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For immediate release

New Argonne supercomputer makes 'Top 500' list

ARGONNE, Ill. (Nov. 21, 2007) – A new high-performance computer cluster at the Center for Nanoscale Materials (CNM) at the U.S. Department of Energy's (DOE) Argonne National Laboratory is number 150 on the list of the world's 500 fastest computers. The new cluster, capable of performing up to 12 trillion floating-point operations per second, is currently the fastest computer at Argonne, at least until the IBM Blue Gene/P supercomputer being installed at the Argonne Leadership Computing Facility is finished.

The list was released Monday, Nov. 12, at the SC07 Supercomputing Conference in Reno, Nev.

The cluster was designed from the ground up to support research at the CNM. The CNM has five experimental and one theory and modeling group, and as a user facility, will host hundreds of users, many requiring top-flight computer power and generating mountains of data. Some of this data must be processed in real time while experiments are under way, so that samples can be repositioned or instruments can be adjusted as needed for fine-tuning.

“When one tackles problems in computational nanoscience, one can no longer rely on the objects being studied having just small numbers of atoms or molecules, or being part of a periodic crystal,” said Senior Scientific Associate Michael Sternberg, who helped design the machine. “Nanoscale materials are in between these two extremes, which is why this is such an exciting field. The usual simplifying assumptions are not applicable, so these problems require a very high capacity for computing and memory.”

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New Argonne computer makes 'Top 500' list – add one

The new cluster is a black box the size of three refrigerators side by side. Inside are stacks of “compute nodes,” 72 in all, each about the size of a large pizza box. Every node has two motherboards, each with two quad-core Intel Xeon chips operating at 2.66 gigahertz. Each motherboard holds a generous 16 gigabytes of memory. An InfiniBand network provides rapid communications between nodes. With tuning support from Intel and by the cluster’s vendor, TeamHPC, the cluster has been measured at 10 teraflops, making it Argonne's fastest computer.

“Of course that will be a short-lived honor,” Sternberg said, “just until the new BlueGene/P is first operational.”

The setup is optimized for the kind of software that many nanoscience researchers use such as MATLAB and Dacapo.

“These are programs that help to process data and solve problems in quantum chemistry and materials science,” Sternberg said. “The cluster will run them very efficiently.”

The cluster will be available to all researchers via a peer-reviewed user proposal system that is open to academia, industry, government agencies and research institutes worldwide. The cluster is currently being readied for general use by early 2008.

About Argonne

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