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TECHNOLOGY

Brown, IBM turn on new supercomputer

By Marion Davis
PBN Contributing Writer

PROVIDENCE – Brown University and IBM (NYSE: IBM) on Friday unveiled a multimillion-dollar “high-performance computing” system that is able to perform more than 14 trillion calculations per second, making it by far the most powerful computer in Rhode Island.

The machine operates at a peak performance speed of more than 14 teraflops, which Brown said meets “supercomputer” standards, but doesn’t make the Top 500 worldwide list. It has 390 terabytes of storage capacity and holds 4.5 terabytes of memory.

It will be housed at Brown’s Center for Computation and Visualization and will be available to users across the state, starting with universities and hospitals, to tackle “grand challenges” in climate change, education, energy and health, Brown said.

The university and IBM plan to work with local organizations to make the most of the system, and over the next several months, they will host a series of symposia with “world-class scientific experts” to help identify fields in which the supercomputer could be used.

“Combined, the supercomputer and the symposia allow us to begin to tackle our state’s most sobering challenges, thus allowing for economic growth and stability through productivity, innovation and competitiveness,” said Clyde Briant, vice president for research at Brown.

In an interview, Briant said he expects the system to be particularly valuable for materials-science projects involving large-scale simulations; population biology, which can draw from huge public-health databases; environmental informatics; genomics and more.

“The bottom line is, in the age we’re in now, high-performance computing is just critical for all kinds of research,” Briant said. “In particular, the two prongs of high-speed, high-powered calculation and vast, quickly retrievable data storage ... are going to be vital to us in all sorts of ways.”

Jan Hesthaven, professor of applied mathematics and director of the Center for Computation and Visualization, noted that computer-enabled research today cuts across disciplines and “opens entirely new pursuits and innovations,” but it requires top-notch computers.

“We now have a computing system for these times,” Hesthaven said.

Brown has worked with IBM for decades. The supercomputer partnership began



BROWN UNIVERSITY

THE NEW SUPERCOMPUTER, which can perform 14 trillion operations a second, is housed in Brown’s Center for Computation and Visualization, above.

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to take shape in the spring of 2008, when Briant introduced Nick Bowen, vice president of technology at IBM, to the R.I. Science and Technology Advisory Council.

The meeting led to discussions about IBM's statewide relationship model and how Rhode Island could develop one. The partnership that ultimately emerged is targeted at using the supercomputer to address major societal issues. In June, Brown and IBM signed an agreement for the system, with the cost shared by the university and the corporation.

Brown researchers will be among the first to use the system, but researchers at the University of Rhode Island and the Marine Biological Laboratory in Woods Hole, Mass., have also been involved nearly from the start, helping to design the system to ensure it is versatile and can meet the needs of a wide range of users, Briant said.

Brown is working with the nonprofit consortium OSHEAN to provide high-speed connectivity for research, education and public service in the state in order to ensure the network is powerful enough to support remote users of the supercomputer, Briant said.

By next year, the system is expected to be available to other universities in Rhode Island, as well as to hospitals and nonprofit organizations, who will pay to use it.

Eventually, Briant said, the goal is to make the system available to an even broader range of users, including small businesses that couldn't otherwise afford such high-end computing. "It's a big step forward not only for Brown, but for the state," he said.

Inside the Supercomputer

- The new system, with 1,440 microprocessors, is based on three IBM iDataPlex systems, equal to the size of six refrigerators; an IBM Cluster 1350; and multiple IBM storage systems running General Parallel File System, supported by IBM Global Services.

- With a peak performance speed of more than 14 teraflops, it is nearly 50 times faster than what had been available at Brown. Its 390 terabytes of storage capacity and 4.5 terabytes of memory give it about 70 times more memory than what had been available at Brown.

- The system can allow parallel programs to run that, in aggregate, are 20 times faster than what had been available at Brown. Researchers can now compute a problem that is 20 times larger in the same time.

- Combined with the supercomputer, Brown has increased its backbone network tenfold, to 10 gigabits from one gigabit. The greater bandwidth means more data can be moved within the system or into another system.

- The system is six times more energy efficient than what had been available at Brown.

Additional information is available at brown.edu/departments/CCV.

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