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Largest Known Prime Number Discovered; Verified in U.S. Using NeXT Technology

REDWOOD CITY, Calif., March 27, 1992 — NeXT Computer, Inc. today announced that the largest prime number, discovered by Cray scientists Gage and Slowinski during a random search at a computer laboratory in Great Britain, was verified in the U.S. using a NeXT program. The new prime number was reported in the March 26, 1992 issue of *Nature* magazine. The new world record prime was verified by Crandall, Doenias and Smitley on a government supercomputer running a software program written at NeXT, using NeXTstation workstations and NeXT-to-supercomputer connectivity tools. The software development for the program took place over the last two years, using connections between NeXT and the San Diego Supercomputer Center.

The new number is $2^{756839} - 1$. The NeXT program verifies in about 16 Cray hours that this number is indeed a prime number.

"When they stumbled upon this new prime in England they asked a group of us in the U.S. — a team we refer to as the 'Gang-of-Eight' — to prove the number was indeed prime," explained Richard E. Crandall, NeXT's chief scientist.

The "Gang-of-Eight" had been searching on their own for many months for primes in the region of 2^{200000} to 2^{500000}; the newly discovered prime is way beyond this range, but still easily handled by the software. In fact, the NeXT method can test numbers for primality, up to $2^{32000000}$.

When the team became aware of the possibility of a new prime beyond their search region, Crandall and Josh Doenias, a programmer at NeXT, asked David Smitley, a government scientist, to perform the test overnight. In this way a Cray-2 supercomputer at a U.S. government supercomputer center in Maryland ran the C software code from NeXT, 16 hours later verifying the British-discovered number as the world's largest prime.

"The verification program we developed with NeXT software technology arose from several ideas exchanged among the Gang-of-Eight over the last few years," Crandall said. "Modern programs such as this one combine ideas from the fields of number theory and signal processing. One basically treats the digits of a monster number as a signal, and applies some new algorithms from the field of signal processing. It says a great deal for NeXT technology, portability and connectivity that we not only developed the program using NeXT tools, but also found it so easy to run the program overnight on a Cray supercomputer, the most powerful computer in the world."

In addition to Crandall, Doenias and Smitley, members of the Gang-of-Eight included Barry Fagin at Dartmouth College, Walter Colquitt at HARC, Joseph Buhler at Reed College, Roger Frye at Thinking Machines, Inc. and David Slowinski at Cray Research, Inc.

NeXT Computer, Inc. designs, manufactures and markets professional workstations based on the revolutionary NeXTSTEP object-oriented system software. NeXT computers are used by medium and large organizations to develop and deploy mission-critical custom applications, which can run alongside a robust suite of advanced productivity applications. NeXT is headquartered at 900 Chesapeake Drive, Redwood City, California, 94063.

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