SAP on VMware: ESX 4.0 and vSphere 4.0 Redefine the ERP Platform

Abstract

VMware, Inc., the market share leader in virtualization software, announced vSphere 4.0 in April of 2009. vSphere 4.0, the most recent release of VMware's virtualization platform, is being positioned as VMware's answer to the challenges of delivering public and private Cloud applications. The evolving partnership between VMware and SAP leverages these capabilities to solve the scalability challenges often encountered when delivering enterprise applications on virtual servers.

VMware initially announced an expanded partnership with SAP in December of 2007. Since that time, multiple enhancements to the product line have strengthened VMware's ability to effectively support the performance and workload requirements of Enterprise Resource Planning (ERP) deployments in general, and SAP in particular. This brief summarizes the enhancements, and focuses on the latest releases of ESX (4.0) and vSphere 4.0. They position VMware as a platform capable of supporting the higher performance requirements of Cloud and production ERP deployments. These and similar enhancements may force software experts to re-think traditional assumptions regarding the use of virtual servers to support resource-intensive applications and production workloads.

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VMware ESX 4.0 and vSphere 4.0

With the announcements of 4.0 releases of ESX and vSphere, VMware is repositioning as an infrastructure vendor for internal Clouds and Cloud-based applications and services. VMware has commoditized x86 server virtualization and in doing so has changed the face of the data center. No longer compelled to purchase hardware to support every new enterprise application, companies have wholeheartedly embraced VMware's ease of deployment, efficient utilization of server resources, and growing list of management tools.

Regardless of VMware's impact on the data center, however, convincing application teams that VMware is robust enough to support production enterprise applications has been an uphill battle. Many experts still associate virtual servers with pre-deployment development and testing. Enterprise applications, particularly resource-intensive applications such as ERP systems, are more often associated with mainframe and midrange platforms. With this announcement, VMware is addressing the horsepower problem with clustered, pooled VMs running on multiple hosts. The result, a "single" virtual environment for high-powered computing, is VMware's answer to the Cloud.

Background

As a review, ESX is, of course, VMware's hypervisor, the underlying foundation for virtualization of x86-based Windows and Linux Operating Systems (OSs). vSphere 4.0, the most recent release of the virtualization platform, builds on ESX with capabilities specifically focused on low-level management of virtual server deployments.

Billed as "The Industry's First Cloud Operating System," vSphere does not replace the traditional operating system but runs on top of it. A better terminology might be "Virtual Cloud Operating System," in that it does

introduce OS-like capabilities such as pooling and dynamic management for virtual environments. The result is a platform more capable of supporting Cloud Computing than has been the case with past releases. Fault tolerance, enhanced security, dynamic storage allocation, and power efficiencies are part of vSphere, and provide a basis for virtual environments to become more production-ready.

RAAD Research conducted an independent study in Q4 2008 that quantified German SAP customer usage of VMware:

- Thirty percent of overall SAP customers virtualize SAP test/dev environments
  - Forty four percent of (x86) SAP customers virtualize SAP test/dev environments
- Twenty six percent of overall SAP customers virtualize production SAP application servers
  - Twenty eight percent of (x86) SAP customers virtualize production SAP application servers
- Twenty one percent of overall SAP customers virtualize production SAP databases
  - Twenty four percent of (x86) SAP customers virtualize production SAP databases
- Eighty nine percent of SAP customers who use virtualization in their data centers use VMware virtualization.

As the stats show, penetration of VMware in the SAP space is already significant, although production deployments have considerable room for growth.

The fact that production SAP instances are being deployed on virtual servers at all likely comes as a surprise to many experts familiar with ERP products. These enterprise software deployments, designed to help companies optimize their financial, personnel, and asset resources, are powerful and complex. They are also big. Oracle's JD Edwards EnterpriseOne ERP suite encompasses over 70 different products, and Oracle's complete product list includes over 600.

Of course, not every company deploys every product. Nevertheless, ERP suites are well-known for their size and complexity, as well as for the risks inherent in deploying and managing them. SAP's solution sets include Financials, Human Resources, Customer Relationship Management, Supplier Relationship Management, Product Lifecycle Management, Supply Chain Management, and Business Intelligence lines. SAP's applications, like those of its ERP brethren, tend to be associated with mainframes and midrange computers more often than they are with commodity, x86-based hardware.

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Benefits to SAP Users

These new releases, combined with VMware's existing capabilities, benefit SAP users in a number of ways, including:

- Better flexibility in deploying and supporting SAP applications
  - Reduced SAP upgrade risks and simplification of the transition to 64-bit environments
  - SAP enhancements can be "plugged in" to the VMware platform without going through a full SAP upgrade cycle. Early adopters report upgrade project time savings of up to 33%.

- Better availability assurance at lower cost
  - Applicable to production, test, and Disaster Recovery (DR) environments
  - Customers reporting uptimes as high as 99.99%
- Decreased SAP data center costs for space, energy, cooling, hardware, and labor
  - Cost savings of 30-40% are commonly reported
- Improved SAP data center utilization, flexibility, availability, and agility
  - Customer example cites a key benefit of SAP on VMware as the ability to manage capacity and priority on a macro level

Key Ramifications

Technology supporting these capabilities includes:

- VM pooling: VMs can be clustered into a single execution platform
- Dynamic load balancing between hosts: vMotion (live transfer of VMs between hosts) examines the capacity requirements of the VM and matches requirements to host workloads, then automatically moves the VM to the receiving host. This enables "hot swapping" from one host to another, keeping production applications running during routine host maintenance, for example.
- Security zones: VMs can now be separated into security zones; for example, an external-facing Web tier and an internal-facing application tier
- Built-in service level controls
- vSphere 4.0 enhancements including:
  - Double the number of virtual CPUs that can be assigned to a Virtual Machine from 4 to 8
  - Quadruple the amount of memory that can be assigned to a VM from 64GB to 256GB
  - Increase in network bandwidth allocation from 9 GB to 20+ GB
  - Increase in the number of I/O Operations per Second (IOPS) from 100,000 to 200,000+ to support highly utilized databases
- Distributed power management: Automatically assesses server bandwidth requirements of applications at various times of day. During off-hours, VMs can be consolidated on a set of machines and unnecessary hardware can be powered off.
- Thin provisioning: vStorage provides dynamic storage allocation, which increases automatically when needed.

VMware and SAP have a history as technology partners. As part of this partnership, joint activities include:

- VMware Virtualization Competency Center for SAP headquartered in Walldorf, Germany
- VMware member of SAP Co-Innovation Labs in Palo Alto, Tokyo and Bangalore
- VMware runs SAP's 'Center of Excellence' infrastructure in Walldorf, Germany and Palo Alto, U.S.

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- SAP Managed Services is one of VMware's largest customers
  - Supports over 8000 VMs, performing hundreds of vMotions on a daily basis
  - Integration of VMware into SAP Adaptive Computing Controller has been showcased at SAP TechEd events throughout the globe

Enterprise Management Associates (EMA) Perspective

With the release of vSphere 4.0, VMware is reinventing itself in an industry that has become highly competitive, with multiple vendors positioning for a piece of the virtualization pie. At the same time, VMware is taking advantage of the growing popularity of Cloud computing as a way to explain the value proposition delivered by the 4.0 enhancements to vSphere and the ESX hypervisor.

Popular wisdom about ERP applications is that they are big, complex, and always require powerful execution platforms. Although many companies have put a toe in the water by using VMware for non-production deployments such as QA and testing, fewer have taken the plunge into production. This is in part because older versions of VMware's virtualization platform were not yet "production friendly" enough to support enterprise applications.

The recent vSphere announcements should go a long way toward changing this perception. Performance enhancements, VM pooling, dynamic storage allocation, continuous availability, and security zones all help to position VMware for better support of production applications. Enhancements such as expansion of network bandwidth, virtual CPUs, and better memory usage make VMs increasingly attractive as well. The fact that numerous ERP deployments are being successfully run on x86-based hardware by SAP support teams adds credibility to the overall story.

In the end, VMware's recent enhancements provide value for all concerned. For VMware, it adds ammunition in overcoming a perception problem and positions VMware as a stronger player in the Cloud application space. For SAP, it supports a goal of reducing overall customer TCO. And for SAP customers, it offers time as well as cost efficiencies.

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While any change to production systems requires extensive performance and load-testing, the fact that VMware is already being used to support production SAP should assure prospects that this is not "vaporware." EMA sees these announcements as a significant step forward for VMware and one that makes the virtual platform more relevant to enterprise applications.

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