LavA: An Open Platform for Rapid Prototyping of MPSoCs

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Overview

- Configurable hardware is becoming increasingly powerful and less expensive, which allows developers to design complex systems on chip.

- Problem: Design of complex heterogeneous multiprocessor systems is error-prone and time-consuming - even if performed using hardware description languages.

LavA provides a streamlined toolchain and workflow to rapidly prototype complex, heterogeneous multiprocessor systems-on-chip based on tools from software product line engineering.

Model-Driven Approach

- Approach abstracts from hardware details and the low-level configuration to reduce complexity.

- Model describes the hardware from a high system-level perspective.

- Basis for model creation is a meta-model, which provides the various components (available CPUs, Peripherals) and describes valid compositions.

Advantages:

- Abstract High-Level View: Results in a fast and easy design process from model to FPGA.

- Fast Reconfiguration: Rapid changing of a few aspects of the system for design space exploration.

- Less Error-Prone: Model and check-rules save the developer from incorrect configurations.

- No Proprietary Tools: The tools used in LavA are freely available.

Hardware Configuration

- LavA's hardware basis is an extensible library of VHDL-based open source IP components for MPSoCs - extended with component-specific configuration options.

- Frame technology-based configuration of complex communication structures and local buses: configuration of hard- and software independent of implementation languages.

- Configuration process supports possibilities to easily integrate new peripheral components in LavA.

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