OpenMP Fundamentals

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Introduction

- Standard defining APIs for multi-threaded, shared memory architectures
- API contains
  - Compiler directives
  - Runtime library routines
  - Environment variables
- Major implementations - libgomp, MPC

OpenMP Programming Model

- Shared memory
- Thread based parallelism
- Explicit parallelism
- Fork - Join model
- IO - No consistency guaranteed

Hello world...

[fragile] 1

Constructs for parallelism

- parallel for
- parallel sections
- single

Constructs for synchronization

- 1

Constructs for synchronization

- 1

Restrictions on synchronization over parallelism

- Restriction on the position of omp barrier inside omp parallel
- Other restrictions?

Relative costs of each of the parallel constructs

- cost of barrier
- cost of one task creation
- other costs?

An example(no synchronization) - Mergesort

- Nice and easy way to understand concepts
- Each recursive calls works on different data sets
- So easy to parallelize

An example(with synchronization)

- 1

References

- https://computing.llnl.gov/tutorials/openMP/
- Parallel Programming with OpenMP: Science and Technology Support Group, High Performance Computing, Ohio Supercomputer Center