



Case Study

VMware: Server Memory Addition Extends Cloud Performance and Flexibility

"The competitive pricing and reliability of Kingston's server memory allowed us to scale the capacity of our cloud environment while reducing the number of physical servers. As a result, we are better able to deliver product integration and operational workflow feedback to VMware R&D."

Adam Zimman

*Senior Director of Integration Engineering,
VMware R&D*



Challenge

VMware's Integration Engineering (IE) Team provides transparent feedback on the implementation and operation of VMware products and technologies as "Customer [0]" running within an infrastructure as a service cloud. As part of this mandate, the IE Team built out a Service-Provider-scale cloud. The majority of servers in the initial implementation were configured with a 48 GB memory footprint. However, based on the utilization rate of the equipment for 2011 activities, the Team determined that doubling the memory footprint of 48 GB servers would be the best way to accommodate an increased workload projected for 2012.

Integration Engineering Cloud Hardware

- Kingston 8GB ECC Reg 1333MHZ (KCS-B200ALV/8G) Low Voltage Modules contribute to a total memory footprint of 39.936 TB.
- 416 compute nodes utilize OEM blade servers.
- 1 petabyte of usable storage capacity.
- Cloud resources for 2011 VMworld event:
 - 9 racks of computing hardware totaling 544 compute nodes with a yield of 3,520 compute cores and 29.95 TB of RAM.
 - Converged fabric NFS, 10 GB Ethernet network.
- Cloud resources for 2012 VMworld event:
 - 7 racks of computing hardware totaling 416 compute nodes with a yield of 3,840 compute cores and 39.936 TB of RAM.
 - Converged fabric NFS, 10 GB Ethernet network.

Solution

To increase the memory footprint of 288 servers from 48 GB to 96 GB, VMware specialists installed 1,728 Kingston 8GB Low Voltage Modules. This brought all 416 servers to 96 GB across the board. These servers utilized a petabyte of usable storage along with a total memory footprint of 39.96 TB.

Business Challenge

VMware, Inc. (NYSE: VMW) is the global leader in virtualization and cloud infrastructure. Additionally, the company's product portfolio includes solutions in downtime management, system recovery, resource provisioning and security issues. The Palo Alto, California-based company is a major player in its space, posting 2011 revenues of \$3.77 billion. Today, over 11,000 VMware employees serve more than 350,000 customers and 50,000 partners.

VMware's Integration Engineering (IE) Team was formed to capture, validate and deliver transparent feedback to the company's R&D division. As VMware's "Customer (0)" the team generates feedback through the operation of a Service-Provider-scale cloud. Workloads running in the IE cloud include on-site betas for new products, VMware Hands-On Labs (HOLs), and various special projects as needed.

In order to support the application workloads associated with these directives, the IE Team built out a Service-Provider-scale cloud across three data-center locations.

Technology Solution

Of the cloud environment's 416 servers, 288 of these required a memory upgrade. However, even with discounted pricing, the OEM manufacturer's pricing was so high, that only a percentage of the 288 servers could be outfitted with 96 GB of memory.

That motivated Adam Zimman, the Senior Director of Integration Engineering, for VMware R&D, to explore alternatives including memory from Kingston Technology Company.

Business Results

The Kingston solution resulted in a number of benefits for VMware's environment.

Able to take on more workloads with confidence

The Kingston memory upgrade doubled the capacity of the VMware workloads running on top of them. This result is consistent with an independent study of Kingston memory that found that the number of virtual machines a server could support increased proportionally with the increase in RAM.

In addition to doubling workload capacity, the Kingston memory increased the average number of instances that could run on each host by 150 percent, (from two instances on a 48 GB host to five on a 96 GB host). Moreover, the IE Team averages 11 virtual machines per instance with some that can support as many as 27.

With memory headroom to spare, the IE Team can accept more application workloads from internal customers. For example, in 2011 the Team completed six onsite beta tests. In the first half of 2012 it has completed eight tests and is on track to complete up to 25 by the end of the year.

And while the 2011 VMworld Hands-On Lab events tallied 31 labs with 144,083 virtual machines deployed, the added server memory can handle even greater workloads for future events.

Results Summary

- **Doubled the workload capacity of upgraded servers to easily take on expanding workloads.**
- **Value-priced memory enabled the implementation of a uniform server memory footprint across the cloud environment.**
- **Highly reliable Kingston memory supports demanding workload requirements.**

2012 planning drives infrastructure upgrade

Initially, the facilities housed blade servers provisioned with 48 GB of memory each, which was sufficient to support the Team's workloads. However, the projected workloads for 2012 were great enough to justify infrastructure improvements. That led to an analysis of how to most effectively increase the cloud's workload capacity on a limited budget.

Equipment utilization reports showed that server memory constrained their ability to take on more application workloads. To overcome this obstacle, the decision was made to double the memory footprint of 288 servers from 48 MB to 96 MB. This approach had the added advantage of better utilizing server processor power and network storage.

"We chose Kingston for two reasons," recalls Zimman. "First, their pricing was significantly more competitive—so much so that I was able to upgrade all 288 blade servers within the budget I was allotted. Secondly, based on my 20 years of building systems, I have always trusted Kingston as a reliable manufacturer of top-quality parts."

After procuring 1,728 Kingston KCS-B200ALV/8G 8 GB DDR3 SDRAM Modules, VMware technicians installed them into the blade servers.

Competitive pricing enables operational efficiencies

The Kingston memory offered a competitive list price significantly better than the OEM's discounted price. Consequently, 288 servers were upgraded to 96 GB of memory to bring the entire installed base of 416 servers to a uniform memory footprint.

Operationally, the uniform 96 GB servers make it easier to implement automated provisioning. And through that automation, the Team expects to manage workload distribution even more efficiently.

VMware's CAPEX budget also received a boost. The service life of installed servers was extended by supplementing them with more memory versus the capital-intensive alternative of procuring newer ones.

Reliable modules support high-availability objectives

The reliability of the Kingston modules is an added plus in production environments. The company incorporates rigid quality assurance measures into its manufacturing operations and vigorously tests modules to ensure that they meet its high standards. That's consistent with Zimman's personal experience. In over nine years of using Kingston memory, he can't recall experiencing a single DIMM failure.