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# Context-aware, Autonomous and Smart Architectures (CASA@ECSA 2017)

Workshop Abstract

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## ABSTRACT

Software is becoming more and more aware of its execution context. Decisions made at design time are moved at run time to enhance the services offered by the software. The Context-aware, Autonomous, and Smart Architectures (CASA) workshop aims to address the issues and challenges raised by the development and evaluation of software that is context-aware, dynamic, autonomous, smart, adaptive, self-managed. Novel approaches are needed to face the new issues raised by such software. Further, existing architectural solutions should be adapted and improved to meet the dynamic requirements of today systems.

## CCS CONCEPTS

• **Software and its engineering** → **Software systems structures** -> **Software architectures**

## KEYWORDS

Context-aware, autonomous, smart, software architecture.

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## 1 INTRODUCTION

Context-aware, autonomous, and smart solutions observe and acquire knowledge about their execution environment with the objective to use or reason about and exploit this knowledge to offer enhanced services to their users. The software architecture of such systems is not trivial because of the interaction, integration, communication, observation, and control issues that should be addressed through their development.

Furthermore, two of the main keywords that characterize such solutions are: heterogeneity and dynamicity. Heterogeneity refers to the participants in the solutions: they are developed by different engineers, they are built with different technologies, they use different communication protocols, they provide different functionality. Dynamicity refers to the fact that the participants in the solutions may be mobile, hence they may enter or leave the system frequently, or to the fact that the stakeholders or their expectations may change frequently in time.

Context-aware, autonomous, and smart have become keywords in the last years in IT. They are associated to small devices such as mobile phones and their related applications, as well as to large and complex systems concerning transportation, airports, cities. They are used in a wide range of application domains starting from healthcare, e-government to networks, grids, energy, or to finance, conference management systems and learning, just to give some examples.

The development of such solutions involve interdisciplinary and trendy concepts and skills concerning context-awareness, autonomicity, adaptivity, machine learning, Internet-of-Things (IoT), Big Data, integration and communication, networks, green and efficient energy consumption, user-friendly access. In this context, software architectures play a fundamental role in the success and quality of a such systems.

This workshop aims to discuss the fundamental principles of context-aware, autonomous, and smart solutions, the current architectural trends, the future issues and challenges to be addressed at the architectural level. The workshop invites researchers and practitioners from industry and academic environments to share their solutions, ideas, visions, and doubts in the design of software architectures for such solutions. We aim to enable discussions, partnerships, and collaborations among the software architects interested in these solutions.

## **2 TOPICS OF INTEREST**

The topics of the workshop concern the architectural aspects in Context-aware, Autonomous, and Smart (CASA) solutions. A list of topics for CASA solutions is the following:

- software architectures: surveys, issues, challenges;
- architecture frameworks;
- architecture description languages;
- standards for software architectures;
- model-driven engineering approaches;
- software architecture and Big Data;
- software architecture and IoT;
- cloud-computing and network infrastructures;
- machine learning;
- autonomous and self-adaptive aspects;
- social and technological issues;
- evolution and maintenance issues;
- privacy, safety, security, cyber-physical issues;
- testing and evaluation of smartness;
- case studies and innovative applications;
- teaching software architectures.

## **3 WORKSHOP CO-CHAIRS**

The workshop co-chairs are:

- Claudia Raibulet, University of Milano-Bicocca, Italy;
- Maria Grazia Fugini, Politecnico di Milano, Italy;

- Khalil Drira, University of Toulouse, LAAS, France;
- Patrizio Pelliccione, Chalmers University of Technology and University of Gothenburg, Sweden;
- Ilias Gerostathopoulos, Fakultät für Informatik, Technische Universität München, Germany;
- Klaus Moessner, University of Surrey, Surrey, UK;
- Christian Prehofer, fortiss GmbH and Fakultät für Informatik, Technische Universität München, Germany.

### **3 PROGRAM COMMITTEE MEMBERS**

The Program Committee members in alphabetical order:

- Mahdi Ben Alaya, Sensinov, France;
- Ovidiu Constantin, Oracle, Italy;
- Liliana Dobrica, POLITEHNICA University, Romania;
- Khalil Drira, University of Toulouse, France;
- Ernesto Exposito, University of Pau, France;
- Paolo Falcarin, University of East London, UK;
- Maria Grazia Fugini, Politecnico di Milano, Italy;
- Nikolaos Georgantas, INRIA, France;
- Henry Muccini, Università degli Studi dell'Aquila, Italy;
- Stefano Mussino, ReDiX Informatica s.r.l., Italy;
- Marie Christin Platenius, Paderborn University, Germany;
- Patrizio Pelliccione, Chalmers University of Technology and University of Gothenburg, Sweden;
- Claudia Raibulet, University of Milano-Bicocca, Italy;
- Romina Spalazzese, Malmö University, Sweden ;
- Thierry Villemur, University of Toulouse and LAAS-CNRS, France.

### **4 WORKSHOP PAPERS**

Four papers have been accepted for the CASA@ECSA 2017 workshop. They address different topics in different application domains. Two of them are research papers presenting results concerning context variability of mobile applications and evaluation of architecture quality and human satisfaction in cyber-physical systems:

- Mai Abusair, Antinisca Di Marco, Paola Inverardi, *An Empirical Approach for Determining Context of Mobile Systems*;
- Mai Abusair, Mohammad Sharaf, Henry Muccini, Paola Inverardi, *Adaptation for Situational-Aware Cyber-Physical Systems Driven by Energy Consumption and Human Safety*.

While two of the accepted papers are position papers proposing approaches which concern a context-aware offloading framework in 5G for an augmented reality application, and system integration and data interoperability through an open architecture for IoT:

- Anna Reale, Melinda Tóth, Zoltán Horváth, *Towards Context Aware Computations Offloading in 5G*;
- An Open Architecture Approach: *Towards Common Design Principles for an IoT Architecture*.

The invited speaker of the workshop Tomas Bures, from the Charles University, Czech Republic proposed a talk about autonomic component ensembles for dynamic evolving architectures of context-aware smart systems.

### **ACKNOWLEDGMENTS**

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