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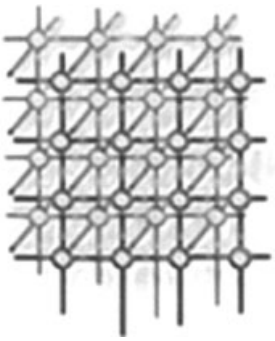

Special Issue: Second International Workshop on Workflow Management and Applications in Grid Environments (WaGe2007)

This special issue of *Concurrency and Computation*: *Practice and Experience* contains selected high-quality papers from the second International Workshop on Workflow Management and Applications in Grid Environments (WaGe2007), which was held on 17 August 2007 in Urumqi China [1]. The WaGe workshop series was aimed at providing an international forum for the presentation and discussion of research and development trends regarding workflow support in Grid environments. WaGe2007 attracted a number of international attendants. Deep discussion between attendants was actively performed. Especially, the discussion tried to view workflow management in Grid environments from different perspectives and areas. Different views can provide different potentials for further research and development.

Grid workflow has been under investigation for several years [2–6]. In particular, the special issue titled Workflow in Grid Systems in *Concurrency and Computation*: *Practice and Experience* was a key step [7]. The special issue was edited by Professor Geoffrey C. Fox and Professor Dennis Gannon from Indiana University in the U.S.A. A follow-up was the special issue in the same journal for WSGE2006 (First International Workshop on Workflow Systems in Grid Environments) [8]. This WaGe2007 special issue is a further follow-up of the two special issues to further boost the research and development of workflow management and applications in Grid environments.

Many research and development efforts have been made to workflow management and applications in Grid environments such as [2,4–6,9–15]. More and more people from different areas are trying to facilitate the techniques from their respective areas to tackle tough issues in Grid workflow area such as quality of service-based scheduling, data-intensive workflow modelling and semantic/knowledge management issues. Accordingly, this special issue tries to accommodate a range of papers from different perspectives and areas to provide some different views and hints for further Grid workflow research.

This special issue contains eight papers based on those that were presented at WaGe2007. They are listed as [16–23]. Research problems in these papers have been analysed systematically. For specific approaches or models, evaluation has been performed to demonstrate their feasibility and advantages. Based on these, eight papers were selected and also peer reviewed thoroughly. They are briefed as follows.

Cafaro *et al.* [16] view Grid workflow from an application perspective. Their paper designs and implements a Grid workflow execution engine. A specific example of bioinformatics in the Italian

FIRB LIBI International Laboratory for Bioinformatics is presented to demonstrate the feasibility of the engine.

Dou *et al.* [17] view Grid workflow from the perspective of collaborative computing between scientists. Considering the context and role enactment in Grid workflow execution, their paper proposes a context and role-driven scientific workflow development pattern. A case study is presented to demonstrate the feasibility of the proposed pattern.

Wang *et al.* [18] view Grid workflow from the perspective of supporting virtual computing. Distributed workflow execution on virtual machines is investigated. Then, they propose to organize workflows on virtual machines in Grid environments. The execution scenarios are discussed and experimental tests are conducted to evaluate overall performance.

Li *et al.* [19] view Grid workflow from the perspective of fault tolerance and avoidance. Focusing on performance optimization of checkpointing schemes and dynamic voltage scaling (DVS) for Grid workflow systems, their paper proposes an offline checkpointing scheme with DVS and online adaptive checkpointing schemes that dynamically adjust the checkpointing intervals by using store checkpoints and compare checkpoints. Simulations performed to demonstrate these online schemes outstandingly increase the likelihood of timely task completion when faults occur.

Lou *et al.* [20] view Grid workflow from the perspective of knowledge flow in e-science knowledge Grid. Their paper proposes a method to discover textual knowledge flow in e-science knowledge Grid. Experiments show that the proposed method can effectively discover textual knowledge flow for e-science knowledge Grid.

Liu *et al.* [21] view Grid workflow from the perspective of business application of the Grid. Their paper is concerned about scheduling transaction-intensive workflows on Grid. Transaction-intensive workflows typically underlie computation-intensive business applications such as banking and taxation return processing. Their paper proposes a new scheduling strategy targeting maximizing the throughput in transaction-intensive workflow execution on the Grid. The simulation is conducted to demonstrate that the strategy can improve the throughput significantly over other typical ones.

Liu *et al.* [22] view Grid workflow from the perspective of service-oriented computing and business process. Their paper defines some performance indicator and proposes a performance evaluation model to assess the performance of process execution in service-oriented environments. An example is presented to demonstrate the soundness and the feasibility of the model.

Schikuta *et al.* [23] view Grid workflow from the perspective of automatic computing. Their paper is concerned about automatic construction of workflows on Grid where dynamic changes need to be taken into consideration. Their paper proposes a method to optimize a workflow based on a heuristic approach that allows to react to dynamics in Grid environments. An example is presented to demonstrate the feasibility of the proposed method.

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