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VM based Evaluation of the Scalable Parallel Minimum Spanning Tree Algorithm for PGAS Model

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The minimum spanning tree problem has influential importance in computer science, network analysis, and engineering. However, the sequential algorithms become unable to process the given problem as the volume of the data representing graph instances overgrowing. Instead, the high-performance computational resources pursue to simulate large-scale graph instances in a distributed manner. Generally, the standard shared or distributed memory models like OpenMP and Message Passing Interface are applied to address the parallelization. Nevertheless, as an emerging alternative, the Partitioned Global Address Space model communicates in the form of asynchronous remote procedure calls to access distributed-shared memory, positively affecting the performance using overlapping communications and locality-aware structures. The paper presents a modification of the Kruskal algorithm for MST problems based on performance and energy-efficiency evaluation relying on emerging technologies. The algorithm evaluation shows great scalability within the server up to 16 vCPU and between the physical servers coupled with a connected weighted graph using different vertices, edges, and densities.

Summary

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