OSC Supercomputing Systems

HP Intel Xeon Oakley Cluster

Total system peak performance: 154 TFLOPS

In 2012, OSC installed the Oakley Cluster, a Hewlett Packard system featuring Intel Xeon processors. The Oakley Cluster, named for legendary Ohio sharpshooter Annie Oakley, provides clients with far more performance at 60 percent of the power consumption of previous systems.

Base Configuration
- 692 nodes/33TB memory/8,300+ total cores
  - 12 cores/node – 48 gigabytes (GB) of memory/node
  - Intel Xeon x5650 CPUs (2.67 GHz)
  - HP SL390 G7 Nodes
- Large memory
  - 8 dual socket, 12-core nodes (192 GB of memory/node)
- Huge memory
  - HP ProLiant DL580 G7 with 4 Intel Xeon E7 8837 processors/32 cores total, with 1TB memory
- QDR Infiniband interconnect in all nodes (40 Gbps)

GPU Configuration
- 128 nVidia Tesla M2070 GPUs
  - 64 nodes (2 GPUs/node)

IBM 1350 AMD Opteron Glenn Cluster

Total system peak performance: 60 TFLOPS

Named for pioneering Ohio astronaut and statesman John Glenn, OSC's IBM 1350 Glenn Cluster was significantly revised in 2012 for the Oakley Cluster installation. The 650 nodes of AMD Shanghai quad-core hardware were installed in 2009.

Base Configuration
- 650 nodes/24TB memory/5300 cores
  - 650 dual socket, quad core 2.5 GHz Shanghai nodes (24GBs memory/node)
  - 8 quad socket, quad core 2.4 GHz Shanghai nodes (64GBs memory/node)
- Infiniband interconnect (20Gbps)

GPU Configuration
- 36 GPU-accelerated nodes, connected to 18 nVidia Quadro Plex S4's for a total of 72 CUDA-enabled devices (2 GPUs/node)
- Each Quadro Plex S4 includes:
  - 4 Quadro FX 5800 GPUs; 240 cores/GPU
  - 4GB memory per card

Contact Us

Ohio Supercomputer Center, 1224 Kinnear Rd, Columbus, OH 43212 | ph: (614) 292-9248 | www.osc.edu

Pankaj Shah
Executive Director, OSC and OARnet
(614) 292-1486   pshah@oh-tech.org

Kevin Wohlever
Director of Supercomputing Operations
(614) 247-2061   kevin@osc.edu

David Hudak
Program Dir. for Cyberinfrastructure & Software Dev.
(614) 247-8670   dhudak@osc.edu

Brian Guilfoos
Client and Technology Support Manager
(614) 292-2846   guilfoos@osc.edu

Alan Chalker
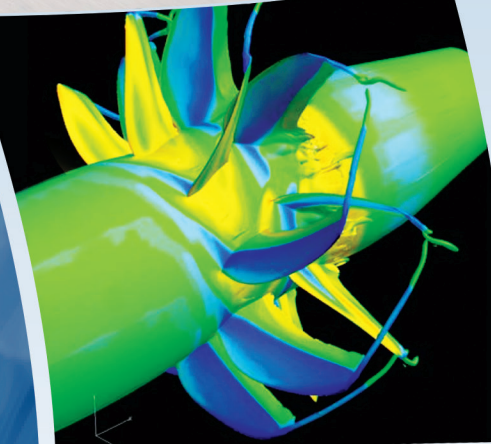Client Engineering Director
(614) 247-8672   alanc@osc.edu

Ohio Supercomputer Center
Empower. Partner. Lead

www.oh-tech.org
OH·TECH
Ohio Technology Consortium
A Division of the **Ohio Board of Regents**

214 Teraflops of peak computing performance empowers

2.2 million annual computer runs

8.5 million computing hours

370+ partner institutions

70+ million dollars in related research funding

Empower. Partner. Lead.

Ohio Supercomputer Center

Ohio Supercomputer Center
An **OH·TECH** Consortium Member
www.osc.edu

OSC propels innovation, discovery and economic competitiveness

The Ohio Supercomputer Center (OSC) provides supercomputing, cyberinfrastructure, research and educational resources to a state and national community, including academic research, industry and government.

Building Ohio's future

Addressing the need for high-performance computing resources and expertise, the center strives to be a strategic force in propelling Ohio's economy and positioning the state as a competitive national forerunner in science and technology.
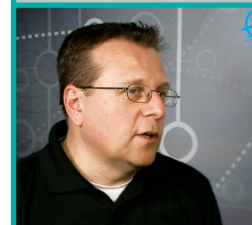
- **We empower researchers.**
  Recognizing HPC resources as an indispensable springboard for innovative breakthroughs, OSC empowers academic and industry researchers to achieve pioneering scientific discoveries in biosciences, advanced materials, energy and a host of emerging disciplines.

- **We partner with industry.**
  In addition to harnessing collaborative research opportunities across the nation and developing joint research proposals, OSC facilitates industrial processes with modeling and simulation tools for virtual product development, bringing leading-edge resources and advanced expertise to large and small enterprises.

- **We lead Ohio's knowledge economy.**
  OSC directs strategic research activities of vital interest to the State of Ohio, the nation and the world community. Our in-house research staff specialize in supercomputing, computational science, data management, biomedical applications and a host of emerging disciplines.

The new $1.3 million Ohio State University Driving Simulation Laboratory – a partnership between OSC, Honda R&D Americas, Inc., and Ohio State – will help researchers learn more about driver distraction and how to prevent it.

"TotalSim wouldn't exist without computational science, and without our access to OSC we could not price ourselves the way we do to our clients, and we could not be the business we are right now."

Ray Leto, President
TotalSim USA

Providing tools for innovation

At the heart of the Ohio Supercomputer Center are our supercomputers, mass storage systems and software applications. *(see back page for system specs)*

- HP Intel® Xeon® 'Oakley' Cluster supercomputer, with a total peak performance of 154 teraflops of computing power.

- IBM 1350 AMD® Opteron® 'Glenn' Cluster, which provides clients with a total peak performance of 60 teraflops.

- Csuri Advanced GPU Environment, which leverages the unique computing properties of the Graphics Processing Unit to provide a robust visualization environment.

- Mass Storage Environment, containing more than 2 petabytes of disk storage for a single, centralized point of control.

- More than 30 software applications maintained by OSC and access to more than 70 different software packages. These include the leading software for computational fluid dynamics, structural mechanics, numeric computation and visualization. OSC also develops advanced software codes and novel computational methods with its research partners.

OSC: Key Initiatives

Ohio's investment in OSC is energizing economic and workforce education efforts throughout the state.

Industrial Engagement

OSC helps industrial partners large and small access high performance technologies.

- Our latest industrial engagement effort, AweSim, creates manufacturing apps that provide easy access to simulation-driven design for small and mid-sized businesses. This pubic/private partnership builds on the success of Blue Collar Computing, our first industry program, and our leadership with the National Digital Engineering and Manufacturing Consortium (NDMEC), a recently concluded public/private partnership that provided Midwestern manufacturers with access to advanced modeling and simulation resources.

- Additionally, we actively support firms, such as Intel, P&G, TotalSim, AltaSim, Nimbis Services and Kinetic Vision, with their modeling and simulation needs.

- We create tools for staff with minimal programming knowledge to run specific tests. For example, the Weld Predictor, created with the Edison Welding Institute, provides virtual arc weld modeling and simulation.

- The Interface Lab provides expertise, advanced equipment and intuitive interfaces for integrating multi-sensory data into a single, coherent simulation.

"It is vital that small- and medium-sized businesses have access to the powerful computational and storage resources that OSC provides. That computing power fuels the more precise and accurate models necessary to mimic the actual results of physical tests commonly used to innovate. OSC also provides guiding expertise for emerging new users — who are often just learning how to replace their expensive physical prototypes with ever-more-realistic, faster and more affordable simulations."

– Tom Lange, Director
Modeling & Simulation Corporate R&D
Procter & Gamble Company

Workforce Education

OSC has earned an international reputation for exceptional training and education programs.

- Our Ralph Regula School of Computational Science coordinates computational science education— the use of computer modeling and simulation to solve complex business, technical and academic research problems. We offer programs for a baccalaureate minor, an associate degree concentration and workforce certification.

- We promote student interest in the Science, Technology, Engineering and Mathematics (STEM) fields through our Summer Institute for Ohio's brightest freshmen, sophomores and juniors, as well as Young Women's Summer Institute for middle-school girls. OSC also focuses on updating the skills of K-12 teachers, so they can apply technology, modeling and simulation, and project-based learning in their classrooms.

- Our instructors provide training to faculty and student researchers through scientific computing workshops, one-on-one classes, and web-based portal training.

- We support numerous national partnerships and collaborative programs, such as supercomputer training sponsored by the National Science Foundation, Department of Defense and Great Lakes Consortium for Petascale Computation.

Working in small peer teams, OSC Summer Institute students use supercomputers for practical applications such as solving complex science and engineering problems, conducting network forensics to catch hackers, studying the spread of the bird flu and designing computer games.