

# INFORMATION SYSTEMS DEVELOPMENT

*Advances in Theory,  
Practice, and Education*

- ❑ ISD Methodologies
- ❑ Method Engineering
- ❑ Web Systems Engineering
- ❑ Information Analysis and Data Mining
- ❑ Costing Methods
- ❑ Security Issues

Edited by

Olegas Vasilecas, Albertas Caplinskas,  
Wita Wojtkowski, W. Gregory Wojtkowski,  
Jože Zupančič, and Stanisław Wrycza

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**Vilnius, Lithuania, September 9–11, 2004**

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Springer

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## PREFACE

This volume contains papers presented during 13<sup>th</sup> International Conference on Information Systems Development – Advances in Theory, Practice and Education (ISD'2004), held in Vilnius, Lithuania, September 9–11, 2004. The intended audience for this book comprises researchers and practitioners interested in current trends in the Information Systems Development (ISD) field. Papers cover a wide range of topics: ISD methodologies, method engineering, business and IS modelling, web systems engineering, database related issues, information analysis and data mining, quality assessment, costing methods, security issues, impact of organizational environment, and motivation and job satisfaction among IS developers. The selection of papers was carried out by the International Program Committee. All papers were reviewed in advance by three reviewers and evaluated according to their relevance, originality and presentation quality. Papers were evaluated only on their own merits, independent of other submissions. Out of 117 submissions Program Committee selected 75 research papers to be presented at the Conference. 39 best papers and 5 papers presented by invited speakers are published in this volume.

The 13<sup>th</sup> International Conference on Information Systems Development continues the tradition started with the first Polish-Scandinavian Seminar on Current Trends in Information Systems Development Methodologies, held in Gdansk, Poland in 1988. Through the years this seminar has evolved into one of most prestigious conferences in the field. ISD Conference provides an international forum for the exchange of ideas between the research community and practitioners and offers a venue where ISD related educational issues are discussed.

ISD progresses rapidly, continually creating new challenges for the professionals involved. New concepts and approaches emerge in research as well as in practice. Emerging ideas need to be disseminated in order to stimulate the exploration of new solutions. Advanced ISD curricula and new teaching and learning approaches need to be developed. That is why ISD'2004 Conference theme was *Advances in Theory, Practice, and Education*. In addition to regular presentations and invited talks, the Conference provided two discussion panels: *Issues of Business Rules Approach in IS Development* and *Issues in Information Systems Education: Capitalizing on Recent Advances in Learning Theory*.

Many people contributed to the organization of the ISD'2004. We would like to express our thanks to all authors, members of the Program Committee, and external reviewers



for their efforts. We also wish to acknowledge the support of the members of the Organizing Committee, the administration of Vilnius Gediminas Technical University, Institute of Mathematics and Informatics (Vilnius, Lithuania), Lithuanian Science and Studies State Foundation, Lithuanian Ministry of Education and Science, and all other institutions that actively supported the Conference.

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STG <sup>®</sup>	Structured Technology Group, Inc.
Sun <sup>®</sup> , Sun Microsystems <sup>®</sup>	Sun Microsystems, Inc.
VERITAS <sup>®</sup>	VERITAS Software Corporation
W3C <sup>®</sup>	World Wide Web Consortium (MIT, INRIA, Keio)

***Abreviation***

BMBF  
BRG  
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CEN  
FIPA  
GGF  
ICAR-CNR

ISOC  
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NCSA  
  
NISO  
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The Global Grid Forum  
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The Internet Society  
Massachusetts Institute of Technology  
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Organization for the Advancement of Structured Information Standards  
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***Organisation***

IBM  
Microsoft  
BOC Information Systems GmbH

Agent Factory	ICAR-CNR, Agentcities.NET
Ant	The Apache Software Foundation
Apache™ HTTP Server	The Apache Software Foundation
APM	The EXTERNAL Consortium
APM BoK	Association for Project Management
Argo/UML	TIGRIS Open Source Comunity
Aris®	IDS-Scheer AG
ASP®	Microsoft
Atlas database™	ATLAS Database Group
Axiom-SYS™	STG
Balanced Scorecard®	Balanced Scorecard Collaborative
BML™	IBM
BPEL4WS	BEA, IBM, Microsoft, SAP, Siebel
BPML™	The Business Process Management Initiative
BP Win™	Unitek Information Technologies
BRBeans	IBM
BROCOM	Institut fur Wirtschaftsinformatik (University of Bern)
Casewise Corporate Modeler™	Casewise
Chimaera	Knowledge Systems Laboratory (Stanford University)
CIMOSA™	AMICE Consortium, CIMOSA association
Clementine®	SPSS, Inc.
Cloudscape®	Cloudscape, Inc.
COBIT	ISACA, ISACF, IT Governance Institute
COSA® Workflow	TRANSFLOW AG
CVS	JBoss, Inc.
CWM™	OMG
C++™	American Telephone and Telegraph, Inc.
DAML	DARPA, Joint US/EU ad hoc Agent Markup Language Committee
DB2 OLAP Server®	IBM
Dewey Decimal Classification®	OCLC
DOORS®	Telelogic AB
DSDM®	Dynamic Systems Development Method Ltd.
DTF	W3C
Dublin Core <sup>SM</sup>	OCLC
ebXML	United Nations, OASIS
Eclipse™	Eclipse Foundation
Enterprise JavaBeans®	Sun Microsystems
Excel®	Microsoft
EXTERNAL	The EXTERNAL Consortium
FLINTS™	West Midlands Police
FrameSolutions™	Computas AS

GATE™	NLP group (University of Sheffield)
GERAM™	IFIP/IFAC Task Force on Architectures for Enterprise Integration
GME	Institute for Software Integrated Systems
GRADE™	Grade Development Group, INFOLOGISTIK GmbH
GRAI-GIM	University of Bordeaux
HTML	W3C
HTTP™	W3C
IDC®	International Data Group, Inc.
IDEF	IDEF Information
IEM	Fraunhofer Institute for Production Systems and Design Technology
IMPRESS™	NLP group (University of Sheffield)
Intelligent Miner™	IBM
ISAC™	Indicus Software Pvt. Ltd.
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JBoss®	JBoss, Inc.
JDBC®	Sun Microsystems
JMining	Vilnius Gediminas Technical University
JMS	Sun Microsystems
JSP™	Sun Microsystems
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KACTUS	KACTUS consortium
KIF	InterLingua Working Group (DARPA Knowledge Sharing Initiative)
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Ontolingua	Knowledge Systems Laboratory (Stanford University)
Ontosaurus	Information Sciences Institute (University of Southern California)
OPEN	Open Consortium
Opera <sup>®</sup>	Opera Software AS
Oracle CASE*Method <sup>™</sup>	Oracle Corporation
Oracle Designer <sup>™</sup>	Oracle Corporation
OS/390 <sup>™</sup>	IBM
PERA	Purdue Laboratory for Applied Industrial Control (Purdue University)
PMBOK <sup>®</sup>	PMI
Power Point <sup>®</sup>	Microsoft
Prometheus	Computer Science and IT School (RMIT University)
PROSIT <sup>™</sup>	WM Data
Protégé	Stanford Medical Informatics
ProVision <sup>®</sup>	Proforma Corporation
QStudio <sup>®</sup>	QA Systems BV.
Rational Rose <sup>®</sup>	IBM, Rational Software Corporation
RequisitePro <sup>®</sup>	IBM, Rational Software Corporation
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SDLC <sup>™</sup>	IBM
SILVERRUN <sup>®</sup> -BM	CSA Research Pte Ltd.
SIMULA <sup>®</sup>	The Norwegian Computing Center
SimVision	The EXTERNAL Consortium
SOAP	W3C
SPSS for Windows <sup>®</sup>	SPSS, Inc.
SSADM <sup>®</sup>	OGC
SWEBOK	IEEE Computer Society,

Telelogic DOORS®	Association of Computing Machinery
TGN	Teleologic AB
TOVE	The J. Paul Getty Trust
	Enterprise Integration Laboratory (University of Toronto)
UDDI	OASIS
UEML	IFAC TC5.3 WG UEML
UML™	OMG
UNIX®	The Open Group
URL	The Internet Society
Visio®	Microsoft
WAP®	Wireless Application Protocol Forum Ltd.
WebML	Stefano Ceri, Piero Fraternali, Aldo Bongio
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Workflow BPR™	IBM, HOLOSOFX
WORKWARE	The EXTERNAL Consortium
WSCI	W3C
WSDL	W3C
XCHEAPS	The EXTERNAL Consortium
XMI®	OMG
XML®	Massachusetts Institute of Technology, World Wide Web Consortium
XSL™	World Wide Web Consortium
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## ABBREVIATIONS

The following abbreviations are used throughout this book:

<i>Abbreviation</i>	<i>Full text</i>
ABC	Activity-Based Costing
ABM	Activity-Based Management
ABR	Accessible Business Rules
ADO	ActiveX Data Objects
AF	Agent Factory
AI	Artificial Intelligence
AIFS	Australian Integrated Forecast System
AMICE	European CIM Architecture
ANOVA	ANalysis Of VAriance
AO	Agent-Oriented
AOM	Adaptive Object Model