Preface

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Biographical notes: Bertil Schmidt is an Associate Professor at the University of New South Wales. Prior to that he was a faculty member at the Nanyang Technological University (NTU). At NTU he also held appointments as Programme Director of MSc in Bioinformatics and as Deputy Director of the Biomedical Engineering Research Centre. Before coming to Singapore, he held research appointments at the University of Karlsruhe and RWTH Aachen. He has been involved in the design and implementation of parallel algorithms and architectures for over a decade. He has published extensively in premium and leading journals in this area.

The *1st International Workshop on Grid Testbeds* was held in May 2006 in Singapore. The workshop was co-located with the *6th International Symposium on Cluster Computing and the Grid (CCGrid 2006).* From the eleven accepted workshop papers, we have invited five authors to submit their extended versions for a special issue in the *International Journal of Web and Grid Services*. Additionally, the special issue includes an invited survey paper. The theme of this issue is 'Grid testbeds'. The papers describe design and implementation of new grid systems for a variety of applications as well as experiences gained from operating those grids. The work presented in these papers is summarised as follows.

In the first paper, Frizziero *et al.* investigate how instruments can be integrated into traditional computational/storage grids. They propose and realise the first release of the *Instrument Element*, a new Grid component that provides a Grid with an abstraction of real instruments, and Grid users with a more interactive way to control them.

Hellincks *et al.* introduce a new multi-purpose lightweight grid system called *CoBRA* (Computational Basic Reprogrammable Adaptive grid). Their system provides the opportunity to test and alter grid components online. The authors evaluate the performance of their system using a quantum physics application.

In the next paper, Zheng *et al.* discuss the coordination, design and implementation of the *PRAGMA* (Pacific Rim Applications and Grid Middleware Assembly) Grid. It is described how human factors, resource availability and performance issues have affected the grid design. The authors also discuss how middleware components in grid monitoring, accounting and file systems have dealt with some of the characteristics of this grid.

Poshkohi *et al.* propose *DotGrid*. DotGrid is a new cross-platform software for Desktop Grid computing. It utilises the .NET framework in Windows-based environments and MONO .NET in UNIX-class systems. The authors show how DotGrid services and APIs, Grid Desktop middleware and applications can be implemented conveniently.

The paper by Guim *et al.* addresses the job monitoring problem in Grid systems. The authors present a new infrastructure that allows uniform access to job monitoring information from different virtual organisations. The authors explain the API that each centre has to implement for providing access to its job monitoring information.

The last paper by Schmidt surveys Desktop Grid applications for E-Science. The surveyed applications are based on the open-source *BOINC* (Berkeley Open Infrastructure for Network Computing) middleware and are classified into four categories: Earth Sciences, Astronomy and Physics, Biology and Medicine, and Mathematics and Strategy Games.

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