

Special Issue on Middleware and Network Applications

Guest Editorial

Network technologies are gaining increasing interest and their applications are covering a wide spectrum of applications such as cloud, ubiquitous and sensor applications. However, developing such applications faces many challenges. Currently, middleware frameworks and services are used to relax some of the constraints and tackle the challenges to simplify network applications development, increase usability and enhance QoS among many others.

In the International Symposium on Middleware and Network Applications (MNA 2010) held in Las Vegas, USA, several papers were presented addressing the different aspects of middleware services and network applications. For this issue we invited some of the best papers presented to submit an extended version of their work and we also invited some authors in the field to submit their work. After a careful review, we choose the list you find here.

The first paper in this special issue, authored by Dabholkar and Gokhale, tackle the issue of middleware specialization to fit product-line requirements. Middleware solutions supporting reuse are generalized excessively to become suitable for a wide range of products and applications. However, this introduces high overhead and complexity in integrating and using the available functionalities. Therefore, the authors proposed a model to help specialize middleware features based on the product-line specific needs using reverse engineering. As a result the same general framework is adapted differently to different product-lines thus reducing footprint and overhead.

On another front middleware support is highly needed to support sensor networks and their applications. This is demonstrated in the following two papers addressing sensor network software deployment and specific sensor functions such as target tracking. Horré et. al. tackle the issue of software deployment using application-level quality goals. At the application level, users and application developers require specific system behavior in terms of quality goals. While sensor network designers do not directly address high level requirements. Thus the authors provide a middleware service QARI that provides goal management and helps enable quality-aware software deployment for sensor network applications. The second paper by Makki et. al. addresses another important issue in sensor networks related to decision making and target tracking. Applications on wireless sensor networks have to face the challenges imposed by the nature of the networks including limited power, low processing abilities and limited communications capabilities. Target tracking is one of these applications and the authors propose an intelligent and independent decision making strategy for sensors to monitor targets in an active environment. The proposed method helps conserve energy by intelligently controlling sleep/awake times for services and providing fast wake up mechanisms for sensor nodes to enhance detection accuracy.

The following three papers share one common feature which is addressing issues related to services computing. The main highlights here are the Quality of Service management and enforcement and service abstractions for non-technical users. All of which increases services visibility, usability and quality. Badidi and Esmahi introduce policy-based QoS management as a middleware framework for SOA environments. Here, the framework allows users to utilize services across a variety of platforms and networks while maintaining the required QoS parameters. The QoS federation of brokers uses auction-based ranking to find services capable of satisfying the QoS requirements. Serhani and Benharref also address QoS by introducing techniques to enforce QoS within web services communities using a managerial community of web services. This community monitors and controls services within web services communities to provide the required QoS levels and to help adapt requirements based on current conditions. Finally in Santos et. al. address usability of services particularly to non-technical service clients. The authors present a middleware framework to support service provisioning for non-technical users relieving them from having to deal with technical issues such as data representation, XML coding, etc. The framework also provides support for service discovery, selection and composition.

The articles you will read represent a small sample of what middleware can do and how much it can help in advancing the development, functionality and value of network applications. Middleware has evolved and matured from the simple data exchange facilitator into a well defined highly functional framework for complex distributed systems and network applications. Nevertheless, this is just the beginning and middleware and network applications will further evolve and become an integral part of our lives facilitating many of our daily jobs and enhancing the quality of our lives.

At the end, it is important for us to extend our gratitude to many people, without whom we would not have been able to make this issue happen. To start, we would like to thank the Editor-in-Chief, Prof. Kassem Saleh, for accepting to host this issue in JSW and for all the valuable feedback and support he provided throughout the process. We are also very thankful for MNA 2010 technical program committee and all the reviewers who participated in the process and offered valuable feedback to the authors. Finally we also thank all the authors for their valuable contributions and for their patience throughout the process. I hope they will all be satisfied with this issue and find some value in the contributions we included.

Guest Editors

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Jameela Al-Jaroodi received her Doctor of Philosophy degree in Computer Science from the University of Nebraska-Lincoln, USA, 2004. Since August 2006, she has been with the College of Information Technology, at the United Arab Emirates University, UAE as an Assistant Professor. Prior to joining UAEU, Dr. Al-Jaroodi was a research assistant professor at Stevens Institute of technology in New Jersey, USA. Currently, her research interests involve middleware, distributed collaborative systems, information systems, and mobile and pervasive computing. Her research generated over 60 refereed articles in international Journals and conferences such as Journal of Network and Computer Applications (JNCA), Concurrency and Computation: Practice and Experience, IEEE Transactions on Distributed Systems, and IEEE International Conference on Cluster Computing. Dr. Al-Jaroodi received the Research Excellence Grant from Sun Microsystems, Inc. In addition, several areas of her research were also supported by the United States National Science Foundation (NSF), Nebraska Foundation, and the National Center for Information Technology in Education (NCITE).



Nader Mohamed is an Associate Professor at The Faculty of Information Technology, United Arab Emirates University, Al-Ain, UAE. Before that, he was an assistant professor of Computer Engineering at Stevens Institute of Technology in New Jersey, USA. He worked at the University of Nebraska-Lincoln as a research assistant from May 2001 to May 2004 in National Science Foundation (NSF) supported research and development projects. His current professional interest focuses on communication software and middleware, Internet computing, systems integration, cluster and Grid computing, and sensor networks. His research was published in prestigious international journals such as IEEE Transactions on Parallel and Distributed Systems (TPDS), Journal of Network and Computer Applications (JNCA), Journal of Computer Communications, Journal of Parallel and Distributed Computing (JPDC), International Journal of High Performance Computing Applications, and IEEE Distributed Systems Online. He has 8 years of industry experience in the information technology field as IT Consultant and IT projects leader. He obtained his Ph.D. in Computer Science from The University of Nebraska-Lincoln, Nebraska, USA in 2004. In addition, He obtained The American Management Association's Certificate in Business Management for IT and Technical Professionals, New York, USA.