



# AMD Opteron™ Processors and VMware Virtualization Products

## Reduce Operating Costs and Increase Business Value

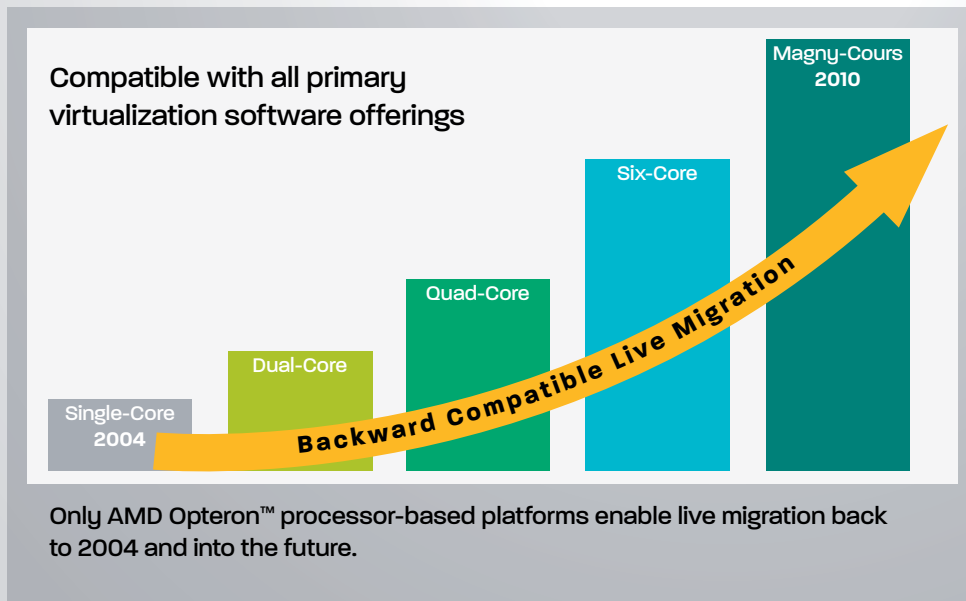
- Scalability to handle peak workloads and demanding applications
- Outstanding performance through superior memory management
- Consolidation of resources on highly energy-efficient hardware



### Optimal Virtualization with AMD Virtualization™ (AMD-V™) Technology and VMware vSphere™

AMD Technology Feature	Business Value
Direct Connect Architecture	<b>Scalability</b> Seamlessly handles demanding workloads like web and database and helps improve resource utilization
AMD-V™ with Rapid Virtualization Indexing (RVI)	<b>Outstanding Performance</b> Superior memory management for demanding, high-density virtualization environments
Enhanced Power Management	<b>Leading Edge Performance-Per-Watt</b> Helps to achieve reduced power and cooling costs
I/O Virtualization	<b>Helps Improve Performance and Security</b> Enables hardware isolation of virtual machine memory and reduced overhead through enhanced I/O functionality
AMD Extended Migration	<b>Investment Protection</b> Enables live migration of VMs across virtually all available generations of AMD Opteron™ processors via VMware VMotion

### Seamless Live Migration from 2004 to 2010



**AMD Extended Migration** is a hardware feature that enables virtualization ISVs to provide live migration capabilities between different generations of AMD Opteron™ processors.

- Allows ISVs to identify processor features and support live migration between processor revisions with varying functionality
- Enables users to create Virtualization Pools that can include a broad range of AMD Opteron™ processor-based systems
- AMD Extended Migration capability has been available in all AMD Opteron™ processors beginning with Rev C (2003)

## Putting AMD Virtualization™ Technology and VMware to Work

### Consolidation

- Help reduce operating costs and accelerate provisioning time
- Optimized server utilization rates
- Control capital expenditures

### Management

- Help simplify management and reduce server sprawl
- Ability to move legacy apps to new hardware

### Desktop Virtualization

- Helps increase end user "up time"
- Centrally stores data to improve data and application security
- Simplifies management through centralized software control
- Helps reduce client infrastructure costs

### Business Continuity

- Enables IT staff to plan for and reduce downtime
- Maintain high availability with live migration and fault tolerance capabilities
- Help optimize computing resources for peak performance with automated load balancing as workload demands change

## Superior Price Performance

AMD Opteron™ processor-based systems currently hold the top VMmark scores for 48, 32, 24, and 12 core systems.

System Description	VMmark Version and VMmark Score	Cores, Threads, and Sockets	Estimated System Price <sup>1</sup>	Price per VM <sup>2</sup>
HP ProLiant DL785 G6 256GB (8GB x 32), DDR2 667MHz 2.8GHz, 105W ACP Six-Core AMD Opteron 8439SE processors	VMmark v1.1.1 53.73 @ 35 tiles 210 VMs (6 x 35 tiles)	48 cores 48 threads 8 sockets	\$78,568	\$374.13
HP ProLiant DL585 G6 128GB (8GB x 16), DDR2 667MHz 2.8GHz, 105W ACP Six-Core AMD Opteron 8439SE processors	VMmark v1.1.1 29.95 @ 20 tiles 120 VMs (6 x 20 tiles)	24 cores 24 threads 4 sockets	\$32,079	\$267.33
HP ProLiant DL385 G6 64GB (8 x 8GB), DDR2 667 MHz 2.6GHz, 75W ACP Six-Core AMD Opteron 8435 processors	VMmark v1.1 15.54 @ 11 tiles 66 VMs (6 x 11 tiles)	12 cores 12 threads 2 sockets	\$11,654	\$176.58
HP ProLiant BL490c G6 96GB (12 x 8GB), DDR3 1333 MHz 2.93GHz, 95W TDP Dual-Core Intel Xeon X5570 processors	VMmark v1.1.1 24.54 @ 17 tiles 102 VMs (6 x 17 tiles)	8 cores 16 threads 2 sockets	\$18,972	\$186.00

<sup>1</sup> Estimated system prices based on HP online system configurator as of December 30, 2009 for HP systems.

<sup>2</sup> Price per VM estimated based on total system price ÷ number of VMs per system.