Guest Editorial: Special Issue on Cloud Computing*

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Cloud computing has been gaining more acceptance thanks to the benefits it offers to customers including increased scalability, higher reliability, cost reduction, and higher accessibility. For example, customers such as small sized companies are able to offload the important tasks of data storage and computation because of these services offered by cloud computing providers (e.g. Amazon, Flexiscale, GoGrid, etc.). However, cloud computing still faces many challenges in its three different segments: "applications", "platforms", and "infrastructure", not the least of which are security-related challenges. Security (more specifically, the integrity and confidentiality of data and computation) has been agreed to be the most important issue preventing from the popular adoption of cloud computing by companies.

This special issue on "Cloud Computing" attempts to highlight some of the latest research addressing those challenges. It collects a series of papers on secure cloud computing architecture [1], collaborative applications with mobile cloud [2], capacity planning model for cloud market [3], quality of convergent services [4], and mobile learning in the cloud [5]. More specifically:

- The paper of Fukushima, Kiyomoto and Miyake [1], titled "Towards Secure Cloud Computing Architecture - A Solution Based on Software Protection Mechanism", presents a novel approach for solving the essential issue of cloud computing: how to protect a program running in an untrusted cloud computing environment. They apply a separation technique to the program and divide it into two pieces: a user program and a protected program. Their security analysis shows that both internal and external attacks require exponential computational costs;

- Chang and Hung's paper "Developing Collaborative Applications with Mobile Cloud - A Case Study of Speech Recognition" [2] presents a paradigm to guide the design of the following: the system architecture, the principle for partitioning applications, the method for offloading computation, and the control policy for data access. They argue that the proposed paradigm provides a unified solution to the performance and privacy issues, with a case study, a cloud-assisted speech recognition application, to illustrate our experimental results;

- Shang, Wang, Jiang, Wu, and Zheng's paper on "An Intelligent Capacity Planning Model for Cloud Market" [3] proposes an intelligent capacity planning model to decide how many and which compute instance is needed to ensure service level object. Their model can save more money but the serving level object does not degrade;

- The paper of Luo, Wang and Zhu [4], titled "Self-aware Services of NGSDP: Using Bayesian Networks for Measuring Quality of Convergent Services", describes a quality engine, which is the central component of our proposed architecture of self-aware convergent services of NGSDP. The quality engine combines domain independent statistical analysis and probabilistic reasoning technology (Bayesian networks) with domain dependent measurement collection and evaluation methods;

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- Yee, Chia, Tsai, Tiong and Kanagasabai's paper on "Cloud-based Semantic Service-Oriented Content Provisioning Architecture for Mobile Learning" [5] proposes a generic semantics-based service-oriented infrastructure and show how semantic technologies, when used together with a cloud-based SOA, can provide mobile users with a fresh learning experience.

Besides the above papers for the special issue on cloud computing, we also include two regular papers [6, 7] in this issue. Both of these two papers address the security issues in general systems that can potentially have value for systems used in cloud computing. More specifically:

- Korkmaz and Tek's paper on "Analyzing Response Time of Batch Signing" [6] analyzes how the batch formation strategies and batch sizes impact the response time and verifies their analytical results obtained under the assumption of non-bursty arrivals;

- The paper of Claycomb and Shin [7] on "Extending Formal Analysis of Mobile Device Authentication" uses BAN logic to show that device authentication using a single channel is not possible, and propose a BAN logic extension to help prove correct existing authentication protocols.

Finally, we would like to congratulate on the meaningful commencment of *Journal of Internet Services and Information Security (JISIS)*. It is indeed our honor and pleasure to open *JISIS* with this special issue. With the Editor-in Chief, Dr. Ilsun You, we wish to extend special thanks to all authors, reviewers and editorial members for their invaluable contribution, without which this special issue cannot be reality.

References

[1] Kazuhide Fukushima, Shinsaku Kiyomoto, and Yutaka Miyake. Towards secure cloud computing architecture - a solution based on software protection mechanism. *Journal of Internet Services and Information Security (JISIS)*, 1(1):4–17, 2011.

[2] Yu-Shuo Chang and Shih-Hao Hung. Developing collaborative applications with mobile cloud - a case study of speech recognition. *Journal of Internet Services and Information Security (JISIS)*, 1(1):18–36, 2011.

[3] Shifeng Shang, Bo Wang, Jinlei Jiang, Yongwei Wu, and Weimin Zheng. An intelligent capacity planning model for cloud market. *Journal of Internet Services and Information Security (JISIS)*, 1(1):37–45, 2011.

[4] Zhi Luo, Junping Wang, and Qiliang Zhu. Self-aware services of ngsdp: Using bayesian networks for measuring quality of convergent services. *Journal of Internet Services and Information Security (JISIS)*, 1(1):46–58, 2011.

[5] Keng Y. Yee, Yilun Chia, Flora S. Tsai, Ang Wee Tiong, and Rajaraman Kanagasabai. Cloud-based semantic service-oriented content provisioning architecture for mobile learning. *Journal of Internet Services and Information Security (JISIS)*, 1(1):59–69, 2011.

[6] Turgay Korkmaz and Suleyman Tek. Analyzing response time of batch signing. *Journal of Internet Services and Information Security (JISIS)*, 1(1):70–85, 2011.

[7] William Claycomb and Dongwan Shin. Extending formal analysis of mobile device authentication. *Journal of Internet Services and Information Security (JISIS)*, 1(1):86–102, 2011.

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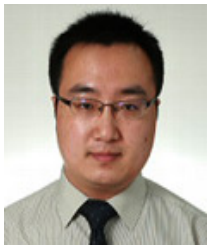

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