

# PrimeGrid's Proth Prime Search

On 13 May 2013 12:41:57 UTC, PrimeGrid's Proth Prime Search project found a world record prime Fermat divisor:

$$57 \cdot 2^{2747499} + 1 \text{ Divides } F(2747497)$$

The prime is 827,082 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (<http://primes.utm.edu/primes>) ranked 1st for prime Fermat divisors and 101<sup>st</sup> overall. Incidentally, it is also a new record for "weighted" prime Fermat divisors.

The discovery was made by Marshall Bishop of the United States using an AMD Quad-Core AMD Opteron(tm) Processor 2374 HE with 32 GB RAM running Linux. This computer took about 2 hours 28 minutes to complete the primality test using LLR.

The prime was verified on 13 May 2013 18:23:23 UTC, by PrimeGrid user [AF>Le\_Pommier>MacGeneration.com]Sloughi of France using an Intel(R) Xeon(R) CPU E5645 @ 2.40GHz with 12 GB RAM running Mac OS X. This computer took about 4 hour and 46 minutes to complete the primality test using LLR. [AF>Le\_Pommier>MacGeneration.com]Sloughi is a member of the L'Alliance Francophone team.

The credits for the discovery are as follows:

1. Marshall Bishop (United States), discoverer
2. PrimeGrid, et al.
3. Srsieve, sieving program developed by Geoff Reynolds
4. PSieve, sieving program developed by Ken Brazier and Geoff Reynolds
5. LLR, primality program developed by Jean Penné
6. OpenPFGW, a 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=114144>.

Fermat number divisibility (including generalized and extended) was checked by OpenPFGW using the following settings: -gxo -a2 57\*2^2747499+1 . For more information about Fermat and generalized Fermat number divisors, please see Wilfrid Keller's sites:

<sup>35</sup>/<sub>17</sub> <http://www.prothsearch.net/fermat.html>

<sup>35</sup>/<sub>17</sub> <http://www1.uni-hamburg.de/RRZ/W.Keller/GFNfacs.html>

No generalized or extended generalized Fermat number divisors were discovered.

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 all the sievers who work behind the scenes to make a find like this possible.

The Proth Prime Search will continue to search for more primes. 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, 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, 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](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>