PrimeGrid's
Generalized Cullen/Woodall Prime Search

On 29 Jan 2012, 08:10:03 UTC, PrimeGrid's PRPNet found the largest known generalized Cullen prime:

$$427194*113^{427194}+1$$

Generalized Cullen numbers are of the form: n*b^n+1. Generalized Cullen numbers that are prime are called generalized Cullen primes. For more information, please see "Cullen prime" in The Prime Glossary (http://primes.utm.edu/glossary).

The prime is 877,069 digits long and enters Chris Caldwell's "The Largest Known Primes Database" (http://primes.utm.edu/primes) ranked 1st for generalized Cullen primes and 57th overall. It is the largest non-base 2/non-generalized Fermat prime ever found.

The discovery was made by Ricky L. Hubbard of the United States using an AMD Phenom II X6 1090t @ 3.2GHz with 8GB RAM, running Windows 7. This computer took 7 hours and 15 minutes to complete the probable prime test using pfgw64 and 7 hours 20 minutes to complete the primality test again using pfgw64. Ricky is a member of the AMD Users Team.

Ricky has the special distinction of also holding the record for the largest generalized Woodall prime: $404882*43^{404882}-1$.

The credits for the discovery are as follows:

1. Ricky L. Hubbard (United States), discoverer
2. PrimeGrid, et al.
3. MultiSieve, sieve program developed by Mark Rodenkirch
4. gcwsieve, sieve program developed by Geoff Reynolds
5. PFGW, primality program developed by Chris Nash & Jim Fougeron with maintenance and improvements by Mark Rodenkirch

Entry in "The Largest Know Primes Database" can be found here:
http://primes.utm.edu/primes/page.php?id=104121

Base 113 was one of 16 prime-less generalized Cullen bases below b=121 that PrimeGrid is searching. The remaining bases are 13, 25, 29, 41, 47, 49, 53, 55, 69, 73, 79, 101, 109, 116 & 121. All have been extensively searched so this find is very exciting.

Using a single PC would have taken years to find this prime. So this timely discovery would not have been possible without the hundreds of volunteers who contributed their spare CPU cycles. A special thanks to everyone who offered their advice and/or computing power to the search - especially Mark Rodenkirch, Steven Harvey, and Lennart Vogel who were instrumental in moving the project forward and to all the PRPNet'ers who contributed to this effort.

PrimeGrid's Generalized Cullen/Woodall Prime Search will continue seeking primes for other primeless bases. To join the search please visit PrimeGrid:
http://www.primegrid.com

PrimeGrid's
Generalized Cullen/Woodall Prime Search

About PrimeGrid

PrimeGrid is a distributed computing project, developed by Rytis Slatkevičius, Lennart Vogel, and John Blazek, 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 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

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