

PrimeGrid's Generalized Woodall Prime Search

On 07 Dec 2009, 08:32:59 UTC, PrimeGrid's PRPNet found the largest known generalized Woodall prime:

$$563528 * 13^{563528} - 1$$

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

The prime is 627,745 digits long and enters Chris Caldwell's "The Largest Known Primes Database" (<http://primes.utm.edu/primes>) ranked 1st for generalized Woodall primes and 65th overall. It is the largest non-base 2/non-generalized Fermat prime ever found.

The discovery was made by Lennart Vogel of Sweden using an Intel Q6600 @ 2.4 GHz with 4 GB RAM. This computer took about 3 hours and 54 minutes to complete the probable prime test using pfgw. Lennart is a member of the PrimeSearchTeam.

The prime was confirmed on 08 Dec 2009, 16:04:00 UTC, by an Intel Q6600 @ 2.4 GHz with 4 GB RAM. This computer took a little over 30 hours 3 minutes to complete the primality test using pfgw.

The credits for the discovery are as follows:

1. Lennart Vogel (Sweden), 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

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

<http://primes.utm.edu/primes/page.php?id=91121>

Base 13 had the peculiarity of having no generalized Cullen or Woodall primes although it had been tested further than any other generalized base. This disparity certainly made 13 very 'unlucky'. However, its fate has changed now producing the largest known generalized Woodall prime.

Using a single PC would have taken years to find this prime. So this timely discovery would not have been possible without the almost 50 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 and Lennart Vogel who were major forces in moving the project forward and to all the PRPNet'ers who contributed to this effort.

PrimeGrid's Generalized Woodall Prime Search is now complete for base 13. However, the Cullen side will continue up to 1M or until a prime is found. To join the search please visit PrimeGrid: <http://www.primegrid.com>

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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 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, 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>