Lecture Notes
in Business Information Processing

Series Editors

Wil van der Aalst
Eindhoven Technical University, The Netherlands

John Mylopoulos
University of Trento, Italy

Michael Rosemann
Queensland University of Technology, Brisbane, Qld, Australia

Michael J. Shaw
University of Illinois, Urbana-Champaign, IL, USA

Clemens Szyperski
Microsoft Research, Redmond, WA, USA
Preface

Several developments are expected to change the nature and affect the operation of enterprises in the near future. These developments are not new, and their influence when considered in isolation may not be decisive, but combined they represent important challenges as well as opportunities. Globalization, as one of the most important drivers of modern times, continues to influence enterprises and makes the boundaries for enterprise operation increasingly disappear. Constant and rapid change in technological capabilities, consumer demands, and legal/regulatory constraints push enterprises to become more agile and adaptive. The ability to create and offer value-added services by anyone to anyone has blurred the roles of consumer and producer, and of employee and employer. One conclusion to be drawn from these developments is that the success of an enterprise more and more depends on its ability to interoperate with other enterprises, of any size and in any place. Enterprises have to function in dynamic networks, with value being created in both directions in order to stay competitive and achieve their business goals.

Collaboration, interoperability, and services are essential for the networked enterprises of the future. A better understanding of these concepts and their relationships will help to face the challenges and exploit the opportunities ahead. In addition, it will foster appropriate architectural frameworks and IT solutions. For example, the technical development of the Future Internet should not only be driven by problems of the current Internet but also be guided and evaluated from the enterprise perspective regarding collaboration, interoperability, and services. This will ensure that the Future Internet really aims at empowering enterprises to create business value in competition and cooperation with other enterprises, based on relevant knowledge about each other and the market. Several enterprise-relevant aspects should be grounded in the Future Internet, meaning that collaboration is supported by IT services (to find information) for connecting partners and binding resources according to enterprise-defined performance indicators on top of a general interoperability infrastructure. Such IT services may require integration of physical sensing, business intelligence, and knowledge sharing.

IWEI is an International IFIP Working Conference covering all aspects of enterprise interoperability with the purpose of achieving flexible cross-organizational collaboration through integrated support at business and technical levels. It provides a forum for discussing ideas and results among both researchers and practitioners. Contributions to the following areas are highlighted: scientific foundations for specifying, analyzing, and validating interoperability solutions; architectural frameworks for addressing interoperability challenges from different viewpoints. 
and at different levels of abstraction; maturity models to evaluate and rank interoperability solutions with respect to distinguished quality criteria; and practical solutions and tools that can be applied to interoperability problems to date.

This year’s IWEI – IWEI 2012 – was held during September 6–7, 2012, in Harbin, China, following previous events in Stockholm, Sweden (2011), Valencia, Spain (2009), and Munich, Germany (2008). The theme of IWEI 2012 was “Collaboration, Interoperability and Services for Networked Enterprises,” thus especially soliciting submissions and discussions related to the three previously mentioned interrelated areas for enterprise interoperability.

IWEI 2012 was organized by the IFIP Working Group 5.8 on Enterprise Interoperability in co-operation with InterOP-VLab. The objective of IFIP WG5.8 is to advance and disseminate research and development results in the area of enterprise interoperability. IWEI provides an excellent platform to discuss the ideas that have emerged from IFIP WG5.8 meetings, or, reversely, to transfer issues identified at the workshop to the IFIP community for further contemplation and investigation.

The proceedings of IWEI 2012 are contained in this volume. In total 14 full papers and three short papers were selected for oral presentation and publication. The selection was based on a thorough review process, in which each paper was reviewed by at least three experts in the field. The papers are representative of the current research activities in the area of enterprise interoperability. The papers cover a wide spectrum of enterprise interoperability issues, ranging from foundational theories, frameworks, architectures, methods and guidelines to applications and case studies.

The proceedings also include the abstracts of the invited talks of our two renowned keynote speakers: Sergio Gusmeroli (Director of TXT Labs Corporate Research Unit) and Lei Qin (Executive of Cloud Labs and Smarter Commerce Service Delivery, IBM China Development Laboratory).

We would like to take this opportunity to express our gratitude to all those who contributed to the IWEI 2012 working conference. We thank the authors for submitting content, which resulted in valuable information exchange and stimulating discussions; we thank the reviewers for providing useful feedback to the submitted content, which undoubtedly helped the authors to improve their work; and we thank the attendants for expressing interest in the content and initiating relevant discussions. We are indebted to IFIP TC5 as well as InterOP-VLab for recognizing the importance of enterprise interoperability as a research area with high economic impact, and acting accordingly with the establishment of WG5.8. Finally, we are grateful to HIT, the Harbin Institute of Technology, for hosting the working conference.

June 2012

Marten van Sinderen
Pontus Johnson
Organization

IWEI 2011 was organized by IFIP Working Group 5.8 on Enterprise Interoperability, in cooperation with InterOP VLab.

General Chairs

Xiaofei Xu  
Harbin Institute of Technology, China

Guy Doumeingts  
InterOP-VLab/University of Bordeaux 1, France

Steering Committee

Degang Cui  
AVIC, China

Guy Doumeingts  
InterOP-VLab/University of Bordeaux 1, France

Tao Huang  
Institute of Software, CAS, China

Pontus Johnson  
Royal Institute of Technology, Sweden

Lea Kutvonen  
University of Helsinki, Finland

Kai Mertins  
Fraunhofer IPK, Germany

Marten van Sinderen  
University of Twente, The Netherlands

Xiaofei Xu  
Harbin Institute of Technology, China

Program Chairs

Marten van Sinderen  
University of Twente, The Netherlands

Pontus Johnson  
Royal Institute of Technology, Sweden

International Program Committee

Khalid Benali  
LORIA - Nancy Université, France

Peter Bernus  
University Griffith, Australia

Ricardo Chalmeta  
University of Jaume I, Spain

David Chen  
Université Bordeaux 1, France

Paul Davidsson  
Malmö University, Sweden

Antonio De Nicola  
ENEA, Italy

Yves Ducq  
Université Bordeaux 1, France

Ip-Shing Fan  
Cranfield University, UK

Ricardo Goncalves  
New University of Lisbon, UNINOVA, Portugal

Claudia Guglielmina  
TXT e-solutions, Italy

Sergio Gusmeroli  
TXT e-solutions, Italy

Axel Hahn  
University of Oldenburg, Germany

Jenny Harding  
Loughborough University, UK

Roland Jochem  
University of Kassel, Germany
VIII Organization

Leonid Kalinichenko  
Russian Academy of Sciences, Russian Federation
Bernhard Katzy  
University of Munich, Germany
Kurt Kosanke  
CIMOSA Association, Germany
Xiaoping Li  
South-East University, China
Laufeng Lin  
Zhejiang University, China
Shijun Liu  
Shandong University, China
Jean-Pierre Lorre  
PETALS Link, France
Philippe Mahey  
Blaise Pascal University, France
Michiko Matsuda  
Kanagawa Institute of Technology, Japan
Lanshun Nie  
Harbin Institute of Technology
Andreas Opdahl  
University of Bergen, Norway
Angel Ortiz  
Polytechnic University of Valencia, Spain
Hervé Panetto  
UHP Nancy I, France
Hervé Pingaud  
École des Mines d’Albi-Carmaux, France
Raul Poler  
Polytechnic University of Valencia, Spain
Alain Quilliot  
Blaise Pascal University, France
Raquel Sanchis  
Polytechnic University of Valencia, Spain
Ulrike Stedefns  
OFFIS, Germany
Raymond Slot  
Hogeschool Utrecht, The Netherlands
Bruno Vallespir  
Université Bordeaux 1, France
Nianbin Wang  
Harbin Engineering University, China
Alain Wegmann  
Ecole Polytechnique Fédéral de Lausanne, Switzerland
George Weichart  
Johannes Kepler University Linz, Austria
Jun Wei  
Institute of Software, CAS, China
Junfeng Zhan  
Institute of Standardization, China
Li Zhang  
BUAA, China
Cuilian Zhao  
Shanghai University, China
Yunlong Zhu  
Institute of Automation Shenyang, CAS, China

Local Organizing Chairs

Dechen Zhan  
Harbin Institute of Technology, China
Cathy Lieu  
InterOP-VLab, Belgium

Local Organization Committee

Shengchun Deng  
Harbin Institute of Technology, China
Ting He  
Harbin Institute of Technology, China
Quanglong Li  
Harbin Institute of Technology, China
Xiaofeng Liu  
Harbin Institute of Technology, China
Hui Luo  
Harbin Institute of Technology, China
Lanshun Nie  
Harbin Institute of Technology, China
Hanchuan Xu  
Harbin Institute of Technology, China
Sponsoring Organizations

IFIP TC5, www.ifip.org
InterOP-VLab, www.interop-vlab.eu
InterOP-VLab, China Pole
Harbin Institute of Technology
Table of Contents

Keynotes

From Enterprise Interoperability to Service Innovation: European Research Activities in Future Internet Enterprise Systems ............ 1
  Sergio Gusmeroli

Building a New Eco-System to Transform a Smarter Logistics Industry with Smarter Logistics Cloud .............................. 3
  Lei Qin

Full Papers

Session 1: Requirements Engineering and Enterprise Integration

Innovation Management Needs an Interoperable Requirements Management ................................................................. 5
  Katja Landgraf and Roland Jochem

A Goal Decomposition Approach for Automatic Mashup Development ............................................................ 20
  Lin Bai, Dan Ye, and Jun Wei

Benefits of Enterprise Integration: Review, Classification, and Suggestions for Future Research ................................. 34
  Ariyan Fazlollahi, Ulrik Franke, and Johan Ullberg

Session 2: Manufacturing Applications and Enterprise Planning

A Resource Virtualization Mechanism for Cloud Manufacturing Systems .............................................................. 46
  Ning Liu and Xiaoping Li

Manufacturing Software Interoperability Services Which ISO 16100 Brings about .............................................. 60
  Michiko Matsuda
A Confidentiality-Guarantee Mechanism for SaaS .......................... 71
   Guozhen Ren, Qingzhong Li, Yuliang Shi, and Lizhen Cui

Session 3: Model Manipulation and Ontology Building

A QoS-Aware Hyper-graph Based Method of Semantic Service
Composition .................................................................................. 81
   Cui Lizhen and Xu Meng

Towards Information Customization and Interoperability in Food
Chains ............................................................................................. 92
   Kai Mertins, Frank-Walter Jaekel, and Quan Deng

A Value-Oriented Iterative Service Modeling Process ......................... 104
   Xiaofei Xu, Chao Ma, and Zhongjie Wang

Session 4: Model-Driven Service Engineering in
Enterprise Ecosystems

Principles of Servitization and Definition of an Architecture for Model
Driven Service System Engineering .................................................. 117
   Yves Ducq, David Chen, and Thécle Alix

Control-Flow Pattern Based Transformation from UML Activity
Diagram to YAWL ........................................................................... 129
   Zhaogang Han, Li Zhang, Jiming Ling, and Shihong Huang

MDA-Based Interoperability Establishment Using Language
Independent Information Models ....................................................... 146
   Carlos Agostinho, Jaroslav Černý, and Ricardo Jardim-Goncalves

An Approach for Validating Semantic Consistency of Model
Transformation Based on Pattern .................................................... 161
   Jin Li, Dechen Zhan, Lanshan Nie, and Xiaofei Xu

Negotiations Framework for Monitoring the Sustainability of
Interoperability Solutions ................................................................. 172
   Carlos Coutinho, Adina Cretan, and Ricardo Jardim-Goncalves

Short Papers

A Hypergraph Partition Based Approach to Dynamic Deployment for
Service-Oriented Multi-tenant SaaS Applications ............................ 185
   Ying Pan, Lei Wu, Shijun Liu, and Xiangxu Meng
Table of Contents

Service-Oriented Digital Identity-Related Privacy Interoperability: Implementation Framework of Privacy-as-a-Set-of-Services (PaaS) 193
Ghazi Ben Ayed and Solange Ghermaoui-Hélie

Research on Semantic Interoperability for Business Collaboration 201
Zhan Jiang, Lanfen Lin, and Fei Xie

Author Index 209
<table>
<thead>
<tr>
<th>Author</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agostinho, Carlos</td>
<td>146</td>
</tr>
<tr>
<td>Alix, Thécle</td>
<td>117</td>
</tr>
<tr>
<td>Ayed, Ghazi Ben</td>
<td>193</td>
</tr>
<tr>
<td>Bai, Lin</td>
<td>20</td>
</tr>
<tr>
<td>Černý, Jaroslav</td>
<td>146</td>
</tr>
<tr>
<td>Chen, David</td>
<td>117</td>
</tr>
<tr>
<td>Coutinho, Carlos</td>
<td>172</td>
</tr>
<tr>
<td>Cretan, Adina</td>
<td>172</td>
</tr>
<tr>
<td>Cui, Lizhen</td>
<td>71</td>
</tr>
<tr>
<td>Deng, Quan</td>
<td>92</td>
</tr>
<tr>
<td>Dueq, Yves</td>
<td>117</td>
</tr>
<tr>
<td>Fazlollahi, Ariyan</td>
<td>34</td>
</tr>
<tr>
<td>Franke, Ulrik</td>
<td>34</td>
</tr>
<tr>
<td>Ghernaouti-Hélie, Solange</td>
<td>193</td>
</tr>
<tr>
<td>Gusmeroli, Sergio</td>
<td>1</td>
</tr>
<tr>
<td>Han, Zhaogang</td>
<td>129</td>
</tr>
<tr>
<td>Huang, Shihong</td>
<td>129</td>
</tr>
<tr>
<td>Jaekel, Frank-Walter</td>
<td>92</td>
</tr>
<tr>
<td>Jardim-Goncalves, Ricardo</td>
<td>146, 172</td>
</tr>
<tr>
<td>Jiang, Zhan</td>
<td>201</td>
</tr>
<tr>
<td>Jochem, Roland</td>
<td>5</td>
</tr>
<tr>
<td>Landgraf, Katja</td>
<td>5</td>
</tr>
<tr>
<td>Li, Jin</td>
<td>161</td>
</tr>
<tr>
<td>Li, Qingzhong</td>
<td>71</td>
</tr>
<tr>
<td>Li, Xiaoping</td>
<td>46</td>
</tr>
<tr>
<td>Lin, Lanfen</td>
<td>201</td>
</tr>
<tr>
<td>Ling, Jiming</td>
<td>129</td>
</tr>
<tr>
<td>Liu, Ning</td>
<td>46</td>
</tr>
<tr>
<td>Liu, Shijun</td>
<td>185</td>
</tr>
<tr>
<td>Lizhen, Cui</td>
<td>81</td>
</tr>
<tr>
<td>Ma, Chao</td>
<td>104</td>
</tr>
<tr>
<td>Matsuda, Michiko</td>
<td>60</td>
</tr>
<tr>
<td>Meng, Xiangxi</td>
<td>185</td>
</tr>
<tr>
<td>Meng, Xu</td>
<td>81</td>
</tr>
<tr>
<td>Mertins, Kai</td>
<td>92</td>
</tr>
<tr>
<td>Nie, Lanshun</td>
<td>161</td>
</tr>
<tr>
<td>Pan, Ying</td>
<td>185</td>
</tr>
<tr>
<td>Qin, Lei</td>
<td>3</td>
</tr>
<tr>
<td>Ren, Guozhen</td>
<td>71</td>
</tr>
<tr>
<td>Shi, Yuliang</td>
<td>71</td>
</tr>
<tr>
<td>Ullberg, Johan</td>
<td>34</td>
</tr>
<tr>
<td>Wang, Zhongjie</td>
<td>104</td>
</tr>
<tr>
<td>Wei, Jun</td>
<td>20</td>
</tr>
<tr>
<td>Wu, Lei</td>
<td>185</td>
</tr>
<tr>
<td>Xie, Fei</td>
<td>201</td>
</tr>
<tr>
<td>Xu, Xiaofei</td>
<td>104, 161</td>
</tr>
<tr>
<td>Ye, Dan</td>
<td>20</td>
</tr>
<tr>
<td>Zhan, Dechen</td>
<td>161</td>
</tr>
<tr>
<td>Zhang, Li</td>
<td>129</td>
</tr>
</tbody>
</table>