Model Driven Engineering and Functional Safety

Mark van den Brand
Eindhoven University of Technology, The Netherlands

Abstract: The development of software for domains such as avionics, automotive and healthcare is heavily regulated via safety standards. The effort to interpret the underlying standards is cumbersome and time consuming. The certification of components is expensive. Changing the components or applying the components in another domain involves in many cases re-certification. The representation of relevant information from standards in an electronic form enables, for instance, a faster and more robust safety argumentation. In the OPENCOSS project, www.opencoss.eu, a generic meta-model is developed to support the re-use of safety assurance data. Based on this generic meta-model, conceptual models in the form of meta-models to represent standards, e.g. the ISO 26262 standard, are derived. Model transformations are used to express the mapping between the conceptual models of the safety standards. Furthermore, the safety standard conceptual models can facilitate the construction of safety cases via (derived) vocabularies. This reduces inconsistencies and improves the clearness of the safety cases. Safety argumentation editors, based on EMF and Xtext, have been developed.

BRIEF BIOGRAPHY

Mark van den Brand started his study computer science in 1982 at the Radboud University Nijmegen (The Netherlands). In 1987 he became a PhD student at the Radboud University Nijmegen. In 1992 he started as assistant professor in the Programming Research Group at the University of Amsterdam. In 1997 he switched from University of Amsterdam to CWI (Centrum voor Wiskunde en Informatica) and became senior researcher and project leader on the ASF+SDF project. The ASF+SDF project is one of the main research topics of the Interactive Software Development and Renovation group. Since 2006 Mark van den Brand is a full professor of Software Engineering and Technology at TU/e in the Department of Mathematics and Computer Science. Since May 2009 he is visiting professor at Royal Holloway, University of London.

His current research activities are on generic language technology, and model driven engineering. A number of his research topics are to investigate the correctness and quality aspects of model transformations, and the use of meta-modeling techniques in the area of functional safety. The SET group participates/participated a number of (industrial) projects related to model driven engineering and software evolution. The goal of his research is to investigate the correctness and quality aspects of model transformations.

He is president of the European Association of Programming Languages and Systems (EAPLS) and chair of the steering committee of Software Language Engineering. He was six times guest editor of special issues of Science of Computer Programming on academic software development (Experimental Software and Toolkits (EST)). He is member of the editorial board of the journal of Science of Computer Programming, Central European Journal for Computer Science, and Journal of Computer Languages, Systems and Structures.