Multi-Kernel Simulation Description Within VHDL

Christel Oczko, Michael W. Nitsche
Cadlab
Bahnhofstr. 32, W-4790 Paderborn, Germany
Tel. ++5251/284-110 Fax: ++5251/284-140

Abstract
This overview describes our ongoing work about multi-kernel description facilities within VHDL which is done in the scope of ECIP (European Cad Integration Project). Since the project has started a few months ago, this paper outlines motivation, aims and scope of the work only.

1 Definitions
In the following the term multi-kernel simulation approach characterizes the approach to couple several simulation kernels within a surrounding simulation system for the simulation of a single design. We call this simulator integration platform a simulation backplane. The top-level description of a design to be simulated by a simulation backplane is named multi-kernel description. A multi-kernel description decomposes into different clusters so that each simulator in the simulation run knows about its part of the model as well as its connectivity to other simulators.

2 Motivation
Rapidly growing complexity and heterogeneity of systems require simulation tools that offer an adequate functionality and performance. Even in the presence of VHDL there are a lot of needs concerning heterogeneous simulation which are not covered by VHDL and which must not be covered completely by VHDL. Additionally, the availability of workstation networks suggests the distribution of huge simulation circuits.

The multi-kernel approach is one of the most promising strategies to meet the requirements of simulating today’s and tomorrow’s heterogeneous systems. It allows to utilize the great potential of existing tools, each tuned for its specific application field, and to exploit parallelism on the other hand.

3 Description of Work
In the area of multi-kernel simulation the CAD-Framework Initiative (CFI) installed the Simulation Backplane Working Group[1] aiming at developing a standard for simulation backplanes in cooperation with other evolving CFI standards.

In addition to the standardization efforts for simulation backplanes, e.g. of their coupling mechanisms, one must consider the multi-kernel description of models to be simulated by such tools. To fulfill its adequate role for future system design the leading hardware description standard VHDL must act as a roof for modeling multi-kernel simulation circuits.

Following the above ideas we intend to develop general concepts for the multi-kernel description which will be the base for a concrete realization within VHDL.

The worked-out multi-kernel description will be independent as much as possible from the underlying coupling algorithms, the underlying coupling architecture and the involved description languages of the coupled simulation systems. Summarized, the resulting description concepts will be very flexible and will be open for future developments.

Before the definition of appropriate multi-kernel description concepts several simulation backplanes implementing the multi-kernel approach have to be examined. To guarantee a widespread generality of our modeling concepts we are taking both standardization activities like the work of the CFI Simulation Backplane WG and existing backplanes, e.g. the simulator coupling systems SiCS21 for very heterogeneous simulators and Leim[3] of Mentor Graphics, into account.

4 Forecast
By the end of July 1992 the results of our examinations for multi-kernel description with VHDL will be published as a ECIP deliverable[4]. Further versions will be prepared for September 1992 and finally for March 1993[4].

References