Dataflow Execution of Hierarchically Tiled Arrays

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Abstract As the parallelism in high-performance supercomputers continues to grow, new programming models become necessary to maintain programmer productivity at today's levels. Dataflow is a promising execution model because it can represent parallelism at different granularity levels and to dynamically adapt for efficient execution. The downside is the low-level programming interface inherent to dataflow. We present a strategy to translate programs written in Hierarchically Titled Arrays (HTA) to the dataflow API of Open Community Runtime (OCR) system. The goal is to enable program development in a convenient notation and at the same time take advantage of the benefits of a dataflow runtime system. Using HTA produces more comprehensive codes than those written using the dataflow runtime programming interface. Moreover, the experiments show that, for applications with high asynchrony and sparse data dependences, our implementation delivers superior performance than OpenMP using parallel for loops.

Palabras chave Parallel programming, Dataflow, High-level programming abstraction, Parallel algorithm

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