Foreword and Editorial

International Journal of Grid and Distributed Computing

We are very happy to publish this issue of an International Journal of Grid and Distributed Computing by Science and Engineering Research Support soCiety.

This issue contains 16 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “An Approach to Web Service Dynamic Replacement” proposes a dynamic replacement approach based on the cloud model. It adopts the cloud model to transform the quantitative QoS to qualitative QoS for the uncertainty computation and judges the uncertainty level by setting the corresponding service QoS parameters. When a member service with unstable QoS is found, it will be replaced with the candidate service with the same or better QoS to stabilize the QoS of the entire software.

Paper “Credible Nearest Neighbor Query in Uncertain Network” put forward the concept of the credible nearest neighbor query in uncertain network, and gives credible k-nearest-neighbor query algorithm. Credible distance is used to describe the distance between nodes in uncertain network. Fuzzy simulation is adopted to decrease the problem difficulty. Network distance constraint is used to reduce the searching space. Priority queue is used to fast find k-nearest-neighbor query result.

The paper “A Traffic and Power-aware Algorithm for Virtual Machine Placement in Cloud Data Center” presents an algorithm that improve communication performance by reducing overall traffic cost of virtual machines and while energy by increasing CPU utilization. Because of the convenient for cloud customers, the demand for cloud resource grows, thus make cloud data center enlarge and energy consumption becomes a critical issue for cloud provider as well as the carbon dioxide emission. In order to save energy, virtual machines are consolidated to reduce the number of servers required to host them. However, for applications that require communication among services, this migration can increase the latency which causes bad effect on their performance.

The paper “Cost-Aware Scheduling Algorithm Based on PSO in Cloud Computing Environment” proposed a modified algorithm based on PSO to solve the task scheduling problem in cloud computing environments. Specifically, by adding a cost-aware fitness function to quantify the cost of resource usage, along with the fitness function for time cost, the method can achieve the goal of minimizing both the processing time and resource usage, and therefore reach a global optimal solution.

The Authors of “Optimization of Loadometer Allocation with Internet of Things in Bulk Port” focus on loadometers allocation in bulk port, it proposes an optimization solution with Internet of Things. Primary method of this solution is upgrading devices with RFID technology. This solution provides more efficiencies and accuracies cause of reducing manual
works and collecting dynamic parameters for queuing model. This paper also shows a simple case study of bulk port in southern China.

In “A novel intelligent Sleep Wakeup Scheduling algorithm to the Area Coverage problem in Wireless Sensor Networks”, focus on the area coverage problem. It uses a cluster-based coverage control scheme and propose HSSAC protocol to maintain sensing coverage by keeping a small number of active sensor nodes and a small amount of energy consumption in a wireless sensor network. In this protocol, proper active sensor set can be determined using the harmony search algorithm. Due to the proposed protocol accuracy in selecting the active sensor set, it is able to provide the acceptable coverage rate in sparse deployment. As the result of increasing nodes density, the proposed protocol decreases the number of active nodes in the sensor networks. Thus, the proposed protocol decreases the energy consumption of the networks and prolongs the network lifetime.

In the paper “Performance Analysis and Coding Strategy of ECOC SVMs”, analyzed the factors affecting the generalization performance of ECOC SVMs. From the analysis, it is believed that in real classification tasks, the performance of ECOC depends on the performance of the classifiers corresponding to its coding columns, which is irrelevant to the mathematical characteristics of the ECOC itself. The essence of ECOC SVMs is how to construct an optimal voting machine consisting of a number of SVMs, how to choose Sub-SVMs which have better generalization ability, and how to determine the number of Sub-SVMs taking part in voting, that is the most important issue. Data sets including “Segment” are selected for test. All the ECOC code columns are constructed using an exhaustive technique. A Sub-SVM is trained for each code column, and the generalization ability of each Sub-SVM is evaluated by classification intervals and error rates estimated by cross validation. Then, all the ECOC code columns are sorted by the generalization performance of Sub-SVMs. Three categories of ECOC SVMs, including superior, inferior and ordinary categories, are constructed from the sorted ECOC code columns, by using forward, backward and original sequences.

The paper “A Multi-Criteria QoS-aware Trust Service Composition Algorithm in Cloud Computing Environments” proposes a global trust service composition approach based on random QoS and trust evaluation, considering the multi-criteria assessment of service quality. Firstly, statistical test is employed to remove the uncertain outliers and to estimate the ideal value of the collected objective QoS data. Secondly, subjective QoS evaluations of providers and users are aggregated according to direct trust and recommended trust. Finally, services are composed through global QoS optimization.

The Authors of “A Low Cost Two-Tier Architecture Model for High Availability Clusters Application Load Balancing” proposes a design and implementation of a low cost two-tier architecture model for high availability cluster combined with load-balancing and shared storage technology to achieve desired scale of three-tier architecture for application load balancing e.g. web servers. The research work proposes a design that physically omits Network File System (NFS) server nodes and implements NFS server functionalities within the cluster nodes, through Red Hat Cluster Suite (RHCS) with High Availability (HA) proxy load balancing technologies. In order to achieve a low-cost implementation in terms of investment in hardware and computing solutions, the proposed architecture will be beneficial. This system intends to provide steady service despite any system components fails due to uncertainly such as network system, storage and applications.
In “Behavior-oriented Modeling and Visualization for web Service Composition”, proposed a visualization method to describe service composition models through animation to solve the difficulty in the communication and expression of the requirement information in complex web service composition. This method employed the requirement behavior model established by the behavioral description language as the research object. In the execution mechanism of the animation, state machine and state block were utilized as the execution model and description model respectively. Each state migration was corresponded to a behavior that calls for visualized description. The motion of figure was controlled by associating each migration in the state block model with an action primitive through an association element. The visualization of the requirement behavior model was thereby realized. The advantages of the method lie in that the requirement changes are avoided. This attributes to that the missing and incorrect potential requirements are observable for the users with different backgrounds owning to the intuition of animation. Moreover, the correctness of the requirement animation is ensured through a series of detection on the BDL model.

The paper “Research on large-scale Adhoc routing protocols” proposed the use of a passive clustering based routing reply radio RBPC routing protocol, the protocol in the PC to the network clustering on the basis of the established through radio RREP packet routing, so that a large number of potential data source node need not start routing build process, reduce the number of which is within the scope of the whole network routing, and eventually reduce the overall cost control.

Paper “Energy Efficient Backbone Formation Using Particle Swarm Optimization Algorithm in Wireless Sensor Networks” proposes energy efficient connected dominating set (CDS) scheme in wireless sensor networks which prolongs the network lifetime. In proposed algorithm, it uses an optimal weight based on the minimum residual energy and maximum effective degree of nodes for backbone formation to prolong the network lifetime. The optimal weight coefficients are determined using particle swarm optimization (PSO) algorithm. Then, when selecting nodes for dominating set (DS) formation, these coefficients will be used. If the degree of a node is more than coefficient of degree constraint and energy of a node is less than coefficient of energy constraint, the node won’t be selected for DS formation. The message and time complexity of the proposed algorithm is O(n).

The paper “DSRTrust: A Dynamic Trust Model of Distinguishing Service and Recommendation for Internet-based Virtual Computing Environment” analyzed multidimensional decision factors related to the evaluation of autonomous node, such as user satisfaction, reward function, punishment function and time decay function. According to the network connection degree of node, the model assigns a new trust weight that specifically describes the relationship between network and trust in iVCE. It then proposes a dynamic quantitative model for measuring different kinds of trust.

The paper “A Comprehensive Performance Tuning Scheduling Framework for Computational Desktop Grid” presents a performance tuning framework for computational jobs in a desktop grid that employs an execution monitoring and performance tuning mechanism in addition to an adaptive scheduling scheme. The main emphasis of this paper is to provide an in-depth coverage of the requirements and design of the major elements of the CPTF with a detailed experimental study.
The Authors of “Study on IOT based Architecture of Logistics Service Supply Chain” took LSSC as the object of the research and analyzed the effect of IOT on logistics/service flow, information flow and capital flow in LSSC and the effect on the structure of LSSC. On this basis, it built the architecture of LSSC based on IOT. The study on relationship between IOT and LSSC will be concentrated on the following aspects.

In “Task Scheduling Based on Degenerated Monte Carlo Estimate in Mobile Cloud”, introduced degenerated Monte Carlo estimate and formulate the scheduling strategy, DMCE. Comparisons with Max-Min, Min-Min and IGA show that the strategy is applicable for large scale task scheduling in mobile cloud as it not only has little accumulative effect and low makespan, but also keeps relative load balancing.

February 2014

Osvaldo Gervasi, University of Perugia, Italy

Editors of the February Issue on
International Journal of Grid and Distributed Computing