IBM

20 Petaflop Sequoia Supercomputer

Armonk, NY - 03 Feb 2009: The Department of Energy's National Nuclear Security Administration has selected Lawrence Livermore National Laboratory as the development site for two new supercomputers-- Sequoia and Dawn—and IBM as the computer's designer and builder. These systems will allow for smarter simulation and negate the need for real-world weapon testing.

Under terms of the contract, Sequoia will be based on future IBM BlueGene technology, exceed 20 petaflops (quadrillion floating operations per second) and will be delivered in 2011 with operational deployment in 2012. Dawn, an initial delivery system to lay the applications foundation for multi-petaflop computing, will be based on BlueGene/P technology, reach speeds of 500 teraflops (trillion floating operations per second) and is scheduled for operational deployment in early 2009.

- Sequoia will represent a significant leap forward in compute power. With top speeds of 20 petflops Sequoia will be approximately 15 times faster than today's most powerful supercomputer and offers more processing power than the entire list of Top500 supercomputers running today.
- Sequoia will primarily be used to ensure the safety and reliability of the nation's nuclear weapons stockpile. It will also be used for research into astronomy, energy, human genome science and climate change.
- Sequoia will be based on future IBM BlueGene technology and use 1.6 million IBM POWER processors and 1.6 petabytes of memory, which are housed in 96 refrigerator sized racks occupying just 3422 square feet The Sequoia system will deploy a state of the art switching infrastructure that will take advantage of advanced fiber optics at all levels.
- Sequoia will run the Linux operating system.
- The machine will be built, tested and benchmarked in IBM's Rochester, Minnesota plant, home of the Blue Gene class of supercomputers the company builds for ulra-scale computational applications. The hardware and software development will by provided by IBM engineers in Rochester and by researchers in IBM's Yorktown Heights, N.Y. research lab, in partnership with the Lawrence Livermore National Lab and the Argonne National Lab.
- Compared to most traditional supercomputer designs, Sequoia will offer unprecedented levels of energy efficiency. Sequoia is expected to deliver world-leading efficiency of 3,050 calculations per watt of energy.

   How fast is a petaflop?
- Sequoia operates at speeds exceeding 20 petaflops – Twenty thousand trillion calculations per second; or twenty quadrillion calculations per second.
- One petaflop also equals 150,000 computations for every human on the planet per second. Sequoia is 20 petaflops, which equates to an astounding 3 million computations by every human on the planet

each second.

- 20 petaflops is also equal to 120 billion people armed with calculators nearly 50 years to process what Sequoia could achieve in a single day.

Contact(s) information

Ron Favali
IBM Media Relations
727-489-7202
favali@us.ibm.com

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