Multi-core to the Masses

Justin Rattner  
Intel Senior Fellow and Director, Corporate Technology Group

Abstract:

It is likely that 2005 will be viewed as the year that parallelism came to the masses, with multiple vendors shipping dual/multi-core platforms into the mainstream consumer and enterprise markets. Assuming that this trend will follow Moore's Law scaling, mainstream systems will contain over 10 processing cores by the end of the decade, yielding unprecedented theoretical peak performance. However, it is unclear whether the software community is sufficiently ready for this transition and will be able to unleash these capabilities due to the significant challenges associated with parallel programming.

This keynote addresses the motivation for multi-core architectures, their unique characteristics, and potential solutions to the fundamental software challenges, including architectural enhancements for transactional memory, fine-grain message passing, and speculative multi-threading. Finally, we stress the need for a concerted, accelerated effort, starting at the academic-level and encompassing the entire platform software ecosystem, to successfully make the multi-core architectural transition.