



## Task Description for Masters Thesis

für

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Studiengang:  
Matrikel-Nr.:

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4049037

Thema:

**Ohua as an STM alternative for shared state applications**

The Ohua framework presents a novel approach to writing parallel programs. It provides the developer with algorithms, a simple mechanism for writing code that is implicitly being parallelized by the compiler. This eliminates the need for the developer to use overhead-comprising abstractions and instead lowers the overall code complexity. The resulting Ohua code allows for a modular structure with algorithms that compose. Recent research has shown that Ohua does also perform well in Big Data environments and can produce substantial speedups in Hadoop MapReduce.

However, to this date no research has been conducted regarding the usability of Ohua in shared state programs. Due to its programming model that fosters only local state, this thesis investigates in how far its theoretical foundations allow an extension to shared state. In order to evaluate Ohua in the context of shared state applications, it has to be compared to other, well-established shared state application frameworks. We compare against STM, the state-of-the-art programming model for shared state applications. For evaluation, we use benchmarks from the Stanford Transactional Applications for Multi-Processing benchmark suite, which has been especially designed to measure performance of shared state applications.

This Masters Thesis shall therefore encompass the following tasks:

1. Implement Data Parallelism for Ohua's **smap** primitive to allow for a realistic comparison between Ohua and STM, using compiler transformations.
2. Design and implement a solution for enabling shared state in Ohua.
3. Convert a number of STM benchmarks from the STAMP suite to Rust code and implement them in Ohua for comparison.
4. Evaluate the performance of Ohua and STM using the converted benchmarks.

Betreuer:

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