Reconfigurable Architectures: From Physical Implementation to Dynamic Behavior Modelling

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COSMOS: A System-Level Modelling and Simulation Framework for Coprocessor-Coupled Reconfigurable Systems
Dynamically reconfigurable systems demand complicated run-time management. Due to resource constraints and reconfiguration latencies, efficient reconfiguration strategies that can reduce the overhead cost of dynamic reconfiguration need to be studied. In this paper, we i) propose a reconfigurable task model which extends the classical real-time task model to support the additional states and latencies needed to capture dynamically reconfigurable behavior, ii) propose a coprocessor- coupled reconfigurable architecture which has hardware runtime support for task execution, task reallocation...
and resource management, and iii) present a SystemC based framework to model and simulate coprocessor-coupled reconfigurable systems. We illustrate how COSMOS may be used to capture the dynamic behavior of such systems and emphasize the need for capturing the system aspects of such systems in order to deal with future design challenges of dynamically reconfigurable systems.

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Run-time Dynamic Reconfiguration: A Reality Check Based on FPGA Architectures from Xilinx

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