Preface

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Biographical notes: Wuhui Chen received his Bachelor's degree in 2008 from Software College Northeast University, China. He received his Master's degree in 2011 from School of Computer Science and Engineering, University of Aizu, Japan. In 2014, he obtained a PhD from School of Computer Science and Engineering, University of Aizu, Japan. Currently, he is a JSPS Postdoctoral Fellowship in University of Aizu, Japan. He is the author of more than 30 peer-reviewed publications on the subject of service computing and cloud computing published in journals and conference proceedings, including *IEEE Transactions on Services Computing* and *IEEE Transactions on Parallel and Distributed Systems*. His research interests include service computing, social network, cloud computing and big data infrastructure.

Richard K. Lomotey is a faculty at the Pennsylvania State University and his research focuses on mobile cloud computing services. He has been researching topics related to: web services, ubiquitous cloud computing, and enterprise mobility workforce support. He has been an editorial team member of the *International Journal of Cloud Computing and Services Science*, a reviewer for several IEEE journals, and has served as a program committee member for several IEEE international conferences. He received his PhD and MSc in Computer Science from the University of Saskatchewan, and BSc in Computer Science from the University of Cape Coast, Ghana.

1   Introduction

At the enterprise level, workflows have been employed to support the execution of business logic and transactional services in multifaceted large-scale systems. Business logic includes assessment, modelling, operational implementation, data and process management. As the services landscape is receiving huge industry acceptance, business process management (BPM) techniques are able to facilitate a systematic approach to making an organisation's workflow more agile, effective and efficient. This means that the combination of BPM and workflows can aid in the achievement of a specific organisational goal; and this can further lead to the discovery and advancement of several other aspects of services computing in the business integration process. To reach this goal however, there is the need to explore important areas of the workflow, such as collaboration between different services, synchronisation of processes and data, services reusability, and process-based design systems. The five submitted papers in this special issue provide deep insights into these areas.

2   Contents of this special issue

This special issue contains five articles submitted as regular contributions to *IJBPIM*.

The first contribution, by C. Wang, Z. Luo, X. Zhang, K. He, and X. Chen, with the title 'An approach to business process registration for enterprise collaboration: using BPEL as an example', is concerned with the process model registration (PMR), to register business process automatically, facilitate the semantic discovery of business processes across enterprises, and promote process interoperation and business collaboration. Their approach is to capture and extract selected metadata and semantics of heterogeneous business processes, and to organise them as a

reference meta-model for PMR. In detail, their approach intends to:

a   separate the administrative information from the syntax descriptions of heterogeneous business processes

b   use administrative information as an index for effective discovery and retrieval of processes in different repositories

c   simplify process interoperation, which is supported by the mappings or transformations between source and target process models in previous work.

Remarkably, their approach takes BPEL as an example to illustrate how to specify the mapping rules and algorithms from one specific modelling language to PMR, and implements a web-based prototype to facilitate automatic registration of process models based on PMR.

The second contribution, by J. Zhang, C. Lee, P. Votava, T.J. Lee, R. Nemani and I. Foster, has the title 'A community-oriented workflow reuse and recommendation technique', and is concerned with process and workflow reuse. This approach is to develop a proactive recommendation technology based on collective NASA Earth Exchange (NEX) user behaviours, to promote and encourage process and workflow reuse within NEX. By modelling Earth science workflow modules as social entities and their dependencies as social relationships, it opens up new vistas for applying social science to facilitate software reuse and distributed workflow development. Importantly, a prototyping system has been developed as a plug-in to the NEX workflow design and management system to aid Earth scientists in discovering and reusing workflow modules and extending them to solve more complex science problems.

The third contribution, by B. Upadhyaya, Y. Zou, and F. Khomh, has the title 'An approach to extract RESTful services from web applications'. It addresses the important question of how to semi-automatically identify and extract reusable web tasks from real world web applications. In detail, their approach is to identify a segment of a web application that a user browses to accomplish a task, and to represent the functionality of the identified segment of a web application as a RESTful service, by analysing the client side user interfaces and HTML representation developed with a combination of JavaScript, HTML and CSS code. Based on the experience made with a considerable number of real world web applications from different domains using the reusable web tasks extraction technique, the paper discusses the potential and the limitations of this approach and suggests several possible improvements of it.

The fourth contribution, by D.E.K. Lelei and G. McCalla, has the title 'Using simulation to explore reciprocal help seeking in a lifelong learning context'. It is concerned with the simulation model as a process, to help lifelong learners receive appropriate support to find peers willing to participate in adaptive help-seeking behaviour. In detail, their approach is to describe a process-based design framework for a simulated graduate school as a focused context for studying lifelong learning issues, and use agent-based and discrete event to model lifelong learners and their interaction in the help seeking process respectively.

The fifth contribution, by S. Pham, R.K. Lomotey, W. Fu, and R. Deters, has the title 'Peer-to-peer mobile data flow in a crop field'. This paper presents agronomic data process management and storage in a mobile architecture. With the recent surge in mobile device ownership, farmers own multiple devices and they expect to synchronise their agro-related data across their multiple personalised devices. However, there are challenges that can hamper the data synchronisation process, such as sporadic wireless network disconnections, heterogeneity in the collected agronomic data, and the need to propagate the data in soft-real time. This paper proposes an algorithm to achieve better performance characteristics in synchronising key-value storage systems in a peer-to-peer environment. This is to aid farmers with a more efficient methodology that aids cross-platform data management. The proposed algorithm extends on the set reconciliation technique where the authors propose a two-phase synchronisation methodology. In comparison with other synchronisation solutions, in particular the invertible bloom filter (IBFSync) and the naïve server transfer of data states, the proposed algorithm has a two-phase design with the first phase doing approximate synchronisation and the second phase doing exact synchronisation. The preliminary evaluation carried out by the authors shows that the two-phase synchronisation outperforms existing set reconciliation techniques such as the invertible bloom filter.

We hope that readers will find the papers of this special issue interesting and inspiring.