

Visual Verification Suite: User Defined Checks and Messages

Introduction

The Blue Pearl Software Visual Verification Suite provides enhanced Lint, Debug, Clock Domain Crossing (CDC) and automated SDC generation flows to accelerate ASIC, FPGA and IP RTL Verification.

Analyze RTL™ provides RTL linting combined with a powerful debug environment with the industry's fastest bug find/fix rate to quickly identify critical design issues, up front, streamlining simulation and synthesis while improving overall quality of results.

With the 2071.1 we have extended the Blue Pearl supplied checks with a programmable interface that allow users to query their design and add a message to the results based on the outcome of that query. This user-defined message can be enabled by a user-defined check.

Tcl and SDC based Queries

The Visual Verification Suite supports numerous Tcl and SDC commands to return information of interest to the user. For the most part, Tcl commands starting with "BPS::get_" will return information about tool settings, and SDC commands starting with "get_" will return information about the design.

The new command "BPS::add_custom_check" requires the user to specify a unique name for the custom check, a brief description of the check, and the name of a Tcl procedure to be called by the check. There are a few requirements for this Tcl procedure:

- The procedure must be global in scope, operating on the entire design from the root module down.
- No parameters can be passed in to the procedure.
- While Tcl exceptions and errors produced by the procedure will be reported separately, any return values from the procedure will be ignored. Use the "BPS::record_message" command as the output of the procedure.

You can now use this check like any of the built in checks. This check can be now run standalone or as part of a custom package or as part of the Management Dashboard signoff

- To add the check to a custom package use the command "BPS::add_check_to_package"
- To add the check to a Management Dash board signoff checklist use:
"BPS::add_check_to_checklist" and "BPS::add_message_criterion_to_checklist"

Example

The first step in the process of creating a custom check is to create a Tcl procedure. For this example, we'll report the name of any top-level port longer than ten characters, as follows:

```

proc port_name_too_long {} {
    # Set the port name limit
    set port_name_limit 10
    # The all_ports command gives a list of all top-level port objects
    foreach i [all_ports] {
        # Find the name of each port object
        set port_name [get_port_info $i -name]
        # Find the length of the name
        set port_name_length [string length $port_name]
        # Find the type (input/output/inout) of each port object
        set port_type [get_port_info $i -porttype]
        # Check length of each name, print message if too long
        if {$port_name_length > $port_name_limit} {
            set msgtext "The name of $port_type port $port_name is \
                $port_name_length limit is $port_name_limit"
            BPS::record_message -msgid=CUST-1001 "$msgtext"
        }
    }
}

```

In order to issue a message CUST-1001, we need to create a group called CUST and a message within that group:

```

BPS::add_message_group -name=CUST -description {Custom Messages}
BPS::add_message -msgid=CUST-1001 -severity=Warning -description
{Custom Message Port Name Length}

```

These commands should be issued only once per session, and so should be separate from the procedure. We also need to assign a name to the new check, and associate it with the Tcl procedure:

```

BPS::add_custom_check LONG_PORTNAME -description {Flag top-level
port names longer than ten} -process port_name_too_long

```

Likewise, we need to add the new check to a custom package, and add the check and message to a custom checklist:

```

BPS::add_package {Custom Package}
BPS::add_check_to_package -check {LONG_PORTNAME} {Custom Package}
BPS::create_design_signoff_checklist -checklist {Custom Checklst}
BPS::add_check_to_checklist -check {LONG_PORTNAME} -checklist
{Custom Checklst}
BPS::add_message_criterion_to_checklist -checklist {Custom
Checklst} -msgid CUST-1001 -range {1}

```

GUI users should put these commands, including the process definition, into a custom `bps_setup.tcl` file, as described in Section 2.1 of the Blue Pearl Analyze Reference Manual.

Conclusion

The Blue Pearl Visual Verification Suite contains a comprehensive set of Tcl and SDC commands that can be configured to create custom checks to evaluate your design and accelerate overall design verification.

Further Reading

- Blue Pearl Tcl Reference Guide: *<installation>/doc/BluePearlTclReference.pdf*
- Blue Pearl Analyze Reference Manual: *<installation>/doc/BluePearlAnalyzeReference.pdf*
- Tcl online reference: <http://www.tcl.tk>