PinHaT – A Tool for the automatic generation of Multiprocessor Systems-on-Chip

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Abstract
The PinHaT software allows the automatic generation of an FPGA-based multiprocessor systems from a parallel program. Therefore, Integer Linear Programming and the FPGA vendor tool-chain are used.

1. Introduction
As apparent in current developments the reduction of transistor size and the exploitation of instruction-level parallelization can not longer be continued to enhance the performance of processors. Instead, multi-processor systems are a common way of enhancing performance by exploiting parallelism of applications. This project deals with the automated design of multiprocessor systems from applications using combinatorial optimization.

2. The Synthesis Flow
In figure 1 the underlying design methodology of PinHaT is shown. The flow currently starts with a MPI applications and ends with a bit-stream used for the configuration of an FPGA [1].

3. The PinHaT software
The current version of the PinHaT software is written in JAVA and integrates the described synthesis flow in an easy to use environment (see figure 2) [2].

4. Conclusion & Outlook
PinHaT eases the design of multiprocessor-systems on chip by allowing the automated architecture synthesis from a parallel application and the connection to the FPGA vendor tool-chain for the creation of the bit-file. Currently, the flow is extended to allow (semi-)automatic parallelization of C programmes. A first work in this direction was presented in [3].

5. References