Cool Code Compression for Hot RISC

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Introduction

- Embedded processors make up half of the processor market
- Complexity of embedded systems has grown rapidly over the past several years
- Increase in size of embedded code contradicts goals of low cost and small area
- Code compression is a means of keeping code size from becoming too large

Code Compression Techniques

- Text compression provides basis for current techniques
  - Statistical compression
  - Dictionary compression
- Example systems
  - CCRP
  - Lefurgy97
  - CodePack
- Another alternative: modify the instruction set
  - Thumb
  - MIPS16

Our Proposal

- Examine code compression from the aspect of low power
- Select suitable compression algorithm
- Modify compiler to generate compression-friendly code
- Develop efficient hardware decompression scheme

Plan of Work

- Vanilla Pekoe is the target microprocessor
- gcc (egcs-1.0.3a) is the compiler
- SyChoSys will be used to simulate performance and energy
- Workload: SPECint95, SPECint2000, MediaBench
- Timeline
  - First project checkpoint
    - Compression algorithm selected
    - Initial compiler modification and hardware design
  - Second project checkpoint
    - Compiler support fully implemented
    - Working hardware decompression scheme