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ARMv8 Backend for Graal

Master thesis for Daniel Sturm
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Graal [1] is an effort to create a new just-in-time compiler for Java that is itself written in Java. It is based on a port of the HotSpot client compiler from C++ to Java.

Extensibility is one of Graal's main value propositions - it should be easy to add support for new features and architectures to the compiler. This project should extend the Graal compiler with an ARMv8 backend. The 64-bit ARMv8 architecture will become increasingly important as it starts to be used in a large variety of fields, from mobile devices to servers.

The scope of this project is as follows:

- Evaluate which HotSpot ports currently support the ARMv8 instruction set and architecture.

- Create the assembler component that will output the actual ARMv8 instructions.

- Create the LIRGenerator that will generate low-level instructions from the high-level intermediate representation.

- Create the necessary VM infrastructure for running ARMv8 code compiled by Graal.

- Add tests for the assembler and other ARMv8-specific code.

- Document the problems that were encountered and the changes that were required to overcome them.

The work's progress should be discussed with the supervisor at least every 2 weeks. Please note the guidelines of the Institute for System Software when preparing the written thesis.

Supervisor: Dipl.-Ing. Lukas Stadler

[1] http://openjdk.java.net/projects/graal/