



The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

Status:

Laureate

Year:

2013

Organization Name:

Marist College

Organization URL:

www.marist.edu

Project Name:

World Community Grid

Please select the category in which you are submitting your entry:

World Good

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

The mass deployment of World Community Grid at Marist College was intended to benefit the greater good by using idle computer processing power to crunch work units for various humanitarian and sustainability projects. Some of the World Community Grid projects that Marist has contributed to include finding a cure and/or drug treatments for Muscular Dystrophy, AIDS/HIV, Dengue, Hepatitis C, West Nile, Yellow fever, Leishmaniasis, Schistosoma, and Malaria. Marist has also contributed computing time to projects that find ways to make clean [drinkable] water available to developing nations and finding materials that can make clean and sustainable energy. When computers at Marist are idle for a few minutes, World Community Grid kicks on and starts crunching work units from the available active projects. 100% of Marist College-owned personal computing assets desktops, towers, and laptops, both Windows and Mac, deployed for faculty, staff, lab, or classroom use, contribute to World Community Grid. World Community Grid involves running an agent that fetches work units from the WCG servers, runs the computation when the computer is idle, and reports results back to the

WCG servers. Initially, WCG ran on the Universal Devices agent. This has since been phased out and replaced by the open source BOINC (Berkeley Open Infrastructure for Network Computing) agent. Marist has contributed over 10,800 YEARS of computing time and returned over 21 million results to World Community Grid projects. Out of more than 610,000 members, Marist is ranked #2 in all measured statistics – total run time, points generated, and results returned second only to IBM, the company that hosts the entire WCG infrastructure.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

Marist began piloting the deployment of World Community Grid in 2005. The initial rollouts were cumbersome since it wasn't easy to deploy the old Universal Devices agent on a large scale. In 2007, we made the switch from the Universal Devices agent to the BOINC agent, which is now the official (and only) agent that World Community Grid runs on. The BOINC agent made mass deployments much easier as it could be preinstalled in an image, while remaining unique so that appropriate work units could be allocated to each machine. It also provided support for Windows Vista, which we rolled out in 2007. We have been successful in running World Community Grid on Windows XP, Vista, and 7, and Mac OS X 10.6, 10.7, and 10.8. We are currently investigating Windows 8 compatibility for our upcoming rollouts. Recently, some World Community Grid projects have begun to utilize supported graphics processing units (GPUs). Some of our laptops and tower workstations have Nvidia GPUs that support CUDA, and these machines can crunch specially designed work units on the GPU itself, in addition to the CPU. Since these GPUs are extremely powerful, these special work units complete in a fraction of the time that traditional CPU based work units do. This enables increased output and results generation without any new or additional hardware. Implementation has been staged over several years. With the mass upgrade/deployment of new computers for the Marist Institute of Public Opinion in January 2013, all Marist-owned personal computers contribute to World Community Grid. While the deployment is "complete," this is a work in progress. We will continue to test and tweak as new hardware, software, and operating systems are available to ensure we're maximizing our contribution to World Community Grid.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

Yes, the initial mass deployment with 100% coverage on all Marist-owned machines is now complete. That being said, this is an ongoing project. As new images are built, we will install and configure WCG. As new operating systems and hardware are available, we will test and tweak to make sure we're maximizing our output to benefit WCG projects. As new WCG projects are released, we will work with the research teams to make sure that we're able to compute new work units efficiently, as we did with the Harvard research team for the Clean Energy Project Phase 2.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

In regards to the "Help Fight Childhood Cancer" project, Dr. Nakagawara said, "The Help Fight Childhood Cancer project is progressing very well. The number of targets for drug discovery has been increased from initial 3 to now 11 because the project is getting good results. Testing of the candidate chemical compounds is showing very promising results. We are working on preparing a paper for publication about what we have discovered so far. Thus the HFCC project is going well. All of the team members appreciate your generous donation to World Community Grid for developing new drugs to save the patients with childhood cancer." In regards to the "FightAIDS@Home" project, the research team said, "As of November of 2012, FightAIDS@Home has received over 165,019 CPU years of calculations from World Community Grid!! Thank you all very much for performing these calculations that help us advance the global struggle against HIV/AIDS!!!" In regards to the "Human Proteome Folding, Phase 2" project, the Bonneau research team said, "Again, as in the previous paper, the World Community Grid has contributed to providing a more complete structural landscape spanning a set of selected proteins, giving the Bonneau Lab unparalleled resources for studying the structure and function protein targets important to cutting edge science." After working out some kinks in getting work units, the Harvard research team said, "Marist College, one of the big institutional WCG crunchers, has started running CEP and it already resulted in a distinct bump in the output. A big thank you to New York!" in regards to the "Clean Energy Project Phase 2." (See Appendix 1.) Ultimately, the idle processing power that Marist is contributing to various WCG projects is aiding the scientific research teams behind these projects and these research teams are benefitting all of humanity.

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here. (In 300 words or less.)

The way it's implemented at Marist College would be considered a best practice. Anyone can contribute to World Community Grid. There are thousands of companies, institutions, colleges, and universities that could follow Marist's lead and deploy this on a mass scale. The benefits of doing this would be immense. Adoption of this methodology by large institutions would add literally millions of CPUs and GPUs to WCG. This would result in a huge boost in result generation. The BOINC agent is completely customizable. While Marist is devoting virtually all idle CPU and supported GPU time to WCG, other institutions can tailor this to their own specific needs. For example, it can be configured to only run during specific times during the day or on the weekend only. You can also throttle CPU, RAM, disk, and network utilization to meet your specific needs. Finally, members can choose which World Community Grid projects to participate in from just one to all active projects. With so many computers around the world that are powered on and just sitting idle, it's a shame that more aren't donating idle time to benefit humanity for the greater good.



If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

Marist College was the first college or university in the United States to join World Community Grid and is the largest college or university contributor. Marist has participated in all 20 WCG projects and has earned a "sapphire badge" (the highest attainable rank) for each one. A sapphire badge means at least 2 years of computing time have been devoted to a project. Marist has contributed over 10,800 years of computing time to WCG and has returned over 21 million results to the research teams. In addition to the computers we own, we encourage faculty, staff, and students to join WCG and contribute with their personally owned computers as well. We are more than happy to work with other large institutions, colleges, and universities to help them do a successful mass deployment of World Community Grid. For a complete list of statistics, please see Appendix 2 & 3.