

Introduction

The Octera Verification Environment is a collection of C applications, scripts, and test benches that work together to provide a powerful and flexible verification environment for Networking FPGA designs.

The tool flow consists of scripted traffic generation, C modeling of the FPGA design, and execution of a system level RTL simulation using the generated traffic, the modelled results, and full featured scriptable bus functional models for the interfaces.

Features

Traffic Generation

- Fully scriptable collection of powerful, integrated traffic generation functions.
- Histogram based packet length generation allows for generation of any packet size profile.
- Flexible packet field definition. Fields can be fixed, generated from pools of values, or read from files.
- Inserts a unique 16-bit packet ID in each packet (location selectable) for packet identification during modeling and

simulation.

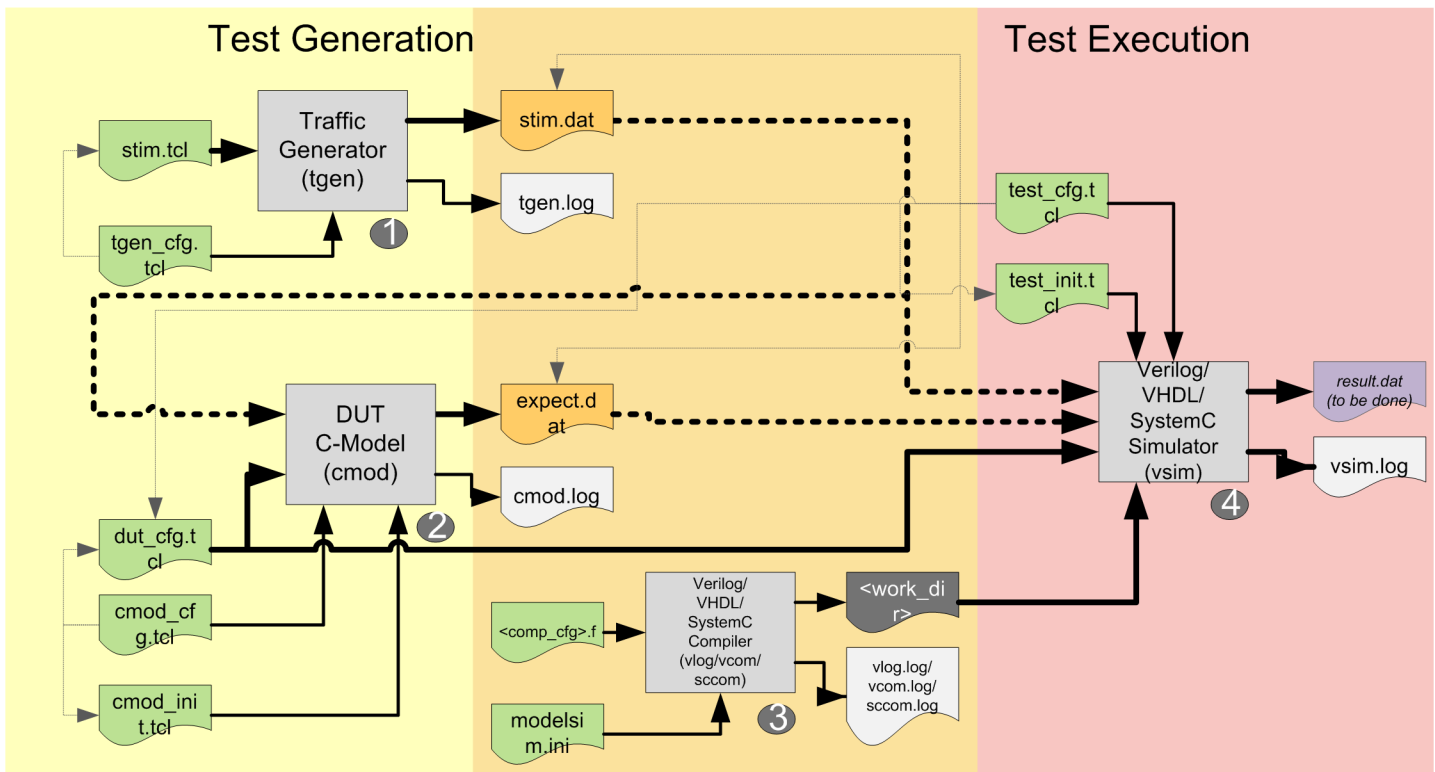
- Generates L2, L3, and Custom packets.
- Integrated Checksum and CRC calculation

C Modeling

- The C Model is provided as C++ source code. It consists of a project that can be built from the collection of classes provided, some of which are customized for the design under test.
- Tcl script interface for user host interface modeling, parameter setting and control of other model features.
- Database class reads traffic files generated by the traffic generator, and writes modelled output traffic files. It allows packets to be selected from the input database in any order, and written to the output database in any order. It allows for bandwidth expansion, and for changes in the number of packets generated.
- Passes packet data and parsed field information to modeling class (customized by the user), and accepts similarly formatted output packets.
- Provides messaging class for user model logging and message generation.

Bus Functional Models (BFMs)

- BFMs are integrated by Octera for custom applications. A Tcl script interface is provided for host interface functions (compatible with the C model), BFM



- paramaterization, and simulation flow.
- Packet database class includes packet identification and checking functions.
- BFM classes for XAUI, XGMII, SPI4, PCI Express, PCI, Avalon-MM, Avalon-ST are available.
- BFMs interface at either the pins of the device, or at a parallel internal interface. This approach lets the engineer choose a faster simulation run for debug, or a full coverage simulation for final test.
- Detailed simulation logging with timestamping is provided.

Scripted Test Execution (gosim.pl)

- The Gosim environment is a Perl script that ties everything together.
- Allows for easy selection of different simulation tools versions.
- Lets you select whether to run a test as a batch process or in the simulator GUI
- Automatically runs the traffic generator, the C Model, compiles the RTL design, and runs the simulation.
- Manages lists of tests for full design verification and regression testing.
- Manages simulation options, like logging of simulation results.
- Provides a summar of test results and a final pass / fail indication after the regression run completes.

Customization

Customer Customization

- Traffic Generation
- C Model source
- Simulation / BFM scripts
- Design compilation scripts
- Regression test lists

Octera Customization for Customer

- Additional customization on traffic generation if required
- Integration of BFMs per the customer requirements
- Custom BFMs if required

Hardware testing with NIOS processor

- The Traffic Generator, C Model and parts of the BFM can be built into a NIOS embedded processor application.
- Allows DUT to be tested in hardware, but not at full line rate.
- Tcl scripts are pre-compiled, so the Tcl interpreter is not needed on the NIOS.
- Interfaces to IP cores instead of BFMs.
- Large FIFOs are used to buffer packets to allow for line rate bursts of traffic.

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Deliverables

- Traffic Generator executable for Windows and RedHat / CentOS Linux
- C Model source code, Microsoft Visual C++ Project, and Linux build script
- Customized (or standard if available) set of integrated BFMs
- Gosim Perl script
- Example directory structure
- Example design (MAC Lite) with full regression suite
- User documentation

Order code: OCT-VERIFICATION