
Preface

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Biographical notes: Leonard Barolli is a Full Professor at the Department of Information and Communication Engineering, Fukuoka Institute of Technology (FIT), Japan. He received BE and PhD from Tirana University, Albania and Yamagata University, Japan in 1989 and 1997, respectively. He has published more than 800 papers in journals, books and international conferences. He has served as a Guest Editor for many journals. He has served as PC Chair and general Chair of many international conferences. He is Steering Committee Co-Chair of IEEE AINA, CISIS, IMIS, BWCCA and NBiS International Conferences. His research interests include ubiquitous computing, next-generation networks, wireless sensor networks, MANETs, P2P system and intelligent algorithms. He is a member of IEEE, IEEE Computer Society, IPSJ and SOFT.

Wenny Rahayu is currently the Head of School of Engineering and Mathematical Sciences at La Trobe University, Australia. She was the Head of Computer Science and Computer Engineering Department. The main focus of her research is the integration and consolidation of heterogeneous data and systems to support a collaborative environment within a highly data-rich environment. She has been a chief investigator of many industrial and international grants. She has published two authored books, three edited books and more than 150 research papers in international journals and proceedings.

This special issue addresses recent advances and research findings for massive processing and cloud storage. With the size of data sets increasing at fast rates, many challenges are arising in the data storage and processing. Such challenges are being addressed through data centres and cloud computing platforms together with new paradigms for parallel processing. For this special issue, we accepted six papers based on their quality and suitability.

In the first paper, Xu An Wang et al. propose two new chosen ciphertext attack (CCA) secure schemes. The first one, which is a public key encryption, proves that security in the random oracle based on the computational Diffie-Hellman (CDH) assumption has almost no additional overhead compared to the traditional secure Elgamal scheme, except one additional modular exponentiation for the decryption. The second scheme, which is a key encapsulation mechanism (KEM), proves that security in the standard model based on a new non-interactive assumption has only two group elements as encapsulation. Thus, the authors solve the open problem of constructing an indistinguishable ciphertext attack secure KEM without pairings based on a non-interactive assumption and with two group elements' encapsulation. To prove the proposed scheme security, the authors develop a new assumption called verifiable CDH assumption. The authors generalize their technique to several existing well-known CCA secure KEMs and show that their new schemes are more efficient than some well-known schemes. The authors also propose a new framework for efficient and secure data outsourcing to the cloud based on their new schemes and present an analysis for framework security.

In the second paper, Jianfeng Wang et al. deal with the problem of user traceability in secure data deduplication system. The authors introduce the concept of user traceability into secure data deduplication. They have designed a novel concrete deduplication scheme called TrDup, which applies traceable signatures and proof of ownership (PoW) on random convergent encryption to achieve user traceability within data deduplication system. Security and efficiency evaluation show that TrDup can achieve the desired security goals, while providing a comparable computation overhead.

In the third paper, Saif ul Islam et al. provide a view of trends for resource utilization, energy consumption and some other important metrics in content distribution network (CDN) evaluation. The authors also present a utilization-aware model for energy consumption in CDN. It is found that internet traffic size and frequency have a considerable impact on CDN metrics. Also, CDN infrastructure size plays an important role in changing CDN behaviour. The authors found that the CDN resources have better utilization if CDN infrastructure is smaller, client request traffic is augmented or intensity of load is increased. The increase in CDN infrastructure size and client requests traffic volume cause an increase in energy consumption. The CDN infrastructure does not impact delay in client request completion. However, end users experience improvement in delays when CDN becomes more mature with higher traffic volumes. The surrogate server caches become smarter by handling more requests, however the increase in infrastructure size and intensity may create a negative impact. The high frequency of client requests may decrease user experience by dropping some client requests.

In the fourth paper, Shigenari Nakamura et al. present sensitivity-based synchronisation protocol to prevent illegal information flow among objects. A transaction can illegally write data to an object after issuing illegal read. The authors present the proposed write-abortion (WA), read-write-abortion (RWA) and flexible RWA (FRWA) protocols to prevent illegal information flow. In the WA and RWA, a transaction is aborted once issuing an illegal write and illegal read, respectively. In the WA, some reads are meaninglessly performed. In the RWA, some reads are lost. In the FRWA, a transaction is aborted with some probability once issuing illegal read. The authors introduce an object sensitivity concept to decide on the abortion probability. The authors show that the execution time of each transaction in the FRWA with object sensitivity is shorter than the WA and more number of reads can be performed than the RWA.

In the fifth paper, Hae-Duck J. Jeong et al. focus on detecting and analysing DDoS attacks on internet which have been shown to be geometrically increased. The authors present ATMSim, which is a Hadoop and self-similarity-based simulator for collecting, detecting, measuring and analysing anomalous traffic. The self-similarity estimation techniques are used to analyse the behaviour of the collected and generated normal and anomalous traffic. This information is used to prove graphically and quantitatively that there is a great difference between the normal traffic and the anomalous traffic in terms of self-similarity.

In the sixth paper, Kun Ma and Bo Yang propose a new live entity resolution approach to find duplicates from the news and tweet data. The authors investigate possible solutions to address live entity resolution in the cloud to make sliding window size adaptive using multistep distance and window size-dependent duplicate count strategy with alterable window step, and find duplicates by overlapping boundary objects in adjacent blocks. The experimental evaluation based on the news data on large data sets shows that the proposed approaches have high effectiveness and efficiency.

As we conclude this preface, we give special thanks to Editor-in-Chief of IJWGS Journal Dr. David Taniar for giving us the opportunity to edit the special issue. We would like to thank all authors for submitting their papers and reviewers for their good work to make it possible to publish this special issue. The support from journal manager is appreciated.