

Evaluating the Impact of Replacement Policies on the Cache Performance and Energy Consumption in Different Multicore Embedded Systems

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Abstract : The cache has an important role in the reduction of access delay between a processor and memory in high-performance embedded systems. In these systems, the energy consumption is one of the most important concerns, and it will become more important with smaller processor feature sizes and higher frequencies. Meanwhile, the cache system dissipates a significant portion of energy compared to the other components of a processor. There are some elements that can affect the energy consumption of the cache such as replacement policy and degree of associativity. Due to these points, it can be inferred that selecting an appropriate configuration for the cache is a crucial part of designing a system. In this paper, we investigate the effect of different cache replacement policies on both cache's performance and energy consumption. Furthermore, the impact of different Instruction Set Architectures (ISAs) on cache's performance and energy consumption has been investigated.

Keywords : energy consumption, replacement policy, instruction set architecture, multicore processor

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