Foreword

It is a great pleasure for me to write the foreword for this book. The quality of the presentations and the scope of recent topics provide the reader with an up-to-the-moment resource in the area of grid computing.

Grid technology enables the combination of geographically dispersed resources such as computer cycles, storage space, software and scientific devices into one large scale virtual environment that can be shared by multiple users.

In a similar fashion to an on-demand electric power utility, grid computing can eliminate underutilized computing capacity and leverage existing investments and best practices in an organization. It is therefore essential to keep educators, students, researchers and professionals abreast of changes in the ever-evolving grid concepts, protocols, applications, methods and tools [http://users.ipfw.edu/udohe/gridintro.htm].

The *Handbook of Research on Grid Technologies and Utility Computing: Concepts for Managing Large-Scale Applications* presents a variety of recent advances in grid technology. Contributions include articles on current trends and tools in grid computing, the impact of the grid on directions for future research and recent developments in grid technology and applications.

Section I of this book presents a comprehensive overview of the history of grid computing, accepted terminology and recent advances in web and grid service technology along with a discussion on emerging standards and the challenges faced by grid researchers.

In Section II, a collection of articles address some of the inherent problems in grid computing such as a performance comparison of load balancing techniques, grid scheduling to leverage available grid capacity and load sharing policies. Data management issues are a significant bottleneck over a distributed collection of heterogeneous and several papers in this section discuss various techniques for data handling along with current case studies and future trends.

The widespread acceptance of grid technology outside of the scientific community has been hindered by a perceived lack of security. Section III of this book presents an article which discusses current electronic privacy preserving schemes and their suitability for implementation in the Grid.

In Section IV the focus is on grid architecture, grid services and the economics of grid computing. Discussions cover the architecture of a grid database access service, an Adaptive Resource Management (ARM) mechanism, biologically inspired grid resource management techniques and storage systems for the Grid.

The final section of this book presents a collection of articles on grid applications in such areas as nuclear physics, biomedical studies, image processing, e-science, modeling, business and global terrorism. A significant growth in the number of international collaborations in a wide collection of application areas has been spawned by advances in grid infrastructure. This book presents a sampling of such

collaborations and, as such, provides readers with an exciting glimpse into what grid computing can provide to research partnerships on a global scale.

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