

Retrascope: Toolkit for Analysis and Verification of HDL Descriptions

<http://forge.ispras.ru/projects/retrascope>



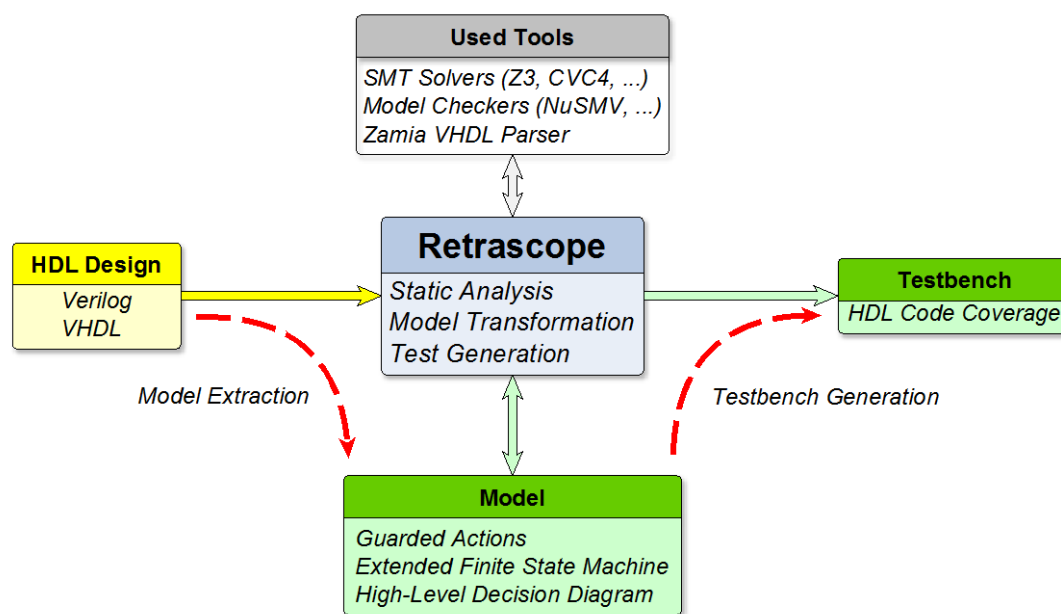
<http://hardware.ispras.ru>

Overview

Retrascope is an open-source toolkit for Reverse Engineering and TRANSformation of digital hardware designs described in such hardware description languages (HDL) as Verilog and VHDL. The toolkit allows analyzing HDL descriptions, reconstructing the underlying models (guarded actions, extended finite state machines, high-level decision diagrams etc.) and using the derived models for test generation, property checking and other tasks. Retrascope is organized as an extendable framework with the ability to add new types of models as well as tools for their analysis and transformation. The primary application domain of the toolkit is functional verification of hardware at the unit level.

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Testbench Generation Process

Retrascope is aimed at HDL designs analysis and verification. The tool analyzes HDL code and extracts the following model kinds: Abstract Syntax Trees, Control Flow Graphs, Guarded Action Decision Diagrams (GADD), Extended Finite State Machines (EFSM) and High-Level Decision Diagrams (HLDD). Depending on the model kind the tool applies different methods to generate functional tests which should cover all possible execution paths in the input HDL design. Testbenches produced by the Retrascope tool can be executed using HDL simulators.

Main Features

- **Automated extraction of models** – several kinds of models can be automatically extracted from HDL code: GADD, EFSM, HLDD
- **Unit-level testbench generation** – sequences of input signals that cover all the execution paths of the target design are saved in the HDL format
- **Model visualization** – extracted models can be saved in the GraphML file format and visualized through Eclipse-based GUI
- **VHDL/Verilog** – digital hardware units written in these languages are supported

About Us

The Retrascope toolkit is developed at the Software Engineering Department of the Institute for System Programming, Russian Academy of Sciences (ISPRAS). The institute performs both academic research and industrial development projects as well as provides advanced services and consulting in various areas of software engineering, information technologies and computer science. More information about ISPRAS can be found at <http://www.ispras.ru>.