

Simulation VIP for NVM Express

World's First NVM Express VIP

Overview

Cadence® Simulation VIP is the world's most widely used VIP for digital simulation. Hundreds of customers have used Cadence VIP to verify thousands of designs, from IP blocks to full systems on chip (SoCs).

The Simulation VIP is ready-made for your environment, providing consistent results whether you are using Cadence Incisive®, Synopsys VCS®, or Mentor Questa® simulators. You have the freedom to build your testbench using any of these verification languages: SystemVerilog, e, Verilog, VHDL, or C/C++. Cadence Simulation VIP supports the Universal Verification Methodology (UVM) as well as legacy methodologies.

The unique flexible architecture of Cadence VIP makes this possible. It includes a multi-language testbench interface with full access to the source code to make it easy to integrate VIP with your testbench. Optimized cores for simulation and simulation-acceleration allow you to choose the verification approach that best meets your objectives.

Specification Support

Supports NVMe specification version 1.0c and 1.1.

Product Highlights

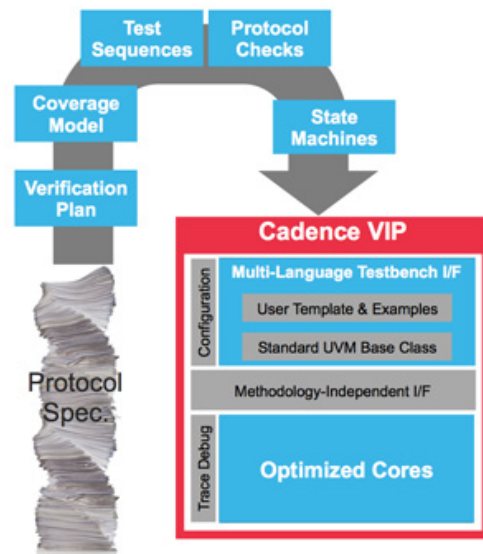
- First VIP to support NVM Express
- Supports the latest specification ECNs

Part of a complete PCI Express solution including:

- PCIe Gen4
- PCIe Gen3
- PCIe Gen2
- Mobile PCIe
- SR-IOV
- MR-IOV

Supported Design-Under-Test Configurations

- | | | |
|------------------------------------------------|-----------------------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> Host | <input checked="" type="checkbox"/> Controller | <input type="checkbox"/> Hub/Switch |
| <input checked="" type="checkbox"/> Full Stack | <input checked="" type="checkbox"/> Controller-only | <input type="checkbox"/> PHY-only |



Deliverables

People sometimes think of VIP as just a bus functional model (BFM) that responds to interface traffic. But SoC verification requires much more than just a BFM. Cadence Simulation VIP components deliver:

- State machine models incorporate the subtle features of state machine behavior, such as support for multi-tiered, power-saving modes
- Pre-programmed assertions that are built into the VIP to continuously watch simulation traffic to check for protocol violations
- Test suites are provided for most Cadence VIP components
- Pre-programmed coverage models used to capture interesting combinations of simulation results. By analyzing the results collected by the coverage model, engineers can tell if the simulations have exercised the various modes of operation of an interface
- Verification plans for most protocols link the “raw” coverage model results back to the protocol specification

Key Features

- Supports all registers including system bus (PCIe) registers and controller registers
- Supports physical region page (PRP) entry that points to a physical memory page
- Supports metadata per logical block
- Provides full support for admin completion/ submission queues and I/O completion/submission queues
- Supports firmware update process
- Enables host to manage NVM subsystem power statically or dynamically
- Supports either a normal shutdown or an abrupt shutdown
- Full support of the admin command and NVM command sets specified in NVMe specification version 1.0c
- Supports PRP list, which is a set of PRP entries
- Provides support for namespace management
- Supports Logical block address (LBA)
- Supports four different interrupt reporting modes: pin-based interrupt, single message MSI, multiple message MSI, and MSI-X
- Supports up to 32 power states
- Supports different command arbitration mechanisms: the round-robin arbitration, weighted round robin with urgent priority class arbitration, and vendor-specific arbitration

Test Suite

This VIP includes a basic test suite capability that includes:

- Constrained-random example tests
- 3rd party simulator test execution

Related Products

- PCIe Gen4 Simulation VIP
- PCIe Gen3 Simulation VIP
- PCIe Gen2 Simulation VIP
- PCIe SR-IOV Simulation VIP
- PCIe MR-IOV Simulation VIP
- Mobile PCI Simulation VIP
- PCIe Gen2/Gen 3 Accelerated VIP



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