



Parallel Computing and I/O

Evaluation and Implementation of Cache Replacement Policies for an Object Store with Tiered Storage

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An increasing concern is the widening disparity between processor frequency and memory latency. To address this issue, different memory technologies are combined in a memory hierarchy. Fast but expensive memory is used in combination with slower but cheaper memory to achieve an optimal balance between cost, latency, bandwidth and capacity. In addition to the memory hierarchy, caching and hierarchical storage management, also known as tiered storage, are utilized for transferring data between different hierarchy levels. In this thesis, we implement and evaluate different cache replacement policies for a hierarchical storage stack. This storage stack is based on the B-epsilon-tree, a write-optimized variant of the B-tree. We conduct several benchmarks for different workloads, access patterns and also examine single threaded and multi threaded workloads. In particular, we are interested in how write optimization affects cache performance. Furthermore, we will give a recommendation on which cache replacement policy should be used for specific workloads.