# Boost your CAE productivity, and break-away from the pack

CU-CCMS — Clemson University Computational Center for Mobility Systems

Sun microsystems

Voltaire

ANSYS

The challenge to all manufacturers is how to balance producing a better product in less time while reining in development costs. Across a variety of industries, including manufacturing, aerospace, and energy, companies share three primary challenges:

- Improve product safety and quality
- Beat the competition to market with new products
- Grow current market share in the midst of severe competition

Clemson University's Computational Center for Mobility Systems (CU-CCMS) helps organizations reduce development time and costs, while improving product performance and quality. Through their tight partnerships with Sun, Voltaire and ANSYS, CU-CCMS delivers solutions to problems once thought of as technically impossible or not feasible due to massive computing scale requirements or challenges related to simulation methodology.

This radical expansion of CAE capabilities is built on four key pillars that when combined deliver unprecedented levels of performance.

- Powerful, Scalable, Open Server and Storage Solutions
- Fastest Server and Storage Interconnect
- Comprehensive and Scalable Multiphysics Simulation Software
- Industry-Focused R&D Resources and Expertise

## Breakaway CAE from Sun, Voltaire and ANSYS

Leveraging Sun's Compute Cluster, you can easily purchase and operate your own high performance computing (HPC) system allowing you to run the same simulations that has led to CU-CCMS's breakthrough CAE productivity.

This pre-configured system is based on Sun Blade 6000 Modular Systems with a Sun Blade 6000 Chassis and server modules connected by a 20 Gb/s Infiniband network supplied by Voltaire delivering exceptional compute power (35 teraflops for entire cluster – theoretical) and stability across a small footprint.

The system also uses the multiphysics suite of software from ANSYS — which includes structural, fluid flow, heat transfer, electromagnetics and many other tools — to develop methodologies and demonstrate feasibility of ground-breaking simulations in key technology areas. The ANSYS adaptive architecture enables software customization specific to project or industry, and its scalability on high-performance computing (HPC) systems will enable high-fidelity simulations and optimization approaches.

**CONTACT US NOW TO LEARN MORE ABOUT THIS SOLUTION BUNDLE**

For more information please go to http://www.sun.com/solutions/hpc/eseminar.jsp

## A basic configuration would include the following:

### Sun Hardware

- Sun Blade X6250 Server Module (qty 90)
  - 2 Quad-Core Intel(R) Xeon(R) E5450 processors
  - 16GB Memory
  - REM (RAID Expansion Module)
- 73GB 10K RPM 2.5" SAS hard disk drive with Nemo bracket. RoHS-6. X-Option.(qty 90)

### Voltaire InfiniBand

- Voltaire ISR 2004 Base Chassis incl. 1 Power Supply & Mgt Board (qty 1)
- 2004 DDR Fabric Board (qty 4 for non-blocking)
- 2024 24-port DDR Line Board (qty 4)
- additional Power Supply (qty 1 for N+1 redundancy)
- additional Management Board (qty 1 for N+1 redundancy)

Note: Voltaire QDR InfiniBand is also available

### DDR cables:

- CBL-00022 2m DDR cable (qty 16)
- CBL-00023 3m DDR cable (qty 48)
- 199C30105 5m DDR cable (qty 32)

### ANSYS simulation software

- Comprehensive multiphysics capability, including fluid dynamics, structural dynamics, electromagnetic, CAD integration, and meshing – scaled to take advantage of the compute grid.
- Customized to include advanced physical and numerical models that address emerging applications

To learn how you can accelerate your computational engineering programs with your own HPC design and simulation system, go to http://www.sun.com/solutions/hpc/eseminar.jsp or call 1-866-685-5665 (U.S. and Canada only), 1-631-870-3447 (Worldwide).

You can also visit CU-CCMS to see this solution in action and to learn more about the unique models and methods developed there. To set up an appointment with CU-CCMS, please contact Bill Taylor at bill@clemson.edu or by calling 1-864-283-7325.

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CU-CCMS
CLEMSON UNIVERSITY COMPUTATIONAL CENTER FOR MOBILITY SYSTEMS

Sun microsystems

## Industry-Focused R&D Resources and Expertise

Clemson University's Computational Center for Mobility Systems (CU-CCMS) has combined leading technologies from Sun, ANSYS, and Voltaire to develop a state of the art computational facility. Dedicated to solving complex issues in the Automotive, Aviation and Energy industries, CU-CCMS offers solutions with speed and simplicity. . By building the methods for "virtual experiments," CU-CCMS enable clients to have a faster time to market, better concept selection and a more competitive bottom line.

By incorporating new and unique methods of computational science, CU-CCMS is able to solve difficult problems. Some examples are:

- Laminar-to-turbulent boundary layer transition model
- Type-II unsteady flow model
- Semi-deterministic stress model (SDSM)

Thanks to a partnership with Sun Microsystems, ANSYS, and Voltaire, CU-CCMS has a world-class computing infrastructure, capable of solving the most complex large-scale problems in short order. The system includes:

### Compute Grid

- 430 Sun Blades with a total of 3,440 processing cores
- Ultra-high-speed, high-capacity Voltaire InfiniBand Network
- 14TB RAM
- 35 Tflops total computing power

### Two Sun Fire E6900 servers

- Each with 48 processing cores
- 384 GB RAM

### Sun E25k Server

- 144 processing cores
- 680 GB RAM

### ANSYS Simulation Software

## Powerful, Scalable, Open Server and Storage Solutions

Sun Microsystems provides HPC systems based on industry-standard hardware and featuring built-in Sun innovation. Sun solutions are scalable from small departmental systems up to world-class systems that rank as the fastest supercomputers in the world (as ranked by the TOP 500 list).

Designed to solve your most demanding analysis problems, the Sun Compute Cluster for CAE is quick to deploy and brings new levels of cluster performance, efficiency, and scalability to your modeling and simulation infrastructure. It gives you the power to run more simulations, run more complex analyses, and brings new products to market faster.

The Sun Compute Cluster is a pre-architected, scalable, and factory built solution that provides a turnkey system for accelerating your CAE applications with faster servers, open storage and software solutions, and high-speed switching in a single, scalable solution, preloaded, tested, and installed by Sun experts.

In addition, for your storage needs, Sun offers a full range of high-performance offerings that address the entire spectrum of HPC storage requirements, helping customers significantly improve the economics and reduce the risks of their deployments. Sun Unified Storage Solutions use a hybrid storage architecture based on Sun's innovative Open Storage products that accelerates I/O between processors in the cluster and provides shared access to stored data.

Benefits of Sun Compute Clusters:

- Run up to 20 applications simultaneously at full speed
- Record breaking performance allows faster analyses and simulations
- Flexible and scalable choice of rackmount or blade servers
- Reduced risk and up to 90% faster deployment with Sun integration and installation
- Lower costs and higher reliability

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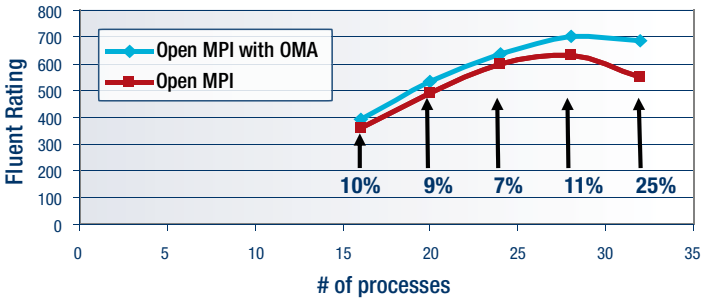
## Fastest Server and Storage Interconnect

Voltaire offers two core solutions that help companies accelerate the CAE process in order to accelerate the product design lifecycle and rate of production while improving design, safety and quality. Each solution can be used separately or together to provide a powerful platform that achieves the benefits of improved CAE application performance.

### High Speed/Lower Latency Inter-Processor Communication

Voltaire's InfiniBand-based, inter-processor communication solutions deliver high performance and scalability to compute clusters through efficient, low-overhead clustering that enables better application utilization of server nodes, with run times of simulation software from ANSYS reduced by as much as 50 percent.




*OMA improves Fluent Aircraft Benchmark by up to 25%*

The OMA Effect on Fluent – Aircraft Benchmark

### Faster Storage Connectivity

For companies looking to incorporate storage into their InfiniBand cluster, Voltaire solutions combine scalable compute and storage capabilities by using parallel file systems. Running scalable file systems over Voltaire switching solutions creates the most scalable solution in the industry and delivers high performance connectivity for storage and client nodes.

## Comprehensive and Scalable Multiphysics Simulation Software

Virtually every industry now recognizes that a key strategy for success is to incorporate computer-based engineering simulation early in the development process, allowing engineers to refine and validate designs at a stage where the cost of making changes is minimal. ANSYS refers to this as Simulation Driven Product Development. Why are innovative companies choosing to partner with ANSYS?

### Comprehensive Multiphysics

ANSYS is committed to providing unequalled technical depth in multiple simulation domains. Across a broad range of disciplines, including structural analysis, fluids, thermal, electromagnetics, meshing, and process & data management, we invest to meet your requirements. This allows you to truly couple multiple physics in a single simulation and understand the complex interactions of different physics.

### Scalability

ANSYS software is tuned and optimized to take advantage of the latest high-performance computing technologies. Our parallel computing capability scales to help you address your largest simulation challenges within timelines that you need for decision making.

### Adaptive Architecture

ANSYS software is designed for today's world of engineering where a multiplicity of different tools and custom processes are used. ANSYS Workbench can be the backbone of your simulation strategy or work peer-to-peer with other software environments. The adaptive architecture incorporated in ANSYS technology can be customized to incorporate specific extensions you need for your applications.

For more information, visit: http://www.sun.com/solutions/hpc/eseminar.jsp