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What I Wish My Regression Run Manager's Vendor Knew!

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Agenda

- BACKGROUND
- CONTROL FILES
- REPORTING
- OUTPUT STRUCTURE
- CENTRAL SERVER
- CONCLUSION

Background

- Want a common "look-and-feel" across the company

- Why?
  - Increase Verification Engineer efficiency
    - Minimize context switching penalty
  - Provide some level of vendor agnosticism
  - Minimize regression environment overhaul in case of a vendor change

Background - Verification Management System[1] (VMS)

- VMS provides
  - Compilation/Simulation/Regression/Formal App execution
  - Standard method of providing tool arguments
  - Basic status logging
  - Results generation
  - **A common look-and-feel**

[1] David Crutchfield, Thom Ellis (2014). *Bringing Regression Systems into the 21st Century*. DVCon 2014, San Jose, CA.

Regression Manager Control

- Meta-data control files
  - Contain hierarchically ordered tasks for the run manager to execute
- Siemens EDA Questa Verification Run Manager (QuestaVRM)
  - Run Manager DataBase (RMDB)
- Cadence Verisium Manager (vManager)
  - Verification Session Input Format (VSIF)

Regression Control - QuestaVRM RMDB

- Format
  - XML with embedded TCL
  - More complex than VSIF but more flexible
- Contents
  - Hierarchically organized "runnables"
  - Conditional runnable execution
  - User-defined TCL procs
  - Hooks into regression flow
- VMS uses a pre-defined RMDB for all regressions

Regression Control - QuestaVRM RMDB

- Challenges
  - Size and complexity of RMDB
    - Our single RMDB did not scale well
  - Performance issues due to single-threaded nature
    - Servicing fast completing jobs starved launching of new jobs
    - Enhancement request: User control over job management algorithm
  - TCL in XML syntax
    - Not ideal for editing or debugging or being generated

Regression Control - Cadence vManager VSIF

- Format
  - Generic Nested Text Format
  - Syntactically more straight forward and simple than the RMDB at the cost of less flexibility
- Contents
  - Sessions, groups, and test containers with pre/post scripts
  - No dynamic flow control
- VMS generates the VSIF for each regression

Regression Control - Cadence vManager VSIF

- Challenges
  - Assumes leaf node script is executing a simulation
  - Compilation can only be done as a pre-session/pre-group script
    - Prohibits using the tool features to launch parallel compilation jobs
    - We implemented our own compile job manager script

- Enhancement request
  - Leaf node flag indicating script is not a test

Reporting

- Regression managers provide little feedback in batch mode (by design)
- Used QuestaVRM user TCL hooks to provide generic status
- Used central logging server with vManager implementation to achieve similar results
- vManager API too expensive (license and time)

```
vrunlog:
vrunlog: *** Preparing Simulation Database. This may take a moment. ***
vrunlog:
vrunlog: *** Launching Tests ***
vrunlog: Test 1     : Sim 1        Pending  Sun Oct 30 23:00:43 2022: test_tree/intr_set_test/intr_set_test_RTL_13
vrunlog: Test 2     : Sim 1        Pending  Sun Oct 30 23:00:44 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog: Test 2     : Sim 2        Pending  Sun Oct 30 23:00:44 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog: Test 1     : Sim 1        Started  Sun Oct 30 23:00:48 2022: test_tree/intr_set_test/intr_set_test_RTL_13
vrunlog: Test 2     : Sim 1        Started  Sun Oct 30 23:00:51 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog: Test 1     : Sim 1        Finished Sun Oct 30 23:00:58 2022: test_tree/intr_set_test/intr_set_test_RTL_13
vrunlog:              Status: Passed
vrunlog: Test 2     : Sim 2        Started  Sun Oct 30 23:00:59 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog: Test 1     : Sim 1        Merge Started  Sun Oct 30 23:01:32 2022: test_tree/intr_set_test/intr_set_test_R
vrunlog: Test 1     : Sim 1        Merge Complete Sun Oct 30 23:01:35 2022: test_tree/intr_set_test/intr_set_test_R
vrunlog: Test 2     : Sim 1        Finished Sun Oct 30 23:03:05 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog:              Status: Passed
vrunlog: Test 2     : Sim 2        Finished Sun Oct 30 23:03:11 2022: test_tree/sample_irq_dsi_ff00_test/sample_irq
vrunlog:              Status: Passed
vrunlog: Test 2     : Sim 1        Merge Started  Sun Oct 30 23:03:44 2022: test_tree/sample_irq_dsi_ff00_test/samp
vrunlog: Test 2     : Sim 1        Merge Complete Sun Oct 30 23:03:47 2022: test_tree/sample_irq_dsi_ff00_test/samp
vrunlog:

Summary Test Results Are:
Tests Passing: 3     100.00%
Tests Warning: 0     0.00%
Tests Failing: 0     0.00%
Unknown      : 0     0.00%
Tests Other  : 0     0.00%
-------------------------
Total Tests  : 3     100.00% Complete
             : 0     0.00% Not Complete

Coverage on this regression run: 60.98%
```

Output Control

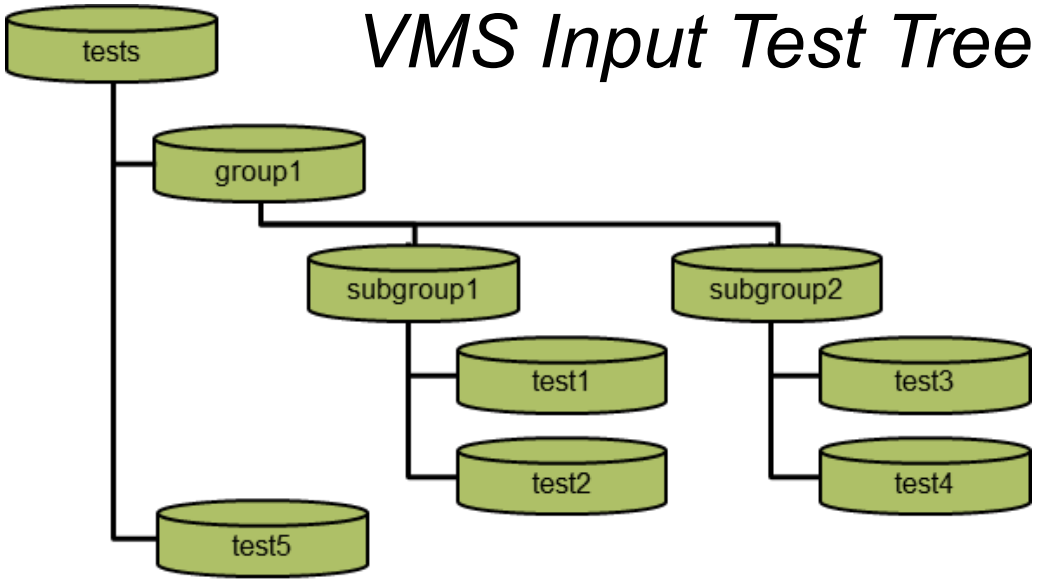
- Where are my results?
  - Run managers force a non-intuitive output directory naming convention
  - Sample QuestaVRM default output directory structure

    `<VRMDATA>/sim/run_tests~1/ts_comp/seeds~1/simulate`
  - Sample vManager default output directory structure

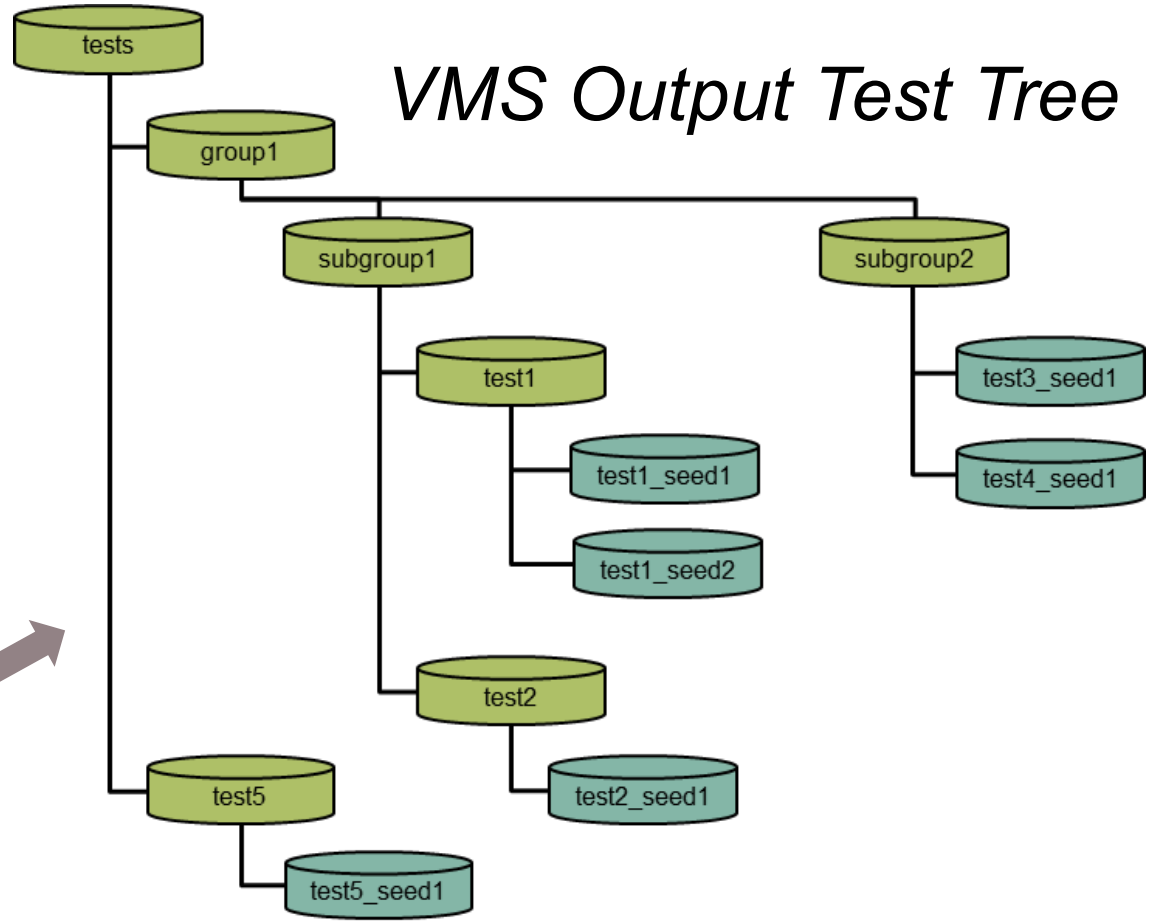
    `<VMGR_regr>/chain_0/<mode>/group1_subgroup1/run_[1…]`

Changing the output directory structure not natively possible with either run manager!

Output Control



VMS Input Test Tree



VMS Output Test Tree

Force the output folder structure to match the input folder structure

Centralized Server

- Pros
  - Collaborative benefits to using a central server
  - More easily track/view regression results between users
- Cons
  - Server cost (setup and maintenance/support)
  - Proprietary database access may require a license
  - Slow API access to DB
- Enhancement Request:
  - Generating results locally and uploading to server post-regression would be an appreciated mode of operation

Conclusion

- Success!
- Both regression managers have been integrated into our environment
- Excellent cooperation with both vendors over the years

Questions?