FACTS

In Partnership with Stony Brook University

BROOKHAVEN NATIONAL LABORATORY

New York Blue

Leveraging New York State Investment in Computational Sciences

Purpose

- Critical for computations in biology, medicine, climate science, materials, nanoscience, renewable energy, finance, and technology
- Centerpiece of New York Center for Computational Sciences

Collaborators

- Stony Brook University
- U.S. Department of Energy's Brookhaven National Laboratory

Funding

$26 million from New York State

Features

- IBM Blue Gene
- 100 teraflops
- 18-rack configuration
- 36,864 processors

www.newyorkblue.bnl.gov

While calculations a century ago were performed with paper and pencil, computers are the indispensable tools of science today. High-end computing, which includes supercomputers, data storage, networking, and visualization, is an essential component of scientific research and technology in the twenty-first century.

New York Blue at Brookhaven Lab

In the spring of 2007, Brookhaven National Laboratory, in partnership with Stony Brook University, installed an IBM Blue Gene supercomputer. Named New York Blue, the new supercomputer is one of the fastest in the world for general users.

Supported by a $26-million allocation from New York State, New York Blue is the centerpiece of the New York Center for Computational Sciences, a cooperative initiative between Stony Brook and Brookhaven. Together with a new supercomputer at Rensselaer Polytechnic Institute, New York Blue will foster research collaborations among research institutions, universities, and companies throughout New York State.

New York Blue is capable of 100 teraflops ("flops" stands for floating point operations per second), which translates to 100 trillion calculations per second — about 10,000 times faster than a personal computer. It will be used to advance science in many areas, notably:

Nanoscale science and technology
Enable the complex calculations required to study the physical and chemical properties of nanoparticles being explored for their potential to foster U.S. energy independence.

Computational biology
Provide interactive models of complex biological systems, including proteins and genomic information, to understand the structure and function of enzymes, to design pharmaceutical drugs and vaccines, and to support cost-efficient production of renewable biofuels.

Climate science
Improve understanding of weather and climate by providing the computational power needed to conduct modeling studies of the fundamental chemical, atmospheric and oceanic processes that affect storms and ocean circulations, how aerosols and clouds impact climate, and how regional climates are altered by global warming scenarios.

Nuclear and high-energy physics
Enhance the computational power for interpreting current data and modeling future experiments at Brookhaven's Relativistic Heavy Ion Collider (RHIC), the nation's premiere nuclear physics facility. RHIC promises a better understanding of the fundamental structure and properties of matter and the evolution of the universe.

Astrophysics
Understand the thermonuclear reactions that generate the energy of our sun and the other stars in the universe.

New York Blue At a Glance

- IBM Blue Gene supercomputer containing 36,864 processors and 1.7 trillion transistors.
- Capable of about 102 trillion calculations per second at peak performance.
- 8,000 times more powerful than Deep Blue, the IBM supercomputer that beat chess champion Garry Kasparov in an historic 1997 chess match.
- Enough storage to contain the equivalent of 70 million full-length novels.

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