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## Government unveils world's fastest computer

- Story Highlights
- Computer is capable of sustaining 1,000 trillion operations per second
- It will be used to help maintain the nation's nuclear weapons stockpile
- The machine is named Roadrunner
- IBM and Los Alamos engineers worked six years on the computer technology

**WASHINGTON (AP)** -- Scientists unveiled the world's fastest supercomputer on Monday, a \$100 million machine that for the first time has performed 1,000 trillion calculations per second in a sustained exercise.

The technology breakthrough was accomplished by engineers from the Los Alamos National Laboratory and the IBM Corp. on a computer to be used primarily on nuclear weapons work, including simulating nuclear explosions.

The computer, named Roadrunner, is twice as fast as IBM's Blue Gene system at Lawrence Livermore National Laboratory, which itself is three times faster than any of the world's other supercomputers, according to IBM.

"The computer is a speed demon. It will allow us to solve tremendous problems," said Thomas D'Agostino, head of the [National Nuclear Security Administration](#), which oversees nuclear weapons research and maintains the warhead stockpile.

But officials said the computer also could have a wide range of other applications in civilian engineering, medicine and science, from developing biofuels and designing more fuel efficient cars to finding drug therapies and providing services to the financial industry.

To put the computer's speed in perspective, if every one of the 6 billion people on earth used a hand-held computer and worked 24 hours a day it would take them 46 years to do what the Roadrunner computer can do in a single day.

IBM and [Los Alamos](#) engineers worked six years on the computer technology.

Some elements of the Roadrunner can be traced back to popular video games, said David Turek, vice president of IBM's supercomputing programs. In some ways, he said, it's "a very souped-up Sony PlayStation 3."

"We took the basic chip design (of a PlayStation) and advanced its capability," said Turek.

But the Roadrunner supercomputer is nothing like a video game.

The interconnecting system occupies 6,000 square feet with 57 miles of fiber optics and weighs 500,000 pounds. Although made from commercial parts, the computer consists of 6,948 dual-core computer chips and 12,960 cell engines, and it has 80 terabytes of memory.

The cost: \$100 million.

Turek said the computer in a two-hour test on May 25 achieved a "petaflop" speed of sustained performance, something no other computer had ever done. It did so again in several real applications involving classified nuclear weapons work this past weekend.

"This is a huge and remarkable achievement," said Turek in a conference call with reporters.

A "flop" is an acronym meaning floating-point-operations per second.

One petaflop is 1,000 trillion operations per second. Only two years ago, there were no actual applications where a computer achieved 100 teraflops -- a tenth of Roadrunner's speed -- said Turek, noting that the tenfold advancement came over a relatively short time.

The Roadrunner computer, now housed at the IBM research laboratory in Poughkeepsie, New York, will be moved next month to the Los Alamos National Laboratory in New Mexico.

Along with other supercomputers, it will be key "to assure the safety and security of our (weapons) stockpile," said D'Agostino. With its extraordinary speed it will be able to simulate the performances of a warhead and help weapons scientists track warhead aging, he said.

But the computer -- and more so the technology that it represents -- marks a future for a wide range of other research and uses.

"The technology will be pronounced in its employment across industry in the years to come," predicted Turek, the IBM executive.

Michael Anastasio, director of the Los Alamos lab, said that for the first six months the computer will be used in unclassified work including activities not related to the weapons program. After that about three-fourths of the work will involve weapons and other classified government activities.,

Anastasio said the computer, in its unclassified applications, is expected to be used not only by Los Alamos scientists but others as well. He said there can be broad applications such as helping to develop a vaccine for the HIV virus, examine the chemistry in the production of cellulosic ethanol, or to understand the origins of the universe.

And Turek said the computer represents still another breakthrough, particularly important in these days of expensive energy: It is an energy miser compared with other supercomputers, performing 376 million calculations for every watt of electricity used.

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