Virtualization: Same Servers, More Capacity

Intel, VMware, and BEA Partner to Virtualize Java-Based Systems

Many companies already have ample computing capacity—but most of it is going to waste. Virtualization enables businesses to get more capacity from each server—faster, more flexibly, and more cost-effectively than ever before. And now, thanks to a new solution from Intel, VMware, and BEA, you can get these virtualization benefits on the Java platform.

With corporate data centers at or near their physical limit, companies are turning to virtualization as the best way to meet their growing needs for computing resource capacity and flexibility. Since most servers run at less than 10 percent of capacity[1], using virtualization to increase this percentage can enable those same servers to meet a business's computing needs for years to come. Virtualization can also deliver other benefits: greater return on investment in hardware and data center facilities, reduction in new expenditure, high application availability and disaster recovery, and perhaps most important, the ability to adjust capacity to meet changing business needs— without incurring new costs—by provisioning new servers and migrating applications in real time.

Companies of all sizes are enthusiastically adopting virtualization. In March 2007, an IDC study estimated that in 2006, virtualization had been adopted by 38 percent of medium-sized companies (fewer than 1000 employees), 67 percent of large companies (1,000-9,999 employees), and 72 percent of very large companies (10,000+ employees). In a recent

Forrester survey, respondents who had already implemented virtualization estimated that it had saved them more than 23 percent in server space, power, and cooling costs.[2]

But while companies are adopting virtualization within their data centers, and want to use it to deploy Java platforms, dedicated solutions have not been available to deliver the advantages of virtualization in a way that maximizes the benefits of the Java platform. Now, a comprehensive solution combines three levels of virtualization—Intel® Virtualization Technology at the chip level, VMware® ESX Server at the server level, and BEA WebLogic® Liquid Operations Control™ (BEA WebLogic LOC) and BEA LiquidVM™ at the software level—to transform the cost/benefit calculations for Java virtualization.

Virtualization and flexibility

Traditional approaches to virtualization achieve efficiencies by breaking the dependency of the software stack on the hardware that runs it—but this does nothing to optimize the software stack itself.

1. IDC, March 2007
2. IDC 2006

Where in a non-virtualized environment there would be one copy of an operating system supporting the software stack, there might now be five, ten or more, each with its own JVM. Now, though, BEA has applied virtualization techniques that pool the resources of the Java runtime stack and leverage automation principles. The result is even greater efficiency that drives higher utilization and results in greater cost savings.

The VMware ESX Server supports this approach to virtualization. It hides the physical characteristics of computing resources from users to reduce apparent complexity and allows applications running on it to act as if they had dedicated hardware. Unlike traditional hypervisor environments, however, it runs on the bare metal of an Intel-based server, eliminating the need for the hardware host's operating system.

Further up the stack, BEA LiquidVM, a virtualization-enabled version of BEA JRockit®—the world's fastest JVM—can run on ESX Server without a standard OS, so that Java applications can run directly on the virtualization layer. This streamlining of OS functionality also frees up key resources such as memory and disk space to enable even higher resource utilization. Compared to standard virtual machines running the full OS and Java stack, more applications can run on a given set of hardware to achieve even higher utilization. BEA's studies suggest that with BEA LiquidVM, companies can deploy up to twice as many virtual instances as they could using traditional virtualized deployments.

The combined BEA, Intel, and VMware approach builds on proven industry-leading technologies to reduce the hardware required to support a given number of applications, cut OS license and administrative costs, and decrease data center complexity.

New levels of business agility

This approach to Java virtualization also delivers new levels of business agility. IT can provision new applications to more cost-efficient hardware without requiring new hardware or new versions of software, so what would typically take days or weeks can now take just minutes or hours. Because provisioning virtual machines is dramatically faster than provisioning physical servers, IT can bring new applications online more quickly, addressing the evolving needs of existing applications in near-real time, all with minimal effort. This approach also helps IT improve service levels by implementing cost-effective virtualization-based high availability, disaster recovery, and business continuity solutions.

Figure 1
The combined BEA, VMware, and Intel approach to Java virtualization.

2
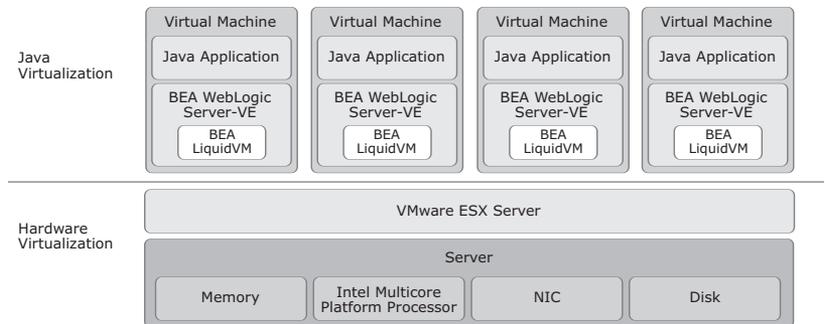
Support for virtualization starts at the chip level

At the microprocessor level, Intel Virtualization Technology built in to the Dual and Quad-Core Intel Xeon® Processors series provides hardware enhancements to ensure a more stable, robust, and efficient virtual server experience. It helps eliminate many potential conflicts, simplifies virtual machine monitor (VMM) requirements, and improves compatibility with unmodified legacy operating systems. This hardware support for handoffs between the VMM and guest operating system reduces the need for complex, compute-intensive software transitions. It also retains processor state information for the VMM and for each guest OS in dedicated address spaces, which helps to accelerate transitions and ensure process integrity.

Server virtualization

VMware ESX Server is a robust, production-proven virtualization layer that runs directly on bare metal, without the need for a host OS. It's also a core technology of VMware Infrastructure 3, the most widely deployed software suite for optimizing and managing IT environments through virtualization. VMware Infrastructure 3 virtualizes servers, storage, and networking, allowing multiple unmodified operating systems and their applications to run independently in virtual machines while sharing physical resources. The suite includes VMware VMotion™, which enables real-time re-allocation of server resources for seamless live migration of running virtual machines, and VMware High Availability, which can automatically restart affected virtual machines on production servers with spare capacity. The suite helps optimize virtual machine performance with VMware VMFS and VMware Virtual SMP. VMware Consolidated Backup, VMware VirtualCenter, and VMware Distributed Resource Scheduler (DRS) work together to simplify the administrative details of running a state-of-the-art virtual system.

Java virtualization

BEA's unique approach to Java virtualization includes a strategy of top-down control and bottom-up enablement. BEA WebLogic LOC provides top-down control by enabling automated provisioning and resource management with adaptive control for enterprise Java applications. BEA LiquidVM supplies bottom-up enablement by facilitating higher resource utilization and performance at the JVM layer when deployed on ESX Server.

BEA WebLogic Server–Virtual Edition, a middleware appliance containing BEA WebLogic Server Premium with LiquidVM, delivers a pre-configured, certified, ready-to-run platform for enterprise Java apps optimized out-of-the-box for ESX Server. Because BEA LiquidVM can run on hypervisor-enabled x86 servers without a standard OS, thus removing redundant copies of the OS from the virtualized container, companies can dramatically improve the utilization and efficiency of their computing resources.

BEA WebLogic LOC software provides significant management benefits for all Java applications in a non-virtualized or virtualized environment—not just those running on LiquidVM or BEA WebLogic Server. The BEA WebLogic LOC console provides visibility into runtime behavior of applications and virtualized server resources. With BEA WebLogic LOC, IT can easily provision Java applications on virtualized Java infrastructure. The BEA WebLogic LOC resource broker supports policy-driven automation of provisioning tasks and frees infrastructure to be dynamically reconfigured and re-optimized without manual intervention.

Find out more

For more on this unique approach to Java virtualization and how it can help your business, please visit *bea.com/virtualization*.

Mike Williams, CIO for the Defense Contract Management Agency (DCMA), learned a lesson about thinking strategically when he did a virtualization project in 2006. (The DCMA, a federal Department of Defense agency, places contract managers inside companies fulfilling defense contracts for weapons systems, jets, military equipment and parts.) Williams deployed VMware, reducing the agency's number of servers to 160 from 560 and the number of data centers to three from 17. But that move taxed the WAN when all the network traffic converged on the three data centers. His advice: Optimize the WAN first. Still, Williams likes the results. Before virtualization, DCMA replaced about one-third of its 560 servers annually at a cost of about $2 million, Williams says; virtualization cut that expense to $560,000.

Source:

infoworld.com/article/07/02/08/HNsaveonvirtualization_1.html

About BEA

BEA Systems, Inc. (Nasdaq: BEAS) is a world leader in enterprise infrastructure software. The BEA SOA 360™ platform, the industry's most unified SOA platform for business transformation and optimization, is designed to improve cost structures and grow new revenue streams. Information about how BEA is enabling customers to achieve Business LiquidITy™ can be found at *bea.com*.

Join the BEA community

To join one or more of the BEA communities, simply register online at *bea.com/register*.

BEA Systems, Inc.

2315 North First Street
San Jose, CA 95131

+1.800.817.4BEA (US)
+1.408.570.8000

bea.com

bea®
Think liquid.™