

Special Issue on Recent Advances in Network and Parallel Computing

Guest Editorial

THIS special issue is associated with the International Conference on Network and Parallel Computing (NPC 2008), which was held in Shanghai, China in October 2008. The purpose of this special issue is to provide a channel to guarantee fast publication of extended versions of the high-quality conference papers on network and parallel computing in the Journal.

Papers for this special issue were solicited not only from participants presented at the NPC 2008 and Workshops, but also from authors with original high-quality contributions that have neither been published in nor submitted to any journals or refereed conferences. Papers were sought that encompassed interdisciplinary research in the sense of applying novel network and distributed computing techniques to unsolved problems, such as wireless, P2P, high-performance computing, network coding and etc.

We received 21 papers from around the world and selected 10 to be included in the special issue after a thorough and rigorous review process. The presented papers span a number of topics and are assembled into 4 categories, i.e. parallel computing, wireless networks, steam media and security.

In recent years, many new types of parallel computing such as grid computing and cluster computing become the hot research topics. In "Continuance Parallel Computation Grid Composed of Multi-Clusters", Q. K. Chen introduces a Continuance Parallel Computation Grid (CPCG) architecture in the dynamic network environment. It makes use of multi-agent structure, fuzzy theory based control, self-learning method, data parallel computing and migration mechanism to design the CPCG model that can support the continuance data parallel computing. In "FAPP: A New Fairness Algorithm for Priority Process Mutual Exclusion in Distributed Systems", S. Kanrar et al. proposes a new token based Fairness Algorithm for Priority Processes (FAPP) that addresses both the issues and keeps the control message traffic reasonably low.

Wireless network has been widely applied in many domains. In "LBLS: A Locality Bounded Hashing-Based Location Service", R.N. Rao presents a new location service, named LBLS (Locality Bounded Location Service) to solve the locality problem with the comparable least communication and storage cost. In "LDB: Localization with Directional Beacons for Sparse 3D Underwater Acoustic Sensor Networks", H. J. Luo proposes a 3D localization scheme with directional beacons for Underwater Acoustic Sensor Networks (UWA-SNs). By utilizing an Autonomous Underwater Vehicle (AUV) as a mobile beacon sender, the AUV patrols over the 3D deployment volume with predefined trajectory. Theoretical analysis and simulation results show high localization accuracy. There are still many research issues to be solved in wireless network itself. In "Map Synchronization and Alternatives Optimization for Firefighters Cooperative Decision Support in Ad Hoc Networks", Y.W. Chen et al. presents an effective map synchronization scheme and a method to solve the problem of assistance alternative optimization of firefighter cooperation decision support in mobile ad-hoc networks. The proposed process will increase system effectiveness safety. In "Relay Aided Wireless Multicast Utilizing Network Coding: Outage Behaviour and Diversity Gain", C. Zhi et al. define cooperative multicast schemes to achieve higher spatial diversity. They developed a network coding based cooperative multicast scheme (NCBC), which exploits limited feedback. Simulation results demonstrated significant gains over the direct multicast transmission.

Steam media becomes a very important application of network. We have two papers focusing on this topic. In "An Incentive Mechanism for Tree-based Live Media Streaming Service", S. Yang et al. addresses the incentive problem in P2P live streaming, which very important when there are free-riders. They proposed a rotation-based incentive mechanism for overlay tree structure. The rotation plus reenter method is simple and effective. In "A Programmable Architecture for Layered Multimedia Streams in IPv6 Networks", B. McAllister et al. introduces programmable network functionality (PNF) into QoS-enabled IPv6 networks. They integrate FPGA-based hardware devices into intermediate network devices. Thus improves efficiency and flexibility in multimedia transmission.

Security is always an unavoidable issue in network and its application. In "Novel Stream Cipher Using SCAN and Variable Ordered Recursive CA Substitutions and Its DSP+FPGA Implementation", R. J. Chen et al. presents a new method of stream cipher using 2-D hybrid cellular automata (CA). The scanning pattern for the CA is generated using an image pre-processing language (SCAN) from a short set of primitives. The hardware implementation of DSP plus FPGA is feasible and helpful for image security. In "A Novel Data Mining-Based Method for Alert Reduction and Analysis", X. Fu et al. gives a novel data mining-based method for alert reduction and analysis. They build a real-time framework to filter false IDS alerts using outlier detection. The prototype enhances the efficiency for handling IDS alerts.

We believe that this Special Issue will contribute to enhancing knowledge in many diverse areas of the network and parallel computing. In addition, we also hope that the presented results will stimulate further research in these areas.

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quality:

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