

# On the Verification Problems of the Component-Based Software Development

Zsolt Borsi<sup>a</sup>, László Kozma<sup>a</sup>, Anna Medve<sup>b</sup>

<sup>a</sup>Department of Software Technology, Eötvös Loránd University

email: [bzsr@inf.elte.hu](mailto:bzsr@inf.elte.hu), [kozma@ludens.elte.hu](mailto:kozma@ludens.elte.hu)

<sup>b</sup>Department of Electrical Engineering and Information Systems, University of Pannonia

email: [medve@almos.vein.hu](mailto:medve@almos.vein.hu)

## Abstract

This paper focuses on the verification problems of the Component-Based Software Development (CBSD). CBSD may be subdivided into two distinct development activities. The component engineering is focusing on the development of components as individual building block designed for integration in a number of different applications. The application engineering is concerned with the assembly and integration of the building blocks with new software systems. Using a CBSD method (e.g. Kobra) you can decompose the entire system into finer-grained parts that will be mapped to existing functionality. The Kobra method suggests a development process according to a three-dimensional model (composition/decomposition, abstraction/concretisation, genericity/specialization); it uses the UML as a main model-based notation for all analysis and design activities; it supports to create platform independent models (Model Driven Architecture - MDA); it supports to handle verification problems of the CBSD process.

The verification activities of the CBSD are related to the fact that a component must be correct with respect to its specifications respectively that the entire system must be correct with respect to its requirements. In this paper, the relation of testing and model checking methods are discussed. An example is given to demonstrate that model checkers can be successfully used for testing usage models. Model-based testing activities are concerned with deriving test information out of modeling artifacts (e.g. in Kobra method: the usage, the structural, the behavioural models, etc. ).

*Keywords:* component-based software development, model-based testing, model checking

## References

- 1] Haus-Gerhard Gross. Component-Based Software Testing with UML. *Springer-Verlag Berlin Heidelberg, 2005.*
- 2] E.M. Clark Jr., O. Grumberg and D.A. Peled. Model Checking. *The MIT Press, Cambridge 2000.*
- 3] Antonio Bucchiarone, Henry Muccini, Patrizio Pelliccione, P. Pierini. Model-Checking Plus Testing: From Software Architecture Analysis to Code Testing. *FORTE Workshops 2004: 351-365*
- 4] NuSMV Model Checker. <http://nusmv.iirst.itc.it>
- 5] Ákos Dávid, László Kozma. Educational aspects of incremental model checking. *Proceedings of the 3rd International Multi-Conference on Society, Cybernetics and Informatics, Vol 2, pp. 190-194, 10-13, 2009, Orlando, Florida, USA, ISBN-10: 1-934272-73-6, ISBN-13: 978-1-934272-73-2., <http://www.iis.org/CDs2008/CD2009SCI/EISTA2009/index.asp?id=0&area=4>*