
Preface

Understanding Parallel Supercomputing is a survey book providing a thorough introductory review of high-performance parallel computers, a type of computer that has grown to importance in recent years. It was written to describe a technology in-depth including the architectural concepts, a variety of hardware implementations, (both commercial and research), major programming concepts, algorithmic methods, and representative applications.

The book is intended for a wide range of readers. Computer professionals will find sufficient detail to incorporate much of this material into their own endeavors. Program managers and applications system designers may find the solution to their requirements for high-computational performance at an affordable cost. Scientists and engineers will find sufficient processing speed to make interactive simulation a practical adjunct to theory and experiment. Entrepreneurs will find a case study of an emerging and maturing technology. The general reader is afforded an opportunity to appreciate the power of advanced computing and some of the ramifications of this growing capability.

Although there are numerous books on conventional parallel processing, this volume is devoted to supercomputing on a wide variety of parallel machines. The reader already familiar with sequential processing will discover an alternative philosophy—parallelism—including both the widespread program parallel paradigm and the data parallel scheme.

The contents of the book are organized into nine chapters, rich with illustrations and tables. Topics covered include: High-Performance Computing and Communications Program, Grand Challenges, Parallel Supercomputing Concepts, History, SIMD and MIMD (e.g., Paragon, T3D, CM-5, etc.), Alternative Architectures, Distributed Heterogeneous Supercomputing, Software, and Applications.