2016 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks Workshop (DSN-W 2016)

Toulouse, France
28 June – 1 July 2016
# Table of Contents

Greetings from the General Chairs...........................................................................................................xii  
Message from the Workshop Chairs.......................................................................................................xiii  
Foreword for the Industrial Track...........................................................................................................xiv  
Message from the Tutorial Chairs..........................................................................................................xv  
Organizing Committee..............................................................................................................................xvi  
Program Committee................................................................................................................................xviii  
Steering Committee..................................................................................................................................xxii  

---

**RADIANCE 2016: The Second International Workshop on Recent Advances in the Dependability Assessment of Complex Systems**

Introduction to RADIANCE 2016 ..............................................................................................................1  

*Ariadne M. B. R. Carvalho, Nuno Antunes, Andrea Ceccarelli, and Andras Zentai*

**RADIANCE: Preliminary Works on Dependability and Security**

Use of Similarity Measure to Suggest the Existence of Duplicate User Stories  
in the Scrum Process .................................................................................................................................2  

*R. Barbosa, A. E. A. Silva, and R. Moraes*

Code Change History and Software Vulnerabilities ................................................................................6  

*Marcus Piancó, Baldoino Fonseca, and Nuno Antunes*

**RADIANCE: Cloud and SOA Services**

Hierarchical Model and Sensitivity Analysis for a Cloud-Based VoD Streaming  
Service .......................................................................................................................................................10  

*Jamilson Dantas, Rubens Matos, Jean Araujo, Danilo Oliveira, Andre Oliveira, and Paulo Maciel*

SOASales: A SOA System for Research Purposes ..................................................................................17  

*Carla Machado, Cristiano Areias, and João Carlos Cunha*
RADIANCE: Analysis and Model-Based Techniques

A Bayesian Networks Based Method for Ship Reliability Assessment .................................................................25
   Hong Dong Wang, Xiao Feng Liang, Hong Yi, and Dan Li

Scalable Robustness .................................................................................................................................................31
   Thomas B. Jones and David H. Ackley

D-MBTDD: An Approach for Reusing Test Artefacts in Evolving System ...........................................................39
   Thais Harumi Ussami, Eliane Martins, and Leonardo Montecchi

RSDA 2016 Workshop: The Third International Workshop on Reliability and Security Data Analysis

Introduction to RSDA 2016 ..................................................................................................................................47
   Antonio Pecchia and Olivier Thonnard

RSDA: Internet Threats and Countermeasures

Comparing Detection Capabilities of AntiVirus Products: An Empirical Study with Different Versions of Products from the Same Vendors .................................................................48
   Areej Algaith, Ilir Gashi, Bertrand Sobesto, Michel Cukier, Selman Haxhijaha, and Gazmend Bajrami

An Application of Unsupervised Fraud Detection to Passenger Name Records .............................................54
   Rémi Domingues, Francesco Buonora, Romain Senesi, and Olivier Thonnard

MimeoDroid: Large Scale Dynamic App Analysis on Cloned Devices via Machine Learning Classifiers ....................60
   Parvez Faruki, Akka Zemmari, Manoj Singh Gaur, Vijay Laxmi, and Mauro Conti

RSDA: Error and Failure Detection

Error Monitoring for Legacy Mission-Critical Systems .........................................................................................66
   Marcello Cinque, Raffaele Della Corte, and Stefano Russo

SDC is in the Eye of the Beholder: A Survey and Preliminary Study ....................................................................72
   Bo Fang, Panruo Wu, Qiang Guan, Nathan DeBardeleben, Laura Monroe, Sean Blanchard, Zhizong Chen, Karthik Pattabiraman, and Matei Ripeanu

RSDA: Virtualization and Cloud

Classifying Virtual Machine Managers by Overhead ..............................................................................................77
   Colin S. Murray

Hunting Killer Tasks for Cloud System through Behavior Pattern Learning ......................................................83
   Hongyan Tang, Ying Li, Tong Jia, and Zhonghai Wu
DISN 2016 Workshop: The Second International Workshop on Dependability Issues on SDN and NFV

Introduction to DISN 2016 ..................................................................................................................89
    Elias P. Duarte Jr., Matti Hiltunen, and Robert Soulé

DISN: Fault-Tolerant Software Defined Networks

Ground Control to Major Faults: Towards a Fault Tolerant and Adaptive SDN Control Network ........................................................................................................................................90
    Liron Schiff, Stefan Schmid, and Marco Canini

Experience with 3 SDN Controllers in an Enterprise Setting .........................................................................97
    Zhiyuan Teo, Ken Birman, and Robbert Van Renesse

Availability Modelling of Software-Defined Backbone Networks .......................................................................105
    Gianfranco Nencioni, Bjame E. Helvik, Andres J. Gonzalez, Poul E. Heegaard, and Andrzej Kamisiński

DISN: Dependable Routing in Software Defined Networks

Routing-Verification-as-a-Service (RVaaS): Trustworthy Routing Despite Insecure Providers ........................................113
    Liron Schiff, Kashyap Thimmaraju, and Stefan Schmid

KAR: Key-for-Any-Route, a Resilient Routing System .................................................................................120
    Rodolfo R. Gomes, Alextian B. Liberato, Cristina K. Dominicini, Moisés R. N. Ribeiro, and Magnos Martinello

NetCo: Reliable Routing With Unreliable Routers .......................................................................................128
    Anja Feldmann, Philipp Heyder, Michael Kreutzer, Stefan Schmid, Jean-Pierre Seifert, Haya Shulman, Kashyap Thimmaraju, Michael Waidner, and Jens Sieberg

ReSA4CI 2016 Workshop: The Third International Workshop on Reliability and Security Aspects for Critical Infrastructure

Introduction to ReSA4CI 2016 ......................................................................................................................136
    Silvia Bonomi and Ilaria Matteucci

ReSA4CI Keynote

An Architecture for Semi-Automatic Collaborative Malware Analysis for CIs ..................................................137
    Giuseppe Laurenza, Daniele Ucci, Leonardo Aniello, and Roberto Baldoni
### Res4CI: Quantification and Analysis of Complex Systems

**Diverse Compiling for Software-Based Recovery of Permanent Faults in COTS**

Andrea Höeller, Bernhard Spitzer, Tobias Rauter, Johannes Iber, and Christian Kreiner

---

**Quantification and Analysis of Interdependency in Cyber-Physical Systems**

Koosha Marashi, Sahra Sedigh Sarvestani, and Ali R. Hurson

---


Mikel Iturbe, José Camacho, Iñaki Garitano, Urko Zurutuza, and Roberto Uribeetxeberria

---

### SSIV 2016 Workshop: The Second International Workshop on Safety and Security of Intelligent Vehicles

**Introduction to SSIV 2016**

João Carlos Cunha, Kalinka Branco, António Casimiro, and Urbano Nunes

---

**In-Vehicle Real-Time Fog Computing**

Hermann Kopetz and Stephan Poledna

---

### SSIV: Communication Safety and Security

**An Effective Two-Level Redundancy Approach for FlexRay Network Systems**

Yung-Yuan Chen and Kuen-Long Leu

---

**Designing Security for In-vehicle Networks: A Body Control Module (BCM) Centered Viewpoint**

Bogdan Groza, Horațiu-Eugen Gurban, and Pal-Ștefan Murvay

---

**IEEE 802.11n vs. IEEE 802.15.4: A Study on Communication QoS to Provide Safe FANETs**

Emerson A. Marconato, Jean Aimé Maxa, Daniel F. Pigatto, Alex S. R. Pinto, Nicolas Larrieu, and Kalinka R. L. J. Castelo Branco

---

### SSIV: Design and Validation

**On the Validation of a UAV Collision Avoidance System Developed by Model-Based Optimization: Challenges and a Tentative Partial Solution**

Xueyi Zou, Rob Alexander, and John McDermid

---

**Safety Engineering for Autonomous Vehicles**

Rasmus Adler, Patrik Feth, and Daniel Schneider
Industrial Track

Session IT1: Position Papers
A Distributed Avionics Communication Network .................................................................206
  Paul Boivin Champeaux, David Faura, Marc Gatti, and William Terroy
HARP: High Availability Registration Platform for Software Defined Infrastructure ................210
  Henry Zhu and Sejun Song
Secure Embedded Hypervisor Based Systems for Automotive ..............................................211
  Stefaan Sonck Thiebaut, Antonio De Rosa, and Ralph Sasse
Software Safety Assessment and Probabilities ......................................................................213
  Jean-Paul Blanquart, Philippe Baufreton, Jean-Louis Boulanger,
  Jean-Louis Camus, Cyrille Comar, Hervé Delseny, Jean Gassino,
  Emmanuel Ledinot, Philippe Quéré, and Bertrand Ricque

Session IT2: Automotive and Aeronautics Systems Engineering
AUTOSAR for Connected and Autonomous Vehicles: The AUTOSAR Adaptive Platform .................................................................215
  Simon Fürst and Markus Bechter
Evaluation of EEE Reliability Prediction Models for Space Applications .................................218
  S. Bourbouse, Jean-Paul Blanquart, J. F. Gajewski, and C. Lahorgue
An Uncrewed Aerial Vehicle Attack Scenario and Trustworthy Repair Architecture ................222
  Kate Highnam, Kevin Angstadt, Kevin Leach, Westley Weimer, Aaron Paulos,
  and Patrick Hurley
Transformation of Failure Propagation Models into Fault Trees for Safety Evaluation Purposes ........................................................................226
  Moomen Chaari, Wolfgang Ecker, Thomas Kruse, Cristiano Novello,
  and Bogdan-Andrei Tabacaru

Session IT3: Security and Resilience
The Concept of a Software-Free Resilience Infrastructure for Cyber-Physical Systems ................230
  Algirdas Avizienis, Rimas Avizienis, and Audrius V. Avizienis
A System for the Security Protection of Embedded Binary Programs ......................................234
  Jack W. Davidson, Jason D. Hiser, Anh Nguyen-Tuong, Clark L. Coleman,
  William H. Hawkins, John C. Knight, Benjamin D. Rodes, and Ashlie B. Hocking
Trusted Software Repair for System Resiliency .................................................................238

Westley Weimer, Stephanie Forrest, Miryung Kim, Claire Le Goues, and Patrick Hurley

Resiliency Challenges in Accelerating Carrier-Grade Networks with SDN .............................242

Catello Di Martino, Veena Mendiratta, and Marina Thottan

Session IT4: Computer Architecture and Networks

A Triple Core Lock-Step (TCLS) ARM® Cortex®-R5 Processor
for Safety-Critical and Ultra-Reliable Applications ..............................................................246

Xabier Iturbe, Balaji Venu, Emre Ozer, and Shidhartha Das

Improving DRAM Fault Characterization through Machine Learning ..................................250

Elisabeth Baseman, Nathan DeBardeleben, Kurt Ferreira, Scott Levy, Steven Raasch, Vilas Sridharan, Taniya Siddiqua, and Qiang Guan

Towards Black-Box Anomaly Detection in Virtual Network Functions .............................254

Carla Sauvanaud, Kahina Lazri, Mohamed Kaâniche, and Karama Kanoun

Profiling Memory Vulnerability of Big-Data Applications ....................................................258


Tutorials

Common Safety Method for Risk Evaluation and Assessment (CSM-RA)
and Hazard Analysis Tutorial: Managing Effectively Significant Changes in
a Railway System ......................................................................................................................262

Francisco Moreira and Nuno Pedro Silva

DSN 2016 Tutorial: Reliability and Availability Modeling in Practice ..................................263

Kishor S. Trivedi and Andrea Bobbio

Activating Protection and Exercising Recovery Against Large-Scale Outages
on the Cloud ..........................................................................................................................264

Long Wang, Harigovind V. Ramasamy, Ruchi Mahindru, and Richard Harper

Measuring Resiliency through Field Data: Techniques, Tools and Challenges ..................265

Antonio Pecchia, Marcello Cinque, and Veena Mendiratta

Building Highly-Available Distributed SDN Applications with ONOS .........................266

Ali Al-Shabibi, Brian O’Connor, and Thomas Vachuska

DSN 2016 Tutorial: Resilience for Scientific Computing: From Theory
to Practice ...........................................................................................................................267

Franck Cappello and George Bosilica
Best of SELSE

A Unified Framework for Error Correction in On-chip Memories .................................................. 268
  Frederic Sala, Henry Duwe, Lara Dolecek, and Rakesh Kumar

Special Session at DSN for the Best Papers from SELSE 2016 .................................................. 275
  Alan Wood

Software-Defined Error-Correcting Codes .................................................................................... 276
  Mark Gottscho, Clayton Schoeny, Lara Dolecek, and Puneet Gupta

External Assessment of QoS Provisioning in Distributed Cloud Services .................................. 283
  K. Ravindran, A. Adiththan, M. Iannelli, and M. Rabby

Author Index ..................................................................................................................................... 291