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Introduction to Parallel Computing, Second Edition

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Increasingly, parallel processing is being seen as the only cost-effective method for the fast solution of computationally large and data-intensive problems. The emergence of inexpensive parallel computers such as commodity desktop multiprocessors and clusters of workstations or PCs has made such parallel methods generally applicable, as have software standards for portable parallel programming. This sets the stage for substantial growth in parallel software.

Data-intensive applications such as transaction processing and information retrieval, data mining and analysis and multimedia services have provided a new challenge for the modern generation of parallel platforms. Emerging areas such as computational biology and nanotechnology have implications for algorithms and systems development, while changes in architectures, programming models and applications have implications for how parallel platforms are made available to users in the form of grid-based services.

This book takes into account these new developments as well as covering the more traditional problems addressed by parallel computers. Where possible it employs an architecture-independent view of the underlying platforms and designs algorithms for an abstract model. Message Passing Interface (MPI), POSIX threads and OpenMP have been selected as programming models and the evolving application mix of parallel computing is reflected in various examples throughout the book.

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