Editorial: web and database technologies in business solutions

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Biographical notes: Rafael Corchuelo is a Reader in Computer Engineering, and he has been with the University of Seville since 1994. He is the Head of the Research Group on Distributed Systems of this University, and he has set up several cooperation and exchange programmes with several European universities and research centres. His research activities focus on distributed systems: quality, fairness, co-ordination, information extraction, and so forth. Currently, he is a member of the editorial board of Springer-Verlag's Journal of Universal Computer Science, and serves as a Reviewer for ACM's Computing Reviews and Wiley's Concurrency and Computation.

Antonio Ruiz-Cortés is a Doctor of Computer Science, and he is with the Department of Computer Languages and Systems of the University of Seville. Before joining the University, he worked for several companies and as an external consultant. His current research interests include requirements engineering and software architecture applied to multi-organisational web-based systems and geographical information systems. He also works as an expert of the Fifth Framework Programme of the European Commission.

Robert Wrembel works as an Assistant Professor at the Poznan University of Technology. In 2001 he received his PhD in computer science (databases). In 1996–2002 he took part in three research projects on databases and four industrial projects in the field of information technology. He paid a number of visits to research and education centres, including INRIA Paris-Rocquencourt (France), University Paris Dauphine (France), University of Klagenfurt (Austria), and recently to Loyola University (USA). His research interests encompass object-oriented databases, views, multiversion databases, object-relational data warehouses, and multiversion data warehouses. His research interests encompass object-oriented databases, views, multiversion databases, object-relational data warehouses, and multiversion data warehouses. Robert Wrembel works also as a Lecturer at Oracle Poland. He is a member of the executive board of the Polish Oracle Users Group and was elected to the board of directors of Europe, Middle East, and Africa Oracle Users Group in 2000–2001.

E-commerce has been heralded as likely to transform the global marketplace, since it is gaining currency at an ever-increasing pace. Mainstream, successful companies are adopting e-business strategies and changing the way they buy, sell and interact with trading partners and customers by means of sophisticated web interfaces that often need to integrate heterogeneous business solutions. By 1999 approximately 62 million people made purchases online, worth approximately $110 billion according to a well-known report by OECD. These figures have expanded exponentially during previous years, and if this expansion continues at this quick pace, then e-commerce transactions will soon account for about 5% of inter-company transactions and retail sales. Obviously, companies need to maximise the benefits of e-commerce in today's internet-driven business environment so as not to risk falling behind their competitors.

Building and running an e-commerce system requires the application of several technologies including web user interfaces, web log mining, data exchange and integration, efficient data storage in databases, and advanced distributed transaction management. The goal of this special issue was to collect a good set of papers on web and database technologies to support business solutions, and we think we have succeeded since it covers a wide range of topics with a constant emphasis on breakthroughs. The research results about which this issue reports allows to build business solutions that can inter-operate from a semantic point of view (Li, Tsai, and Zhang) by means of light-weight transactions (Younas, Eaglestone, and Chao); the model behind them can be built by using a novel data modelling approach (Ruscio, Muccini, and Pierantonio) whose XML documents can be stored and retrieved efficiently using standard relational databases (Kit and Ng). Finally, the results of a real-world experience using web technologies, wireless and mobile communications (Malhotra and Tari) can be a source of inspiration to those interested in real-world, successful business solutions.

The first paper was written by Muhammad Younas, Barry Eaglestone, and Kuo-Ming Chao, from the UK. They have developed a new protocol that allows to coordinate several business objects on the internet by means of light-weight transactions. Such transactions cannot guarantee classical ACID properties, but the authors argue that these properties are not adequate in the context of web-based systems and propose a new set of properties to which they refer to as SACReD. The protocol is both efficient and effective, the authors prove that it helps reduce latency, and significantly improves the resiliency of business transactions in the event of failures or the unavailability of requested services. A formal CCS definition of the protocol is presented so that others can implement it using their favourite technologies.

The second paper is the result of a joint effort between the Arizona State University and the IBM T.J. Watson Research Centre. It was written by Bing Li, Wei-Tek Tsai, and Liang-Jie Zhang, from the US, who address the so-called web services scandal. web services were presented as a technology to integrate business solutions, which according to Fortune 500 IT organisations is the number-one challenge for companies which want to be ahead of their competitors in the e-world. Unfortunately, current web-services protocols are only the first step towards insuring that business solutions can communicate, i.e., they are the alphabet for computers but not the language. The proposal by Li, Tsai and Zhang is a semantic application framework that supports the implementation of automatic business process compositions, and helps materialise the concept of semantic applications, which is a major cornerstone of next-generation applications.

The third paper was written by Davide di Ruscio, Henry Muccini, and Alfonso Pierantonio, from Italy. It focuses on the development of a visual, UML-based language that allows to produce high-level specifications of data-intensive web applications. The specifications are written in XML and can be transformed into executable applications by means of XSL automatic transformations.

The fourth paper reports on a novel approach to store XML documents in traditional relational databases that has been developed by Lau Hoy Kit and Vincent Ng, from Hong Kong. The authors proved that the proposed relational representation of XML documents is more efficient in terms of query performance than other representations found in the research literature. The proposed INode* representation resulted in a very quick retrieval of data via ancestor–descendant relationships that, additionally, uses less storage space than other representations.

The fifth paper comes from Spain, and it was written by Vicente Luque Centeno, Carlos Delgado Kloos, Luis Sánchez Fernández, and Norberto Fernández García. They argue about the unsuitability of current web pages to automate tasks since HTML was designed to suit human user needs, but not computer information needs. Wrapper agents are a common technique to automate the retrieval of structured or semistructured information from web pages, but their maintenance costs tend to be quite high. In this paper, the authors report on several techniques for reducing maintenance costs that are based on industrial standards solely.

The sixth paper was written by Manish Malhotra and Zahir Tari, from Australia. The authors report on an industrial project whose goal was to provide the Australian transport industry with a new system that allows to track and fulfil orders throughout the entire supply chain using wireless technologies. The components of the system include, amongst others, main data and web servers as well as applications on PDAs and mobile phones. The key point of this system is that it allows to monitor orders and lorries on the way, and also allows operators to schedule a route dynamically. The system presented in this paper has proved to increase the performance of the road transport in Australia since it allows companies to offer and deliver orders in a way that insures customer satisfaction and thus maximises the profits of being on the internet.

Last, but not least, the guest editors would like to thank the authors who submitted proposals to this special issue. We got 42 excellent submissions from Algeria, The Arab Emirates, Australia, Canada, China, France, Germany, Greece, Hong Kong, Italy, Korea, Mexico, Spain, Taiwan, UK, and USA. Only six papers passed the first reviewing process, although two additional papers were considered to have potential as regular papers. Only five papers passed the second reviweing round. We undoubtedly are deeply indebted to our reviewers for their hard work.