

NYU Acquires Fastest Supercomputer in New York City

IBM Supercomputer to Aid NYU Research

By David Ackerman

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New York University recently installed a new IBM eServer BladeCenter system capable of a peak performance of 4.5 teraflops (one trillion floating-point operations per second). According to the TOP500 List, a ranking of supercomputers published at <http://www.top500.org>, NYU's supercomputer is the fastest in New York City and the 117th fastest supercomputer in the world. The acquisition of this supercomputer, which will support NYU research with heavy computational requirements, was made possible by a gift from IBM and federal funding. The supercomputer has been dubbed "Max," in honor of Max Goldstein, a computing pioneer and—among his many accomplishments—the first director of NYU's Academic Computing Facility, one of Information Technology Services' predecessor organizations.

Operations began in May 2005. Among the research enterprises that are early beneficiaries of the new system are NYU's Center for Atmosphere-Ocean Science in the Courant Institute for Mathematical Sciences, which is developing sophisticated models to study the behavior of the Earth's atmosphere and oceans, and the Center for Comparative Functional Genomics and the Courant Institute of Mathematical Sciences, in their new program of collaborative research in genomics and bioinformatics.

RE-ESTABLISHING NYU'S LEADERSHIP IN HIGH PERFORMANCE COMPUTING

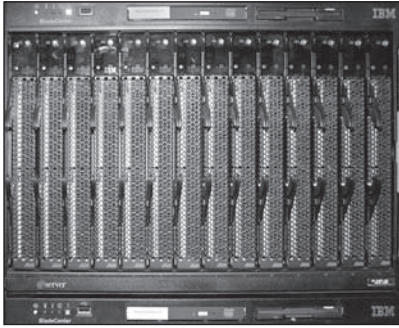
As NYU Provost David McLaughlin noted, "The Courant Institute of Mathematical Sciences is world-renowned for the strength of its scholarship in mathematics and computer science. NYU had an important and prominent role in the development of computers and the field of computer science. This technology

will not only be a tremendous resource for a number of our faculty in areas of scholarly strength for the University, but also helps re-establish our role as an important center for computing. We are grateful to IBM for their generosity, and to the Office of Naval Research and the U.S. Army Medical Research and Materiel Command for their support of our research."

According to NYU Associate Provost and Chief Information Tech-

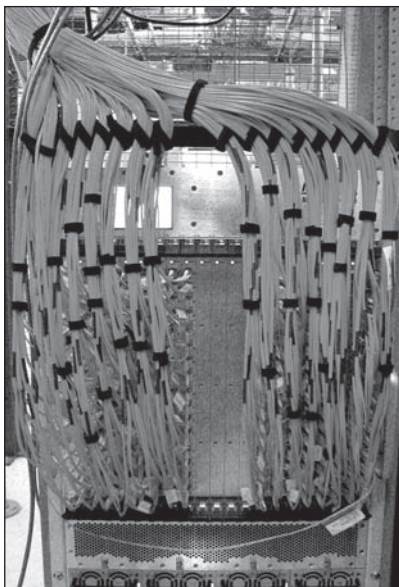


ITS Information Technology Specialist Joseph Hargitai at work on Max.



Just a few of Max's many powerful Central Processing Units (CPUs).

nology Officer Marilyn McMillan, "IBM's off-the-shelf blade server technology allowed us to easily connect a cluster of systems and solve the challenge of building a supercomputer in valuable space here in the city. By leveraging IBM's POWER5 microprocessor technology with Linux, we are able to tap into a 64-bit computing platform that will greatly speed the research process and help our researchers to more rapidly turn scientific theory into real-world benefits to society. This supercomputer re-establishes NYU's position of leadership in high performance computing."



A cascade of Max's fiber optic cable connections.

INNOVATIVE, SPACE-SAVING DESIGN & A NEW TEST CENTER

NYU's new BladeCenter supercomputer consists of a cluster of 256 IBM eServer BladeCenter JS20 systems running Linux, each with dual 2.2 GHz PowerPC 970 processors, or 512 processors in total. It is the first supercomputer in the United States to use IPv6, the next generation Internet Protocol.

"The innovative design of IBM's BladeCenter systems has revolutionized high performance computing, offering organizations such as NYU the option to scale-out its infrastructure in a space-saving manner without sacrificing power or performance," said Dave Turek, Vice President of Deep Computing at IBM. "We're looking forward to working with NYU on a powerful, state of the art clustered supercomputing solution that will help the Courant Institute and other parts of the University maintain leadership in scientific research and help make IBM's JS20 systems the platform of choice for high performance computing applications."

IBM is also working with New York University to create a joint test center, where high performance computing application developers can enable, test, and tune their applications and solutions using IBM JS20 systems. This center will be capable of a peak performance of more than one teraflop, and will consist of 64 IBM eServer BladeCenter JS20 systems (128 processors) running Linux. The new center will help to promote innovation utilizing IBM's BladeCenter JS20 and Linux on Power platforms. Myrinet switch technology connects each cluster of the BladeCenter systems. Myrinet is an extremely high-performance, low-latency switching technology used to interconnect computer clusters and allow the distribution of demanding computations across an array of cost-effective hosts.

FACILITATING RESEARCH REQUIRING HEAVY COMPUTATION

One of the NYU research enterprises already making use of the new supercomputing system is the Center for Atmosphere-Ocean Science in the Courant Institute for Mathematical Sciences (<http://caos.cims.nyu.edu/>). The Center uses computational modeling to simulate atmospheric circulation and oceanic currents.

The acquisition of the supercomputer, supported in part by the Department of the Navy's Office of Naval Research, will help researchers combine theory, mathematical analysis, and numerical models to better understand the Earth's climate, including the impact of weather events such as thunderstorms and hurricanes, coupled atmospheric and oceanic oscillations such as El Niño, and oceanic currents like the Gulf Stream and the Antarctic Circumpolar Current.

The supercomputer is also helping to foster a research program in genomics at NYU, enhancing collaboration between the Center for Comparative Functional Genomics and the Courant Institute of Mathematical Sciences. Aspects of this research include advanced algorithm and software development for data integration, data mining and visualization, biological network simulation, and high-throughput microscopy. The acquisition of the supercomputer has been supported in part by the U.S. Army Medical Research and Materiel Command (USAMRMC).

If you are a researcher or advanced student engaged in research with heavy computational requirements, contact ITS high performance computing support staff at hpc@nyu.edu for further information, access, and help.

Dr. David Ackerman is Executive Director for ITS' .edu Services and the Digital Library Program.