1. Record Nr. UNINA9910831169503321

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Titolo	Parallel computing on heterogeneous networks / / Alexey Lastovetsky
Pubbl/distr/stampa	Hoboken, New Jersey : , : Wiley-Interscience, , 2003 ©2003
ISBN	1-280-36605-2 9786610366057 0-470-34948-4 0-471-45718-3 0-471-65416-7
Descrizione fisica	1 online resource (440 p.)
Collana	Wiley Series on Parallel and Distributed Computing Wiley series on parallel and distributed computing
Disciplina	005.2/75
Soggetti	Internetworking (Telecommunication) Parallel programming (Computer science) Heterogeneous computing Computer networks
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	PARALLEL COMPUTING ON HETEROGENEOUS NETWORKS; CONTENTS; Acknowledgments; Introduction; PART I EVOLUTION OF PARALLEL COMPUTING; 1. Serial Scalar Processor; 1.1. Serial Scalar Processor and Programming Model; 1.2. Basic Program Properties; 2. Vector and Superscalar Processors; 2.1. Vector Processor; 2.2. Superscalar Processor; 2.3. Programming Model; 2.4. Optimizing Compilers; 2.5. Array Libraries; 2.5.1. Level 1 BLAS; 2.5.2. Level 2 BLAS; 2.5.3. Level 3 BLAS; 2.5.4. Sparse BLAS; 2.6. Parallel Languages; 2.6.1. Fortran 90; 2.6.2. The C[ ] Language 2.7. Memory Hierarchy and Parallel Programming Tools2.8. Summary; 3. Shared Memory Multiprocessors; 3.1. Shared Memory Multiprocessor Architecture and Programming Models; 3.2. Optimizing Compilers; 3.3. Thread Libraries; 3.3.1. Operations on Threads; 3.3.2. Operations on Mutexes; 3.3.3. Operations on Condition Variables; 3.3.4. Example of

MT Application: Multithreaded Dot Product; 3.4. Parallel Languages; 3.4.1. Fortran 95; 3.4.2. OpenMP; 3.5. Summary; 4. Distributed Memory Multiprocessors; 4.1. Distributed Memory Multiprocessor Architecture: Programming Model and Performance Models
4.2. Message-Passing Libraries4.2.1 Basic MPI Programming Model; 4.2.2. Groups and Communicators; 4.2.3. Point-to-Point Communication; 4.2.4. Collective Communication; 4.2.5. Environmental Management; 4.2.6. Example of an MPI Application: Parallel Matrix-Matrix Multiplication; 4.3. Parallel Languages; 4.4. Summary; 5. Networks of Computers: Architecture and Programming Challenges; 5.1. Processors Heterogeneity; 5.1.1. Different Processor Speeds; 5.1.2. Heterogeneity of Machine Arithmetic; 5.2. Ad Hoc Communication Network; 5.3. Multiple-User Decentralized Computer System
5.3.1. Unstable Performance Characteristics5.3.2. High Probability of Resource Failures; 5.4. Summary; PART II PARALLEL PROGRAMMING FOR NETWORKS OF COMPUTERS WITH MPC AND HMPI; 6. Introduction to mpC; 6.1. First mpC Programs; 6.2. Networks; 6.3. Network Type; 6.4. Network Parent; 6.5. Synchronization of Processes; 6.6. Network Functions; 6.7. Subnetworks; 6.8. A Simple Heterogeneous Algorithm Solving an Irregular Problem; 6.9. The RECON Statement: A Language Construct to Control the Accuracy of the Underlying Model of Computer Network
6.10. A Simple Heterogeneous Algorithm Solving a Regular Problem6.11. Principles of Implementation; 6.11.1. Model of a Target Message-Passing Program; 6.11.2. Mapping of the Parallel Algorithm to the Processors of a Heterogeneous Network; 6.12. Summary; 7. Advanced Heterogeneous Parallel Programming in mpC; 7.1. Interprocess Communication; 7.2. Communication Patterns; 7.3. Algorithmic Patterns; 7.4. Underlying Models and the Mapping Algorithm; 7.4.1. Model of a Heterogeneous Network of Computers; 7.4.2. The Mapping Algorithm; 7.5. Summary
8. Toward a Message-Passing Library for Heterogeneous Networks of Computers

Sommario/riassunto

New approaches to parallel computing are being developed that make better use of the heterogeneous cluster architectureProvides a detailed introduction to parallel computing on heterogenous clustersAll concepts and algorithms are illustrated with working programs that can be compiled and executed on any clusterThe algorithms discussed have practical applications in a range of real-life parallel computing problems, such as the N-body problem, portfolio management, and the modeling of oil extraction