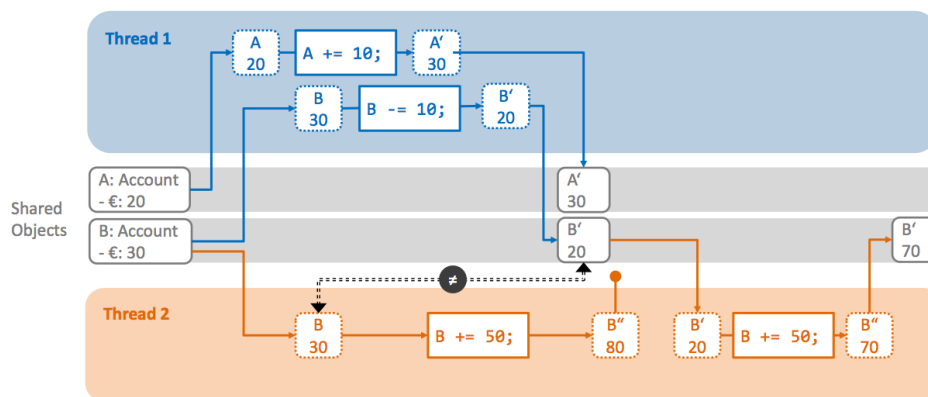


## Software Transactional Memory for R/Squeak-VM

### Background

R/Squeak-VM is a research virtual machine for Squeak/Smalltalk. It is written in RPython and translated to C with the PyPy toolchain. The toolchain automatically adds a just-in-time compiler, garbage collector, and various other transformations to optimize the performance of the generated code. Recently, this toolchain added software transactional memory (STM) as an experimental feature to automatically add safe concurrency to the generated virtual machine.



### Description

An initial prototype that enables native threads in R/Squeak-VM has already been implemented. This prototype is still considerably slow. The task is to continue the work to enable the just-in-time compiler to work efficiently with STM threads, extend the image to use such threads where feasible, and provide examples illustrating the benefits of parallelization.

This project will include work with PyPy, R/Squeak-VM sources, and the Squeak/Smalltalk system. Participants will develop a deep understanding of the RPython language, the PyPy translation toolchain, and its just-in-time compiler.

### References

- N Shavit, D Touitou, "Software transactional memory". Distributed Computing, 1997
- <http://morepypy.blogspot.de/2013/08/update-on-stm.html>
- <http://source.lukas-renggli.ch/transactional.html>
- Masterarbeit Lars Wasserman (available at the chair)
- Seminar presentation on STM in R/Squeak-VM (available at the chair)

### Contact

Fachgebiet

- Prof. Dr. Robert Hirschfeld
- Tim Felgentreff, Tobias Pape