Custom Microcoded Dynamic Memory Management for McNoC Platforms with Distributed Memories

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Abstract

Multi-core Network-on-Chips (McNoCs) have attracted significant attention since they are recognized as a scalable paradigm to interconnect and organize a high number of cores. Current multi-core embedded systems exhibit increased levels of dynamic behavior, leading to unexpected memory footprint variations unknown at design time. Dynamic Memory Management (DMM) is a promising solution for such types of dynamic systems. Although some efficient dynamic memory managers have been proposed for conventional bus-based MPSoC platforms, there are no DMM solutions regarding the constraints and the opportunities delivered by the physical distribution of multiple memory nodes of the platform. In our work, we address the problem of providing customized microcoded DMM on McNoC platforms with distributed memory organization. Customization is enabled at application and platform level using a Dual Microcoded Controller (DMC). Results show that customized microcoded DMM can serve approximately 7x more allocation requests and perform 25% faster than the corresponding high-level implementation in C language.
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