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May 1, 2008

Purdue to install Big Ten's biggest campus computer in just a day

WEST LAFAYETTE, Ind. - The largest supercomputer on a Big Ten campus will be installed at Purdue in a single-day, electronic "barn-raising."

More than 200 employees will gather May 5 to help build the massive machine, which will be about the size of a semitrailer when installed. It will be the largest Big Ten supercomputer that is not part of a national center.

Purdue's computer is being built in a single day to keep the university's science and engineering researchers from facing a lengthy downtime, says Gerry McCartney, vice president for information technology and chief information officer.

"Our staff thought we were insane when we challenged them to build such a big computer in a single day," McCartney says. "But now there's real excitement to be a part of this."

To generate interest on campus, the organizers created a spoof movie trailer called "Installation Day," which is a take off of the movie "Independence Day." The video can be seen on YouTube at <http://www.youtube.com/watch?v=wVzThRN4QJI>

Supercomputers are ranked by their performance in running a complex benchmarking system. The results of the tests are published twice each year at <http://www.top500.org>. Purdue's new supercomputer would rank in the top 40 of the current Top 500 list, which was published in Nov. 2007.

The current campus leader in supercomputing in the Big Ten is Indiana University's Big Red, which ranks 42nd in the world. (The National Center for Supercomputing Applications' "Abe" cluster, which is based in Urbana, Ill. and operated by the University of Illinois, offers computing resources to researchers across the nation and is the largest supercomputer installed at a Big Ten university.)

The world's largest supercomputer is BlueGene/L, which is located at Lawrence Livermore (Calif.) National Laboratory.

The Purdue supercomputer will consist of 812 Dell dual quad-core computer nodes and is predicted to have a peak performance of more than 60 teraflops, which means it could

perform more than 60 trillion operations in one second.

A group of more than 25 university scientists and engineers pooled research grant funds to contribute to the purchase of the machine; less than 25 percent of the purchase is funded from the university's IT budget.

"The community approach is a new and cost-effective way to fund cyberinfrastructure on campuses," McCartney says. "This approach not only maximizes resources at Purdue, but researchers across the nation will benefit from the unused cycles which will be available on the TeraGrid."

Rudolf Eigenmann, professor of electrical and computer engineering and interim director of Purdue's Computing Research Institute, says the computer will be used for a wide variety of research.

"Faculty using this computer will be designing new drugs and materials, modeling weather patterns and the effects of global warming, engineering future aircraft, and making many more discoveries," Eigenmann says. "High performance computing is an essential to conducting research and development, so having one of the world's largest supercomputers here on campus will be a real benefit to our faculty."

The three computing clusters that previously served university researchers were taken off-line and removed from the basement of Purdue's Mathematics Building on April 28. A small number of the nodes for the new computer were then installed to serve as a "bridge" for continuing research until the new computer is fully installed.

An additional 154 nodes will be installed in Mann Hall. These nodes have already started practice computing runs for an international high-energy physics project that will begin this summer.

"We didn't set out to acquire the largest supercomputer in the Big Ten. Our intent was to design a computer that would allow Purdue researchers to take the next step in discovery," McCartney says.

The new computer will be named "Steele," after John Steele, the former director of the Purdue University Computing Center, and a member of the Computer Science faculty, who retired in 2003.

"I appreciate that I can continue to be a part of high performance computing at Purdue and our efforts to remain at the forefront of this type of computing," Steele says. "This machine will keep us on the high performance computing map."

McCartney says Purdue plans to continue naming its major computers after faculty, staff or students who have made significant contributions to the university's computing infrastructure.

"This isn't the same as naming a building after someone; these machines have a lifecycle of about five years. But it is a way to salute members of the Purdue community who have worked so long and hard to help Purdue achieve the world-famous reputation it now enjoys," McCartney says.

Purdue has a long history of leadership in information technology. In 1962, Purdue founded the first department of Computer Science. In 1967, Purdue became one of the first institutions to acquire a supercomputer, a Control Data Corp. 6500 (which had a performance of one-third of a megaflop). In 1982, Purdue.edu was the second URL registered for the Internet.

Purdue faculty members partnering with ITaP on the purchase of Steele are:

College of Engineering, School of Electrical and Computer Engineering:

Alexander Kildishev, principal research scientist, Electrical and Computer Engineering

Gerhard Klimeck, professor of electrical and computer engineering

Minghao Qi, assistant professor of electrical and computer engineering

College of Engineering, School of Materials Engineering:

Alejandro Strachan, assistant professor of materials engineering

College of Engineering, School of Mechanical Engineering:

Qingyan Chen, professor of mechanical engineering

Steve Frankel, professor of mechanical engineering

E. Daniel Hirleman, William E. and Florence E. Perry Head and Professor of Mechanical Engineering

Sangtae Kim, Donald W. Feddersen Distinguished Professor of Mechanical Engineering and of Chemical Engineering

Marisol Koslowski, assistant professor of mechanical engineering

Ashlie Martini, assistant professor of mechanical engineering

Charles Merkle, Reily Professor of Engineering, mechanical engineering and aeronautics and astronautics engineering

Jayathi Murthy, professor of mechanical engineering

College of Science, Department of Biological Sciences:

Wen Jiang, assistant professor, biological sciences

Michael Rossmann, Hanley Distinguished Professor of Biological Sciences

College of Technology, Department of Computer and Information Technology:

Thomas Hacker, assistant professor of computer and information technology

College of Science, Department of Earth and Atmospheric Sciences:

Indrajeet Chaubey, associate professor of earth and atmospheric sciences

Noah Diffenbaugh, associate professor of earth and atmospheric sciences

Joseph Francisco, William E. Moore Distinguished Professor of Earth and Atmospheric Sciences

Jeff Trapp, associate professor of earth and atmospheric sciences

Qianlai Zhuang, assistant professor of earth and atmospheric sciences

College of Science, Department of Mathematics:

Xiulin Ruan, professor of mathematics

Jie Shen, professor of mathematics

College of Science, Department of Physics:

Dénes Molnár, assistant professor of physics

Norbert Neumeister, assistant professor of physics

Information Technology at Purdue:

Carol Song, senior research scientist, Information Technology at Purdue

College of Pharmacy, Nursing, Health Sciences, Department of Medicinal Chemistry and Molecular Pharmacology:

Markus Lill, assistant professor of medicinal chemistry and molecular pharmacology

Carol Post, professor of medicinal chemistry and molecular pharmacology

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Note to Journalists: Gerry McCartney and John Steele will be at the event at noon on May 5. A time-lapse video of the event will be available on May 6. Contact Steve Tally at (765) 494-9809, or tally@purdue.edu

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