

Multi-teraflop computer system targets large-scale discovery projects

February 5 2009

Penn State's Institute for CyberScience will target large-scale modeling, simulation and data analysis with a terascale advanced computing system, funded by the National Science Foundation's Major Research Instrumentation Program.

The instrument will enable researchers from seven disciplines -- biological, materials and social sciences, computer and information science, engineering, education and geosciences -- to perform virtual experiments to address open problems in their disciplines. Research projects include predictive network modeling of infectious disease dynamics, developing new piezoelectric materials, designing next-generation computer systems, modeling human interactions to promote learning in virtual communities and developing a critical zone environmental observatory.

Despite their diversity, these projects share computational scalability challenges that must be addressed to enable scientific advances that often depend on solving large problems representing a sufficient level of detail and complexity. The instrument will also enable activities to promote technology transfer to industrial partners and provide training and outreach to enhance the diversity of the computational science talent pool.

The total cost of the instrument will be about \$1.85 million with NSF's portion being \$1.25 million. Penn State matching funds make up the remainder of the costs. The system will consist of nearly a thousand

processors and be capable of 20 teraflops per second at peak. A teraflop is a measure of a computer's speed and is equal to a trillion floating-point operations per second or a trillion actions per second.

Supporting the computer nodes will be data servers for about half a Petabyte -- half a quadrillion bytes -- of high throughput storage, an interactive login-server and code development cluster and high speed interconnects. The system will also have a visualization Data Wall, including projectors capable of one large stereo image or six different images on individual tiles.

More information on the project can be found at www.research.psu.edu/ics/research/mriproject.html

Source: Penn State

Citation: Multi-teraflop computer system targets large-scale discovery projects (2009, February 5) retrieved 23 April 2024 from <https://phys.org/news/2009-02-multi-teraflop-large-scale-discovery.html>

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