world community grid

NEWSLETTER

Issue 2

World Community Grid has restarted!

- **18+ years of WCG**
- **2,466,146 years of computation**
- **808,652 volunteers**
- **7,633,532 devices**
- **32 projects benefited**

On March 1st, we encountered a major network file system failure (read our initial Hardware Recovery Update article and our follow-up update thread for more detail). The data center was able to locate and lend us an alternate system that could recognize our RAID keys after swapping the disks out of the failed system. After rebuilding the RAID on the stopgap storage system, and recovering the state of all databases and files at the time of the failure, we then transferred all data to a new storage system with better performance due to using fast SSD disk instead of spinning disk HDDs in the old system.

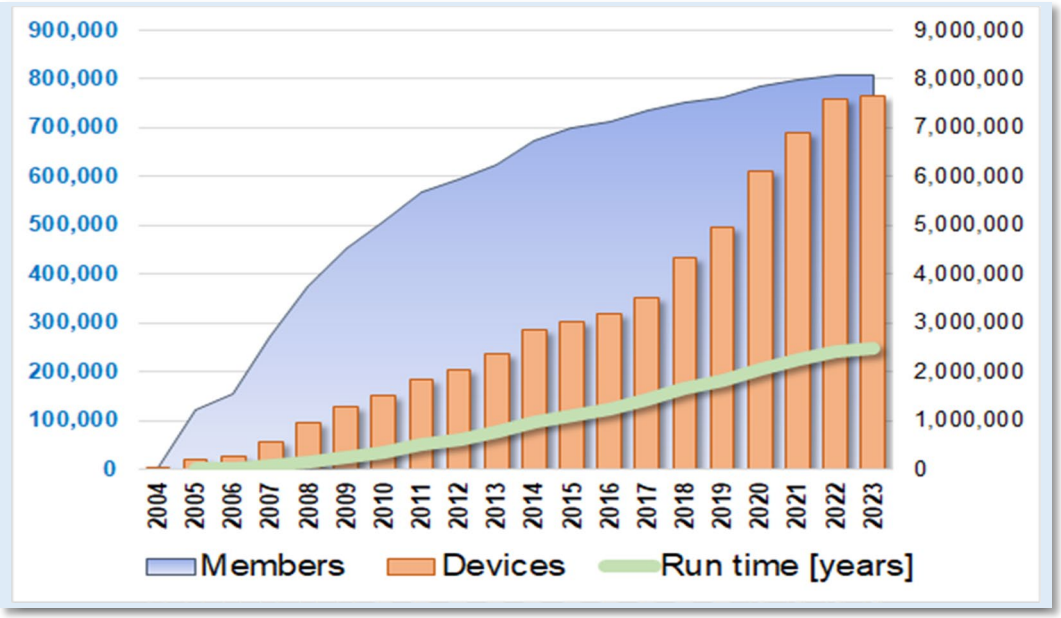
As of March 31st, all data has been transferred to the new system and we began running the network file system from our new storage, which provides much improved performance, and reliability.

To download all work units (WUs) processed before our storage failure, we have adjusted timeouts for the completion of WUs, and on April 2nd, we restarted BOINC – receiving processed WUs and making new OPN1 and MCM work units available for processing.

While we continue to monitor the system functionality and performance, we will return to fixing the issues we have included on our Comprehensive Issue List. As always, we encourage volunteers to report any issues or bugs to us directly or here instead of creating new threads.

Thank you for contributing your computational power to advance scientific discoveries. We are restarting the World Community Grid on April 13th. If you have not contributed during the alpha testing phase, we encourage you to join a community of some thirty thousand dedicated volunteers. Please, restart your BOINC application and choose the project you would like to contribute to – the more volunteers contributing, the better, as we will not only have more WUs from the current active projects, we are working on bringing in new ones soon! The

impressive growth of WCG's computing capacity and volunteer involvement over the years has naturally slowed down over the "WCG transition" period – but together, we can ensure that this platform will grow and enable seemingly impossible scientific research to come to life.



World Community Grid

"Scientists are searching for answers to the world's biggest problems. The use of supercomputers is critical to help them find solutions that we can benefit from during our lifetime. We help them run high-computation problems in a condensed time, allowing for faster results and more research!"

Active Projects Updates

Africa Rainfall Project

Volunteers computed 358,742 results during the alpha testing phase. The African Rainfall Project is still developing simulations to accurately predict rainfall patterns in rain-reliant regions such as sub-Saharan Africa. In their most recent update with us, they have been working behind the scenes to move their data to a new storage system to keep up with the volume of data they have been receiving from the volunteer community. They are continuing to research the African weather patterns and create accurate forecasts for every day in 2023. For more information, read our recent research update from the ARP team.

Help Stop Tuberculosis

The team has been analyzing previous results and devising new strategies for the search. In addition, the team leader Dr. Anna Croft will be moving to the University of Loughborough as a full professor. We celebrate with Dr. Croft this exciting move, and trust that WCG will be larger (and large enough) once the new HSTB work units will be available. Please, join the WCG https://www.worldcommunitygrid.org/join/signup.

Mapping Cancer Markers

Volunteers computed 118,875,915 results for sarcoma during the alpha testing phase. In the meantime, we have continued the analysis of the identified 9 trillion lung cancer gene signatures. Our focus is on 26 genes that are present in signatures of all sizes. From those 26 genes we further researched VAMP1, a gene connected to a patient's smoking status, was heavily represented in patients who survived cases of cancer, making it a strong choice as a prognostic marker. For more information, read our recent research update from the MCM team.

Open Pandemics

During the alpha testing phase volunteers crunched 50, 950,437 results. OPN1 has continued searching for new treatments for COVID-19 and creating quick-response toolkits for future pandemics. We look forward to sharing more news from them soon.

Smash Childhood Cancer

The SCC team has introduced Nikita Rozanov as a new team member, who is using his experience developing computer simulations of molecules to develop new potential drugs for treating cancers. The team has begun their research into a new target protein, FLI1. It is a member of the ETS transcription factor family that controls cell proliferation, differentiation and survival. A fusion of FL1 gene and EWSR1 is frequently present in cases of Ewing Sarcoma and other cancers. EWSR1 encodes for an RNA-binding protein (EWS), and when EWS is fused to FLI1 the latter becomes constantly activated (instead of finely regulated), creating the molecular environment for tumor formation. The EWS-FLI1 fusion protein has been thought to inhibit p53 and/or activate NOTCH signaling, accelerating sarcoma progression. Useful FLI1 inhibitors need to specifically target this fusion protein but not other related ones to avoid inadvertent side effects. For more information, read our recent research update from the SCC team.

Partnerships with High Schools

The World Community Grid is a powerful computing platform that enables the public to support large-scale science from their own home or office. Combining individual contributions with those of large organizations, WCG condenses computational time needed by scientists to answer the world's most pressing questions. In addition, partnering with universities and high schools enables youth outreach and education programs that help prepare the next generation.

The World Community Grid is refining the definition of WCG partners – from scientific partners (universities and research institutions that run research projects on the grid), to funding partners (e.g., Distributive) and contributing partners (e.g., volunteer teams and organizations providing unused computing resources). We also aim to expand our collaboration with high schools. We aim to provide an exciting platform for motivating the new generation. If you are a teacher or a student who is interested, or if you know those that might be, please contact us directly.

Dylan Bucci Grid Computing Club at Sisler Cyber Academy

Sisler Cyber Academy student Dylan Bucci, instructor Robert Esposito, and Dr. Igor Jurisica during their tour of Krembil Research Institute (2019).

Sisler High School's Cyber Academy in Winnipeg, MB, Canada has been collaborating with WCG for eight years, not only by donating substantial computing capacity but by engaging students with an understanding of high-performance computing and the science it enables.

Sisler's involvement with WCG started in 2015 with a grade 9 project requiring students to set up WCG on several computers. In 2018, Dylan Bucci, a 10th grade student at Sisler Cyber Academy, decided to get involved with WCG. In addition to wanting to support the goals of WCG in helping with early diagnosis of cancer, Dylan had a personal motivation since many of his family and friends had passed away from this disease. He spent many hours of his free time reconfiguring a dozen donated servers, and within a year, he contributed 168 years of processing time to World Community Grid's cancer research (CTV news Winnipeg). He shared his enthusiasm and interest in the WCG with other students, and the volunteer base started to grow rapidly. In 2019, Dylan along with Mr. Esposito became the first volunteers to meet Dr. Jurisica and the MCM team at Krembil Research Institute in Toronto.

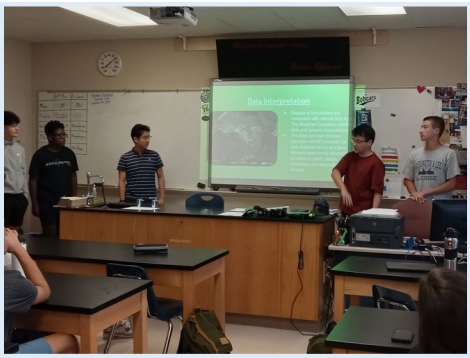
Sadly, in August 2020 Dylan was diagnosed with Stage 4 Ewing's sarcoma, a rare type of cancer that occurs in bones or the soft tissue around them. Cancer had rapidly metastasized to his hips, spine, pelvis, ribs, lungs, and further up his arm. Despite treatments and his relentless fight, Dylan passed away on February 19, 2022, at the age of nineteen. Although Dylan was not able to achieve all his dreams and potential, he has inspired many students to continue his mission.

To carry on Dylan's legacy, Mr. Esposito started the Dylan Bucci Grid Computing Club, which teaches new students about the WCG, how to use the BOINC platform to support scientific discoveries, and discusses new developments in research initiatives.

The full article with insight from Sisler Cyber Academy Instructor Robert Esposito and grade 12 student Eric Easter to discuss how they integrated citizen science into their curriculum and student culture will be posted on the World Community Grid website on April 17, 2023.

WCG Club at Boca Raton Community High School

Boca Raton Community High School is on a mission to expand science curriculum for its students, and introduce them to high-performance computing on the grid and its benefits to research across many domains of science. We talked with a teacher and Science Olympiad coach from Boca Raton Community High School, Jonathan Benskin, about how he expands biology classes with World Community Grid research, and how he strives to bring supercomputing into the high school.



Students at Boca Raton Community High School giving a presentation on World Community Grid.

Late in the 2020 academic year, Mr. Benskin introduced a class of juniors to the World Community Grid, which they found greatly

interesting. Shortly after, students created a WCG Club at the high school with the aim to grow the base of volunteers, just in time for new students to learn about the platform during the next academic year. They aspire to become one of the main contributing partners on the WCG. Their initial success is a great motivating factor for them as they are always looking for new ways to support a project that means a lot to them. We are extremely grateful for their contribution and applaud their enthusiasm. The full article will be posted on the World Community Grid website on April 24, 2023.

A Call for Help

The need for massive computational resources in research is growing exponentially with increased volume and improved data quality. Better algorithms and more specialized hardware have enabled seemingly impossible and world-changing breakthroughs in medical research, and in the study of climate change. Never has the need for WCG been greater, and never has the potential to impact humanity been more profound.

WCG needs your help. If you are already contributing your computing resources, we thank you; but if you can add more devices at home or office, please consider doing so as we will need a larger grid to accommodate new projects. If you haven't joined the grid yet, please, sign up at https://www.worldcommunitygrid.org/login.

As an academic resource, WCG faces significant financial and technical challenges in providing the necessary level of support to the global research community. If you can, please consider donating to WCG – any amount donated is appreciated: https://www.cs.toronto.edu/~juris/jlab/mcm.html?tab=donations.

Transitioning from running two projects on the grid to running & supporting them all.