Increasing Computing Power for RADIOSS Clients

Microsoft® Windows® Compute Cluster Server 2003 Optimizes CAE Performance

Windows Compute Cluster Server 2003

Altair Engineering

Customer Profile

Altair strengthens client innovation and decision-making through technology that optimizes the analysis, management and visualization of business and engineering information. Privately held with more than 1,000 employees, Altair is the developer of the Altair® HyperWorks® CAE technology suite. HyperWorks is an enterprise simulation solution for rapid design exploration and analysis. RADIOSS, part of the HyperWorks product family, is a finite element solver technology for explicit and implicit analysis to simulate multi-physics problems like crash, impact, safety-related performance, biomechanics and fluid-structure interaction problems.

The Challenge

Companies that are seeking the advantages of virtual engineering know that by reducing their product design and development time, they can stay ahead of the competition. Simulation-driven design enables process automation - and a drastic reduction in physical tests, but to capitalize fully on the benefits of computer aided modeling requires the deployment of a high-performance computing (HPC) solution. Most high-performance computing solutions are complex and expensive and require a full staff of IT professionals to maintain and operate.

Solution

RADIOSS has been optimized to run on Microsoft® Windows® Compute Cluster Server (CCS) 2003. CCS is an HPC platform from Microsoft, designed specifically to run parallel, high-performance computing applications. CCS accelerates innovation by providing a reliable HPC platform that is easy to deploy, manage, and integrate with existing infrastructure and tools. Running on CCS, RADIOSS clients can increase computational capacity and product quality, and decrease time to market using a simple and familiar Windows operating environment. Two versions of RADIOSS exist for Windows: SMP for one processor, and SPMD for Windows CCS.

Benefits

- Greatly increased calculation speed
- Familiar Windows HPC operating environment
- Decreased reliance on physical testing
- Lower design and development costs

Overview

With Windows Compute Cluster Server 2003 and RADIOSS, organizations can now experience increased computing power, reduced cost, enhanced quality and greater speed in the manufacturing process. For simulated design projects including safety-related performance, impact events, fluid-structure interaction and biomechanics, Windows Compute Cluster Server 2003 and RADIOSS provide a high-performance computing (HPC) platform that is simple to deploy, operate, and integrate with existing infrastructure and tools.

RADIOSS

RADIOSS solver technology simulates mechanical, structural, and fluid-structure interaction phenomena.

By leveraging a wide range of formulations such as Lagrangian, Eulerian, Arbitrary Euler-Lagrange (ALE) and Smooth Hydrodynamic Particles (SHP), RADIOSS can accurately simulate the performance of structures that are subjected to large strains, dynamic loadings, displacements, and rotations by using specific numerical approaches and a comprehensive library of material laws and rupture mode.

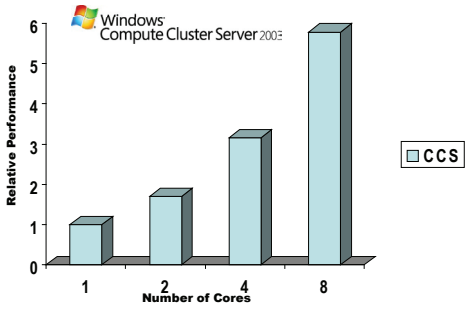
Windows Compute Cluster Server 2003

Windows CCS is a high-performance computing platform from Microsoft that is designed specifically to help scientists and engineers allocate their time and resources on product design - and not on IT administration. CCS contains wizard-based set-up procedures, which makes it easy to set up and manage a cluster at the desktop and workgroup level.

CCS contains an integrated job scheduler for managing the job queue, cluster resource allocation, and job execution, which simplifies workflow. It is also highly scalable, making it quick and easy to add more nodes when jobs require more resources. Each node of a CCS cluster is a Windows server, so your IT personnel are operating in a familiar Windows environment, leveraging their existing expertise.

The Combination

Recent testing of a Windows CCS cluster based on two dual core AMD processors shows RADIOSS scales extremely well. As the following graph indicates, a RADIOSS simulation runs approximately six (6) times faster using eight (8) cores.



As CPUs are added to the cluster, the simulation speed increases linearly on a correctly sized cluster. CCS provides a reliable and highly scalable platform for RADIOSS clients.

Microsoft®

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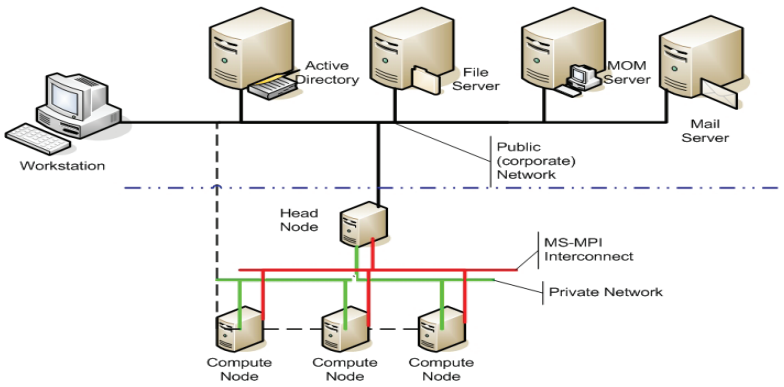
CCS Architecture

Windows CCS uses off-the-shelf, readily available components.

The Windows Compute Cluster Server 2003 head node:

- Controls and mediates all access to the cluster resources.
- Is the single point of management, deployment, and job scheduling for the compute cluster.



Windows Compute Cluster Server 2003 uses the existing corporate infrastructure and Active Directory for:

- Security
- Account management
- Operations management

System Requirements:

CPU Requirement:	64-bit architecture computer Intel Pentium, or Xeon family with Intel Extended Memory 64 Technology (EM64T) processor architecture, or AMD Opteron family, AMD Athlon family, or compatible processor(s).
Minimum RAM:	512 MB
Maximum RAM:	32 GB
Multiprocessor Support:	Up to 4 processors
Disk Space for Setup:	4 GB
Disk Volumes:	Head node requires a minimum of two volumes (C:\ and D:\). For additional roles, additional partitions are recommended. Compute node requires a single volume. RAID 0/1/5 may be used, but is not required.
Network Interface Cards:	All nodes require at least one. Each node may require additional network interface cards as appropriate for the network topology, for public network access or in support of an MPI network.

More Information

For more information about Windows Compute Cluster Server 2003, please visit http://www.microsoft.com/hpc.

For more information about Altair RADIOSS, please visit http://www.altair.com.

For information about purchasing Microsoft Windows Compute Cluster Server 2003, please email hpcinfo@microsoft.com

To join the HPC Community, please visit http://www.windowshpc.net.

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