

# Development Tools of Simulation Models with MDA

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**Abstract.** In this paper, we propose Component Builder, which is a tool to develop simulation models and to share them with diagrams.

If a modeler has few experiences of programming, it is difficult to make a simulation model or to share it. It is because existing tools only support the modelers to make simulation models with programming. For solving the problem, Component Builder supports simulation development not with programming but with diagram. This tool generates executable program codes from a structure of models with diagrams. This tool enables the modeler to develop simulation without knowledge of programming.

Moreover, we propose the development methodology with diagrams independent of any programming language or software implementation. Existing tools depend on a specific programming language. It prevents a modeler who has knowledge of another programming language from developing simulation models. For solving the problem, we propose to apply a paradigm of software engineering to developing simulation models. The paradigm "MDA" (Model Driven Architecture) is to turn models with "UML" (Unified Modeling Language) into executable program code. Applying the paradigm, we can keep our mind on modeling without considering any programming language or software implementation.

Thus we implemented the develop environment for drawing diagrams and generating program codes from them. Some modeler tried developing simulation models with these tools. As a result, they could develop them without programming.

## 1 Introduction

Many researchers and we almost agree that the agent-based model (multi-agent model) is suitable for studying complex systems, however in the current state,