Workshop Proceedings

ACES^{MB} 2009

Second International Workshop on Model Based Architecting and Construction of Embedded Systems

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Foreword

The development of embedded systems with real-time and other critical constraints raises distinctive problems. In particular, development teams have to make very specific architectural choices and handle key non-functional constraints related to, for example, real-time deadlines and to platform parameters like energy consumption or memory footprint. In this context, the last few years have seen an increased interest in using model-based engineering (MBE) techniques. MBE techniques are interesting and promising for the following reasons: They allow to capture dedicated architectural and non-functional information in precise (and even formal) domain-specific models, and they support a layered construction of systems, in which the (platform independent) functional aspects are kept separate from architectural and non-functional (platform specific) aspects, where the final system is obtained by combining these aspects later using model transformations.

The objective of this workshop is to bring together researchers and practitioners interested in model-based software engineering for real-time embedded systems. We are seeking contributions relating to this subject at different levels, from modeling languages and semantics to concrete application experiments, from model analysis techniques to model-based implementation and deployment. Given the criticality of the application domain, we particularly focus on model-based approaches yielding efficient and provably correct designs. Concerning models and languages, we welcome contributions presenting novel modeling approaches as well as contributions evaluating existing ones. The workshop targets in particular:

- Architecture description languages (ADLs). Architecture models are crucial elements in system and software development, as they capture the earliest decisions which have a huge impact on the realization of the (non-functional) requirements, the remaining development of the system or software, and its deployment. We are particularly interested in examining:
    - Position of ADLs in an MDE approach;
    - Relations between architecture models and other types of models used during requirement engineering (e.g., SysML, EAST-ADL, AADL), design (e.g., UML), etc.;
    - Techniques for deriving architecture models from requirements, and deriving high-level design models from architecture models;
    - Verification and early validation using architecture models.

- Domain specific design and implementation languages. To achieve the high confidence levels required for critical embedded systems through analytical methods, in practice languages with particularly well-behaved semantics are often used, such as synchronous languages and models (Lustre/SCADE, Signal/Polychrony, Esterel), super-synchronous models (TTA, Giotto), scheduling-friendly models (HRT-UML, Ada Ravenscar), or the like. We are interested in examining the model-oriented counterparts of such languages, together with the related analysis and development methods.
- Languages for capturing non-functional constraints (MARTE, AADL, OMEGA, etc.)
- Component languages and system description languages (SysML, MARTE, EAST-ADL, AADL, BIP, FRACTAL, Ptolemy, etc.).

We accepted 10 papers for the workshop from 8 different countries: 7 full papers and 3 short papers. We hope that the contributions for the workshop and the discussions during the workshop will help to contribute and provide interesting new insights in Model Based Architecting and Construction of Embedded Systems.

The ACES^{MB} 2009 organizing committee,

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