

## Workshop on Architectures for Complex Application Integration (WACAI 2003)

Piyush Maheshwari  
School of Computer Science  
and Engineering, The University  
of New South Wales, Sydney  
NSW 2052, Australia  
E-mail: piyush@cse.unsw.edu.au

Ian Gorton  
Pacific Northwest National  
Laboratory, Battelle, PO Box  
999, MSIN: K7-28, Richland WA  
99352, USA  
E-mail: Ian.Gorton@pnl.gov

Anna Liu  
Microsoft Australia, 1 Epping  
Road, North Ryde NSW 2113  
Australia  
E-mail: annali@microsoft.com

### Abstract

*The first Workshop on Architectures for Complex Application Integration (WACAI 2003) was held in Dallas, Texas on November 5, 2003. This was a joint workshop with COMPSAC 2003. The major aim of the workshop was to bring together key research ideas and practices in the field of evolving architectures for application integration, with the goal of assessing the state of the art and of identifying the fundamental open issues in the research field. Six papers are accepted for formal presentation. In the last section, a summary is outlined for each paper.*

### 1. Introduction

Integrating information, business processes, workflows and different applications across the enterprise is at the top of many corporate agendas. As business-to-business (B2B) e-commerce becomes more common, how well enterprises work with their suppliers, customers and other trading partners in the value chain will have a dramatic impact on their success and long-term viability.

A typical application integration solution requires broad, reliable, fast and cost-effective connectivity, a scalable software architecture built on some middleware infrastructure, common data standards and formats, reusable integration processes, and a framework to establish security and trust. The problem of application integration is already complex due to diverse requirements of business units and heterogeneity of technologies involved. In addition, integration requirements are continuously evolving. For example, there is growing need for the integration of functional behaviour of the systems, not just the data alone. The flow of data must be bi-directional and often must happen in real time.

It is clear that a large scale, multi-system, enterprise application integration project requires an architectural approach with large amounts of planning and coordination.

Among many other important requirements, an integration architecture must focus on secure, interoperable, robust and reliable design for integrating heterogeneous applications. Currently, architectures based on brokers, hub-and-spoke, component-based or message-oriented middleware are popular, but there are many other alternatives.

New business applications bring together many technology components: the Web, data warehouses, high-speed networking, PKI, wireless, multimedia and others. Putting them together to form a secure, high-performance, integrated system is a challenging task for any organization.

Traditional middleware technologies such as DCE and CORBA, new application servers based on J2EE/JCA standards, frameworks such as .NET, and messaging software are seen as enabling technologies for application integration. Synchronous and asynchronous messaging and other queuing software acts as a transport layer between applications and, in general, provides the ability to receive and deliver messages in a distributed environment. Message-oriented middleware (MOM) such as MQSeries, MSMQ, TIB/RV, JMS, etc. are some data transport mechanisms offered by established IT vendors. Recently some proponents are also promoting web services as nirvana to the application integration problem across the Internet.

The purpose of WACAI 2003 is to provide a forum for researchers and practitioners from both industry and academia to discuss the latest practices and experiences in designing and deploying middleware-based architectures for the evolving needs of application integration. The major aim of the workshop is to bring together key research ideas and practices in the field of evolving architectures for application integration, with the goal of assessing the state of the art and of identifying the fundamental open issues in the research field.

## 2. Areas of Interest

We asked the authors to submit papers on the topics related to any research issue specific to architectural needs for complex application integration, spanning from theoretical aspects to practical system implementation.

Topic list included:

- Architectural styles for application integration
- Architectural frameworks and design patterns for integration projects
- Service-oriented architectures for complex system integration
- Integration platforms and middleware systems for large scale heterogeneous software federations
- Suitability of CORBA, J2EE, .NET/COM+, and MOM for complex system integration
- Architectures ensuring quality-of-service including performance, reliability, security and interoperability
- Impact of new generation of middleware technologies for integration needs
- Architectural evaluation and technology assessment
- Software engineering processes and best practices for integration projects
- Experience reports and case studies

## 3. Program Committee

International program committee for WACAI 2003 consisted of:

Piyush Maheshwari, UNSW, Australia

Ian Gorton, Pacific Northwest National Laboratory, USA

Anna Liu, Microsoft, Australia

Priya Narasimhan, Carnegie Mellon University, USA

Jeffrey Gosper, CSIRO, Australia

Marc Lacoste, France Telecom R&D

Paul Pogonoski, Japara Solutions, Australia

Andy Bond, DSTC, Australia

Liam O'Brien, Software Engineering Institute, USA

Ross Altman, EDS, USA

Paul Allen, CA, UK

Stefan Tai, IBM T.J. Watson Research Center, USA

Will Tracz, Lockheed Martin Systems Integration, USA

## 4. Summary of the Papers

WACAI 2003 was planned to be held in conjunction with COMPSAC 2003 as a joint workshop. According to an earlier plan, the conference site was Hong Kong. Due to the

SARS problem in Hong Kong, the date and location of COMPSAC2003 was later changed to November 3-6, 2003, Dallas, TX, USA. This led to less number of papers submitted by the prospective authors. Some industry-oriented papers were also withdrawn due to downsizing and cost cutting exercises by their employers.

We received 14 papers, out of which 7 are accepted after the formal reviewing process. At least, two review reports were sought for each paper. In the proceedings, however, six authors are presenting their work.

The first paper "Just What Could Possibly Go Wrong In B2B Integration?" authored by Kuo *et al.* provides an explanation of the different types of transaction models. It provides a definition of three different possible types of states within the context of a business process. It treats the business process in an EAI scenario as a big state engine. Seven types of failures are described and samples are provided to relate the exception scenarios to the provided e-procurement case study.

The second paper "An Experience of Applying Architecture-based Approach to Build a Component-based Requirements Management Toolset" by Alibabar presents author's experience of applying architecture-based approach to develop an integrated requirements management tool by integrating various standalone systems developed on heterogeneous platforms.

The third paper "Enterprise Application Integration (EAI) using a Component-based Architecture" by Maheshwari provides an introduction to some of the major issues surrounding EAI as it stands today. It then evaluates the suitability of CORBA and Enterprise JavaBeans as enablers of EAI and B2B integration and the suitability of XML for data integration via a simple B2B example, Online Negotiation System.

The fourth paper "Flexible Fault Tolerance in Configurable Middleware for Embedded Systems" by Dorrow describes MicroQoSCORBA – a middleware platform that enables configurability for various internal components in an embedded system. Specifically, a set of fault tolerance mechanisms devised are discussed.

The fifth paper "Ad hoc Software Interfacing: Enterprise Application Integration When Middleware is Overkill" by Reyes *et al.* describes Ad Hoc Software Interfacing (AHSI) as a solution to EAI problems. Authors also explain a number of technologies, e.g., BizTalk and XML, which can be used to solve EAI problems without heavily relying on middleware technologies.

The last paper "Next Generation Application Integration: Problems and Possible Solutions" by Gorton *et al.* discusses the problems associated with the current application integration problems and provides some insights into newer solutions to this problem.