
Preface

Yongwei Wu

Department of Computer Science and Technology
Tsinghua University
Beijing, 100084, P.R. China
E-mail: wuyw@tsinghua.edu.cn

Biographical notes: Yongwei Wu received his PhD degree from the Chinese Academy of Sciences in 2002. Since then, he has worked Department of Computer Science and Technology, Tsinghua University. His research interests include grid computing, distributed and parallel computing.

Aiming to bring together up-to-the-minute contributions ranging from papers that report novel research in basic grid components to papers that propose application-oriented grid technologies, we have selected six papers in this special issue, to address various aspects of grid middleware, information grid, service container, data management and so on.

All of the papers published in this special issue has been presented at Grid Middleware 2006 held in Changsha, China on 21–23 October 2006. In order to control broad heterogeneous resources, grid computing has a middleware layer that controls the distributed execution of applications. The purpose of this workshop is to provide an open forum for researchers from hardware and software areas to present, discuss, and exchange research-related ideas, results, and experiences in the area of grid middleware.

Although all the accepted Grid Middleware 2006 papers had excellent quality as evaluated by reviewers, because of the limited space of this special issue, only prospective authors were invited to extend and enhance their papers for submission. Except for a survey paper about grid middleware research and development in China, at least two review reports were obtained for each paper.

The first paper, ‘Grid middleware in China’, is contributed by leaders of three Chinese key grid middleware development groups. It proposes up-to-date grid middleware research and development in China. Three Chinese nationwide grid programmes, China National Grid, ChinaGrid and NSFCGrid, are described briefly first, then corresponding grid middleware, ChinaGrid Support Platform (CGSP), China National Grid Operation System (GOS), China Research and Development Environment Over Wide-area Network (CROWN) are detailed in architecture, main function components, applications and interoperability aspects.

The service container provides basic executing environment for a grid. One enhanced grid service container based on GT4 WS core is proposed by Sun *et al.*, in the paper ‘Design and implementation of an enhanced grid service container in CROWN grid’. The main features included in the enhanced container are remote and hot service deployment

with trustworthiness, monitoring, logging and management, *etc.*, which are of paramount importance for building applications using service grid technologies. Furthermore, several security challenges faced by the CROWN project are also discussed in the paper.

Workflow technology has been paid more and more attention in the grid research area. The paper, 'A transactional grid workflow service for ShanghaiGrid', by Tang *et al.* focuses on proposing a transactional grid workflow service (GridTW), for the ShanghaiGrid to guarantee the reliability and automatisation of e-business applications. A coordination algorithm is put forward for the management of transactional grid workflows, and validates its correctness through Petri net.

The paper 'Data management services and transfer scheme in ChinaGrid' tries to propose a group of system services for managing storage and data resources, in order to support transparent data access and high-performance data transfer on ChinaGrid. The design principle, implementation of data management services and data transfer schemes are discussed in detail in the paper.

The paper 'The architecture and implementation of Vega information grid' by Li *et al.*, deals with the integration and sharing of information resources over a grid. By abstracting the common requirements of information virtualisation, the paper introduces one information virtualisation model based on the relation schema, decoupled architecture supporting personalised utilisation pattern, and virtual database engine to integrate decentralised and autonomous data sources.

'Parallel Programming over ChinaGrid' contributed by Huang *et al.*, discusses the programmable service composition model. A practical task-level distributed Parallel Programming Interface (PPI) for grid computing (GridPPI) is proposed. It is an MPI-like interface plus high-level parallel tasking over a grid. GridPPI supports all operations that are necessary for such task-level distributed parallel computing over a grid, including service discovering and selecting, task submitting and reporting, *etc.* In the paper, the WSRF service-oriented implementation and evaluation of the GridPPI on ChinaGrid Support Platform, are discussed in detail.