

Integration of OpenModelica in Ptolemy II

Mana Mirzaei Lena Buffoni Peter Fritzson
Department of Computer and Information Science (IDA),
Linköping University, Division SE-581 83, Linköping, Sweden

Distributed, concurrent systems are becoming increasingly common. However, they are complex to develop. Therefore a large number of computational models and tools for modeling and developing such systems has emerged. The Ptolemy project aims to support such heterogeneous modeling in Ptolemy II[1], an open-source software framework for modeling, simulation and design of large concurrent real-time systems. This framework is a system-level design environment that provides the possibility of combining several variants of models of computation (MoCs) in one hierarchical heterogeneous model. Ptolemy II also supports an actor-oriented view of a system where the basic building blocks of a system are concurrent components called actors which communicate through messages sent via interconnected ports.

In this paper we present the integration process of OpenModelica into the Ptolemy II framework:

- In order to integrate OpenModelica into Ptolemy II, a dedicated computation domain with the corresponding director must be defined. Since Modelica is a language designed for continuous and discrete event modeling modeling of physical systems and variables described using DAEs, the continuous-time domain in Ptolemy II which models physical processes and supports mixtures of discrete and continuous behaviors is considered the most suitable for the Modelica language. Therefore the OpenModelica domain extends the continuous time domain already present in Ptolemy.
- To simulate Modelica models in Ptolemy II, it is necessary to invoke the OpenModelica Compiler (OMC). OMC provides a CORBA interface for remotely invoking the compiler from client applications. This interface is used to communicate with OMC from Ptolemy II.
- Moreover, OpenModelica offers a user-interactive and time synchronous simulation known as OpenModelica Interactive (OMI). OMI is part of the simulation runtime core and is used for interactive simulation of Modelica models in Ptolemy II.

Integrating OpenModelica into OMI enables the Ptolemy II users to simulate Modelica models with the OpenModelica Compiler from within the Ptolemy environment and interface them with components from other computation models.

References

- [1] Christopher Brooks, Edward A. Lee, Xiaojun Liu, Stephen Neuendorffer, Yang Zhao, Haiyang Zheng, Heterogeneous Concurrent Modeling and Design in Java (Volume 1: Introduction to Ptolemy II) , April 1, 2008.
- [2] Peter Fritzson. Principles of Object-Oriented Modeling and Simulation with Modelica 2.1, 940 pages, Wiley-IEEE Press, 2004.