

Supercomputer could be fully functional late 2012

Hannah Meisel | Posted: Monday, May 7, 2012 12:00 am

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A project five years in the making finally began early this semester with the installation of Blue Waters' Early Science System. But the path the project took turned out to be not as clear-cut as it appeared in the beginning.

Computing giant IBM had entered into a contract in 2008 with the University's National Center for Supercomputing Applications but broke the contract in early August after more than a year of dispute. The NCSA sent back equipment already installed in the National Petascale Computing Facility, 1725 S. Oak St., and IBM refunded the NCSA the \$30 million that had already been paid.

At that time, the NCSA was charged with restructuring its plan for the supercomputer and presenting the altered plan to the National Science Foundation in order to keep its funding. The foundation had originally awarded \$208 million for the project in 2007. But in November, after searching for a new vendor for three months, the University entered into a contract with Seattle-based computing company Cray Inc., which began delivering new supercomputing equipment in January.

Presently, six research teams are using the Early Science System, navigating the kinks and debugging programs along the way. This system only represents 15 percent of the complete Blue Waters project. Trish Barker, NCSA spokeswoman, said the initial teams on the Early Science System were chosen based on experience, as working with the new system could prove difficult.

The NCSA has not yet set a date to deliver the next round of equipment, but Barker said Blue



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Kevin Hutchinson, a mechanical engineer for Cray, Inc., attaches pipes to supercomputer racks delivered by Cray for the Blue Waters project on Saturday, Jan. 29 at the National Petascale Computing Center. The pipes, carrying system-cooling water that lends Blue Waters its name, are being integrated into the first Blue Waters hardware delivered to the University since IBM pulled out of the supercomputing project. About 40 racks will be installed by Cray over the next few weeks to make up the first 10 percent of the Blue Waters supercomputer, with roughly 300 in total when the system is complete.

Waters could be fully functional by late 2012. Around 40 researchers are waiting for the complete system, as the foundation has awarded more than \$380 million to these scientists nationwide in preparation for the project's completion.

Already, preliminary goals have been met by some of the research teams in the first two months of the Early Science System. Physics professor Klaus Schulten and his team make up one of the cornerstone projects, researching the development of the HIV virus. Schulten's program will simulate the cylinder-shaped protein coating around the HIV-1 genome to understand how the virus disassembles and releases its genetic material into the body.

Blue Waters' computing power is one of the fastest in the world; at peak performance it will run at about 11.5 petaflops, doing quadrillions (a thousand trillions) of calculations in a second.

With all the electricity it takes to power a supercomputer's massive calculations, most systems reach extreme temperatures without proper cooling, which traditionally has been provided by fans. However, Blue Waters is named for its cooling system, which uses naturally chilled water running through the computer's facility to cool the racks of computing equipment.

Eventually, when the estimated 300 cabinets that will make up Blue Waters are installed, the supercomputer may increase campus energy consumption by up to one quarter of its current use. Though the National Petascale Computing Facility that houses the Blue Waters project received a rating of "Gold" LEED certification in early January, Facilities and Services spokesman Andy Blacker said the rating takes more into account than energy efficiency.