COMPASS – A tool for evaluation of compression strategies for embedded processors

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Abstract

A major concern of embedded system architects is the design for low power. We address one aspect of the problem in this paper, namely the effect of executable code compression. There are two benefits of code compression – firstly, a reduction in the memory footprint of embedded software, and secondly, potential reduction in memory bus traffic and power consumption. Since decompression has to be performed at run time it is achieved by hardware. We describe a tool called COMPASS which can evaluate a range of strategies for any given set of benchmarks and display compression ratios. Also, given an execution trace, it can compute the effect on bus toggles, and cache misses for a range of compression strategies. The tool is interactive and allows the user to vary a set of parameters, and observe their effect on performance. We describe an implementation of the tool and demonstrate its effectiveness. To the best of our knowledge this is the first tool proposed for such a purpose.

Keywords: Code compression; Embedded system tool; Power reduction