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# 17-million-digit prime number smashes world record

A researcher from the University of Missouri has broken a 4-year-old record for the largest ever prime number discovered. The discovery was made thanks to the Great Internet Mersenne Prime Search, a distributed computing project established in 1996.

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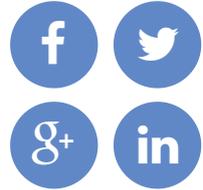
*Take a look at the world's largest prime in its full 17-million-digit glory, [here](#). Warning: this is a 22MB file!*

Distributed computing has helped researchers break a 4-year-old record for the largest ever prime number discovered. The discovery of the 17,425,170-digit prime was made by Curtis Cooper, a researcher at the [University of Central Missouri, US](#), and it smashes the previous record of a 12,978,189-digit prime, held since 2008.

Hunting for ever-larger prime numbers is a laborious task, since they essentially become both rarer and harder to verify with each passing discovery. Cooper was able to make his discovery thanks to the [Great Internet Mersenne Prime Search \(GIMPS\)](#), a distributed computing project set up to hunt for a special kind of prime, named after the French monk Marin Mersenne, who discovered them in the early 17th century. Whereas regular prime numbers are only divisible by themselves and 1, Mersenne primes also take the form  $2^p - 1$  (where 'p' itself is a prime number).

GIMPS was established in 1996 and now has a sustained throughput of almost 100 teraflops - theoretically enough to earn it a spot on the [TOP500 supercomputers list](#). GIMPS software's

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source code is publicly available and has been installed by Curtis on approximately a thousand computers at the University of Missouri.

39 days of non-stop computing were required on one of the university's computers, in order to prove that the 17-million digit number was in fact prime. This was then verified independently by other researchers using other programs. Jerry Hallett verified the prime using [CUDALucas](#) running on a NVidia GPU in 3.6 days, Jeff Gilchrist verified the find using the standard GIMPS software on an Intel i7 CPU in 4.5 days, and Serge Batalov ran [Ernst Mayer's MLucas software](#) on a 32-core server in 6 days to verify the new prime.

Curtis's discovery is the 48th Mersenne prime to be discovered and it is the 14th found through the use of GIMPS. Today, all of the 10 largest known primes are Mersenne primes and each of these was discovered through GIMPS, which currently has approximately 100,000 users worldwide.

While hunting for large prime numbers may seem like a somewhat esoteric hobby, Curtis says that he finds the pursuit exciting. He told [the Associated Press](#): "Every time I find one it is incredible... I kind of consider it like climbing Mount Everest or finding a really rare diamond or landing somebody on the moon. It's an accomplishment. It's a scientific feat."

Yet, as well as the sheer thrill of having made the discovery, Curtis is also in line for a significant financial reward. He stands to collect a \$3,000

prize from GIMPS for making the discovery. And, if you fancy downloading the GIMPS software and joining the ranks of the prime hunters, even more substantial financial rewards could lay ahead. [The Electronic Frontier Foundation](#) is offering a whopping \$150,000 reward for discovering the first 100-million-digit prime.

Discover more about prime numbers in our article: ['Researchers edge closer to solving 270-year-old math problem thanks to grid computing'](#)

- *Andrew Purcell*

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