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Serializable Coroutines for the HotSpot Java Virtual Machine

Master thesis for Lukas Stadler
Matrikelnummer: 0656589

The Multi-Language Virtual Machine project (MLVM) aims to extend the HotSpot Java Virtual Machine (JVM) with new features that allow languages other than Java, especially dynamic languages, to run on top of the JVM efficiently.

Control abstractions like Continuations and Coroutines that occur in some of these languages are especially difficult to emulate without support from the underlying JVM. Building upon previous work on Continuations, the key goals of this master thesis are to implement Coroutines for the HotSpot JVM and to derive a means for them to be serialized and transferred to other threads, processes and machines.

Important goals are:

- *Implementation of Coroutines for the HotSpot JVM:* The implementation should follow the rules for MLVM projects and thus be targeted at the BSD port of the HotSpot JVM.

- *Performance estimation:* Giving estimates for the run-time overhead of the most important operations and for the memory consumption on different operating systems and CPU architectures.

- *Performance analysis:* Providing performance analysis and comparisons to other coroutine implementations.

- *Serializable Coroutines:* Implementing serialization and deserialization for Coroutines which allows Coroutines to be transferred to other threads, processes and machines.

- *Applications:* Exploring the applications of serializable Coroutines.

The thesis should be written in English. The resulting implementation should be contributed to the Mercurial repository of the MLVM project.

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