

Virtualization Performance of Dell PowerEdge Servers using the VMmark benchmark



Virtualization is a key component of the Dell Scalable Enterprise strategy. Dell offers mature, proven, best-of-breed solutions that can deliver dramatically higher levels of operational efficiency by helping to improve server utilization rates, streamline development and test environments, and support legacy applications more effectively. Dell PowerEdge servers provide a proven platform for customers interested in the benefits of virtualization. But how does one measure the virtualization performance of one platform against another?

Many vendors have published various "results" touting their offerings as having superior virtualization performance, but there has been inconsistent and often questionable methodologies used. This has led to widespread customer confusion, creating a critical need for a standardized methodology. **To this end, Dell has partnered with VMware to create a standard measure of performance and capacity of virtualized environments via the VMmark¹ workload consolidation benchmark.** The initial release of VMmark is slated for early 2007; at that time, VMware will begin accepting results for review, and will host a list of compliant results on their website to allow customers to easily compare the performance of virtualization solutions from different vendors.

Dell offers outstanding virtualization performance on both two- and four-socket servers. [About the VMmark Benchmark](#)

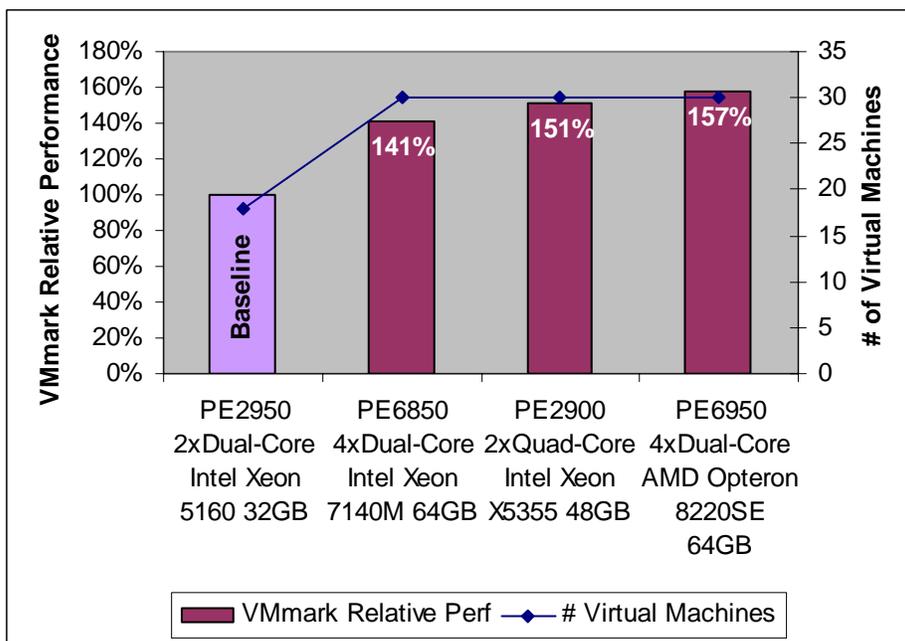
Dell has recently measured various configurations of two- and four-socket PowerEdge servers running VMware ESX Server 3 using a beta version of the VMmark benchmark. The graph below shows a 4-socket PowerEdge 6950 with dual-core AMD Opteron™ processors has 57% higher virtualization performance than a 2-socket PowerEdge 2950 with dual-core Intel® Xeon® series 5100 processors.² The 2-socket PowerEdge 2900 with new quad-core Intel Xeon 5300 series processors shows 51% better performance.² Equally impressive, all three 8-core servers were able to support the same number of heavily-loaded virtual machines.²

Traditional performance benchmarks measure the performance of a server running a single application (databases like Microsoft SQL Server or Oracle Database, web servers such as Apache or Microsoft IIS, etc.) at peak load; in these environments, one or more subsystems (CPU, memory, or disk I/O) is driven to saturation. Virtualized environments, however, typically have multiple virtual machines (called "guests") running on a single physical server (the "host"), and individual applications are usually not resource-bound. Due to these differences, measuring the performance of virtualized environments requires a new methodology.

VMmark aims to provide this methodology. It is built upon VMware's expertise and customer usage cases. It leverages existing (and well-understood) benchmarks and facilitates running multiple heterogeneous workloads in parallel to provide an easy-to-understand measure of system performance. This allows an objective way to compare two virtual environments, i.e. servers with varying numbers of cores and sockets.

VMmark scales by running multiple "tiles" until the host reaches saturation. Each tile is a set of 6 workloads (virtual machines): a database server, mail server, web server, Java transaction server, and a standby server (for failover or quick deployments). The final score is based on the performance of the workloads at a given number of tiles.

For more information, refer to VMware's VMmark white-paper: http://www.vmware.com/pdf/vmmark_intro.pdf



¹ VMmark is a product of VMware, an EMC Company. VMmark utilizes SPECjbb2005 and SPECweb2005, which are available from the Standard Performance Evaluation Corporation (SPEC).

² Dell's beta VMmark Results were obtained in October-November 2006 on VMmark v0.02.20060914, based on internal testing of Dell PowerEdge 2950, 2900, 6850, and 6950 servers running VMware ESX Server 3.0.1. The server configurations tested include: PowerEdge 2950, 2x Intel Xeon 5160 3.0GHz/4M dual-core CPUs, 32GB (8x4GB 667MHz FBDIMM) memory; PowerEdge 2900, 2x Intel Xeon X5355, 2.66GHz/2x4M quad-core CPUs, 48GB (12x4GB 667MHz FBDIMM) memory; PowerEdge 6850, 4x Intel Xeon 7140M, 3.4GHz/16M L3 dual-core CPUs, 64GB (16x4GB DDR2-400) memory; PowerEdge 6950, 4x AMD Opteron 8220SE 2.8GHz/2x1M dual-core CPUs, 64GB (16x4GB DDR2-667) memory. Each server had the same PERC5/E PCI-e RAID controller attached to 30x36GB/15K drives in 2xPowerVault MD1000s; the volume was configured in a hardware RAID-0 configuration and hosted the virtual machines. Each network used onboard gigabit network controllers with PowerEdge 1750 clients.

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