PrimeGrid's
321 Prime Search

On 3 Apr 2009 15:40:01 UTC, PrimeGrid's 321 Prime Search found another Mega Prime:

$$3*2^{5082306}+1$$

The prime is 1,529,928 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (http://primes.utm.edu/primes) ranked 15th overall. It is the 6th largest Proth prime found and the largest found Mega Prime using LLR.

The discovery was made by Andy Brady of the United States using an Intel C2Q Q8200 @ 2.33GHz with 3GB RAM running Windows Vista. This computer took about 14 hours 7 minutes to complete the primality test. Andy is a member of the BOINCstats team.

The prime was verified on 4 Apr 2009 11:59:13 UTC, by Bogdan Lewdański of Poland using an Intel C2Q Q6600 @ 2.40GHz with 3GB RAM running Windows XP. This computer took about 8 hours 5 minutes to complete the primality test. Bogdan is a member of the BOINC@Poland team.

The credits for the discovery are as follows:

1. Andy Brady (United States), discoverer
2. PrimeGrid, et al.
3. Srsieve, sieving program developed by Geoff Reynolds
4. LLR, primality program developed by Jean Penné

Entry in "The Largest Know Primes Database" can be found here:
http://primes.utm.edu/primes/page.php?id=87449

OpenPFGW, a primality program developed by Chris Nash & Jim Fougeron, was used to check for Fermat Number divisibility (including generalized and extended) using the following settings: -gxo –a2 $3*2^{5082306}+1$. For more information about Fermat and Generalized Fermat Number divisors, please see Wilfrid Keller's sites:

- http://www.prothsearch.net/fermat.html
- http://www1.uni-hamburg.de/RRZ/W.Keller/GFNfacs.html

Generalized and extended Generalized Fermat Number divisors discovered are as follows:

3*2^5082306+1 is a Factor of GF(5082303,3)
3*2^5082306+1 is a Factor of GF(5082305,5)
3*2^5082306+1 is a Factor of xGF(5082305,5,3)
3*2^5082306+1 is a Factor of xGF(5082302,7,4)
3*2^5082306+1 is a Factor of GF(5082304,8)
3*2^5082306+1 is a Factor of xGF(5082304,8,3)
3*2^5082306+1 is a Factor of xGF(5082305,8,5)
3*2^5082306+1 is a Factor of xGF(5082305,9,5)
3*2^5082306+1 is a Factor of xGF(5082304,9,8)
3*2^5082306+1 is a Factor of GF(5082305,11)
3*2^5082306+1 is a Factor of xGF(5082305,11,3)
3*2^5082306+1 is a Factor of xGF(5082302,11,5)
3*2^5082306+1 is a Factor of xGF(5082305,11,8)
3*2^5082306+1 is a Factor of xGF(5082305,11,9)
3*2^5082306+1 is a Factor of xGF(5082303,12,7)

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PrimeGrid's 321 Prime Search is an extension of Paul Underwood's 321 Search which concluded at n=5M. PrimeGrid added the $3*2^n+1$ form to the search and is testing both $3*2^n-1$ and $3*2^n+1$ forms beyond 5M.

Using a single PC would have taken years 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 Wilfrid Keller, the (x)(G)FN divisibility testers, and all the sievers who work behind the scenes to make a find like this possible.

PrimeGrid's 321 Prime Search will continue to search for even larger primes. To join the search please visit PrimeGrid: http://www.primegrid.com

About PrimeGrid

PrimeGrid is a distributed computing project, developed by Rytis Slatkevičius, which utilizes BOINC and PRPNet to search for primes. PrimeGrid's primary goal is to bring 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 distributed Client/Server application, developed by Mark Rodenkirch, which can be used to manage and perform primality and probable prime tests on a list of candidate numbers. The PRPNet Client uses LLR, Phrot, or PFGW to perform these tests.

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