

# PrimeGrid's Proth Prime Search

On 31 Mar 2009 13:28:33 UTC, PrimeGrid's third Fermat Number divisor in the Proth Prime Search project was discovered:

$$659 \cdot 2^{617815} + 1 \text{ Divides } F(617813)$$

It's the 3rd found Fermat Number divisor of 2009 and 273rd overall. The prime is 185984 digits long and is the 6th largest Fermat Number divisor in Chris Caldwell's "The Largest Known Primes Database". Incidentally, it is a new record for "weighted" Fermat Number divisors.

The discovery was made by Eric Embling of the United States using an Intel C2D E6750 @ 2.66GHz with 4 GB RAM. This computer took about 8 minutes 31 seconds to test. Eric is a member of team [H]ard|OCP.

The prime was verified on 1 Apr 2009 10:47:46 UTC, by Anonymous of Japan using an Intel C2D CPU E8500 @ 3.16GHz with 3 GB RAM. This computer took about 7 minutes 48 seconds to test.

The credits for the discovery are as follows:

1. Eric Embling (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 Known Primes Database" can be found here:

<http://primes.utm.edu/primes/page.php?id=87401>.

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 -a1  $659 \cdot 2^{617815} + 1$ . 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/GFNfacts.html>

There were no Generalized or extended Generalized Fermat Number divisors.

The Proth Prime Search is done in collaboration with the Proth Search project. This search looks for primes in the form of  $k \cdot 2^n + 1$ . With the condition  $2^n > k$ , these are often called Proth primes. PrimeGrid is searching odd  $k < 1200$  for  $n < 5M$  as well as odd  $1200 < k < 10000$  for  $n < 2M$ .

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.

PrimeGrid's Proth Prime Search will continue to search for more primes. To join the search please visit PrimeGrid: <http://www.primegrid.com>

# PrimeGrid's Proth Prime Search

## **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, 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>