

BOINC and Volunteer Computing Fact Sheet

Einstein@home gets computing power from over 100,000 desktop and laptop PCs volunteered by their owners. Its data analysis program runs in the background on these computers. This approach, called “volunteer computing”, is being used by a growing number of scientific research projects. Because of the huge population of PCs (over 1 billion) and their rapidly-increasing speed, volunteer computing offers scientists more computing power, at a much lower cost, than supercomputers and other dedicated hardware. In addition, by directly involving the public in science, volunteer computing increases public awareness of scientific goals, methods, and progress.

Most volunteer computing initiatives, including Einstein@home, are based on software called BOINC, which serves as an Internet-wide operating system for volunteer computing. Scientists can plug their programs and jobs into BOINC, creating their own “projects”. Computer owners install the BOINC software (available for Windows, Mac OS X, and Linux) and can then attach their computer to any project or combination of projects. BOINC then downloads data files and programs, runs jobs, and uploads results, unobtrusively and without user intervention. It can be configured to run while the PC is not in use (perhaps as a screensaver) and/or to run at zero priority while the PC is in use.

There are currently over 50 BOINC-based projects supporting research from institutions around the world in a wide range of scientific areas, including biomedical research, astronomy, particle physics, climate research, epidemiology, ecology, nanoscience, cognitive science, seismology and mathematics. In addition to Einstein@home, these projects include Milkyway@home, IBM World Community Grid, Climateprediction.net, Milkyway@home, SETI@home, Rosetta@home, Quake Catcher Network, LHC@home, and GPUGRID.net.

Collectively, these projects have about 300,000 active volunteers and 500,000 active PCs (many volunteers have more than 1 PC). Together these PCs provide an average computing power of about 3 PetaFLOPS (3 quadrillion floating-point operations per second). By comparison, the most powerful current supercomputer (the Cray Jaguar at Oak Ridge National Laboratory) provides 1.7 PetaFLOPS.

The BOINC project is based at the U.C. Berkeley Space Sciences Laboratory, and has been funded by the National Science Foundation since its start in 2002. The BOINC software is open-source: it is distributed under the Lesser General Public License (LGPL). The BOINC project has only 2 full-time staff, and many of its activities (including software testing, customer service, documentation, and text translation) are done with the help of a large and active volunteer community.

For more information about BOINC, visit its web site (<http://boinc.berkeley.edu>) or contact its director, Dr. David P. Anderson at davea@ssl.berkeley.edu or +1 510 642 4921.