Editorial

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Biographical notes: Stéphane Gagnon is a Professor of IT Management in the Department of Administrative Sciences (DSA) at the Université du Québec en Outaouais (UQO), Canada. From 2002 to 2006, he was Professor at the New Jersey Institute of Technology (NJIT). His research is focused on semantic web services and automated process composition, especially as applied to economic and financial analysis solutions. He is active in IEEE and ACM, among others as workshop co-chair of the 1st and 2nd Workshops on Business Services Networks and Workshop on Service Oriented Business Process Integration. He is also active as Vice President Research and Standards of the Integration Consortium. He received a PhD in Technology Management from the Université du Québec à Montréal (UQAM) in Canada.

1 Introduction

A widely recognised trend in business and markets is the push towards the idea of companies and enterprises as networked organisations, which can gain profit from collaborations in the network, improving their flexibility and reducing operational costs. This transformation requires the adoption of more collaborative working practices based on the integration of business processes within a wide community of business partners, suppliers, vendors and public bodies.

In parallel to this trend, service-oriented technologies are transforming the web from an infrastructure for sharing information to a place where the networked organisations can meet to integrate their business interests. Service-Oriented Computing (SOC) is currently the most promising technology supporting the development and execution of business processes that are distributed among the most disparate entities, both within an organisation and across organisational borders.

However, a practical industry-wide adoption of web services, to support the collaboration among networked organisations and the integration of their business process, is still an open challenge. This challenge can be addressed only by a tight integration of service-oriented development within new business models and new ways of management that are able to exploit new technological solutions. Moreover, web service technology is still emerging and, therefore, their industry-wide adoption requires to inject research results within real industry practices, but, even more important, to drive research activities and roadmaps according to industrial needs.

2 Research themes

Business Processes Integration (BPI) is an approach to application development that leverages process semantics in order to build composite solutions merging several business processes. Integration mechanisms may include data exchanges between process endpoints, remote invocation of componentised process activities and the seamless interconnection of workflows between runtime engines. In most cases, the goals of integration are to automate activities, ensure data quality and integrity across processes and improve the monitoring of process execution.

BPI is emerging as one of the most promising applications of web services and the Service-Oriented Architecture (SOA). Implementing Service-Oriented BPI (SOBPI) helps to extend Business Process Management (BPM) by leveraging new integration platforms, among others, the Enterprise Service Bus (ESB) and Business Services Networks (BSN).

Early issues in SOBPI were focused on the development and application of standards such as the Business Process Execution Language (BPEL). Building upon the strong support BPEL has received from the IT industry, the next challenge is to make the whole service/process lifecycle more seamless, intelligent and automated. Emerging research issues include:

- The fusion of BPM and SOA into Enterprise Integration Suites (leveraging ESBs) as a single platform for information, application and process integration.

- The use of semantic web technologies for automated service/process mediation, reconciliation and composition.

- The use of Model Driven Architecture (MDA) tools to ensure service/process platform-independence and reuse.

3 Papers in this Special Issue

The papers in this Special Issue address emerging technical issues in SOBPI. These include primarily service-process adaptability in dynamic settings, modelling techniques and methods and data access through grid-oriented processes.

The first paper, by Mascari and Cavarretta, introduces some new and important rules in process adaptability in BPI. As a key starting point, they address the duality between service providers and services consumers as a basic pattern of service oriented computing. A service oriented approach to business processes and to adaptive interacting processes requires an additional pattern based on, possibly online, the interaction between specification, execution and evaluation of basic processes. These two patterns combine into composed processes: the foundations of complex adaptive services. The management of the dynamics of such services is then obtained by additional processes distributed over the network of interactions of the basic and composed processes. The double triad architecture so obtained is inspired from quark-antiquark models of particle physics.

Continuing on service adaptation, the paper by Brogi and Popescu deals with service-process adaptability. Because of the heterogeneous and evolving nature of business processes, service adaptation is necessary to overcome mismatches between the interacting parties. The long term objective is to develop a general methodology for service adaptation capable of suitably overcoming semantic and behaviour mismatches in view of business process integration within and across organisational boundaries. In this paper the authors show how to adapt a service in order to fulfil a client query requesting a service with certain inputs and outputs. The proposed technique relies on inspecting service execution traces and generates a service contract tailored to the client needs. Service contracts include a description of the service behaviour (expressed by a YAWL workflow) as well as an ontology-annotated signature.

The paper by Wislicki et al. introduces a solution to the problem of integrating relational databases with the data grid architecture and presenting their contents as a purely object-oriented business model. The authors describe a dedicated wrapper constructed with the Stack-Based Approach (SBA) and updatable views concepts. The proposed architecture sustains the grid's transparency and allows a grid user to operate in an object-oriented environment with SBQL – the stack-based query language. The strength of the described wrapper is a possibility of employment of native SQL optimisers. A query entering the front-end of the wrapper (object-oriented business model) can be rewritten according to the powerful SBQL optimisation rules (within the wrapper) and then evaluated in the relational resource environment where appropriate SQL optimisers apply. The paper contains a description of the wrapper and its place in the grid architecture with a query optimisation procedure and an example of such a process.

We then shift our attention to practical cases, with a paper by Iacob et al. The authors have conducted a number of case studies in order to validate the concepts and techniques for service-oriented enterprise architecture modelling. This paper describes one of these case studies, conducted at the Dutch Tax and Customs Administration. It shows how business processes, applications and technical infrastructure can be modelled and related using a generic 'service' concept. It also shows the usage of quantitative analysis techniques to compute the application and infrastructural workloads imposed by the characteristics of the business processes.

Another contribution is on modelling looks at the gap between requirements, models and applications. In their paper, Zhao et al. present two practical paradigms which facilitate domain concepts to be directly used to model business operations. The first paradigm is based on business artefacts and their life cycle. The second paradigm is based on business tasks and their sequencing. They emphasise that model transformations are an effective way to bridge the gap between business level analysis and IT solutions. They present algorithms that transform business process models based on these two paradigms into IT solutions of web service platform. The specific problems addressed in this transformation are:

1   how to generate the implementation code of an optimal size for any arbitrary process model

2   how to preserve the natural structure of business process models in the generated code and

3   how to translate concurrent processes.

Our last paper, by Gannod et al., discusses the generation of 'groundings' (or bindings) to specific Web Services using the Web Ontology Language for Services (OWL-S), which remains the leading standard to describe and specify semantic web services. In this paper, they characterise groundings, describe an approach for generating groundings for a semantic web service and demonstrate how the use of a lightweight interactive development tools can facilitate creation of groundings for a semantic web service.

4   Conclusions

The results presented in these papers have addressed key research issues and clearly demonstrate the promising value of SOBPI and the need for further efforts. We, therefore, plan to revisit these contributions in the light of upcoming ones and hope to build upon the lessons learned and expand this emerging field.