

# Editorial

**Minglu Li**

**Xian-He Sun**

Department of Computer Science, Illinois Institute of Technology,  
Stuart Building, Room 229C, Chicago, IL 60616, USA  
E-mail: sun@iit.edu

**Biographical notes:** Professor Xian-He Sun is a Professor of computer science and the Director of the Scalable Computing Software laboratory at Illinois Institute of Technology (IIT), and is a guest faculty at the Argonne National Laboratory. He received his PhD in computer science from Michigan State University in 1990 and his BS in mathematics from Beijing Normal University in 1982. Before joining IIT, he worked at the Ames National Laboratory, at the ICASE, NASA Langley Research Center, and was an ASEE fellow at Navy Research Laboratories. Dr. Sun's research interests include parallel and distributed processing, software systems, performance evaluation, and scientific computing.

In the last few years, the grid and web services community has been growing very rapidly. This goes along with the growing popularity of the internet, the availability of powerful computers and high-speed networks, and is changing the way we do computing.

This special issue of the *International Journal of High Performance Computing and Networking* (IJHPCN) contains six extended papers that were presented in more brief forms at the Second International Workshop on Grid and Cooperative Computing (GCC, 2003), held in Shanghai, from December 7–10, 2003.

GCC 2003 was sponsored by the China Computer Federation (CCF), the Shanghai Jiao Tong University (SJTU), and the IEEE Beijing Section. It provided a forum to present current and future work, as well as to exchange research ideas by researchers, developers, practitioners, and users in grid computing, web services, and cooperative computing, including theory and applications. GCC 2003 received more than 550 papers from 22 countries and regions such as China, USA, Japan, Australia, UK, Germany, Korea, Hong Kong, and so on.

The six papers selected went through a careful review process in order to ensure the high quality of the issue. They came from Japan, USA, and China, and made wide and systematic research on Grid and cooperative computing.

In the paper 'Dominating-set-based searching in peer-to-peer networks', Chunlin Yang, Xiuqi Li and Jie Wu propose a dominating-set-based peer-to-peer searching algorithm to maximise the return of searching results, while keeping a low cost for both searching and creating/maintaining the connected-dominating-set (CDS) of the peer-to-peer network. Simulation showed that dominating-set-based searching returned more documentations than random walk searching, and kept the

searching cost low because the searching space is restricted to dominating nodes.

The paper 'Optimal methods for object placement in coordinated en-route web caching for tree networks and autonomous systems' by Keqiu Li and Hong Shen addresses the problem of computing the optimal locations for placing copies of an object among the en-route caches in coordinated en-route web caching for tree networks, such that the overall cost gain is maximised. The authors formulated this problem as an optimisation problem, under both unconstrained and constrained condition, presented and implemented a solution for coordinated en-route web caching for autonomous systems, based on the solution for coordinated en-route web caching for tree networks.

Minyi Guo's paper 'One-dimensional I test and direction vector I test with array references by induction variable' presents theoretical aspects, to demonstrate the accuracy of the Interval Test (the I test and the direction vector I test), to be applied for testing data dependence. Also, it is proved from the proposed theoretical aspects that under a specific direction vector  $\vec{\theta} = (\theta_1, \dots, \theta_d)$  there are integer-valued solutions for one-dimensional arrays with sub-scripts formed by induction variable, and under other specific direction vectors there are no integer-valued solutions. The proposed theorems can improve the precision of data dependence analysis for one-dimensional arrays with references formed by induction variable.

Hai Zhuge's paper, 'Algebra model and experiment for semantic link network', investigated a Semantic Link Network (SLN) that contains rich semantic links and reasoning rules, proposed an algebra model that supports semantic reasoning and the management of SLN by using a semantic matrix, and presented the experiment for putting the SLN into practice. Moreover, this paper has also put

forward a solution to efficiently manage the huge SLN by dividing the whole SLN into partitioned semantic matrices.

Zhaohui Wu's paper 'DartGrid: a framework for grid-based database resource access and discovery' describes a database-oriented resource management middleware DartGrid, which offers solutions to a series of Grid resource management problems, such as resource access, semantic discovery and dynamic integration.

The paper ' $C^2$ : a new overlay network based on CAN and chord' by Wenyuan Cai et al. presents a new overlay network  $C^2$ , based on CAN and Chord. It is primarily designed for dynamic environment in which peers join and

depart the network frequently.  $C^2$  is decentralised, scalable, and fault-tolerant. What distinguishes  $C^2$  from many other peer-to-peer data-sharing systems is its low computation cost and high routing efficiency in dynamic network.

Finally, we would like to thank the authors of above papers published in this special issue, and regret that more papers could not be included. We appreciate the thoughtful work of the reviewers for their collaboration and work. We also want to thank Professor Laurence T. Yang, Editors-in-Chief of IJHPCN. His generous help and support has made this special issue a reality.