

Nvidia's Fermi Architecture Will Offer Improved Visual Computing

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Nvidia's Fermi architecture and software development tools are part of the next generation of high-performance visual computing. Its success depends on cost-effective production in quantity and fulfilling delivery targets.

NEWS ANALYSIS

Event

On 30 September 2009, at the Nvidia GPU Technology Conference, Nvidia CEO Jen Hsun Huang announced the third generation of the company's Compute Unified Device Architecture (CUDA), code-named "Fermi." The Fermi architecture, which will be used in new GeForce, Tesla and Quadro graphics processor units (GPU) products, also has a runtime platform and software development tools.

On 1 October 2009, Nvidia released its Nexus Integrated Development Environment (IDE) for massively parallel computing. Nexus IDE will be included within Microsoft's Visual Studio for the development of Windows-based and Web applications. Nvidia said that Fermi also supports other programming languages, including Microsoft's DirectCompute and OpenCL, an open standard for general-purpose programming of heterogeneous systems, such as combined many-core GPUs and multicore CPUs.

Analysis

High-performance visual computing can benefit enterprises running applications with highly parallel code that uses floating-point arithmetic. Fewer systems are needed to give equal performance, resulting in savings on cost, space and power. Enterprise applications currently utilizing GPUs include finance, medical imaging, product design, movie and digital-video production, and oil and gas exploration.

Fermi was designed to focus on graphics as well as compute processing. Nvidia claims that Fermi provides eight times the peak double precision floating-point calculations offered by present Nvidia GPUs.

Nvidia's strategy is to make its graphics processors smarter, while its competitors Advanced Micro Devices (AMD) and Intel focus on leveraging CPU capabilities by moving their graphics processors closer to the CPU. The Fermi architecture is impressive, but Nvidia will be challenged to cost-effectively produce this processor in quantity and meet its delivery targets. AMD recently began shipping its high-performance Radeon HD 5800 architecture and series of graphics boards. Intel's Larrabee processor, a competitor to Fermi, is in development; Intel currently plans to ship Larrabee during 1H10.

Gartner expects more applications for high-performance visual computing in the enterprise to emerge as the development of highly parallel code becomes practical for software vendors. However, vendors must select target applications carefully, as the cost of implementing the code may exceed the benefits of the technology. Though Nvidia cites GPU implementations that have resulted in overall cost savings for enterprises, in general, its benefits lie in improved time to market and response times, rather than in overall cost reduction.

RECOMMENDATIONS

Enterprises:

- Identify applications that could benefit from a massive increase in floating-point performance.
- Ask providers of compute-intensive applications to parallelize their code.

RECOMMENDED READING

- "Hype Cycle for PC Technologies" — Gartner evaluates 40 PC-related technologies to guide PC buyers making tough cost optimization decisions and PC vendors making tough product line management decisions. **By Bruno Lehal and others**
- "Market Share: Processor, Chipset and GPU Shipments, Worldwide, 2Q09" — Intel and Nvidia have regained market share lost to AMD in microprocessors and desktop GPUs, respectively, even as AMD enjoyed a second quarter of record strength in desktop PC processors and mobile PC GPUs. **By Christian Heidarson**

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