

# Toward a Unified Task-based Parallel Programming Interface

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## Abstract

Task based parallel programming has shown competitive outcomes in many aspects of parallel programming such as efficiency, performance, productivity and scalability. Different approaches are used by different software development frameworks to provide these outcomes to the programmer while making the underlying hardware architecture transparent to her. However, since programs are not portable between these frameworks, using one framework or the other is still a vital decision by the programmer whose concerns are expandability, adaptivity, maintainability and interoperability of the programs. In this work, we propose a unified programming interface that a program can use for working with different task based parallel frameworks transparently. In this approach we abstract the common concepts of task based parallel programming and provide them to the programmer in a single programming interface uniformly for all frameworks. We have tested the interface by running a single program which implemented matrix multiplication (`gemm` operation) with three frameworks that are optimized for shared memory, distributed memory and GPU architectures, respectively, while the cooperation scheme is configured externally with no need to modify the program. Further possible extensions of the interface and future potential research are also described.