

## PrimeGrid's Generalized Fermat Prime Search

On 29 May 2020, 07:52:25 UTC, PrimeGrid's Generalized Fermat Prime Search found the Mega Prime:

$$3638450^{524288} + 1$$

The prime is 3,439,810 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (<http://primes.utm.edu/primes>) ranked 3rd for Generalized Fermat primes and 35th overall.

The discovery was made by Wolfgang Schwieger of Germany using a GeForce RTX 2070 in an AMD Ryzen 7 3700X 8-Core Processor with 16GB RAM, running Linux openSUSE Tumbleweed. This GPU took about 31 minutes to complete the probable prime (PRP) test using GeneferOCL5. Wolfgang Schwieger is a member of SETI.Germany.

The prime was verified on 29 May 2020, 08:23:51 UTC by Greg Miller of the United States using a gfx1010 in an AMD FX-8370 Eight-Core Processor with 16GB RAM, running Microsoft Windows 10 Professional x64 Edition. This computer took about 1 hour, 3 minutes to complete the probable prime (PRP) test using GeneferOCL5. Greg Miller is a member of USA.

The PRP was confirmed prime by an Intel(R) Xeon(R) CPU E3-1240 v6 @ 3.70GHz with 4GB RAM, running Linux Debian. This computer took about 1 day, 19 hours, 22 minutes to complete the primality test using LLR.

The credits for the discovery are as follows:

1. Wolfgang Schwieger (Germany), discoverer
2. PrimeGrid, et al.
3. AthGFNSieve, sieve program developed by David Underbakke
4. GFNSvCUDA, sieve program developed by Anand Nair
5. GeneferOCL, probable prime program developed by Yves Gallot
6. LLR, primality program developed by Jean Penné

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

<https://primes.utm.edu/primes/page.php?id=130938>

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 Yves Gallot, Iain Bethune, David Underbakke, Anand Nair, Mark Rodenkirch and Geoff Reynolds who were major forces in moving the project forward. Also, thank you to all the sievers, especially Honza Cholt and Jim Breslin. A final thanks to Michael Goetz for porting to BOINC.

The Generalized Fermat Prime Search will continue to seek even larger 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 and currently managed by Tyler Bredl, Scott Brown, Ulrich Fries, Michael Gutierrez, Dao Heng Liu, Reginald McLean, Rytis Slatkevičius, Roman Trunov, and Christian Wallbaum.

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, www, 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>