

Xavier Franch  
Dan Port (Eds.)

LNC3 3412

# COTS-Based Software Systems

4th International Conference, ICCBSS 2005  
Bilbao, Spain, February 2005  
Proceedings



Springer

TP311-53  
I15  
2005

Xavier Franch Dan Port (Eds.)

# COTS-Based Software Systems

4th International Conference, ICCBSS 2005  
Bilbao, Spain, February 7-11, 2005  
Proceedings



E200500952



Springer

## Volume Editors

Xavier Franch  
Universitat Politècnica de Catalunya (UPC)  
Jordi Girona 1 - 3, 08034 Barcelona, Spain  
E-mail: franch@lsi.upc.edu

Dan Port  
University of Hawaii at Manoa  
Department of Information Technology Management  
Honolulu, HI, USA  
E-mail: dport@hawaii.edu

Library of Congress Control Number: 20044118380

CR Subject Classification (1998): K.6.3, D.2, J.1

ISSN 0302-9743

ISBN 3-540-24548-0 Springer Berlin Heidelberg New York

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

Springer is a part of Springer Science+Business Media

springeronline.com

© Springer-Verlag Berlin Heidelberg 2005  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India  
Printed on acid-free paper SPIN: 11386254 06/3142 5 4 3 2 1 0

*Commenced Publication in 1973*

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison

*Lancaster University, UK*

Takeo Kanade

*Carnegie Mellon University, Pittsburgh, PA, USA*

Josef Kittler

*University of Surrey, Guildford, UK*

Jon M. Kleinberg

*Cornell University, Ithaca, NY, USA*

Friedemann Mattern

*ETH Zurich, Switzerland*

John C. Mitchell

*Stanford University, CA, USA*

Moni Naor

*Weizmann Institute of Science, Rehovot, Israel*

Oscar Nierstrasz

*University of Bern, Switzerland*

C. Pandu Rangan

*Indian Institute of Technology, Madras, India*

Bernhard Steffen

*University of Dortmund, Germany*

Madhu Sudan

*Massachusetts Institute of Technology, MA, USA*

Demetri Terzopoulos

*New York University, NY, USA*

Doug Tygar

*University of California, Berkeley, CA, USA*

Moshe Y. Vardi

*Rice University, Houston, TX, USA*

Gerhard Weikum

*Max-Planck Institute of Computer Science, Saarbruecken, Germany*

# Lecture Notes in Computer Science

For information about Vols. 1–3283

please contact your bookseller or Springer

- Vol. 3412: X. Franch, D. Port (Eds.), *COTS-Based Software Systems*. XVI, 312 pages. 2005.
- Vol. 3398: D.-K. Baik (Ed.), *Systems Modeling and Simulation: Theory and Applications*. XIV, 733 pages. 2005. (Subseries LNAI).
- Vol. 3397: T.G. Kim (Ed.), *Artificial Intelligence and Simulation*. XV, 711 pages. 2005. (Subseries LNAI).
- Vol. 3391: C. Kim (Ed.), *Information Networking*. XVII, 936 pages. 2005.
- Vol. 3388: J. Lagergren (Ed.), *Comparative Genomics*. VIII, 133 pages. 2005. (Subseries LNBI).
- Vol. 3387: J. Cardoso, A. Sheth (Eds.), *Semantic Web Services and Web Process Composition*. VIII, 148 pages. 2005.
- Vol. 3386: S. Vaudenay (Ed.), *Public Key Cryptography – PKC 2005*. IX, 436 pages. 2005.
- Vol. 3385: R. Cousot (Ed.), *Verification, Model Checking, and Abstract Interpretation*. XII, 483 pages. 2005.
- Vol. 3382: J. Odell, P. Giorgini, J.P. Müller (Eds.), *Agent-Oriented Software Engineering V*. X, 239 pages. 2004.
- Vol. 3381: P. Vojtáš, M. Bieliková, B. Charron-Bost, O. Sykora (Eds.), *SOFSEM 2005: Theory and Practice of Computer Science*. XV, 448 pages. 2005.
- Vol. 3376: A. Menezes (Ed.), *Topics in Cryptology – CT-RSA 2005*. X, 385 pages. 2004.
- Vol. 3375: M.A. Marsan, G. Bianchi, M. Listanti, M. Meo (Eds.), *Quality of Service in Multiservice IP Networks*. XIII, 656 pages. 2005.
- Vol. 3368: L. Paletta, J.K. Tsotsos, E. Rome, G. Humphreys (Eds.), *Attention and Performance in Computational Vision*. VIII, 231 pages. 2005.
- Vol. 3363: T. Eiter, L. Libkin (Eds.), *Database Theory – ICDT 2005*. XI, 413 pages. 2004.
- Vol. 3362: G. Barthe, L. Burdy, M. Huisman, J.-L. Lanet, T. Muntean (Eds.), *Construction and Analysis of Safe, Secure, and Interoperable Smart Devices*. IX, 257 pages. 2005.
- Vol. 3360: S. Spaccapietra, E. Bertino, S. Jajodia, R. King, D. McLeod, M.E. Orlowska, L. Strous (Eds.), *Journal on Data Semantics II*. XI, 223 pages. 2004.
- Vol. 3359: G. Grieser, Y. Tanaka (Eds.), *Intuitive Human Interfaces for Organizing and Accessing Intellectual Assets*. XIV, 257 pages. 2005. (Subseries LNAI).
- Vol. 3358: J. Cao, L.T. Yang, M. Guo, F. Lau (Eds.), *Parallel and Distributed Processing and Applications*. XXIV, 1058 pages. 2004.
- Vol. 3357: H. Handschuh, M.A. Hasan (Eds.), *Selected Areas in Cryptography*. XI, 354 pages. 2004.
- Vol. 3356: G. Das, V.P. Gulati (Eds.), *Intelligent Information Technology*. XII, 428 pages. 2004.
- Vol. 3355: R. Murray-Smith, R. Shorten (Eds.), *Switching and Learning in Feedback Systems*. X, 343 pages. 2005.
- Vol. 3353: J. Hromkovič, M. Nagl, B. Westfechtel (Eds.), *Graph-Theoretic Concepts in Computer Science*. XI, 404 pages. 2004.
- Vol. 3352: C. Blundo, S. Cimato (Eds.), *Security in Communication Networks*. XI, 381 pages. 2004.
- Vol. 3350: M. Hermenegildo, D. Cabeza (Eds.), *Practical Aspects of Declarative Languages*. VIII, 269 pages. 2005.
- Vol. 3348: A. Canteaut, K. Viswanathan (Eds.), *Progress in Cryptology – INDOCRYPT 2004*. XIV, 431 pages. 2004.
- Vol. 3347: R.K. Ghosh, H. Mohanty (Eds.), *Distributed Computing and Internet Technology*. XX, 472 pages. 2004.
- Vol. 3345: Y. Cai (Ed.), *Ambient Intelligence for Scientific Discovery*. XII, 311 pages. 2005. (Subseries LNAI).
- Vol. 3344: J. Malenfant, B.M. Østvold (Eds.), *Object-Oriented Technology. ECOOP 2004 Workshop Reader*. VIII, 215 pages. 2004.
- Vol. 3342: E. Şahin, W.M. Spears (Eds.), *Swarm Robotics*. IX, 175 pages. 2004.
- Vol. 3341: R. Fleischer, G. Trippen (Eds.), *Algorithms and Computation*. XVII, 935 pages. 2004.
- Vol. 3340: C.S. Calude, E. Calude, M.J. Dinneen (Eds.), *Developments in Language Theory*. XI, 431 pages. 2004.
- Vol. 3339: G.I. Webb, X. Yu (Eds.), *AI 2004: Advances in Artificial Intelligence*. XXII, 1272 pages. 2004. (Subseries LNAI).
- Vol. 3338: S.Z. Li, J. Lai, T. Tan, G. Feng, Y. Wang (Eds.), *Advances in Biometric Person Authentication*. XVIII, 699 pages. 2004.
- Vol. 3337: J.M. Barreiro, F. Martin-Sanchez, V. Maojo, F. Sanz (Eds.), *Biological and Medical Data Analysis*. XI, 508 pages. 2004.
- Vol. 3336: D. Karagiannis, U. Reimer (Eds.), *Practical Aspects of Knowledge Management*. X, 523 pages. 2004. (Subseries LNAI).
- Vol. 3335: M. Malek, M. Reitenspieß, J. Kaiser (Eds.), *Service Availability*. X, 213 pages. 2005.
- Vol. 3334: Z. Chen, H. Chen, Q. Miao, Y. Fu, E. Fox, E.-p. Lim (Eds.), *Digital Libraries: International Collaboration and Cross-Fertilization*. XX, 690 pages. 2004.
- Vol. 3333: K. Aizawa, Y. Nakamura, S. Satoh (Eds.), *Advances in Multimedia Information Processing – PCM 2004, Part III*. XXXV, 785 pages. 2004.

- Vol. 3332: K. Aizawa, Y. Nakamura, S. Satoh (Eds.), *Advances in Multimedia Information Processing - PCM 2004*, Part II. XXXVI, 1051 pages. 2004.
- Vol. 3331: K. Aizawa, Y. Nakamura, S. Satoh (Eds.), *Advances in Multimedia Information Processing - PCM 2004*, Part I. XXXVI, 667 pages. 2004.
- Vol. 3330: J. Akiyama, E.T. Baskoro, M. Kano (Eds.), *Combinatorial Geometry and Graph Theory*. VIII, 227 pages. 2005.
- Vol. 3329: P.J. Lee (Ed.), *Advances in Cryptology - ASIACRYPT 2004*. XVI, 546 pages. 2004.
- Vol. 3328: K. Lodaya, M. Mahajan (Eds.), *FSTTCS 2004: Foundations of Software Technology and Theoretical Computer Science*. XVI, 532 pages. 2004.
- Vol. 3327: Y. Shi, W. Xu, Z. Chen (Eds.), *Data Mining and Knowledge Management*. XIII, 263 pages. 2004. (Subseries LNAI).
- Vol. 3326: A. Sen, N. Das, S.K. Das, B.P. Sinha (Eds.), *Distributed Computing - IWDC 2004*. XIX, 546 pages. 2004.
- Vol. 3323: G. Antoniou, H. Boley (Eds.), *Rules and Rule Markup Languages for the Semantic Web*. X, 215 pages. 2004.
- Vol. 3322: R. Klette, J. Žunić (Eds.), *Combinatorial Image Analysis*. XII, 760 pages. 2004.
- Vol. 3321: M.J. Maher (Ed.), *Advances in Computer Science - ASIAN 2004*. XII, 510 pages. 2004.
- Vol. 3320: K.-M. Liew, H. Shen, S. See, W. Cai (Eds.), *Parallel and Distributed Computing: Applications and Technologies*. XXIV, 891 pages. 2004.
- Vol. 3318: E. Eskin, C. Workman (Eds.), *Regulatory Genomics*. VIII, 115 pages. 2005. (Subseries LNBI).
- Vol. 3317: M. Domaratzki, A. Okhotin, K. Salomaa, S. Yu (Eds.), *Implementation and Application of Automata*. XII, 336 pages. 2005.
- Vol. 3316: N.R. Pal, N.K. Kasabov, R.K. Mudi, S. Pal, S.K. Parui (Eds.), *Neural Information Processing*. XXX, 1368 pages. 2004.
- Vol. 3315: C. Lemaître, C.A. Reyes, J.A. González (Eds.), *Advances in Artificial Intelligence - IBERAMIA 2004*. XX, 987 pages. 2004. (Subseries LNAI).
- Vol. 3314: J. Zhang, J.-H. He, Y. Fu (Eds.), *Computational and Information Science*. XXIV, 1259 pages. 2004.
- Vol. 3313: C. Castelluccia, H. Hartenstein, C. Paar, D. Westhoff (Eds.), *Security in Ad-hoc and Sensor Networks*. VIII, 231 pages. 2004.
- Vol. 3312: A.J. Hu, A.K. Martin (Eds.), *Formal Methods in Computer-Aided Design*. XI, 445 pages. 2004.
- Vol. 3311: V. Roca, F. Rousseau (Eds.), *Interactive Multimedia and Next Generation Networks*. XIII, 287 pages. 2004.
- Vol. 3310: U.K. Wilf (Ed.), *Computer Music Modeling and Retrieval*. XI, 371 pages. 2005.
- Vol. 3309: C.-H. Chi, K.-Y. Lam (Eds.), *Content Computing*. XII, 510 pages. 2004.
- Vol. 3308: J. Davies, W. Schulte, M. Barnett (Eds.), *Formal Methods and Software Engineering*. XIII, 500 pages. 2004.
- Vol. 3307: C. Bussler, S.-k. Hong, W. Jun, R. Kaschek, D. Kinshuk, S. Krishnaswamy, S.W. Loke, D. Oberle, D. Richards, A. Sharma, Y. Sure, B. Thalheim (Eds.), *Web Information Systems - WISE 2004 Workshops*. XV, 277 pages. 2004.
- Vol. 3306: X. Zhou, S. Su, M.P. Papazoglou, M.E. Orlowska, K.G. Jeffery (Eds.), *Web Information Systems - WISE 2004*. XVII, 745 pages. 2004.
- Vol. 3305: P.M.A. Sloot, B. Chopard, A.G. Hoekstra (Eds.), *Cellular Automata*. XV, 883 pages. 2004.
- Vol. 3303: J.A. López, E. Benfenati, W. Dubitzky (Eds.), *Knowledge Exploration in Life Science Informatics*. X, 249 pages. 2004. (Subseries LNAI).
- Vol. 3302: W.-N. Chin (Ed.), *Programming Languages and Systems*. XIII, 453 pages. 2004.
- Vol. 3300: L. Bertossi, A. Hunter, T. Schaub (Eds.), *Inconsistency Tolerance*. VII, 295 pages. 2005.
- Vol. 3299: F. Wang (Ed.), *Automated Technology for Verification and Analysis*. XII, 506 pages. 2004.
- Vol. 3298: S.A. McIlraith, D. Plexousakis, F. van Harmelen (Eds.), *The Semantic Web - ISWC 2004*. XXI, 841 pages. 2004.
- Vol. 3296: L. Bougé, V.K. Prasanna (Eds.), *High Performance Computing - HiPC 2004*. XXV, 530 pages. 2004.
- Vol. 3295: P. Markopoulos, B. Eggen, E. Aarts, J.L. Crowley (Eds.), *Ambient Intelligence*. XIII, 388 pages. 2004.
- Vol. 3294: C.N. Dean, R.T. Boute (Eds.), *Teaching Formal Methods*. X, 249 pages. 2004.
- Vol. 3293: C.-H. Chi, M. van Steen, C. Wills (Eds.), *Web Content Caching and Distribution*. IX, 283 pages. 2004.
- Vol. 3292: R. Meersman, Z. Tari, A. Corsaro (Eds.), *On the Move to Meaningful Internet Systems 2004: OTM 2004 Workshops*. XXIII, 885 pages. 2004.
- Vol. 3291: R. Meersman, Z. Tari (Eds.), *On the Move to Meaningful Internet Systems 2004: CoopIS, DOA, and ODBASE, Part II*. XXV, 824 pages. 2004.
- Vol. 3290: R. Meersman, Z. Tari (Eds.), *On the Move to Meaningful Internet Systems 2004: CoopIS, DOA, and ODBASE, Part I*. XXV, 823 pages. 2004.
- Vol. 3289: S. Wang, K. Tanaka, S. Zhou, T.W. Ling, J. Guan, D. Yang, F. Grandi, E. Mangina, I.-Y. Song, H.C. Mayr (Eds.), *Conceptual Modeling for Advanced Application Domains*. XXII, 692 pages. 2004.
- Vol. 3288: P. Atzeni, W. Chu, H. Lu, S. Zhou, T.W. Ling (Eds.), *Conceptual Modeling - ER 2004*. XXI, 869 pages. 2004.
- Vol. 3287: A. Sanfeliu, J.F. Martínez Trinidad, J.A. Carasco Ochoa (Eds.), *Progress in Pattern Recognition, Image Analysis and Applications*. XVII, 703 pages. 2004.
- Vol. 3286: G. Karsai, E. Visser (Eds.), *Generative Programming and Component Engineering*. XIII, 491 pages. 2004.
- Vol. 3285: S. Manandhar, J. Austin, U.B. Desai, Y. Oyanagi, A. Talukder (Eds.), *Applied Computing*. XII, 334 pages. 2004.
- Vol. 3284: A. Karmouch, L. Korba, E.R.M. Madeira (Eds.), *Mobility Aware Technologies and Applications*. XII, 382 pages. 2004.

## Foreword

The theme “Build and Conquer” chosen for this year’s conference fully represents what we (the organizers) want to put across to the software community: software development is an engineering discipline, and not an artistic expression. Once we are ready to “build” our software systems using pieces previously built in (similar to any other technology manufacturer), we will be able to “conquer” the software engineering process. If we take a look at other engineering disciplines such as car manufacturing, house appliances or aeronautics, we see that the final products are built through the integration of multiprovider commercial components. These components are successfully integrated and constitute an important part of the final product. Most software-related organizations still build software from scratch, omitting thousands of ready-built commercially available software components that could be used very effectively during the development phase.

This year ICCBSS moves to Europe for the first time since the first conference took place in Orlando, FL, USA in 2002. The conference scope has enlarged over the years to include the Open Source community and Web Services technologies. The reason for this is that I believe both are considered components-off-the-shelf, so many of the characteristics of COTS are also applied to Open Source and Web Services. Due to this, we will enjoy the presence of keynote speakers and researchers presenting on these two topics for the first time.

The conference program is divided into three different tracks comprising research and experience presentations, panels of discussion with renowned experts, tutorials in which to expand the knowledge of the field, poster presentations, and keynote presentations. The conference is preceded by two additional workshops, in which attendees may interact with COTS experts face-to-face to solve certain COTS-related issues. Moreover, due to the fact that this is the first time to host the conference in Europe, there is an introductory course on “Building Software Systems with Commercial Components (COTS)” for those who are new to this area.

Last but not least, I would like to express my thanks to all the members of the ICCBSS 2005 Planning Committee for volunteering their time to make the fourth conference a reality. I would also like to thank the Program Committee for their excellent work in reviewing and selecting the papers that will be presented here.

Again, welcome to the proceedings of ICCBSS 2005, and I hope you find this conference interesting for your own needs, and you find the solutions needed to “conquer” your software systems.



## Preface

On behalf of the ICCBSS 2005 Planning and Program Committees, we would like to welcome you to the proceedings of this year's conference, the fourth in the series. All of the previous ICCBSS conferences indicated a growing interest in the issues of COTS, and this year's conference continues this trend: the number and excellence of the papers we received for this year's conference attest to the continuing interest throughout the world in the use of commercial software in almost every domain.

Our original hope for this year's conference was to emphasize those issues that mark the growing maturity of COTS in the world: consolidating the COTS market, dealing with the many legal issues, and finding and publicizing COTS success stories. While not all of the papers in the conference are reflections of these goals, there are many that do. We believe that at least some of the impetus for this growing maturity about COTS issues is a reflection of the hard work and perseverance that has marked the three previous ICCBSS conferences.

This year's conference is the first to be held in Europe, and the papers that will be presented reflect this fact. They represent a very broad, multinational community that spans the globe, and it can truly be said that ICCBSS is an international conference.

We would especially like to thank the members of the Program Committee and the referees for their great contribution of time, talent, and wisdom in choosing the papers you will hear. We would also like to thank our hosts, the members of the European Software Institute, for their generous work in organizing the conference. We look forward to a truly memorable conference in Bilbao.

David Carney  
Jean-Christophe Mielnik





International  
Conference  
on COTS-Based  
Software Systems

## **Planning Committee**

### **General Chair Program Chairs**

### **Proceedings Chairs**

### **Tutorials Chair**

### **Panels Chair**

### **Posters Chair**

### **Publicity Chairs**

### **Finance and Local Arrangements**

### **Secretariat**

### **Chair Emeritus**

David Morera (European Software Institute)  
David Carney (Software Engineering Institute)  
Jean-Christophe Mielnik (Thales Research & Technology)  
Xavier Franch (Universitat Politècnica de Catalunya)  
Dan Port (University of Hawaii)  
Lisa Brownsword (Software Engineering Institute)  
Ljerka Beus-Dukic (University of Westminster)  
Mark Vigder (National Research Council Canada)  
Jason Mansell (European Software Institute)  
Sylvia Illieva (Sofia University)  
Paul Mason (Asian University of Science and Technology)  
Ashraf Saad (Georgia Tech Savannah)

Miren Ojinaga (European Software Institute)  
Piergiorgio Di Giacomo (European Software Institute)  
Barry Boehm (University of Southern California)

## Program Committee

Chris Abts	Texas A&M
Cecilia C. Albert	Software Engineering Institute
Carina Alves	University College London
Divya Atkins	Parvat Infotech Private Limited
Sally J.F. Baron	Management Consulting Services
Gorka Benguría	European Software Institute
David P. Bentley	South Carolina Research Authority
Lisa Brownsword	Software Engineering Institute
Ignacio Delgado	Martin & Lawson
Anne Dourgnon-Hanouné	EDF R&D (Électricité de France)
Anthony Earl	Sun Microsystems Inc.
Shadia Elgazzar	National Research Council Canada
Rose F. Gamble	University of Tulsa
Göran V. Grahñ	Volvo Information Technology
Pedro Gutiérrez	European Software Institute
Renya Inagaki	C3IS Corporation
Anatol Kark	National Research Council Canada
Judy Kerner	The Aerospace Corporation
Neil Maiden	Centre for HCI Design, City University London
Diane Mularz	MITRE Corp.
Michael Ochs	Fraunhofer Institute for Experiment Software Engineering
Fernando Piera	INDRA Sistemas
Peter Popov	City University London
Dan Port	University of Hawaii
José María Salvatierra	Vodafone, CDS Zamudio
Mark Vigder	National Research Council Canada
Ye Yang	University of Southern California

## Conference Organizers



The European Software Institute (ESI) has now established itself as one of the world's major centers for software process improvement. Our strength lies in our close partnership with industry. ESI's business-driven approach focuses on issues that result in a genuine commercial impact, such as reduction of costs and improving productivity.

The European Software Institute's technical work is driven by the philosophy of bringing measurable business improvements in the management and development of software-intensive systems for both individual companies and the software-related industry as a whole. In partnership with its patrons, ESI identifies relevant emerging process-improvement technologies. We then mature these methodologies through research, trials and close collaboration with business. Finally, we help companies to adapt the methodologies to their own organization or industry.

Within this overall framework, ESI's work is divided into four key technology areas: software process improvement, measurement, system engineering, and product-line based reuse where COTS research is allocated.

Learn more about the ESI at <http://www.esi.es>



## Carnegie Mellon Software Engineering Institute

The Software Engineering Institute (SEI) provides leadership in advancing the state of software engineering practice. We collaborate with industry, academia, and the government to learn about the best technical and management practices and then use what we learn to benefit the software engineering community.

The SEI program of work consists of initiatives grouped into three areas of software engineering: technical practices (especially product engineering principles and methods), management practices, and independent research and development (IRAD) activities. The COTS-Based Systems Initiative is grouped with other technical practice initiatives like Performance Critical Systems, Product Line Practice, Architecture Tradeoff Analysis, and Survivable Systems.

The institute is based at Carnegie Mellon University and is sponsored by the US Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics [OUSD (AT&L)].

Learn more about the SEI at <http://www.sei.cmu.edu>



**National Research  
Council Canada**

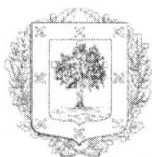
**Conseil national  
de recherches Canada**

The National Research Council (NRC), Canada's premier science and technology research organization, is a leader in scientific and technical research, the diffusion of technology, and the dissemination of scientific and technical information.

Working in partnership with innovative companies, universities and research organizations worldwide, NRC enhances Canada's social and economic well-being and creates new opportunities for Canadians. Through knowledge, research and innovation, NRC and its partners are expanding the frontiers of science and technology. The Institute for Information Technology is one of the National Research Council's research institutes. Its mission is to assist industry through collaborative research and development projects.

Learn more about the NRC at <http://www.nrc-cnrc.gc.ca/>.

## ICCBSS 2005 Sponsors



**Bizkaiko Foru  
Aldundia**

**Berrikuntza eta Ekonomi  
Sustapen Saila**

**Diputación Foral  
de Bizkaia**

**Departamento de Innovación  
y Promoción Económica**

## Keynote Speakers

Mr. John Kemp  
Technical Architect  
Web Services Technologies, Nokia

### **Mobile Web Services – Bridging Fixed and Mobile Networks with COTS Software**

The traditional fixed Internet has offered a wide variety of services and content to the general Web-browsing public. The mobile network has been seen quite differently, offering several challenges to the provision of Internet-based software and services. Web services technologies aim to overcome these challenges, and provide a world of new and exciting software-based services to mobile users. How will COTS software support mobile Web services, and what are some of the issues in bringing Web services support to COTS software?

Prof. Patrice Degoulet  
Head of Medical Informatics  
Pompidou Hospital

### **Building a COTS-Based Hospital Medical System**

Pompidou Hospital is one of the first hospitals to implement an EPR (Electronic Patient Record). This is a not-too-old medical ideal where everyday operations and record-keeping are carried out and maintained almost exclusively with computers. The idea behind it is to make all patients' medical reports, lab results, and images electronically available to clinicians, instantaneously, wherever they are and using only a laptop. Patrice Degoulet chose a commercial solution, a collection of the most effective COTS already existing in the market, in constructing the entire Pompidou's Medical System. He will present how the new system was designed and how the integration was carried out with so many different commercial components from different COTS vendors.

Mr. Tom Glover  
President and Chairman of the Web Services Interoperability Organization (WSI)  
Senior Program Manager – Web Services Standards at IBM

### **Evolving COTS and GOTS Software into the 21st Century**

Throughout the world today the drive towards ubiquitous interoperability has become a critical step towards meeting the need for flexible configuration of software solutions. Web services has emerged as the standards-based component model with the potential to deliver this broad interoperability, and the Services-Oriented Architecture model is hailed as the architecture within which these services will be deployed. We'll look at the synergies between these emerging technologies and the "off-the-shelf software" movement and discuss the synergies between the two initiatives which, if exploited, may empower new software users.

# Table of Contents

## Panels

COTS Component-Based Embedded Systems – A Dream or Reality? <i>Ivica Crnkovic, Jakob Axelsson, Susanne Graf, Magnus Larsson, Rob van Ommering, Kurt Wallnau</i> .....	1
Free and Proprietary Software in COTS-Based Software Development <i>Bernard Lang, Jean-François Abramatic, Jesús M. González-Barahona, Fernando Piera Gómez, Mogens Kühn Pedersen</i> .....	2

## Workshops

2nd International Workshop on Incorporating COTS into Software Systems: Assessment and Prediction of Behavior and QoS Attributes of COTS Software Components and Systems <i>Franck Barbier, Goiuria Sagarduy, Xabier Aretxandietia</i> .....	3
Challenges of COTS IV & V <i>Dan Port, Haruka Nakao, Masafumi Katahira, Christina Motes</i> .....	4

## Tutorials

The COTS Product Market: An EU Legal Perspective <i>Ignacio Delgado González, Carlos Arias-Chausson</i> .....	5
Composable Spiral Processes for COTS-Based Application Development <i>Barry Boehm, Ye Yang, Jesal Bhuta, Dan Port</i> .....	6

## Posters

Heterogeneous COTS Product Integration to Allow the Comprehensive Development of Image Processing Systems <i>Cristina Vicente Chicote, Ana Toledo Moreo, Carlos Fernández Andrés</i> .....	8
A Contextualized Study of COTS-Based E-Service Projects <i>Ye Yang, Barry Boehm</i> .....	9



Quality of Service Profiles in Web Service Discovery  
    *Barry Norton* ..... 10

Decision on Replacing Components of Security Functions in COTS-Based  
Information Systems  
    *Myeonggil Choi, Hyunwoo Kim, Eunhye Kim, Sehun Kim* ..... 11

**Best Papers**

Best Paper Award 2004: Characterization of a Taxonomy for Business  
Applications and the Relationships Among Them  
    *Juan P. Carvalho, Xavier Franch, Carme Quer, Marco Torchiano* ..... 12

Best Paper Award 2005: Using Earned Value Management for  
COTS-Based Systems: Issues and Recommendations  
    *Lisa Brownsword, Jim Smith* ..... 13

**COTS at Business**

Business Process Definition Languages Versus Traditional Methods  
Towards Interoperability  
    *Leire Bastida Merino, Gorka Benguria Elguezabal* ..... 25

The Necessary Legal Approach to COTS Safety and COTS Liability in  
European Single Market  
    *Carlos Arias-Chausson* ..... 36

COTS Acquisition: Getting a Good Contract  
    *Shadia Elgazzar, Anatol Kark, Erik Putrycz, Mark Vigder* ..... 43

**Integration and Interoperability**

Specifying Interaction Constraints of Software Components for Better  
Understandability and Interoperability  
    *Yan Jin, Jun Han* ..... 54

Resolving COTS System Assessment Clashes  
    *Daniel Port, Haruka Nakao, Hideki Nomoto, Hitoshi Mamiya,  
    Masafumi Katahira* ..... 65

COTS Components and DB Interoperability  
    *Radmila Juric, Ljerka Beus-Dukic* ..... 77

## Evaluation and Requirements

On Goal-Oriented COTS Taxonomies Construction <i>Claudia P. Ayala, Pere Botella, Xavier Franch</i> .....	90
Assets and Liabilities of Organizational Trust: COTS Software Adoption in Government Projects <i>Sally J. F. Baron</i> .....	101
Filtering COTS Components Through an Improvement-Based Process <i>Alejandra Cechich, Mario Piattini</i> .....	112
Enabling the Selection of COTS Components <i>Sudipto Ghosh, John L. Kelly, Roopashree P. Shankar</i> .....	122
A Method for Compatible COTS Component Selection <i>Jesal Bhuta, Barry Boehm</i> .....	132
One Global COTS-Based System to Replace 20+ Local Legacy Systems <i>Elisabeth Hansson, Göran V. Grahn</i> .....	144
Using Goals and Quality Models to Support the Matching Analysis During COTS Selection <i>Carina Alves, Xavier Franch, Juan P. Carvalho, Anthony Finkelstein</i> .....	146

## Safety and Dependability

Addressing Malicious Code in COTS : A Protection Framework <i>Donald J. Reifer, Pranjali Baxi, Fabio Hirata, Jonathan Schiffman, Ricky Tsao</i> .....	157
Protective Wrapping of Off-the-Shelf Components <i>Meine van der Meulen, Steve Riddle, Lorenzo Strigini, Nigel Jefferson</i> .....	168
An Automated Dependability Analysis Method for COTS-Based Systems <i>Lars Grunske, Bernhard Kaiser</i> .....	178

## Integration and Interoperability

Loose Integration of COTS Tools for the Development of Real Time Distributed Control Systems <i>Javier Portillo, Oskar Casquero, Marga Marcos</i> .....	191
Managing Dependencies Between Software Products <i>Mark Northcott, Mark Vigder</i> .....	201