Introduction to the Special Section on Best Papers from SEAMS 2015

This special section in the current issue of TAAS contains three papers that were revised and extended from the 10th ACM/IEEE International Symposium on Software Engineering for Self-Managing and Adaptive Systems (SEAMS 2015). The symposium took place in Florence, Italy on May 18–19, 2015, and was a colocated event of the 37th International Conference on Software Engineering. Of the 55 full and position papers submitted for review, 11 full papers and five position papers were ultimately accepted. The acceptance rate was therefore 29%, commensurate with previous editions of SEAMS. The objective of SEAMS is to bring together researchers and practitioners from many of the diverse areas of self-adaptation to investigate, discuss, and examine thoroughly the fundamental principles, state of the art, and critical challenges of engineering self-adaptive and self-managing systems.

For the first time, SEAMS dedicated a special session solely to artifacts that can be potentially used for sharing model problems and comparing self-adaptation approaches. Of five such submissions, three were accepted for presentation and we hope that they will be a valuable resource for the self-adaptive research community. They are hosted on <http://self-adaptive.org>. Artifacts were also rigorously reviewed, under the supervision of at least three PC members.

The three papers selected were revised and extended by the authors and reviewed using the normal standards expected by TAAS. We were pleased to be able to accept the following papers:

- In “Formal design and verification of self-adaptive systems with decentralized control,” Arcaini et al. describe a framework for formal analysis of distributed self-adaptive systems that uses multiagent abstract state machines as the underlying formal model. The framework allows for feedback on the correct functionality of self-adaptive systems design. Static analysis and model checking of the models can be used for verifying properties of individual MAPE-K controllers such as nonconflict, minimality, and coverage of the rules, as well as correct interactions between the elements of distributed MAPE-K controllers.
- In “Control strategies for self-adaptive software systems,” Filieri et al. survey a set of techniques from control theory that can be applied to engineering self-adaptive systems. They describe how a control design process can be applied to designing self-adaptive systems, providing a bridge between the processes used for designing classical control systems and self-adaptive systems design. In addition, they define a taxonomy of controllers based on the type of control loop, and the circumstances in which different kinds of controllers may apply to self-adaptive systems.
- In “Modeling and extracting load intensity profiles,” Kistowski et al. observe that if self-adaptive systems have a better understanding of their service load characteristics, then they can make more precise and timely adaptation decisions. They show how to automatically extract three kinds of load profiles: time series, periodic, and abstraction. Together these models can handle modeling of seasonal and trending loads, as well as those with bursts and noise. For each of these three types of load profiles, they show how the models can be automatically extracted by monitoring load. These

models are useful for use both at run time to adjust adaptation decisions, and at design time for simulating realistic loads.

We believe that these papers represent a broad range of research conducted by the SEAMS community, including software engineering approaches for constructing self-adaptive systems and consolidation of knowledge from other domains, formal analysis of self-adaptive systems, and understanding and modeling the environments in which they must execute that allows for better self-adaptive systems design.

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