AMD | STORIES

DISRUPT ENGINEERING EDUCATION

TECHNOLOGY PARTNER

42

INDUSTRY

Education

CHALLENGES

42 needed supercomputing power for its J-Gravity project. It needed teraflops of computing power to simulate the expansion of the universe using the Barnes-Hut algorithm.

SOLUTION

AMD provided 42 with a Ryzen™ PRO processor system (8 cores/16 threads) with AMD Radeon™ Pro Duo graphics to help solve their educational project.

RESULTS

42 was able to replace all one hundred computers needed to handle the computational magnitude of the project with just one AMD Ryzen PRO processor-powered system.

AMD TECHNOLOGY AT A GLANCE

AMD Ryzen PRO processor
AMD Radeon PRO Duo graphics

42 is a private, nonprofit, tuition-free computer programming school created and funded by French billionaire Xavier Niel, founder of the telecommunication company Illiad.

Its program is designed to prepare students for the workplace using an instructional design that means students learn skills for the digital world and for the technology industry. The school was first opened in Paris in 2013. 42 Silicon Valley opened in Fremont, California in 2016.

The school does not have any professors, does not issue diplomas or degrees, and is open 24/7. "We want our students to be at the center of education," observed David Giron, academic and technical coordinator. "We want them to learn by themselves. That's why we don't have any teachers, we don't have any classrooms, we don't have any lessons of any kind."

The J-Gravity project is an attempt to simulate the universe as detailed by the Janus Cosmological Model.

Researchers at the University of Zurich have explored this model using a simulation including a two-trillion-particle set. The goal of 42's project is to expand this simulation to a universal scale.

"We have all the particles in a cube-shaped space," explained Phil McLaughlin, a 42 student and lead designer of the J-Gravity project.

HELPING DISRUPT ENGINEERING EDUCATION

"We divide the cube until it contains a number of particles that's an appropriate size for the GPU to handle. Then we use the Barnes-Hut algorithm to approximate thousands of distant stars into just one. That reduces the scope of the problem, but it is still very difficult, and it requires a very large number of comparisons." Giron took that challenge to AMD. "We needed many teraflops of computing power for all these calculations," he said. "We contacted AMD, and AMD brought us a supercomputer with a completely new CPU inside."

"We were running on hundreds of computers working together because of the computational magnitude of the problem. But with the new Ryzen PRO hardware, we'll be able to replace all one hundred of those computers with just this one box."

Phil McLaughlin
42 student and lead designer, J-Gravity project

AMD provided its new Ryzen PRO processor for the J-Gravity project. Founded on the award-winning AMD Ryzen processor, the powerful AMD Ryzen PRO offers up to 8 cores and 16 threads for commercial-grade PCs, enabling up to 62%[1] more multithreaded performance on the Ryzen™ 7 Pro 1700 than select competing solutions.

"We use that power for our renderer and part of our computations. We use AMD Radeon Pro duo cards to do all the compute through OpenCL," McLaughlin said. "It was so great to use this kind of computer. Before AMD", McLaughlin added, "we were running on hundreds of computers working together. We had to do that because of the computational magnitude of the problem. But with the new Ryzen PRO hardware and AMD Radeon Pro Duo, we'll be able to replace all one hundred of those computers with just this one box."

42: Modeling the universe

ABOUT 42

42 is a private, nonprofit, and tuition-free computer programming school created and funded by French billionaire Xavier Niel (founder of the telecommunication company Illiad). The school was first opened in Paris in 2013. Out of more than 70,000 candidates in France, 3,000 were selected to complete a four-week intensive computer programming boot camp called *piscine* ("swimming pool"). The school is open 24/7 and does not have any professors, nor does it issue any diploma or degree.The training is inspired by new modern ways to teach, which include peer-to-peer pedagogy and project-based learning.There are two campuses, one in Paris and one in Silicon Valley. For more information, visit www.42.us.org.

ABOUT AMD

For more than 45 years AMD has driven innovation in high-performance computing, graphics and visualization technologies — the building blocks for gaming, immersive platforms and the datacenter. Hundreds of millions of consumers, leading Fortune 500 businesses and cutting-edge scientific research facilities around the world rely on AMD technology daily to improve how they live, work and play. AMD employees around the world are focused on building great products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit the AMD (NASDAQ: AMD) http://www.amd.com website.

1. Testing performed in AMD Internal Labs as of May 10, 2017. System Config: Ryzen 7 PRO 1700 : AMD Myrtle – SM with 95W R7 1800X, AMD Radeon R7 240, 2x4096 DDR4-2400 RAM, Win 10 PRO, 512GB SSD, Graphics driver 21.19.142.257. Intel i7-7700: MSI Z270 SLI (MS-7A59) with 65W i7-7700, Intel HD Graphics 630, 2x4096 DDR4-2400 RAM, Win 10 PRO, 512GB SSD, graphics driver 21.20.16.4534. PC manufacturers may vary configurations yielding different results. Performance may vary based on version of driver used. Cinebench R15 nT is used to show multithreaded performance. Using Cinebench R15 nT, the Ryzen 7 PRO 1700 scored 1422 while the Intel i7-7700 scored 878 which is a performance differential of 61.9 or ~ 62% in favor of the Ryzen 7 PRO 1700. RZP-2