

# PNNL supercomputer fastest in U.S.

## Hewlett-Packard supercomputer at Pacific Northwest National Laboratory now fully operational

Staci Maloof, *Pacific Northwest National Laboratory*

The Department of Energy's Pacific Northwest National Laboratory is now home to the United States' fastest operational unclassified supercomputer. The laboratory's 11.8-teraflop industry-standard Hewlett-Packard Integrity system came to full operating power last week, marking the next advance in high-performance computing designed to enable new insights in the environmental and molecular sciences, including chemistry, biology, climate and subsurface chemistry.

Based on peak performance, the PNNL machine is the fifth fastest system in the world and is the fastest unclassified computer operating in the United States. Also, it's the world's fastest supercomputer that is based on the Linux operating system, and the largest machine ever built using Intel's 64-bit architecture.

The laboratory ordered the supercomputer from HP in April 2002.

"Computational resources such as the PNNL supercomputer are essential to DOE's commitment to provide the most innovative solutions to critical energy and environmental problems," said Secretary of Energy Spencer Abraham. "DOE continues to demonstrate its competitiveness in high-performance computing capabilities by investing in new systems and new approaches to scientific inquiry."

"With this machine, PNNL is providing a balanced architecture that is designed specifically for environmental, chemical and biological sciences and the priorities of DOE's Office of Science," said PNNL director Len Peters. "The laboratory led the supercomputer industry by ordering one of the first large cluster systems in 1996, and has once again demonstrated that an investment in mission-focused computing can open new scientific frontiers. We're pleased we could partner with HP on such an accomplishment."

PNNL's supercomputer draws its speed and computing power from nearly 2,000 next-generation Intel® Itanium®-2 processors code-named "Madison," running on industry-standard HP Integrity servers. Linking the Intel Itanium-2 chips is a Quadrics interconnect that provides communication between processors and allows scientists to sustain a high performance level. HP is providing services to customers that help manage, deploy and enhance the power and ability of supercomputing.



Examining the inner workings of the new supercomputer at the William R. Wiley Environmental Molecular Sciences Laboratory are (left to right) Nathan Tenney, Tim Witteveen and Evan Felix. The system operates 9,200 times faster than your desktop personal computer.

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“HP and PNNL are working together to create next-generation technical computing solutions that will support some of the world’s most important scientific research,” said Martin Fink, vice president of Linux’s HP Enterprise Servers and Storage division. “The world’s fastest Linux supercomputer runs on industry-standard HP platforms and the recently unveiled Madison processor, and was created by a joint effort between PNNL and the many hardware, software and services professionals within the HP organization.”

The PNNL supercomputer is housed in the Molecular Science Computing Facility of the William R. Wiley Environmental Molecular Sciences Laboratory, a DOE scientific user facility at PNNL. As such, scientists from around the country can access the supercomputer for research through a competitive proposal process. The new capability will enable scientists to quickly solve complex scientific problems.

Scott Studham, who manages computer operations within the Molecular Science Computing Facility, said, “We chose the HP system during our competitive procurement process because its overall system balance was best tailored to the needs of the complex computational chemistry done at PNNL. The additional power and speed will enable novel studies in atmospheric chemistry, systems biology, catalysis and materials science.”

Proposals to use the supercomputer can be submitted through a process outlined at <http://www.emsl.pnl.gov/using-emsl/>. ■



**Ralph Wescott (foreground) and Gary Skouson work with PNNL’s supercomputer system. When it’s completed, the computer will have more than 1,400 processors and 3.8 terabytes of random access memory.**