Proceedings

»PNSE’15«
International Workshop on
Petri Nets and Software Engineering

Satellite event of the
36th International Conference on
Application and Theory of Petri Nets
and Concurrency

15th International Conference on
Application of Concurrency to
System Design

Brussels, Belgium, June, 2015

including papers of

»ADECS’15«
International Workshop on
Petri Nets for Adaptive Discrete Event Control Systems
PNSE’15 Editors: Daniel Moldt and
Heiko Rölke and
Harald Störrle

Proceedings of the
International Workshop on
Petri
Nets and
Software
Engineering

PNSE’15

University of Hamburg
Department of Informatics
Preface

These are the proceedings of the International Workshop on Petri Nets and Software Engineering (PNSE’15), which also includes the papers of the International Workshop on Petri Nets for Adaptive Discrete Event Control Systems (ADECS’15) in Brussels, Belgium, June 22–23, 2015.

They are co-located events of Petri Nets 2015, the 36th International Conference on Applications and Theory of Petri Nets and Concurrency and ACSD 2015, the 16th International Conference on Application of Concurrency to System Design. More information about the workshops can be found at:

For PNSE’15:

http://www.informatik.uni-hamburg.de/TGI/events/pnse15/

For ADECS’15:

http://adecs2015.cnam.fr/

PNSE’15 preface:

For the successful realisation of complex systems of interacting and reactive software and hardware components the use of a precise language at different stages of the development process is of crucial importance. Petri nets are becoming increasingly popular in this area, as they provide a uniform language supporting the tasks of modelling, validation, and verification. Their popularity is due to the fact that Petri nets capture fundamental aspects of causality, concurrency and choice in a natural and mathematically precise way without compromising readability.

The use of Petri Nets (P/T-Nets, Coloured Petri Nets and extensions) in the formal process of software engineering, covering modelling, validation, and verification, will be presented as well as their application and tools supporting the disciplines mentioned above.

ADECS’15 preface:

The new generation of Discrete Event Control Systems (DECS) is addressing new important criteria as flexibility and agility. This year concentrated on Dynamic Software Architectures and Adaptable Systems.
We included the papers of ADECS’15 in PNSE’15 and received more than 30 high-quality contributions. For each paper at least three reviews were provided. The program committees have accepted seven of them for full presentation. Furthermore the committee accepted eight papers as short presentations. Several more contributions were submitted and accepted as posters.

The two invited talks are presented by

Fabio Gadducci (University of Pisa, Italy).
Nicolas Guelfi (University of Luxembourg, Luxembourg)

The international program committee of PNSE’15 was supported by the valued work of following sub reviewers:

Thomas Brand,
Cesar Rodriguez,
Marisa Llorens,
Benjamin Meis,
Pedro Alvarez,
Marcin Hewelt and
Dimitri Plotnikov

Their work is highly appreciated.

Furthermore, we would like to thank our colleagues in Hamburg, Germany, for their support in the compilation of the proceedings, in Hagen, Germany, for the support with the CEUR handling and in Brussels, Belgium, for their excellent and responsive organizational support.

Without the enormous efforts of authors, reviewers, PC members and the organizational team this workshop wouldn’t provide such an interesting booklet.

Thank you,

Daniel Moldt, Heiko Rölke and Harald Störrle (Chairs for PNSE’15) and Kamel Barkaoui and Chadlia Jerad (Chairs for ADECS’15)
The PNSE'15 program committee consists of:

Bernhard Bauer (University of Augsburg, Germany)
Robin Bergenthum (University of Hagen, Germany)
Didier Buchs (University of Geneva, Switzerland)
Lawrence Cabac (University of Hamburg, Germany)
Piotr Chrzaszowski-Wachtel (University of Warsaw, Poland)
Gianfranco Ciardo (Iowa State University, USA)
José-Manuel Colom (University of Zaragoza, Spain)
Ernesto Damiani (University of Milan, Italy)
Patrick Delfmann (University of Münster, Germany)
Raymond Devillers (Université Libre de Bruxelles, Belgium)
Susanna Donatelli (University of Turin, Italy)
Gregor Engels (University of Paderborn, Germany)
Joaquín Ezpeleta Mateo (University of Zaragoza, Spain)
Jorge C. A. de Figueiredo (Federal University of Campina Grande, Brazil)
Ulrich Frank (University of Duisburg-Essen, Germany)
Holger Giese (University of Potsdam, HPI, Germany)
Paolo Giogini (University of Trento, Italy)
Luís Gomes (Universidade Nova de Lisboa, Portugal)
Nicolas Guelfi (University of Luxembourg)
Stefan Haar (ENS Cachan, France)
Serge Haddad (ENS Cachan, France)
Nabil Hameurlain (Université de Pau et des Pays de l’Adour, France)
Xudong He (Florida International University, USA)
Vincent Hilaire (Université de Technologie de Belfort-Montbéliard, France)
Thomas Hildebrandt (IT University of Copenhagen, Denmark)
Lom-Messan Hillah (Université Paris Ouest and LIP6 (UPMC), France)
Kunihiko Hiraishi (Japan Advanced Institute of Science and Technology, Japan)
Vladimír Janoušek (Brno University of Technology, Czech Republic)
Peter Kemper (College of William and Mary, USA)
Astrid Kiehn (IIT Delhi, India)
Ekkart Kindler (Technical University of Denmark, Denmark)
Hanna Klaudel (Université d’Evry-Val d’Essonne, France)
Radek Kočí (Brno University of Technology, Czech Republic)
Fabrice Kordon (Université Paris Ouest and LIP6 (UPMC), France)
Maciej Koutny (University of Newcastle, United Kingdom)
Lars Kristensen (Bergen University College, Norway)
Michael Köhler-Bußmeier (University of Applied Science Hamburg, Germany)
Niels Lohmann (Carmeq GmbH, Germany)
Robert Lorenz (University of Augsburg, Germany)
Heinrich Mayr (Alpen-Adria-Universität Klagenfurt, Austria)
Jan Mendling (Vienna University of Economics and Business, Austria)
Daniel Moldt (University of Hamburg, Germany) (Co-Chair)
Berndt Müller (University of South Wales, United Kingdom)
Andreas Oberweis (Karlsruhe Institute of Technology, Germany)
Andrea Omicini (University of Bologna, Italy)
Chun Ouyang (Queensland University of Technology, Australia)
Wojciech Penczek (UPH Siedlce and IPI PAN Warsaw, Poland)
Laure Petrucci (University Paris 13, France)
Lucia Pomello (Università degli Studi di Milano-Bicocca, Italy)
Heiko Rölke (DIPF, Germany) (Co-Chair)
Bernhard Rumpe (RWTH Aachen, Germany)
Christophe Sibertin-Blanc (Université Toulouse 1, France)
Mark-Oliver Stehr (SRI International, USA)
Harald Störrle (Technical University of Denmark, Denmark) (Co-Chair)
Ingo Timm (University of Trier, Germany)
Adelinde Uhrmacher (University of Rostock, Germany)
Eric Verbeek (Eindhoven University of Technology, Netherlands)
Jan Martijn van der Werf (Utrecht University, Netherlands)
Mathias Weske (University of Potsdam, HPI, Germany)
Manuel Wimmer (Vienna University of Technology, Austria)
Karsten Wolf (University of Rostock, Germany)
The ADECS’15 program committee consists of:

- Hassane Alla, France,
- Farhad Arbab, The Netherlands
- Mohamed Bakhouya, Morocco
- Faiza Belala, Algeria
- Beatrice Bérard, France
- Luca Bernardinello, Italy
- Hanifa Boucheneb, Canada
- Roberto Bruni, Italy
- Javier Campos, Spain,
- Piotr Chrzastowski-Wachtel, Poland,
- Vincenzo De Florio, Belgium
- Raymond Devillers, Belgium
- Maria Pia Fanti, Italy
- Georg Frey, Germany,
- Abdoulaye Gamatie, France
- Alessandro Giua, Italy,
- Luis Gomes, Portugal,
- Serge Haddad, France
- Hans-Michael Hanisch, Germany,
- Vladimír Janoušek, Czech Republic,
- Jorge Júlvez, Spain
- Laid Kahloul, Algeria
- Peter Kemper, USA,
- Mohamed Khalgui, Tunisia
- Hanna Klaudel, France,
- Michael Köhler-Bußmeier, Germany,
- Radek Koci, Czech Republic,
- Ouajdi Korbaa, Tunisia
- Lars Kristensen, Norway,
- Alberto Lluch Lafuente, Italy
- Petrucci Laure, France,
- Zhiwi Li, China
- Gaiyun Liu, China
- Robert Lorenz, Germany,
- Cristian Mahulea, Spain
- Ramon Piedrafita Moreno, Spain
- Andrey Mokhov, UK
- Daniel Moldt, Germany,
- Javier Oliver, Spain
- Wojciech Penczek, Poland
- Riadh Robbana, Tunisia
- Éric Rutten, France
· José Luis Villarroel Salcedo, Spain
· Heiko Rölke, Germany,
· Kleanthis Thrampoulidis, Greece,
· Yamen El Touati, Tunisia
· Murat Uzam, Turkey,
· Valeriy Viyatkin, New Zealand,
· Habib Youssef, Tunisia
· Weimin Wu, China,
· Mengchu Zhou, USA
Contents

Part I Invited Talks

Software Engineering and Modeling Education: Problems and Solutions
Nicolas Guelfi ............................................. 17

Awareness and Control in Adaptable Transition Systems
Fabio Gadducci, Roberto Bruni, Andrea Corradini, Alberto Lluch
Lafuente and Andrea Vandin ............................... 19
## Part II Long Presentations

<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unifying Patterns for Modelling Timed Relationships in Systems and Properties</td>
<td>Étienne André and Laure Petrucci</td>
<td>25</td>
</tr>
<tr>
<td>Negotiations and Petri Nets</td>
<td>Jörg Desel and Javier Esparza</td>
<td>41</td>
</tr>
<tr>
<td>Non-Interference Notions Based on Reveals and Excludes Relations for Petri Nets</td>
<td>Luca Bernardinello, Görkem Kılınç and Lucia Pomello</td>
<td>59</td>
</tr>
<tr>
<td>Pragmatics Annotated Coloured Petri Nets for Protocol Software Generation and Verification</td>
<td>Lars Kristensen, Ekkart Kindler and Kent Inge Fagerland Simonsen</td>
<td>79</td>
</tr>
<tr>
<td>Providing Petri Net-Based Semantics in Model Driven-Development for the Renew Meta-Modeling Framework</td>
<td>David Mosteller, Lawrence Cabac and Michael Haustermann</td>
<td>99</td>
</tr>
<tr>
<td>Validating DCCP Simultaneous Feature Negotiation Procedure</td>
<td>Somsak Vanit-Anunchai</td>
<td>115</td>
</tr>
<tr>
<td>Dynamic Software Architecture for Distributed Embedded Control Systems</td>
<td>Tomáš Richta, Vladimír Janoušek and Radek Koči</td>
<td>133</td>
</tr>
</tbody>
</table>
Part III Short Presentations

Reengineering the editor of the GreatSPN framework
Elvio Gilberto Amparore .................................................. 153

Improving Performance of Complex Workflows: Investigating Moving Net Execution to the Cloud
Sofiane Bendoukha and Thomas Wagner ......................... 171

Modelling the Behaviour of Management Operations in Cloud-based Applications
Antonio Brogi, Andrea Canciani, Jacopo Soldani and Pengwei Wang ... 191

Unfolding CSPT-nets
Bowen Li and Maciej Koutny .................. 207

Discovery of Functional Architectures From Event Logs
Jan Martijn Van Der Werf and Erwin Kaats ..................... 227

Interval-Timed Petri Nets with Auto-concurrent Semantics and their State Equation
Elisabeth Pelz, Louchka Popova-Zeugmann and Abderraouf Kabouche ... 245

Lookahead Consistency Models for Dynamic Migration of Workflow Processes
Ahana Pradhan and Rushikesh Joshi ............................... 267

Catalog-based Token Transportation in Acyclic Block-Structured WF-nets
Ahana Pradhan and Rushikesh Joshi ............................... 287
Part IV Poster Abstracts

De-Materializing Local Public Administration Processes
Giancarlo Ballauco, Paolo Ceravolo, Ernesto Damiani, Fulvio Frati and Francesco Zavatirelli ........................................311

Renew – The Reference Net Workshop
Lawrence Cabac, Michael Haustermann and David Mosteller ........313

Queue-less, Uncentralized Resource Discovery: Formal Specification and Verification
Camille Coti, Sami Evangelista and Kais Klai .........................315

Introducing the Quick Fix for the Petri Net Modeling Tool RENEW
Jan Hicken, Lawrence Cabac and Michael Haustermann ............317

Process-oriented Worksheets for the Support of Teaching Projects
Dennis Schmitz and Lawrence Cabac .................................319

Integrating Network Technique Into an Agent-Oriented and Distributed Software Development Process
Christian Röder and Lawrence Cabac .................................321

Applying Petri Nets to Approximation of the Euclidean Distance with the Example of SIFT
Jan Henrik Röwekamp and Michael Haustermann ...................323

Coordination Rules Generation from Coloured Petri Net Models
Adja Ndeye Sylla, Maxime Louvel and François Pacull .............325