

Storage Speedup: An Effective Metric for I/O-intensive Parallel Application

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Abstract—With supercomputer system scaling up, the performance gap between computing and storage system increases dramatically. The traditional speedup only measures the performance of computing system. In this paper, we firstly propose the speedup metric taking into account the I/O constraint. The new metric unifies the computing and I/O performance, and evaluates practical speedup of parallel application under the limitation of I/O system. Furthermore, this paper classifies and analyzes existing parallel systems according to the proposed speedup metric, and makes suggestions on system design and application optimization. Finally, we provide the analysis of this new speedup metric by case studies. The storage speedup reflects the degree of parallel application scalability affected by performance of storage system. The results indicate that the proposed speedup for parallel applications is an effective metric.

Keyword—high performance computing, storage speedup, scalability, system classification, storage architecture



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