



Backgrounder

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Intel Looks to the Many-core Future with Ct Technology

New Parallel Programming Product Beta Utilizing Ct Technology by End of the Year

April 8, 2009 – Intel Corporation plans to add more support for data-parallelism by using Ct Technology in Intel® Software Development Products for parallel programming later this year. Advanced work on Ct Technology has led to breakthroughs in software development techniques for data-parallelism that are now ready for product development.

Increasing Processor Core Counts are Leading to Changes in Software Development

Software development for multi-core processors, known as parallel programming, is becoming common place, whereas it was once exclusive to high performance computing. Nearly all microprocessors sold today are multi-core processors. The future holds processors, such as those using Larrabee architecture, having so many cores that they have been called many-core processors. In this era of increased processor core counts, software performance hinges much more on the utilization of parallelism than on the increasing clock rates of processors. Software engineers rate how well a program uses parallelism by talking about the scalability of a software program. The most scalable programs make the best use of increasing processor core counts.

Ct Technology, a New Perspective on Data-parallel Programming

Intel developed Ct Technology with a singular vision: to provide programmers with tools that would abstract data-parallel programming away from the hardware, as popular programming languages have done for single-core processors, while offering forward-scaling that spans many-core and multi-core processors.

Ct Technology assumes no specific processor architecture, but the underlying model requires a generalized parallel processing architecture such as that which is found in multi-core and many-core processors.

The resulting Ct Technology has shown the ability to:

- **Reduce Errors in Parallel Programming:** It supports a programming style that tends to avoid the parallel programming pitfalls that can plague parallel program development. Specifically, Ct Technology offers determinism, which leads to increased levels of safety.

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Safety refers to avoiding data races and deadlocks, the two most often encountered parallel programming bugs.

- **Parallel Programming that is Readable:** It has an expressive syntax that stays close to the domain expert's mode of expression. The benefits of keeping programming notation close to that which is used by non-expert programmers are well known but realized infrequently. Ct Technology excels by providing the framework that allows programs to realize this goal.
- **Scale Across Multi-core and Many-core Processors:** Simply put, today's programs can be ready for tomorrow's hardware while getting the most out of today's hardware.
- **Fit into Existing Programs:** It does not require a new language. As embodied in a product later this year, Ct Technology will extend C++ for data-parallelism and allow data-parallelism to be added into existing programs, using current tools and programming languages.

The Future for Ct Technology

Ct Technology will form the basis of a new template library for C++ programmers in the form of a product from Intel. This product will be available in beta form before the end of 2009. The new product will deliver data-parallel capabilities through standard C++ templates and will enable the extensive C++ developer community to build applications for optimized performance on several to hundreds of cores. This new product will expand and complement all of Intel's existing Software Development Products, including Intel Parallel Studio, Intel Threading Building Blocks, and Intel's support of OpenMP*.

More information is available at www.intel.com/software/data_parallel.

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