

NVIDIA Ushers In the Era of Personal Supercomputing

June 21 2007



Tesla GPU computing processor, desktide supercomputer, and GPU Computing server.

High-performance computing in fields like the geosciences, molecular biology, and medical diagnostics enable discoveries that transform billions of lives every day. Universities, research institutions, and companies in these and other fields face a daunting challenge: as their simulation models become exponentially complex, so does their need for vast computational resources.

NVIDIA took a giant step in meeting this challenge with today's announcement of a new class of processors based on a revolutionary new graphics processing unit (GPU). Under the NVIDIA Tesla brand, NVIDIA will offer a family of GPU computing products that will place the power previously available only from supercomputers in the hands of every scientist and engineer. Today's workstations will be transformed

into "personal supercomputers."

"Today's science is no longer confined to the laboratory; scientists employ computer simulations before a single physical experiment is performed. This fundamental transition to computational methods is forging a new path for discoveries in science and engineering," said Jen-Hsun Huang, president and CEO of NVIDIA. "By dramatically reducing computation times, in some cases from weeks to hours, NVIDIA Tesla represents the single most significant disruption the high-performance computing industry has seen since Cray 1's introduction of vector processing."

The Tesla family of GPU computing solutions span PCs to large scale server clusters. The new family includes:

- **NVIDIA Tesla GPU Computing Processor**, a dedicated computing board that scales to multiple Tesla GPUs inside a single PC or workstation. The Tesla GPU features 128 parallel processors, and delivers up to 518 gigaflops of parallel computation. The GPU Computing processor can be used in existing systems partnered with high-performance CPUs.
- **NVIDIA Tesla Deskside Supercomputer**, a scalable computing system that includes two NVIDIA Tesla GPUs and attaches to a PC or workstation through an industry-standard PCI-Express connection. With multiple deskside systems, a standard PC or workstation is transformed into a personal supercomputer, delivering up to 8 teraflops of compute power to the desktop.
- **NVIDIA Tesla GPU Computing Server**, a 1U server housing up to eight NVIDIA Tesla GPUs, containing more than 1000 parallel processors that add teraflops of parallel processing to clusters. The Tesla GPU Server is the first server system of its kind to bring GPU

computing to the datacenter.

Computing on NVIDIA Tesla is now available to any software developer through the world's only C-language development environment for the GPU. NVIDIA CUDA is a complete software development solution that includes a C-compiler for the GPU, debugger/profiler, dedicated driver, and standard libraries. CUDA simplifies parallel computing on the GPU by using the standard C language to create programs that process large quantities of data in parallel. Programs written with CUDA and run on Tesla are able to process thousands of threads simultaneously, providing high computational throughput to enable the GPU to quickly solve complex, computational problems. The NVIDIA CUDA development environment is currently supported on the Linux and Microsoft Windows XP operating systems.

Most applications that require massive compute power can leverage the power of NVIDIA Tesla to make parallel computing power more pervasive and affordable. CUDA's recent success can be seen in both the academic and the application development communities. In addition to adoption by leading universities that are pioneering new courses in parallel computing, CUDA is being actively used by thousands of developers and scientists in applications from molecular simulation to seismic analysis to medical device design.

"Many of the molecular structures we analyze are so large that they can take weeks of processing time to run the calculations required for their physical simulation," said John Stone, senior research programmer at the University of Illinois Urbana-Champaign. "NVIDIA's GPU computing technology has given us a 100-fold increase in some of our programs, and this is on desktop machines where previously we would have had to run these calculations to a cluster. NVIDIA Tesla promises to take this forward with more flexible computing solutions."

Source: NVIDIA

Citation: NVIDIA Ushers In the Era of Personal Supercomputing (2007, June 21) retrieved 25 April 2024 from <https://phys.org/news/2007-06-nvidia-ushers-era-personal-supercomputing.html>

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