Reconciling Event Structures with Modern Multiprocessors (Artifact)

Evgenii Moiseenko
St. Petersburg State University, Russia
JetBrains Research, St. Petersburg, Russia
e.moiseenko@2012.spbu.ru

Anton Podkopaev
National Research University Higher School of Economics, Moscow, Russia
MPI-SWS, Kaiserslautern, Germany
JetBrains Research, St. Petersburg, Russia
podkopaev@mpi-sws.org

Ori Lahav
Tel Aviv University, Israel
orilahav@tau.ac.il

Orestis Melkonian
University of Edinburgh, UK
melkon.or@gmail.com

Viktor Vafeiadis
MPI-SWS, Kaiserslautern, Germany
viktor@mpi-sws.org

Abstract

The artifact is a virtual machine image containing two Coq packages which include mechanization of proofs stated in the paper. The first package `imm` contains a modified version of the Intermediate Memory Model, extended with the support of sequentially consistent atomics, and the compilation correctness proofs from it to hardware models. The second package `weakestmoToImm` contains a definition of the Weakestmo memory model as well as a compilation correctness proof from it to IMM.

2012 ACM Subject Classification Theory of computation → Logic and verification; Software and its engineering → Concurrent programming languages

Keywords and phrases Weak Memory Consistency, Event Structures, IMM, Weakestmo

Digital Object Identifier 10.4230/DARTS.6.2.4

Acknowledgements We would like to thank the reviewers from the ECOOP Artifact Evaluation Committee for their time spent on evaluation of our artifact and for their feedback.

https://doi.org/10.4230/LIPIcs.ECOOP.2020.5

Related Conference 34th European Conference on Object-Oriented Programming (ECOOP 2020), November 15–17, 2020, Berlin, Germany (Virtual Conference)

1 Scope

The artifact provides formal machine-checked proofs for the theorems stated in the paper.

2 Content

The artifact package includes VirtualBox image with Ubuntu 18.04 (64 bit) containing two Coq packages: `imm` and `weakestmoToImm`.

© Evgenii Moiseenko, Anton Podkopaev, Ori Lahav, Orestis Melkonian, and Viktor Vafeiadis;
licensed under Creative Commons Attribution 3.0 Germany (CC BY 3.0 DE)
Reconciling Event Structures with Modern Multiprocessors (Artifact)

3 Getting the artifact

The artifact endorsed by the Artifact Evaluation Committee is available free of charge on the Dagstuhl Research Online Publication Server (DROPS). In addition, the most recent version of the source code of the imm and weakestmoToImm packages can be found at https://github.com/weakmemory/imm and https://github.com/weakmemory/weakestmoToImm/ correspondingly.

4 Tested platforms

The artifact was tested by authors on Ubuntu 18.04 (64 bit) with Intel Core i5 (2.30GHz × 4) and 8GB RAM.

5 License

The source code of the Coq packages is distributed under the MIT License (MIT)

6 MD5 sum of the artifact

7e6f14556d2f2f9525ec9dc0c77d28f6

7 Size of the artifact

6.3 GiB

A How to use the artifact

Import the VirtualBox image into VirtualBox, and boot the machine.

The login is semantics and the password is semantics.

All necessary software is installed, and the imm and weakestmoToImm projects are checked out to /home/semantics/Desktop/imm and /home/semantics/Desktop/weakestmoToImm correspondingly. Additionally, Emacs (with Proof General), VS Code, and CoqIDE are installed so that you can browse the sources and the latest version of the paper copied to /home/semantics/Desktop/paper.pdf.

B Compilation of packages

The proofs might be checked by opening a terminal and running:

- for imm
  
  cd /home/semantics/Desktop/imm
  make clean; make -j2

- for weakestmoToImm
  
  cd /home/semantics/Desktop/weakestmoToImm
  make clean; make -j2

The build terminating without printing “error” is successful. Please, note that building of the proofs might take a lot of time (especially, the imm project).
C. MD5 sum of the artifact
7e6f145f56db2f4952dc9edcc77d28f6

D. Size of the artifact
6.28 GB