Development of Technology to Evaluate the Performance of Parallelizing Compilers

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Objectives

- To conduct research and development in methods of evaluating the performance of parallelizing compilers used to achieve a high degree of optimization
- To provide objective evaluation of APC technology

Results in FY 2000

Development of methods for the evaluation of individual functions

Development of methods for the evaluation of general performance

Development of methods for the evaluation of individual functions (1)

- Survey of existing benchmark programs and parallelizing compilers
- Survey of benchmark programs
  - Detailed survey of each component of SPEC2000
  - What code should be used in evaluating the performance of individual functions of a parallelizing compiler?

Development of methods for the evaluation of individual functions (2)

- Survey of parallelizing compilers
  - Survey of Kai Co., Ltd.′s Visual KAP for OpenMP
    - sing parallelization of SPEC CPU2000,
    - Visual KAP clarifies which code can conduct parallelization at the technical level of existing compilers and which cannot,
    - stablishing Visual KAP as a candidate for the benchmark code on which targets for development of individual functions is based.

Development of methods for the evaluation of general performance (1)

- Survey of large-scale benchmarks
  - Perfect Benchmarks,

    NAS Parallel Benchmarks, SPEC
  - Arrangement of the environment in which benchmark programs are used

Development of methods for the evaluation of general performance (2)

- Survey of parallelizing compilers
  - Arrangement of the environment in which parallelizing compilers are used
    - Polaris, Visual KAP for OpenMP

Plan for FY 2001

Development of methods for evaluation of individual functions

Development of methods for evaluation of general performance

Development of methods for evaluation of individual functions

- Extraction of 'individual functions'
  - Extraction from the functions of existing compilers
  - Extraction from benchmark programs
  - Addition of new functions through development of an 'Advanced Parallelizing Compiler'
- Development of benchmarks

Development of Methods for Evaluation of Individual Functions

- Configuration of the environment for performance evaluation
  - Procurement of the latest machines currently available
    - POWER3-ii/375MHz × 16 (SMP)
    - 8GB memory
    - 18.2GB hard disks
- Performance is evaluated using a combination of existing benchmark programs and existing compilers.

  This performance is used to determine performance targets for the APC.

Comments

- Liaison with the Advanced Parallelizing Compiler Development Group
  - Advantages of liaison
    - New functions can be incorporated into development of the compiler.
    - Items extracted for use during performance evaluation can be incorporated into the compiler.
  - Comments regarding liaison
    - Fairness must be maintained at all times.