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50. SREESHMA B NAIR

HPC Exascale Systems using Massive Parallel Computational Tri hybrid Model

Abstract

The emerging high-performance computing Exascale supercomputing system, which is anticipated to be available in 2020, will unravel many scientific mysteries. A new tri-hybrid MOC (MPI + OpenMP + CUDA) parallel programming model attained massive performance through monolithic parallelism in the system. Huge parallelism is one of these challenges, which requires a novel low power consuming parallel programming approach for attaining massive performance. In order to evaluate MOC model, it is implemented in linear algebraic dense matrix multiplication application and observed different metrics such as performance and power consumption during different dataset executions. This seminar introduces a new parallel programming model that achieves massive parallelism by combining coarse-grained and fine-grained parallelism over inter-node and intra node computation, respectively. The proposed framework is tri-hybrid of MPI, OpenMP, and compute unified device architecture (CUDA) MOC model that compute input data over heterogeneous framework. It was observed that MOC with four kernels outperformed against eight and twelve kernels implementations. Further, MOC with peak performance was compared with other most prominent implementations including KBLAS and CuBLAS.