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- ➔ Official Web site
- ➔ IBM grid computing

WCG projects

- ➔ Help Cure Muscular Dystrophy
- ➔ Flocruz Genome Comparison

WCG projects, con.

- ➔ Help Defeat Cancer
- ➔ Human Proteome Folding
- ➔ Fight AIDs @ Home

Customer points-of-view

- ➔ Grid computing success stories

➔ More ideas from IBM

- ➔ Executive Interaction Channel

Overview

The next time you step away from your desk for a quick latte at your local coffee bar, your computer can get to work....doing calculations for AIDS research. Or genome comparisons for drug development. Or sample analyses for better cancer treatments. In fact, your computer can do the calculations while you're actually using it for something else.

It's possible when you volunteer your PC or laptop's unused time to World Community Grid (WCG), created by IBM. Grid computing joins together thousands of individual computers, establishing a large system with massive computational power equal to a supercomputer. Because the work is split into countless tiny pieces and done simultaneously, research time shrinks from decades to months.

So why not donate something you don't need, use or even think about-your idle computer time-and help make the world a better place? Here's how it works.

VOLUNTEER PC

Ready to volunteer?

Your first step is to go to worldcommunitygrid.org and download a free, small software agent onto your PC. It is similar to a screensaver. An icon will appear in your lower right-hand icon tray. Your computer is ready to go to work. Then, this agent will request a set of data-or an assignment-from World Community Grid's servers, located at an IBM facility. These servers send out the "job" assignment (in the form of a data packet) in triplicate-to three separate PCs-as a security measure.

Turn your PC into a tireless volunteer

When idle, your computer performs the calculations and sends the results back to the servers. An average task runs 10-20 CPU hours. The servers wait for the other two sets of identical data to be returned. The results are compared to ensure that they are identical and no hacking has occurred. The servers then send out a new work unit to your PC.



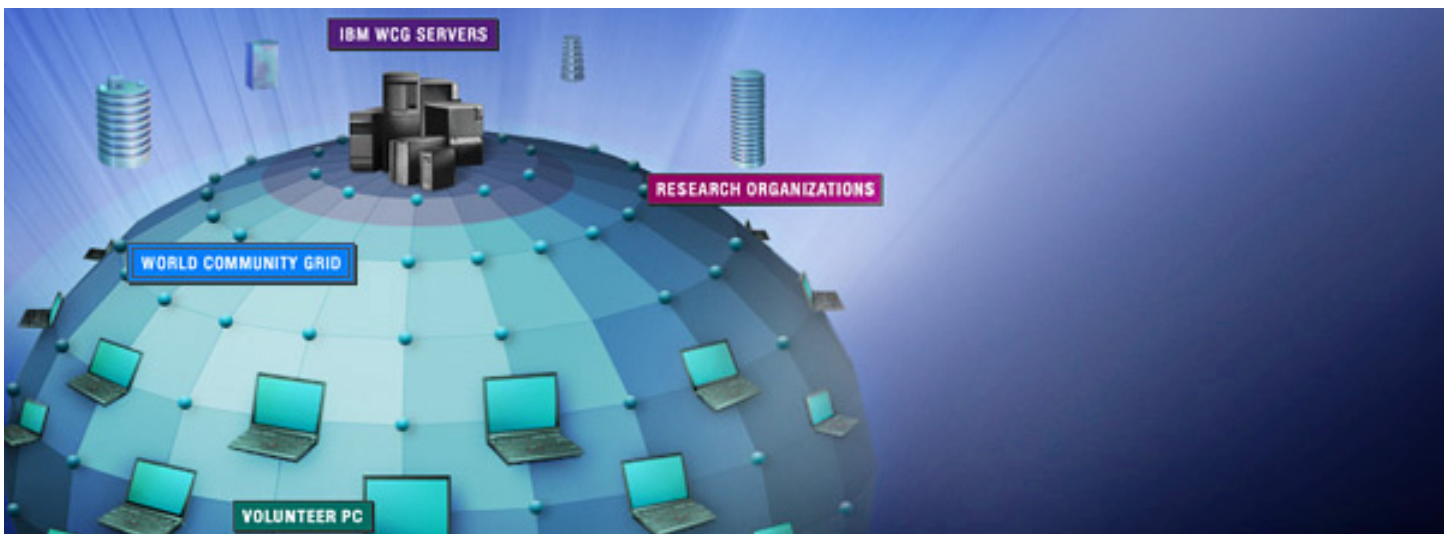
Only when your computer is turned on, and the agent senses it's idle, will it be "volunteered" for research work according to the guidelines you set. Even when your applications are up, your system is idle about 80% of the time and this power can be used. You'll know when your computer is being used for research because a screen saver appears, charting the progress on your current task.

WORLD COMMUNITY GRID

Power in numbers: the Grid

As of early February, about 255,000 individuals from 200 countries have registered some 500,000 devices, contributing 75,000 years of run time to the Grid. It ranks among the top five supercomputers worldwide.

[You can track results here.](#)

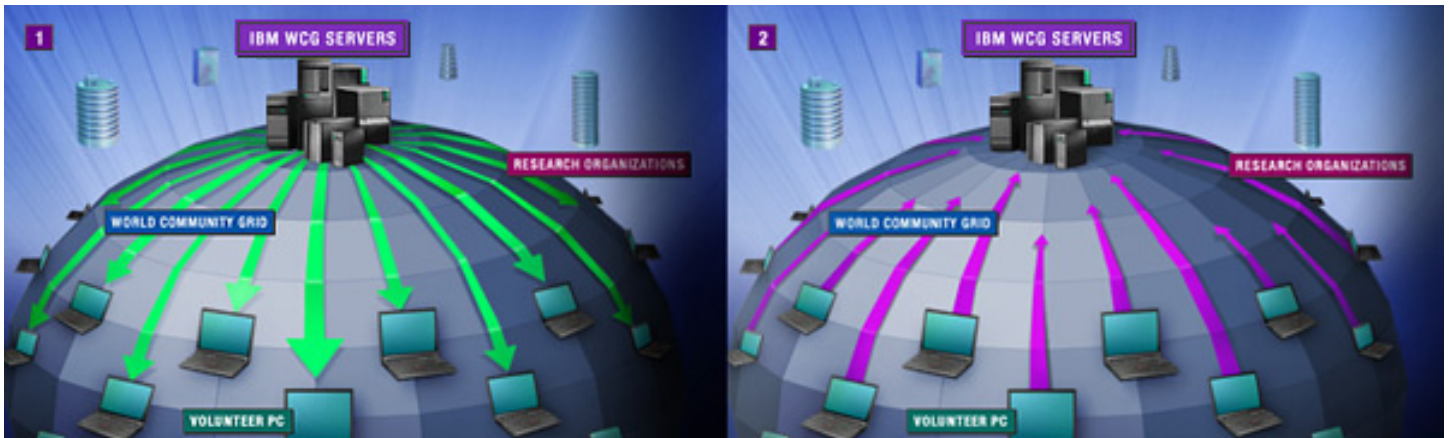


IBM WCG SERVERS

The brains of the Grid

Fourteen IBM servers serve as "command central" for WCG. When they receive a research assignment from an organization, they will scour it for security bugs, parse it into data units, encrypt them, run them through a scheduler and dispatch them out in triplicate to the army of volunteer PCs.

As results come in, they are scrubbed, validated and assembled into a file. When all the calculations are returned and the assignment is complete, the data is packaged and sent to a directory for retrieval.



RESEARCH ORGANIZATIONS

Active projects today

[Help Cure Muscular Dystrophy](#)

[Fiocruz Genome Comparison](#)

[Help Defeat Cancer](#)

[Human Proteome Folding](#)

[FightAIDS@Home](#)

How do projects get chosen?

Projects with the best potential to benefit from WCG technology are chosen by an independent, external board of philanthropists, scientists and officials. Submissions should address humanitarian concerns.

Here's the link: [Submit a proposal](#)



How it Works: World Community Grid

Every day, millions of personal computers sit idly on desks and in people's homes around the world. Screen savers kick in, computer fans slow down; there's a low, quiet hum from the hard drive, spinning and working a little, but offering little of value to the world.

But what if instead of idling away their time these computers could be turned into powerful research tools operating around the clock? IBM asked this question and answered it by creating World Community Grid, a global humanitarian effort to harness unused computing power of individual and business computers and direct that power toward research designed to help address the world's most difficult health and societal problems.

When IBM and members of the world's leading science, education and charity organizations launched the program in November of 2004, their mission was to create the largest public computing grid benefiting humanity. Research showed that computer users only use 10-15% of the power on their computer, leaving the rest to be used in other more far-reaching ways. The way the program works, anyone can take part by registering at www.worldcommunitygrid.org and installing a free software program or "agent" onto their computer.

The agent works like a screen saver, only using a computer's resources when it would otherwise be idle and relinquishing the resources back to the users when they start using their computers again. The grid connects a global community of computers together to solve massive computational problems, performing hundreds of experiments simultaneously.

For example, when idle, your computer will request data on a specific project from World Community Grid's server. It will then perform computations on this data, send the results back to the server, and ask the server for a new piece of work. Each computation that your computer performs provides scientists with critical information that accelerates the pace of research.

Today's computers, like human brains, typically operate at only a small percentage of their capacity; they often sit idle as a processor waits for data. On the grid, the idle time of hundreds – even thousands – of servers can be harnessed by any customer needing a massive infusion of processing power.

Just as the electric grid provides power to the consumer, the computing grid distributes all sorts of computing resources to solve problems. In the process, a grid can give rise to "virtual organizations" – ever-changing groups of individuals and institutions exploiting the resources of the grid for a variety of purposes, much the way that individuals in the same household exploit electricity for their own needs.

Grid computing is the logical, and desirable, outcome of several factors. First, the idle time inherent in computing means that by working on a grid, computers can share operations according to their abilities and unused capacities; thus, information will be processed with maximum efficiency. Second, home computers now are as powerful as supercomputers of a decade past – the advent of broadband enables networked computers to share data constantly at high speeds – critical to the functioning of any sophisticated network.

Grid computing is not a futuristic technology. World Community Grid is at work right now applying this technology to exciting research projects that can benefit us all. For example, in 2003, in less than six months scientists identified 45 potential treatments to fight the deadly smallpox disease using grid computing. Without the grid, the work would have taken years to complete. Based on the success of the smallpox study, World Community Grid was created. And in its inaugural effort researchers used the extra computer capacity to understand how proteins could be used to help develop cures for diseases like Alzheimer's, malaria and tuberculosis.

Other projects underway include one in which grid computing is being used to help find new AIDS therapies. This project uses computational methods to identify new candidate drugs to block HIV protease, a key molecular structure that when blocked, stops the virus from maturing and is a way of avoiding the onset of AIDS and prolonging life expectancy.

The massive computing power of the grid is also helping scientists study the underlying mechanisms of cancer in order to speed and improve treatment and therapy planning for cancer patients. Here, researchers use World Community Grid's combined resources to analyze large numbers of cancer tissue microarrays simultaneously, allowing multiple experiments to be conducted in shorter periods of time, improving the understanding of cancer biology. The speed and sophistication of the computing grid makes it possible to detect and track subtle changes not apparent with human inspection or traditional analysis alone.

Since its launch, more than 250,000 people spread across the globe are running World Community Grid on nearly 500,000 computers. This tremendous volunteer force has so far donated the equivalent of about 72,000 years of unused computing time [as of February 2007]. These numbers increase daily.

But the work is far from over. A World Community Grid advisory board continues to look for other potential research projects that would benefit from grid technology, above and beyond those it is already working on. Future projects might focus on infectious diseases, hunger and natural disasters. The promise of World Community Grid is as real as it is seductive. In a time when the mysteries of science and human health continue to elude us, untold amounts of computing power lay dormant in millions of machines around the globe, holding some hope for the future. And that's how it works.