Diplomarbeit / Masterarbeit
Location based management of Multi-Grained Reconfigurable resources in the KAHRISMA architecture.

The next generation applications possess more diverse processing behavior with non predictable run-time characteristics. We have proposed Karlsruhe Hyperorphic Reconfigurable Instruction-Set Multi-grained Array (KAHRISMA), which is adaptable hardware architecture with tight integration of coarse and fine-grained reconfigurable fabrics. The architecture allows to reconfigure Array of fine- and coarse-grained (FG and CG) reconfigurable Encapsulated Data-path Elements (EDPEs) (i.e. multi-grained array) in such a way that tightly-coupled multi-grained Custom Instructions (CIs) can be realized to match the diverse requirements of hotspots of applications. The integral part of KAHRISMA is an adaptive run-time system, which efficiently manages and distributes available hardware resources between different applications and threads considering performance and power constraints. The run-time system reacts to different scenarios (e.g. amount of running threads, input data for the threads, resulting control-flow and CI frequencies, etc.) and brings the system to a better working point than a static resource management would have achieved.

The focus of this Master Thesis is to research and implement different location based resource distribution strategies and algorithms for threads/tasks, which are running in parallel. We also plan to research mechanisms to improve efficiency of resource distribution algorithms when number of EDPEs will grow considerably.

Requirements:
Knowledge of Computer Architecture.
Good practical knowledge of C/C++.

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Learning
• Advanced computer architectures and next-generation reconfigurable computing systems.
• Run-time resource management.