

计算机科学

基于IPC与公平性的共享Cache划分

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摘要:

提出一种兼顾高速缓冲存储器(Cache)公平性及系统吞吐率的划分方法, 使用Cache访问监控器记录各应用访问Cache的命中及失效次数, 通过动态划分算法决定每个应用占用的Cache数量, 解决了共享Cache访问冲突导致的Cache污染. 实验表明: 在吞吐率方面, 该方法较传统的LRU替换策略可获得最高37.90%, 平均15.71%的提升, 比公平性最优的划分算法可获得最大47.37%, 平均14.11%的吞吐率提升; 在公平性方面, 较传统的LRU替换策略可获得最大4倍, 平均77%的提升; 比失效率最优的划分算法可获得最大9倍, 平均2.29倍的公平性提升.

关键词: Cache划分 公平性 Cache访问监控器

Shared Cache Partitioning Based on IPC and Fairness

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Abstract:

This paper proposes a shared Cache partitioning algorithm, based on throughput (IPC) and fairness, which in order to find a balance between fairness and throughput. We used the Cache access monitor to collect the missing rate information, and then decide the amount of Cache resources allocated to each application by the dynamic partitioning algorithm to resolve the problem of Cache pollution. Experiments show that shared Cache partitioning based on IPC and fairness improves throughput by 15.71% on average (up to 37.90%) over least recently used and by 14.11% on average (up to 47.37%) over fairness based Cache partitioning, and improves fairness by 77% on average (up to 4 times) over least recently used and by a factor of 2.29 on average (up to 9 times) over utility based Cache partitioning.

Keywords: Cache partitioning fairness Cache access monitor

收稿日期 2010-08-25 修回日期 网络版发布日期

DOI:

基金项目:

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