DOE Leadership Computing Facility Scales New Peaks

The Department of Energy's (DOE) National Leadership Computing Facility (NLCF) at Oak Ridge National Laboratory (ORNL) now provides one of the most powerful open-access computational resources to researchers across the nation. Over the summer, the LCF upgraded the Cray X1 supercomputer from a capability of 6.4 trillion operations per second (TFLOPS) to an 18.5 TFLOPS Cray X1E, making it the largest Cray X1E in the world. The upgrade concluded with acceptance of the machine in August. The X1E is currently being used by five major DOE programs using applications developed through the Scientific Discovery through Advanced Computing (SciDAC) program in the Office of Science. The five programs are:

- 3D Studies of Stationary Accretion Shock Instabilities in Core Collapse Supernovae - A. Mezzacappa (Oak Ridge National Laboratory) and J. Blondin (North Carolina State University)
- Turbulent Premix Combustion In Thin Reaction Zones - J. H. Chen (Sandia National Laboratories)
- Full Configuration Interaction Benchmarks for Open Shell Systems - R. Harrison (Oak Ridge National Laboratory) and M. Gordon (Ames Laboratory)
- Computational Design of the Low-Loss Accelerating Cavity for the ILC - Kwok Ko (Stanford Linear Accelerator Center)
- Advanced Simulations of Plasma Microturbulence - W. M. Tang (Princeton University, Plasma Physics Laboratory)

From left to right: 2 TB SGI Altix, 18.5 TF Cray X1E, and 25 TF Cray XT3.

In addition to the Cray X1E, the NLCF has just completed acceptance of the Cray XT3 supercomputer. The XT3 was jointly designed by Cray, Inc. and Sandia National Laboratories for the National Nuclear Security Administration's Advanced Scientific Computing program. ORNL's system has a peak performance of over 25 TFLOPS, making it the largest such system available for open science. The XT3 is already delivering breakthrough science in areas such as fusion simulation, global climate modeling and computational biology, where researchers are able to run largest-ever calculations with a system that provides exceptional scaling and performance.

Allocations for FY 2006 are currently being reviewed by DOE's Office of Science. We anticipate on the order of a dozen awards for the Innovative and Novel Computational Impact on Theory and Experiment (INCITE) program—which includes other agencies, universities, and industry—and Leadership allocations to DOE programs.

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