

Accelerated VIP for I2C

Overview

Sometimes chips are just too big to verify with logic simulation software. SoCs comprised of tens of millions of logic gates will bog down software simulators, even when running on the fastest servers.

Simulating big designs requires hardware-assisted verification, an approach that uses special-purpose hardware, like Cadence® Palladium® XP systems, to dramatically boost simulation performance.

Cadence Accelerated VIPs are complementary products to Cadence simulation VIP and SpeedBridges. Accelerated VIPs are used to funnel data to the user’s design-under-test and respond to stimulus received from it. Monitor functions such as collecting coverage and setting callbacks are not included.

Tuned for performance, AVIPs are an integral component in a simulation acceleration environment, speeding up verification 10’s to 1,000’s of times relative to simulation. The level of acceleration gain is dependent on the user’s individual testbench and DUT synchronizations.

Specification Support

The I2C AVIP is based on the following specifications:

- I2C BFM Requirement Specification, Version 0.9 — 27 August 2012
- I2C-bus specification and user manual, Rev. 03 — 19 June 2007

Usage Options

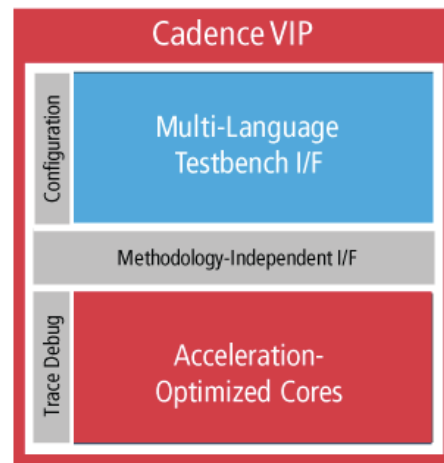
- Simulation Acceleration
- HW/SW Co-Verification

Supported Design-Under-Test Configurations

- Master Slave Hub/Switch
- Full Stack Controller-only PHY-only

Product Highlights

- Synthesizable Bus Functional Model (BFM) compliant with I2C standard

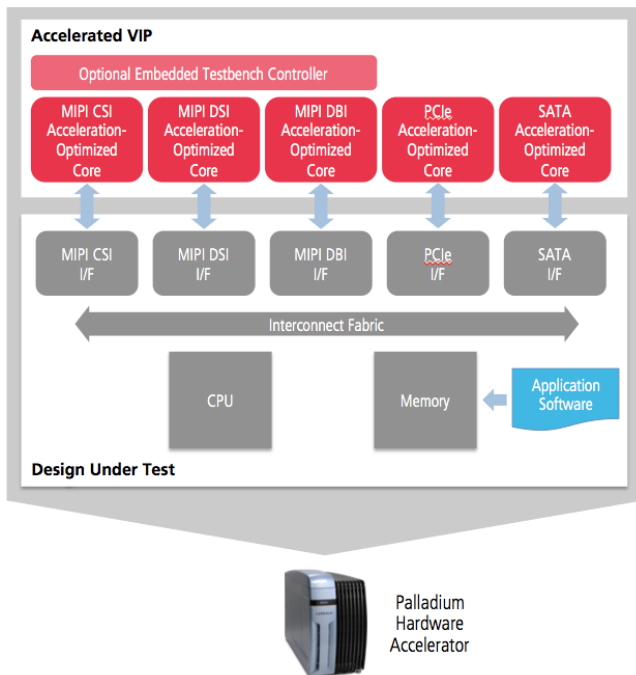
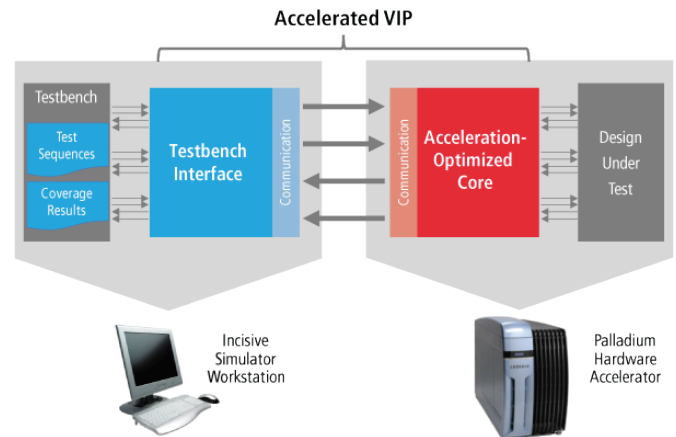


- Internal registers for configuration
- Further I2C standard [4] compliant features:
 - Configurable to both I2C Master or I2C Slave
 - BFM can operate as receiver or transmitter in both Master or Slave mode
 - Fully configurable I2C packets:
- Master BFM supports sending software reset via I2C
- Slave BFM can issue clock stretching
- Master BFM can manage clock stretching
- HW/SW co-verification mode, which supports:
 - Descriptor-based programming model
 - Scalable internal memory for program and local data
 - AHB Slave interface providing full register access and internal memory access
 - DMA and DMA Scatter-Gather capabilities via AHB Master interface
 - Incremental and pseudo-random data generation
 - Configurable H/W and S/W start/stop conditions
 - Support for simple and embedded programming loops
 - IRQ with maskable interrupt status registers

Simulation Acceleration

In simulation acceleration, the Cadence Palladium XP system works in conjunction with the Cadence Incisive® Simulator to divide up the simulation task. The Palladium XP runs the design under test while the Incisive simulator runs the testbench. Accelerated VIP is inserted for each of the standard interfaces in the design with the testbench interface running on Incisive and the acceleration-optimized core running on the Palladium XP.

Most of the testbench components employed in simulation can be reused, which saves set-up time and preserves the controllability and observability of traditional logic simulation. With this approach, performance is often up to 1000X faster than logic simulation.



HW/SW Co-Verification

With the HW/SW co-verification approach, both the test environment and the design under test run in the Palladium XP system. This results in huge performance gains – typically 10,000X to 100,000X faster than logic simulation. That kind of speed enables the verification of software along with the hardware design. This enables hardware/software integration bugs to be efficiently discovered and fixed – a task that would be nearly impossible to manage otherwise. To facilitate the HW/SW co-verification approach, application software is often used to run tests and monitor results.



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