PrimeGrid's
Seventeen or Bust Subproject

On 31 October 2016, 22:13:54 UTC, PrimeGrid's Seventeen or Bust subproject found the Mega Prime:

$$10223*2^{31172165}+1$$

The prime is 9,383,761 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (http://primes.utm.edu/primes) ranked 7th overall.

This is the largest prime found attempting to solve the Sierpinski Problem and eliminates k=10223 as a possible Sierpinski number. It is also the largest known Proth prime, the largest known Colbert number (http://mathworld.wolfram.com/ColbertNumber.html) , and the largest prime PrimeGrid has discovered. Among the 10 largest known prime numbers, it is the only prime that is not a Mersenne number, and the only known non-Mersenne prime over 4 million digits.

Until the Seventeen or Bust project shut down earlier in the year, this search was a collaboration between PrimeGrid and Seventeen or Bust. This discovery would not have been possible without all the work done over the years by Seventeen or Bust.

The discovery was made by Szabolcs Peter of Hungary using an Intel(R) Core(TM) i7-4770 CPU @ 3.40GHz with 12GB RAM, running Microsoft Windows 10 Enterprise Edition. This computer took about 8 days, 22 hours, 34 minutes to complete the primality test using LLR.

The prime was verified on 29 November 2016, 05:45:19 UTC by Heidi Kohne of the United States using an AMD A6-3600 APU with 6GB RAM, running Microsoft Windows 7 Home Premium. This computer took about 27 days, 7 hours, 33 minutes to complete the primality test using LLR.

Credits for the discovery are as follows:

1. Szabolcs Peter (Hungary), discoverer
2. PrimeGrid, et al.
3. Seventeen or Bust, et al.
4. SoBSieve, sieving program developed by Paul Jobling
5. ProthSieve, sieving program developed by Mikael Klasson and Paul Jobling
6. Ksieve, sieving program developed by Phil Carmody
7. Srsieve, sieving program developed by Geoff Reynolds
8. LLR, primality program developed by Jean Penné
9. OpenPFGW, a primality program developed by Chris Nash & Jim Fougeron with maintenance and improvements by Mark Rodenkirch

Entry in "The Largest Known Primes Database" can be found here:

https://primes.utm.edu/primes/page.php?id=122473

OpenPFGW, a primality program developed by Chris Nash & Jim Fougeron, was used to check for Fermat Number divisibility (including generalized and extended). For more information about Fermat and generalized Fermat Number divisors, please see Wilfrid Keller's sites:

• http://www.prothsearch.net/fermat.html
• http://www.prothsearch.net/GFNfacs.html

Testing for Fermat, GFN, and xGFN divisors is still underway, and if any are found they will be announced once that testing is complete.

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The Seventeen or Bust Project was administered by Louis Helm, David Norris and Michael Garrison.

Using a single PC would have taken centuries to find this prime. So this timely discovery would not have been possible without the thousands of volunteers who contributed their spare CPU cycles. A special thanks to everyone who contributed their advice and/or computing power to the search - especially all the sievers who work behind the scenes to make a find like this possible.

PrimeGrid's Seventeen or Bust subproject will continue to seek to eliminate the remaining 5 k values in the Sierpinski problem. To join the search please visit PrimeGrid: http://www.primegrid.com.

For more information about Seventeen or Bust and the Sierpinski problem, please visit http://primes.utm.edu/glossary/xpage/SierpinskiNumber.html.

About PrimeGrid

PrimeGrid is a distributed computing project, developed by Rytis Slatkevičius and currently administered by Iain Bethune, James Breslin, Scott Brown, Ulrich Fries, Charley Gielkens, Michael Goetz, Roger Karpin, Rytis Slatkevičius, and Van Zimmerman.

PrimeGrid is hosted by Rackspace, and their generous contributions have helped make this project possible.

PrimeGrid utilizes BOINC and PRPNet to search for primes with the primary goal of bringing the excitement of prime finding to the "everyday" computer user. Simply download the software and let your computer do the rest. Participants can choose from a variety of prime forms to search. With a little patience, you may find a large or even record breaking prime.

BOINC

The Berkeley Open Infrastructure for Network Computing (BOINC) is a software platform for distributed computing using volunteered computer resources. It allows users to participate in multiple distributed computing projects through a single program. Currently BOINC is being developed by a team based at the University of California, Berkeley led by David Anderson.

This platform currently supports projects from biology to math to astronomy. For more information, please visit BOINC: http://boinc.berkeley.edu

PRPNet

PRPNet is a client/server application written by Mark Rodenkirch that is specifically designed to help find prime numbers of various forms. It is easily ported between various OS/hardware combinations. PRPNet does not run each PRP test itself, but relies on helper programs, such as LLR, PFGW, phrot, wwww, and genefer to do the work.

For more information, please visit PrimeGrid's PRPNet forum thread: http://www.primegrid.com/forum_thread.php?id=1215

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For more information about PrimeGrid and a complete list of available prime search projects, please visit: http://www.primegrid.com