considerable difference."

Renting versus owning
Given the tight margins that come with a cloud-based offering, controlling operational costs is one of the keys to the success of a business. CloudMosa took a huge step in this direction when it made the decision to build its own data center in a colocation environment.

Consider these numbers from Shen: The company's data centers are currently running more than 1,000 servers. To rent that computing capacity from a cloud service provider, CloudMosa would pay about $1M a month. That compares to a one-time cost of about $2M to build the data centers.

"This is a huge savings for us," he says. "To build and run our own data center was a life-or-death decision for our business."

Beyond that point, CloudMosa's economic health depends to a great degree on its ability to operate an extremely lean data center that squeezes the maximum value out of every dollar, watt and CPU.

"The DC operation is really a make-it-or-break-it proposition," Shen says. "If we couldn't run efficiently, then all the good software we have would not be able to make the company a success."

Soaring user acceptance
Since its launch, Puffin has become the No. 1 paid iPad utility in 50 countries and has tallied more than 8 million downloads worldwide. Usage is also extremely high on Android-based phones. Mobile users currently view about a billion web pages per month via the Puffin browser.

Sylvie R. Kadivar, PhD.
Sr. Director, Strategic Marketing DRAM, Samsung

Video »
Samsung's Sylvie R. Kadivar explains the advantages of Samsung Green Memory and SSDs.

Looking ahead, Shen sees more growth and a larger market share on the horizon. "We are growing about 40 percent, quarter to quarter," he says. "Very soon we will be the No. 1 alternative browser. And give another two years and we will be the No. 1 web browser on mobile devices."

To enable this ongoing growth, CloudMosa plans to continue to scale out its data center using Dell servers with high-efficiency Samsung components.

"Our growth rate is very high," Shen says. "That's why we need the PowerEdge C5220 microserver. It gives us the least expensive computing platform with the highest performance per dollar. It fits our power budget. It fits our real budget. It's just a perfect fit for our data center."

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