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 27 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 “Role-based Access Control Using Ontology in Cloud Storage” sets up the Role-based Access Control using Ontology and domains in Cloud Storage (DOnto_RBAC), which could provide a concise and effective strategy for service providers (isp). According to the characteristics of access control in cloud storage, based on the standards (called CDMI), this paper adds Domains and Time constraints of roles into RBAC. With ontology technologies and the OWL language, this paper establishes ontology model including entities’ descriptions and strategies to realize reasoning of multi-domain access control permissions.

Paper “Research on Multi-tenant Replication Consistency Based on Quorum NRW System” summarizes the left change and the right change modes according to the differences changes, and proposes Multi-tenant Quorum NRW system which transitive left change method and transitive right change method online. Multi-tenant Quorum NRW system can ensure strong consistency in condition of $R + W > N$.

The paper “Security Vulnerability and Robust Security Requirements using Key Management in Sensor Network” discusses various constraints available in sensor network, vulnerability through the existence of various security attacks at each layer for the communication and lastly the security requirement using the key management. Here it presents the public key management using Elliptic Curve Cryptography to ensure robust security in sensor network environment.

The paper “On the Scheduling Algorithm for Adapting to Dynamic Changes of User Task in Cloud Computing Environment” proposes a new scheduling algorithm for adapting to dynamic changes of user task. This algorithm utilizes DAG diagram to establish association relation between the cloud computing tasks. When a revocation task appears, algorithm checks every subtask related revocation task, then uses a cost function to determine whether or not need to remove. After removing each task, algorithm will updates the DAG and uses the Min-Min algorithm to perform scheduling.

The Authors of “A New Clustering Model Based on Word2vec Mining on Sina Weibo Users’ Tags” propose a new clustering model focusing on users’ tags people choose to describe themselves. First, it will study the characteristics of Sina Weibo tags of users, which are the foundation of the new clustering model. Second, it will use the word2vec tool to cluster Weibo users based on their tags and verify the accuracy of the results.
In “Control Strategies for DFIG Based Grid Connected Wind Energy Conversion System”, deals with the modelling and control of a doubly-fed Induction generator (DFIG) based grid connected wind energy conversion system. Back to back Pulse width modulated insulated gate bipolar transistors (IGBT) based voltage source converters (VSC) have been used for the control. The complete mathematical analysis of stator flux oriented control and stator voltage oriented control of DFIG based wind system has been done. Maximum power tracking has been done through rotor speed control. The proposed electromechanical system is modelled and simulated in MATLAB using Simulink and Sim power system toolboxes.

In the paper “SH-Sim: A Flexible Simulation Platform for Hybrid Storage Systems”, proposes SH-Sim for hybrid storage research. SH-Sim is a hybrid stor-age simulation built based on DiskSim with new components flash model and hybrid storage manager. It has an accurate hardware simulation including HDD and SSD, which can flexibly support flash of various types. Besides, SH-Sim has a flexible hybrid storage manager which can support different hybrid policies, so SH-Sim is a good tool to test and compare the hybrid storage algorithms for researchers.

The paper “Three Levels Load Balancing on Clouds” propose a load balancing method-Minsd (Minimize standard deviation of Cloud load method) and apply it on three levels control: PEs (Processing Elements), Hosts and Data Centers. Simulations on CloudSim are used to check its performance and its influence on makespan, communication overhead and throughput. A true log of a cluster also is used to test the method. Results indicate that the method not only gives good Cloud balancing but also ensures reducing makespan and communication overhead and enhancing throughput of the whole the system.

The Authors of “Design and Implementation of Metadata Cache Management Strategy for the Distributed File System” does a research on the cache technologies used on global distributed file system, combines with multi-user parallel file system cappella that it developed, and propose a new metadata cache management policy. The policy is easy and efficient, not only improves the performance of MDS, decreases the user’s delay, but also controls the consistence of metadata cache.

In “Detecting Denial of Service Attacks by Analysing Network Traffic in Wireless Networks”, applied three types of denial-of-service (DoS) attacks and implemented in three different nodes on three different environments. The IDS system is designed in such a way that it can be reused very easily. The IDS is written completely in Java.

The paper “A Cloud-computing-based Resource Allocation Model for University Resource Optimization” introduced cloud computing ideas and proposed a cloud-computing-based resource allocation model to conduct a preliminary exploration and research on this issue. It first formulated the resource allocation problem, and then proposed the resource allocation concept model and its corresponding application model in universities. Based on the proposed model, it further expanded detailed analyses and descriptions on resource definition and description, resource allocation rules and methods, resource management mode, and a general mathematical model of resource allocation optimization in university.

Paper “An Energy-efficient Task Scheduler in Virtualized Cloud Platforms” present a novel virtual machine scheduling approach, which the scheduler allows virtual machines to obtain extra CPU shares if they were frequently blocked by I/O interrupted recently. In this way,
I/O-intensive tasks will have more chances of being scheduled so as to compensate their performance losses caused by I/O operations.

The paper “Comparative Study between PI and Resonant Controllers for PV Grid-Connected Inverter” proves that PI controller is not a good solution for controlling injected currents to the grid because it generates a phase difference between current injected and grid voltage; this means that a reactive power is introduced to the grid. By substituting PI controller by resonant controller, to control injected currents to the grid, a power factor close to zero has been obtained. By using resonant controller, third harmonic component magnitude has been decreased more than 10 times less than PI controller.

The paper “Predictive Routing for Mobile Sink Routing Algorithm” proposed the Minimum energy consumption relay node which plays a important role to broadcasting the estimated sink’s location information to the nodes which take data packets to establish the efficient routing. Meanwhile the periodic broadcast scheme to provide the sink’s location information is broadcast to entire network in order to increase the data packet delivery ratio.

The Authors of “Power Balance Protection Using Long-distance Discretization Equation for EHV Transmission Lines” proposes a discretization equation model, analyzes the protection of EHV transmission lines with shunt reactors by applying power balance principle and then the power balance protection criterion is determined. The power balance protection method, which is based on discretization equation of long-distance transmission lines, maximizes the use of the fault information such as voltage and current, etc. In this way, the fault of EHV transmission lines with shunt reactors can be removed accurately and quickly. On the other hand, this method is more convenient for modern microprocessor protection to process the discrete data and improve the power system performance after the criterion of power balance protection is determined.

In “Defending of Trusted Access Control in Cloud Computing”, uses the approach of two layer of encryption, the time of running at the cloud is superior to that at the owner in view of the fact that the cloud performs encryption of fine grained while the owner only carries out coarse grained encryption.

The Paper “Coordination Mechanism and Negotiation Model to Resolve Conflict of Communication Virtual Service in Information Network Corporation” analyzed the features of large, complex and service virtualization in the information network corporation. Based on the organizational structure, the coordination mechanism was designed to describe the collaborative relationship between the group and subsidiaries. Based on the public resource conflict resolution, the negotiation model was established to realize the coexistence of the fixed allocation and the dynamic allocation.

In the paper “A Two-Phase Gaming Model for Resource Pricing in Elastic Cloud Environments” proposes a gaming theory based cloud resource pricing model, in which a cooperative gaming model is applied to optimize the resource benefits and non-cooperative gaming model is used to balance the user’s costs and provider’s benefits. Theoretical analysis is presented to validate the correctness of the proposed gaming model, and extensive experiments are conducted to investigate the effectiveness of the proposed resource pricing mechanism.
In “Multiple Selective Regions Image Cryptography on Modified RC4 Stream Cipher” gives an initiation of an amending technique for multiple selective region image cryptography based on both RC4 stream cipher and chaos. This approach is derived from the standard RC4 algorithm. But currently RC4 is vulnerable. So for making image encryption technique more secure, it has proposed RC4 with chaos.

The paper “A Study on Strength of Sina Weibo” proposes a method to evaluate and compute the influence of one node in sina Weibo. An algorithm named MicroV is proposed to quantify the strength of one user in the microblog space.

In the paper “Method of Fault Detection in Cloud Computing Systems” proposes fault models about cloud from four aspects. Then an improved C4.5 algorithm is implemented to detect the fault.

In “A New Innovation on User’s level Security for Storage Data in Cloud Computing” proposed the new algorithm to give control to users for their data security. This paper also presents the hybrid model for cloud in this model two different techniques are used compression and encryption. For compression it used the existing method and to encrypt I used own encryption algorithm. It know that cloud server contains very huge amount of data and multiple user accesses a cloud server at the same time so this hybrid model reduce the size of data that saves the storage space of cloud server and increase throughput of cloud computing.

The paper “Research of Remote Attestation Model and Protocol of Interactive Terminals of Smart Grid” proposes a remote attestation model sponsored by attester which is based on the binary certificate and combined with the practical application environment. Also, the remote attestation protocol is designed. The model can ensure the legitimate identity of the communicating parties and the accurate verification of terminal platform integrity, and guarantee that only the terminals which has trusted identities and trusted operating environment can access the information intranet.

In the paper “Recommending Optimal API Orchestration with Mining Frequent Mashup Patterns” presented MDOM can visually describe the orchestration mode among Open APIs invoked in mashup applications. On the basis of MDOM features, a directed graph which can express MDOM in formal description –MDOP is also proposed. An algorithm, called FSOMM, is developed specially for discover frequent mashup patterns by combining the strategies employed in Apriori-based and pattern-growth-based algorithms for mining frequent sub-graphs, and the features of MDOM as well.

In “Optimal Control Model for Attack of Worms in Wireless Sensor Network” propose security mechanisms using three different epidemic models with proper countermeasure which depends on the incidence of worm infections. A special crashed compartment is introduced that includes the nodes which crash out due to induced infection or reason other than the attack. The crashed class is expected to provide a new view-point which can help in optimizing the level of infection and of corresponding recovery of sensor nodes in the wireless sensor network. The past and present information of the worms represented in the form of Information variable and a Control function to minimize the attack of malware in WSN is taken into account in the different epidemic models developed.
The paper “Study on Very Fast Transient Overvoltage of Closing No-load China UHV Transmission Demonstration Project Jindongnan-Nanyang-Jingmen 1000 kV Transmission Lines” analyzes the generation mechanism and propagation characteristics of GIS system no-load long-term closing voltage in detail. Then use ATP-EMTP electromagnetic transient simulation software to model UHV GIS system no-load long-term closing very fast electromagnetic transient process, select the desired model and carry through parameter settings, and build simulation calculation model of UHV GIS system no-load long-term closing very fast transient overvoltage.

In the paper “Parallelization of Point Operations on Conic Curves over Finite Field GF(2^n)” proposes four parallel algorithms for conic curves cryptosystem over finite field GF(2^n). One parallel algorithm of modular-multiplication is designed by analyzing its data dependency and making some modifications of several steps. In order to figure out the average runtime, it considers the probability distributions of different cases to compute the mathematical expectation. The operations of point-addition, point-double and point-multiplication, three fundamental point operations in conic curves cryptosystem over finite field GF(2^n), are paralleled based on this parallel algorithm of modular-multiplication and two parallel algorithms it proposed before. Time complexities and speedup ratios of the parallel algorithms and the sequential algorithms are calculated to make the quantitative comparison.

June 2014

Osvaldo Gervasi, University of Perugia, Italy

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