

Solve your complex computational problems with Microsoft Windows® Compute Cluster Server 2003 running on AMD Opteron™ processors

CLUSTERS OF AMD64-BASED SERVERS RUNNING MICROSOFT® COMPUTE CLUSTER SERVER 2003 MAKE HIGH-PERFORMANCE COMPUTING MANAGEABLE AND AFFORDABLE



Microsoft

REDEFINING HIGH-PERFORMANCE COMPUTING

In manufacturing, aerospace, life sciences, geoscience, and financial services, the most complex engineering, scientific, and numerical computations have in the past required expensive supercomputer time on proprietary hardware. But with the evolution of 64-bit and multi-core x86-based servers, engineers, scientists, and analysts are turning to clusters of industry-standard, power efficient computers to solve the next generation of compute-intensive challenges. This combination of affordable hardware with a growing ecosystem of software, tools, and applications is rapidly bringing high performance computing (HPC) capabilities to a broader base of users.

MICROSOFT AND AMD BRING HPC TO THE MASSES

With the introduction of Microsoft Windows® Compute Cluster Server 2003, Microsoft has created an enabling operating environment that provides increases in price-performance for cluster computing, while also making it easier to manage and administer the entire process. And that's helping to make HPC accessible to virtually any engineering, scientific, or analytic enterprise.

By combining Windows Compute Cluster Server with performance leading servers based on AMD Opteron™ processors and commercially available applications, scientists, engineers, and analysts can take advantage of industry standard cluster computing solutions that provide performance only previously found on supercomputers. Now an enterprise can achieve supercomputer-level performance of up to 10 gigaFLOPS or beyond, at a price several orders of magnitude lower.

For customers solving complex computational problems, Windows Compute Cluster Server 2003 running on servers based on AMD Opteron processors delivers:

- » Faster time-to-insight through simplified cluster deployment, job submission, and status monitoring
- » Better integration with existing Windows infrastructure, allowing customers to leverage existing technology and skill sets
- » A familiar development environment that allows developers to write parallel applications from within the Microsoft® Visual Studio® 2005 IDE

WINDOWS COMPUTE CLUSTER SERVER 2003 SUPPORTS THE FOLLOWING CORE TECHNOLOGIES:

- » x64-based host and cluster nodes
- » Message Passing Interface v2 (MPI2)
- » Gigabit Ethernet, Ethernet over RDMA, Infiniband, and Myrinet networking technologies
- » Third-party compilers and libraries

THE AMD OPTERON™ PROCESSOR WITH DIRECT CONNECT ARCHITECTURE PROVIDES:

- » Integrated memory controller for low latency memory access
- » HyperTransport™ technology for fast I/O and glueless multiprocessing
- » 64-bit and multi-core capabilities to handle large and complex problems
- » Power efficiency to reduce power and cooling requirements

AMD OPTERON™ PROCESSORS: THE PERFECT PLATFORM FOR A WINDOWS COMPUTE CLUSTER SERVER SOLUTION

Created specifically for demanding, business-critical server applications, AMD Opteron™ processors have proven themselves in hundreds of the world's biggest enterprise data centers. And now they're available in servers that are ideally suited for HPC applications.

Of all the design features found in AMD Opteron processors, none contributes so directly to their suitability as a cluster computing platform as the AMD Direct Connect Architecture (DCA)—a direct, high-bandwidth connection between processor cores, memory, I/O, and other processors, eliminating the performance bottlenecks created by a conventional front-side bus architecture. And with the use of high-bandwidth networking such as Gigabit Ethernet, it achieves outstanding performance in cluster computing applications at a fraction of the cost of proprietary systems.

BENEFITS OF THE AMD OPTERON™ PROCESSOR

- » 64-bit wide key data and address paths that incorporate a 48-bit virtual address space and a 40-bit physical address space
- » ECC (Error Correcting Code) protection for L1 cache data, L2 cache data and tags, and DRAM with hardware scrubbing of all ECC protected arrays
- » 90nm SOI (Silicon on Insulator) process technology for lower thermal output levels and improved frequency scaling
- » Support for all instructions necessary to be fully compatible with SSE2 technology
- » Two (2) additional pipeline stages (compared to AMD's seventh generation architecture) for increased performance and frequency scalability
- » Higher IPC (Instructions per Clock) achieved through additional key features, such as larger TLBs (Translation Look-aside Buffers), flush filters, and enhanced branch prediction algorithm

INTEGRATED DDR DRAM MEMORY CONTROLLER

- » Changes the way the processor accesses main memory, resulting in increased bandwidth, reduced memory latencies, and increased processor performance
- » Available memory bandwidth scales with the number of processors
- » 128-bit wide integrated DDR DRAM memory controller capable of supporting up to eight (8) registered DDR DIMMs per processor
- » Available memory bandwidth up to 6.4 GB/s (with PC3200) per processor



HIGH PERFORMANCE COMPUTING

FOR MORE INFORMATION ABOUT WINDOWS COMPUTE CLUSTER SERVER 2003, VISIT WWW.MICROSOFT.COM/HPC

SALES

FOR MORE INFORMATION ABOUT PURCHASING WINDOWS COMPUTE CLUSTER SERVER 2003, E-MAIL HPCINFO@MICROSOFT.COM

TO FIND MICROSOFT OFFICES WORLDWIDE, VISIT WWW.MICROSOFT.COM/WORLDWIDE

HYPERTRANSPORT™ TECHNOLOGY

- » Provides a scalable bandwidth interconnect between processors, I/O subsystems, and other chipsets
- » Support of up to three (3) coherent HyperTransport™ technology links, providing up to 24.0 GB/s peak bandwidth per processor
- » Up to 8.0 GB/s bandwidth per link providing sufficient bandwidth for supporting new interconnects including PCI-X, DDR, InfiniBand, and 10G Ethernet
- » Offers low power consumption (1.2 volts) to help reduce a system's thermal budget

MICROSOFT WINDOWS COMPUTE CLUSTER SERVER 2003 BRINGS THE SUPERCOMPUTING POWER OF HIGH-PERFORMANCE COMPUTING TO THE PERSONAL AND WORKGROUP LEVEL

- » Windows Compute Cluster Server 2003 brings together the power of commodity x64 (64-bit x86) computers, the ease of use and security of Active Directory service, and the Windows operating system to provide a secure and affordable high-performance computing (HPC) solution

MICROSOFT WINDOWS COMPUTE CLUSTER SERVER 2003

- » Simplifies network configuration, node configuration, remote loading of nodes, and security setup by using prescriptive setup procedures
- » Accesses the integrated Job Scheduler via command-line interface, or through several APIs provided for submitting and managing cluster workloads
- » Allows you to manage jobs in much the same fashion that you queue and manage print jobs today
- » Uses Microsoft Active Directory integration to provide end-to-end user and security management
- » Supports extensible snap-ins through the Microsoft Management Console, and integration with Microsoft Operations Manager
- » Supports parallel application development and debugging with Microsoft Visual Studio 2005
- » Offers rapid node deployment and cluster configuration, monitoring tools, and policy-based scheduling, which provides a scalable management environment that is easy to use
- » Integrates seamlessly with existing Windows infrastructure, allowing you to leverage existing skills and technology for system and node management, workload management, user management, and security
- » Is supported by leading applications in each target vertical, allowing you to deploy mainstream applications with a broad base of support
- » Allows developers to leverage their existing Windows-based skills and experience

FOR MORE INFORMATION, PLEASE VISIT WWW.AMD.COM/MICROSOFT

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