FOCUS

SOFTWARE ENGINEERING FOR THE INTERNET OF THINGS

24 Guest Editors’ Introduction

Software Engineering for the Internet of Things
Xabier Larrucea, Annie Combelles, John Favaro, and Kunal Taneja

30 Model-Based: Software Engineering to Tame the IoT Jungle
Brice Morin, Nicolas Harrand, and Franck Fleurey

38 Key Abstractions for IoT-Oriented Software Engineering
Franco Zambonelli

46 Model-Driven Engineering for Mission-Critical IoT Systems
Federico Ciccozzi, Ivica Crnkovic, Davide Di Ruscio, Ivano Malavolta, Patrizio Pelliccione, and Romina Spalazzese

54 Enabling IoT Ecosystems through Platform Interoperability
Arne Bröring, Stefan Schmid, Corina-Kim Schindhelm, Abdelmajid Khelil, Sebastian Käbsch, Denis Kramer, Danh Le Phuoc, Jelena Mitic, Darko Anicic, and Ernest Teniente

62 Scalable-Application Design for the IoT
Jagannathan Venkatesh, Barış Akşanlı, Christine S. Chan, Alper S. Akyürek, and Tajana Š. Rosing

72 A Roadmap to the Programmable World Software Challenges in the IoT Era
Antero Taivalsaari and Tommi Mikkonen

FEATURES

82 Guidelines for Managing Requirements Rationales
Anil Kumar Thurimella, Mathias Schubanz, Andreas Pleuss, and Goetz Botterweck

MISCELLANEOUS

6 Contact Us
7 Letters to the Editor
45 IEEE Computer Society Information
DEPARTMENTS

4 From the Editor
Software-Engineering
the Internet of Things
Dionizis Spinellis

9 Voice of Evidence
Preparing Tomorrow’s
Software Engineers for Work
in a Global Environment
Sarah Beecham, Tony Clear, John Barr,
Mats Daniels, Michael Oudshoorn,
and John Noll

13 Practitioners’ Digest
Requirements, Human Values,
and the Development Technology
Landscape
Jeffrey C. Carver, Leandro L. Minku,
and Birgit Penzenstadler

16 Sounding Board
How Best to Teach Global Software
Engineering? Educators Are Divided
Sarah Beecham, Tony Clear,
Daniela Damian, John Barr, John Noll,
and Walt Scacchi

20 Requirements
Aligning Requirements and Testing:
Working Together toward the
Same Goal
Elizabeth Bjarnason and Markus Borg

91 Insights
Microservices in Practice, Part 1:
Reality Check and Service Design
Cesare Pautasso, Olaf Zimmermann,
Mike Amundsen, James Lewis,
and Nicolai Josuttis

99 Invited Content
Web App Security:
A Comparison and Categorization
of Testing Frameworks
Satish M. Srinivasan
and Raghvinder S. Sangwan

103 The Pragmatic Architect
Darkitecture: The Reality Skirted
by Architecture
Balaji Prasad

106 Reliable Code
The Value of Doubt
Gerard J. Holzmann

110 Software Technology
Practices and Technologies in
Computer Game Software Engineering
Walt Scacchi

117 Software Engineering
Kief Morris on Infrastructure as Code
Sven Johann

Building the Community of Leading Software Practitioners
www.computer.org/software