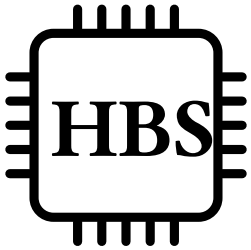

Hardware Build System
User Manual

Revision 0.0

19 December 2025

Abstract

This document serves as the official user manual for Hardware Build System (HBS). HBS is a Tcl-based, minimal common abstraction approach for build system for hardware designs. The main goals of the system include simplicity, readability, a minimal number of dependencies, and ease of integration with the existing Electronic Design Automation (EDA) tools.

keywords: automation, hardware build system, hardware design, hardware synthesis, project maintenance, testbench runner, simulation, FPGA, ASIC, productivity

Contents

Participants

Michał Kruszewski, *Chair*, *Technical Editor*, mkru@protonmail.com

Glossary

Not all terms defined in the glossary list are used in the user manual. Some of them are formally defined because they are helpful when discussing, for example, core definition.

core

Tcl namespace in which `hbs::Register` proc is called.

core name

Name of the Tcl namespace in which `hbs::Register` is called. For example, if `hbs::Register` is called in namespace `lib::pkg::my-core`, then `my-core` is the core name.

core path

Tcl namespace for the core. For example, if `hbs::Register` is called in namespace `lib::pkg::my-core`, then `lib::pkg::my-core` is the core path.

dependency

A target on which at least one other target depends. The dependency is an argument for at least one `hbs::AddDep` proc call.

depender

A target depending on at least one another target. Within a depender body the `hbs::AddDep` proc is called at least once.

flow

An ordered set of actions taken by a tool to produce a result specified by a user.

hbs file

A file with `.hbs` extension containing valid Tcl code.

proc

A Tcl procedure.

stage

A piece of a tool flow with a clearly defined task and output. The number and types of stages depend on a tool. For example, the GHDL has analysis, elaboration and simulation stages.

target

A proc, which name does not start with the floor character (_), defined in core.

target name

The name of the target in the target path. For example, if the target path is `lib::pkg::my-core::my-target`, then the target name is `my-target`.

target path

The Tcl path for the target. For example, if proc `my-target` is defined in the core with the core path `lib::pkg::my-core`, then the target path is `lib::pkg::my-core::my-target`.

tool

A software capable of processing hardware description sources or output from another tool. Example tools are: GHDL, Verilator, yosys, Vivado, nvc, etc.

to run a target

To execute commands defined in the target.