Threaded Programming coursework II: the affinity schedule for scheduling the OpenMP loop construct

Abstract

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1. Introduction

OpenMP version 4.5 supports various scheduling options for its loop construct, for example `static`, `dynamic` or `guided` (see OpenMP Architecture Review Board, 2015, Chapter 2). This paper presents an alternative schedule, called the affinity schedule. The affinity schedule combines some properties of the three above mentioned scheduling options into one schedule.

This paper is a follow-up of a benchmark presented in B160509 (2019). B160509 (2019) presents a scientific program written in the Fortran programming language, containing two loops performing matrix and vector operations. These two loops were parallelized using built-in scheduling options of OpenMP version 4.5 and then benchmarked in order to determine the best schedule for the two loops. The here presented affinity schedule is benchmarked the same way, as are the built-in schedules in B160509 (2019).

This paper begins by describing two versions of the affinity schedule. Afterwards the benchmark is described and its results are presented. The benchmark of the affinity schedule is then compared to the best schedule for both loops determined in B160509 (2019). At last the results are discussed and a conclusion is drawn.

2. Method

3. Results

4. Discussion

5. Conclusion

References

B160509. Threaded Programming coursework I: benchmarking OpenMP schedules, 2019.

OpenMP Architecture Review Board. OpenMP application program interface version 4.5, 2015. URL `https://www.openmp.org/wp-content/uploads/openmp-4.5.pdf`.