2011 IEEE 13th International Symposium on High-Assurance Systems Engineering

(HASE 2011)

Boca Raton, Florida, USA
10 – 12 November 2011
Table of Contents

Preface .........................................................................................................................................................xi
Organizing Committee ...............................................................................................................................xii
Program Committee ..................................................................................................................................xiii
Steering Committee ..................................................................................................................................xiv
Sponsors .....................................................................................................................................................xv
Keynotes ....................................................................................................................................................xvi
Panel ...........................................................................................................................................................xix

Session A: Software Testing and Validation

A Testing Service for Lifelong Validation of Dynamic SOA ...........................................................................1
   Andrea Ceccarelli, Marco Vieira, and Andrea Bondavalli
Supporting Iterative Development of Robust Operation Contracts in UML
   Requirements Models ..............................................................................................................................9
   Wuliang Sun, Robert B. France, and Indrakshi Ray
Improve the Effectiveness of Test Case Generation on EFSM via Automatic Path Feasibility Analysis ..................17
   Rui Yang, Zhenyu Chen, Baowen Xu, W. Eric Wong, and Jie Zhang
Model Driven Validation of System Architectures .......................................................................................25
   André Pflüger, Wolfgang Golubski, and Stefan Queins
Regression Testing of Component-Based Software: A Systematic Practise
   Based on State Testing .............................................................................................................................29
   Chuanqi Tao, Bixin Li, and Jerry Gao
Session B: Modeling Checking and Verification I

A Unifying Approach to Validating Specification-Oriented XML Constraints ........................................33
   Yongxin Zhao, Zheng Wang, Hao Xiao, Jing Ping, Geguang Pu, Jifeng He,
   and Huibiao Zhu

An Event-B Interpretation for SPARQL Model ............................................................................................41
   Jianwen Li, Zheng Wang, Yongxin Zhao, Geguang Pu, Yanxia Qi, and Bin Gu

A Behavioral Analysis Approach for Efficient Partial Order Reduction .........................................................49
   Yingying Zhang, Emmanuel Rodriguez, Hao Zheng, and Chris Myers

Animating the Approach of Deriving Operational Semantics from Algebraic Semantics for Web Services ..........................................................57
   Qian Wang and Huibiao Zhu

Session C: Applications and Technologies

Combining Goal Models, Expert Elicitation, and Probabilistic Simulation for Qualification of New Technology ...........................................................................................................63
   Mehrdad Sabetzadeh, Davide Falessi, Lionel Briand, Stefano Di Alesio,
   Dag McGeorge, Vidar Åhjem, and Jonas Borg

On High-Assurance Scientific Workflows ........................................................................................................73
   Mladen A. Vouk and Pierre A. Mouallem

Integrating Legacy Applications for High Availability: A Case Study ............................................................83
   A. Kanso, F. Khendek, A. Mishra, and M. Toeroe

Personal Health Record System and Integration Techniques with Various Electronic Medical Record Systems ............................................................................................................................91
   Vishesh Ved, Vivek Tyagi, Ankur Agarwal, and A.S. Pandya

Session D: High Assurance Distributed Systems

The OASIS Kernel: A Framework for High Dependability Real-Time Systems ..................................................95
   Stephane Louise, Matthieu Lemerre, Christophe Aussaguès, and Vincent David

Conflict Detection and Lifecycle Management for Access Control in Publish/Subscribe Systems ..........................................................104
   Patrick Hein, Debmalya Biswas, Leonardo A. Martucci, and Max Mühlhäuser

Discriminatively Fortified Computing with Reconfigurable Digital Fabric ..................................................112
   Mingjie Lin, Yu Bai, and John Wawrzynek

Enumerating Software Failures to Build Dependable Distributed Applications ............................................120
   Ingrid Buckley and Eduardo B. Fernandez

Leader-Determined Membership Protocol .......................................................................................................124
   Wenbing Zhao, P.M. Melliar-Smith, and L.E. Moser
Session E: Model Checking and Verification II

Reducing State Explosion with Context Modeling for Model-Checking .................................................. 130
Philippe Dhaussy, Jean-Charles Roger, and Frédéric Boniol

Guidelines for Formal Domain Modeling in Event-B .................................................................................. 138
Atif Mashkoor and Jean-Pierre Jacquot

Patterns for Representing FMEA in Formal Specification of Control Systems ........................................... 146
Ilya Lopatkin, Alexei Iliasov, Alexander Romanovsky, Yuliya Prokhorova, and Elena Troubitsyna

Monarch: A High-Assurance Java-to-Java (J2j) Source-Code Migrator ...................................................... 152
Victor L. Winter, Jonathan Guerrero, Carl Reinke, and James T. Perry

Session F: High Assurance Networked Systems and Services

A Calculus for Mobile Ad Hoc Networks from a Group Probabilistic Perspective ....................................... 157
Si Liu, Yongxin Zhao, Huibiao Zhu, and Qin Li

A Real Time Window-Based Local Call Admission Control Algorithm for IP Networks ............................................... 163
Sami S. Alwakeel and Shaker S. AlGhanmi

Anytime Available Single IP Address Cluster ......................................................................................... 168
Hajime Fujita and Yutaka Ishikawa

Poster Presentations

Autonomous Online Expansion Technology for ZigBee Wireless Sensor Networks ............................................. 174
Md. Emdadul Haque, Fan Wei, Takehiro Gouda, Xiaodong Lu, and Kinji Mori

A Security Modelling Framework for Systems of Embedded Components ............................................... 176
Antonio Maña and Jose Fran. Ruiz

On the Relationship between Preprocessor-Based Software Variability and Software Defects ......................... 178
Kunming Nie and Li Zhang

Towards a Security Domain Model for Embedded Systems ........................................................................... 180
Simin Nadjm-Tehrani and Maria Vasilevskaya

A Task-Based Code Review Process and Tool to Comply with the DO-278/ED-109 Standard for Air Traffic Management Software Development: An Industrial Case Study ........................................................................... 182
Mario Bernhart, Stefan Reiterer, Kilian Matt, Andreas Mauczka, and Thomas Grechenig
Self-Healing Data Exchange Process under Evolving Schemas: A New Mapping Adaptation Approach Based on Self-Optimization ......................................................... 188
   H. Assoudi and H. Lounis

Comparison and Analysis of Cryptographic Algorithms Aiming Performance Improvement in Secure Web Services ................................................................. 191
   Douglas Rodrigues, Daniel F. Pigatto, Júlio C. Estrella,
   and Kalinka R. L. J. C. Branco

Session G: Safety-Critical Systems

Using SysML for Modeling of Safety-Critical Software-Hardware Interfaces: Guidelines and Industry Experience .......................................................... 193
   Mehrdad Sabetzadeh, Shiva Nejati, Lionel Briand, and Anne-Heidi Evensen Mills

An Early Design Stage UML-Based Safety Analysis Approach for High Assurance Software Systems ................................................................. 202
   Chetan Mutha and Carol Smidts

Worst Case Temporal Consistency in Integrated Modular Avionics Systems ................................................................. 212
   Michaël Lauer, Jérôme Ermont, Frédéric Boniol, and Claire Pagetti

High-Assurance Reconfigurable Multicore Processor Based Systems ................................................................. 220
   Manasi Peshave, Farokh B. Bastani, and I-Ling Yen

Session H: High Assurance Ocean Systems

Ensemble Coordination for Discrete Event Control ......................................................... 227
   John C. Sloan and Taghi M. Khoshgoftaar

Using Feature Selection to Determine Optimal Depth for Wavelet Packet Decomposition of Vibration Signals for Ocean System Reliability ......................................................... 236
   Randall Wald, Taghi M. Khoshgoftaar, and John C. Sloan

A Dynamometer for an Ocean Turbine Prototype: Reliability through Automated Monitoring ......................................................... 244
   Janell Duhaney, Taghi M. Khoshgoftaar, John C. Sloan, Bassem Alhalabi,
   and Pierre P. Beaujean

Smart Vibration Monitoring System for an Ocean Turbine ......................................................... 252
   Mustapha Mjit, Pierre-Philippe J. Beaujean, and David J. Vendittis

Session I: Performance, Reliability and Availability Analysis

An Availability Model of a Virtual TMR System with Applications in Cloud/Cluster Computing ......................................................... 261
   Ricardo Paharsingh and Olivia Das

Efficient System Reliability with Correlated Component Failures ......................................................... 269
   Lance Fiondella, Sanguthevar Rajasekaran, and Swapna S. Gohkale
Benchmarking Embedded Software Development Project Performance ..............................................277
    Michael F. Siok and Jeff Tian
Modeling Recovery Strategies in Service-Oriented Architecture Using a Markov Decision Process .................................................................................................................................285
    Dongeun Lee, Heonshik Shin, and Eunjeong Park

**Session J: Monitoring**
Multi-layer Monitoring for Cloud Computing ..................................................................................291
    Javier González, Antonio Muñoz, and Antonio Maña
Using Automated Control Charts for the Runtime Evaluation of QoS Attributes ..........................299
    Ayman Amin, Alan Colman, and Lars Grunske
VMDetector: A VMM-based Platform to Detect Hidden Process by Multi-view Comparison ..........307
    Ying Wang, Chunming Hu, and Bo Li
Validation of Object Recognition Framework on Android Mobile Platform .................................313
    Vivek Tyagi, A.S. Pandya, Ankur Agarwal, and Bassem Alhalabi

**Session K: Bugs and Fault Localization**
On the Effectiveness of the Tarantula Fault Localization Technique for Different Fault Classes .............................................................................................................................317
    Aritra Bandyopadhyay and Sudipto Ghosh
GUI Software Fault Localization Using N-gram Analysis ..................................................................325
    Zhongxing Yu, Hai Hu, Chenggang Bai, Kai-Yuan Cai, and W. Eric Wong
Software-Based Instrumentation for Localization of Faults Caused by Electrostatic Discharge ............................................................................................................................333
    Pratik Maheshwari, Byong-Su Seol, Jong-Sung Lee, Jae-Deok Lim, Sahra Sedigh, and David Pommerenke
Bug Signature Minimization and Fusion ..............................................................................................340
    David Lo, Hong Cheng, and Xiaoyin Wang
So Much to Learn from One Accident Crash of 737 on 25 February 2009 .....................................348
    Herbert Hecht

**Session L: Security and Privacy**
Effects of User Habitation in Keystroke Dynamics on Password Security Policy ............................................352
    Zahid Syed, Sean Banerjee, Qi Cheng, and Bojan Cukic
Formal Analysis of the DNS Bandwidth Amplification Attack and Its
Countermeasures Using Probabilistic Model Checking ........................................................360
   Tushar Deshpande, Panagiotis Katsaros, Stylianos Basagiannis,
   and Scott A. Smolka

Transforming Privacy Policies to Auditing Specifications ..................................................368
   Debmalya Biswas and Valtteri Niemi

Verification of Interoperability Security Policies by Model Checking ............................376
   Mazen El Maarabani, Ana Cavalli, Iksoon Hwang, and Fatiha Zaidi

Author Index ......................................................................................................................382