A Two-Level Scheduling Strategy for optimising communications of data parallel programs in clusters

許慶賢,陳世璋
Computer Science & Information Engineering
Computer Science and Informatics
chh@chu.edu.tw

Abstract

Irregular data distribution and redistribution have been attracting attention recently since it can distribute different size of data segments to heterogeneous processors. High Performance Fortran Version 2 (HPF2) provides GEN_BLOCK distribution format which facilitates generalised block distributions. In this paper, we present a two-level scheduling method to minimise the communication cost in such operations. The proposed technique isolates local messages from inter-processor messages and schedules both kinds of messages in separated steps to efficiently avoid synchronisation delay. The proposed technique which has been implemented with the traditional scheduling approach yields improved schedules for heterogeneous processors environment.

Keyword：irregular data redistribution; GEN_; BLOCK; two-level scheduling; communication optimisation; data parallel programming; clustering; scheduling strategy; irregular data distribution; communications; synchronisation delay.