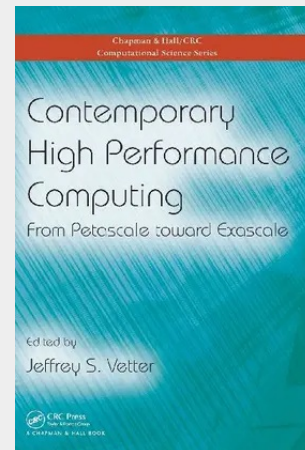


## Contemporary High Performance Computing

From Petascale toward Exascale

Contemporary High Performance Computing: From Petascale toward Exascale focuses on the ecosystems surrounding the world's leading centers for high performance computing (HPC). It covers many of the important factors involved in each ecosystem: computer architectures, software, applications, facilities, and sponsors. The first part of the book examines significant trends in HPC systems, including computer architectures, applications, performance, and software. It discusses the growth from terascale to petascale computing and the influence of the TOP500 and Green500 lists. The second part of the book provides a comprehensive overview of 18 HPC ecosystems from around the world. Each chapter in this section describes programmatic motivation for HPC and their important applications; a flagship HPC system overview covering computer architecture, system software, programming systems, storage, visualization, and analytics support; and an overview of their data center/facility. The last part of the book addresses the role of clouds and grids in HPC, including chapters on the Magellan, FutureGrid, and LLGrid projects. With contributions from top researchers directly involved in designing, deploying, and using these supercomputing systems, this book captures a global picture of the state of the art in HPC.

Focusing on recent, major ecosystems in HPC, this book brings together the vast interconnected aspects behind state-of-the-art HPC. It explains all the factors involved in making the world's leading HPC centers successful, from architectures, applications, facilities, and software to scientists, administrators, and sponsors. The first part of the book examines significant trends in applications, performance, software, and hardware. The second part provides a detailed look at the ecosystem, science, and organization of particular HPC sites. The last part of the book addresses the roles of clouds and grids in HPC.



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