High Performance Computing on Vector Systems 2008

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Editors

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Preface

This book covers the results obtained in the Teraflop Workbench project during a four years period from 2004 to 2008. The Teraflop Workbench project is a collaboration between the High Performance Computing Center Stuttgart (HLRS) and NEC Deutschland GmbH (NEC-HPCE) to support users to achieve their research goals using high performance computing.

The Teraflop Workbench supports users of the HLRS systems to enable and facilitate leading edge scientific research. This is achieved by optimizing their codes and improving the process workflow which results from the integration of different modules into a “hybrid vector system”. The assessment and demonstration of industrial relevance is another goal of the cooperation.

The Teraflop Workbench project consists of numerous individual codes, grouped together by application area and developed and maintained by researchers or commercial organizations. Within the project, several of the codes have shown the ability to reach beyond the TFlop/s threshold of sustained performance. This created the possibility for new science and a deeper understanding of the underlying physics. The papers in this book demonstrate the value of the project for different scientific areas.

The work in the Teraflop Workbench project gave us insight into the applications and requirements for current and future HPC systems. We observed the emergence of multi-scale and multi-physics applications, the increase in interdisciplinary work and the growing tendency to use today’s stand-alone application codes as modules in prospective, more complex coupled simulations. At the same time, we noticed the current lack of support for those applications. Our goal is to offer an environment to our users that allows them to concentrate on their area of expertise without spending too much time on computer science itself.

We would like to thank all the contributors of this book and of the Teraflop Workbench project in general.

Stuttgart, July 2008

Sabine P. Roller
Michael M. Resch

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