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## Introduction

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**Biographical notes:** Quan Z. Sheng is a Lecturer in School of Computer Science at the University of Adelaide, Australia. He holds a PhD Degree in Computer Science from the University of New South Wales and did his post-doc as a research scientist at CSIRO ICT Centre. His main research interests include web services, service-oriented computing, data integration, and pervasive computing. He is the recipient of the Microsoft Research Fellowship (2003–2004). He is a member of ACM and IEEE.

Mark A. Cameron is a Senior Research Scientist at the CSIRO ICT Centre. He has a PhD from the Faculty of Engineering and Information Technology, Australian National University. His research focuses on developing and applying logic on topics in data integration, automated web service composition and RFID networks.

Sherali Zeadally received the BA and MA Degrees in Computer Science from the University of Cambridge, England, and his Doctoral Degree in Computer Science from the University of Buckingham, England, in 1996. He is an Associate Professor in the Department of Computer Science and Information Technology at the University of the District of Columbia, Washington DC. He is a fellow of the British Computer Society (FBCS) and a fellow of the Institution of Electrical Engineers (FIEE), UK. His research interests include computer networks (wired, wireless), mobile computing, network and system security, and ubiquitous computing.

Zakaria Maamar is an Associate Professor in the College of Information Technology at Zayed University in Dubai, UAE. He holds a PhD Degree in Computer Science from Laval University, Canada. He received two IEEE awards in 1999 and 2001. His research interests lie in the areas of mobile computing, web services, and software agents. He has published widely in these areas including papers in well-known journals such as *Communications of the ACM (CACM)* and *IEEE Internet Computing*.

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Radio Frequency Identification (RFID) is a wireless communication technology that uses radio-frequency waves to transfer information between tagged objects and readers without line of sight. This creates tremendous opportunities for linking various objects from the real world. These objects are numbered, identified, catalogued, and tracked.

Although RFID technology has existed for over 50 years, it is only in recent years that this technology is beginning to attract a significant momentum, due to the convergence of lower cost and increased capabilities of RFID tags.

Currently, RFID is emerging as an important technology for revolutionising a wide range of applications including supply chain management, retail, aircraft maintenance, anti-counterfeiting, baggage handling, and healthcare. Many predictions agree that RFID will be worth billions of dollars in new investments. According to IDTechEx, a leading market research and advisory firm, the RFID market will rocket from US\$ 2.71 billion in 2006 to US\$ 26.23 billion in 2016.<sup>1</sup>

While RFID technology provides promising benefits such as inventory visibility and business process automation, several significant challenges such as data processing and management, integration architecture design, security and privacy need to be addressed before these benefits can be fully realised. Many researchers and designers are currently engaged in developing solutions for these challenges. This special issue includes some of the latest research results in this active yet diverse research area. We selected eight best papers that were presented at the IWRT 2007,<sup>2</sup> held in June 2007 at Funchal, Madeira, Portugal. These papers cover a wide range of topics in RFID research that reflect some key directions in this research area.

The invited paper by Riekkii, 'RFID and smart spaces', reports recent developments on *RFID icon*, a new research topic focusing on visual representation of RFID tags. The technology allows an easy-to-use, context-aware, user-controlled, and robust mechanism to discover and select services in smart spaces. The paper by Ling et al. 'RFID-based user profiling of fashion preferences: blueprint for a smart wardrobe', presents an interesting model of a smart wardrobe where RFID is used as an automatic identification tool. Using RFID, the real-world events (e.g., taking a piece of clothing out of a wardrobe) can be captured and used in generating user fashion profile (e.g., daily clothing usage). The paper by Bodhuin et al. 'Supporting document management by using RFID technology', proposes a novel document management service where RFID is also used as an identification mechanism for efficient document tracking.

Supply chain is an important application area for RFID technology. The paper by Melski et al. 'Managing RFID data in supply chains', gives an overview of the current challenges and solutions on RFID data management.

The paper by Waters and Rahman 'RFID and supply chain performance: adoption issues in the retail supply chain', reports the findings on RFID adoption in Australian retail supply chain sector. The paper by Ruta et al. 'If objects could talk: a novel resource discovery approach for pervasive environments', addresses the issue of making RFID tags semantically annotated. Achieving this goal allows RFID objects to be *self-described*, thus improving traceability of products in supply chain.

The paper by Bolotnyy and Robins 'Multi-tag RFID systems', discusses an approach of tagging objects with multiple tags to improve the accuracy of object identification. Experimental results with commercial RFID equipment are also reported. Finally, the last two papers report some valuable experience in real RFID environment. The paper by Dickman et al. 'The Design and Development of an RFID-enabled asset tracking system for challenging environments', presents an overview of an RFID-based asset tracking system called *Phalanx*, developed by Spartan Solutions Ltd. Two asset-tracking commercial case studies (i.e., plant rental and oil/gas services) are also presented. The paper by Golding and Tennant 'Performance testing: evaluating an RFID library inventory reader', reports the results of performance study of an RFID system in a university library environment.

We thank all the authors for considering this special issue as an outlet to publish their research results in the area of RFID. We also would like to thank the referees who provided very useful and thoughtful feedback to the authors. This special issue would not have been possible without their help and selfless dedication. We hope that this collection of papers can help shed some light and generate fruitful discussion on current and future RFID research and development.

Finally, we hope you will enjoy reading these papers as we did.

## Notes

<sup>1</sup><http://rfid.idtechex.com/rfid>.

<sup>2</sup><http://www.iceis.org/iceis2007/workshops/iwrt/iwrt2007-cfp.html>.