

# A Guide To Using Continuous Integration Within The Verification Environment

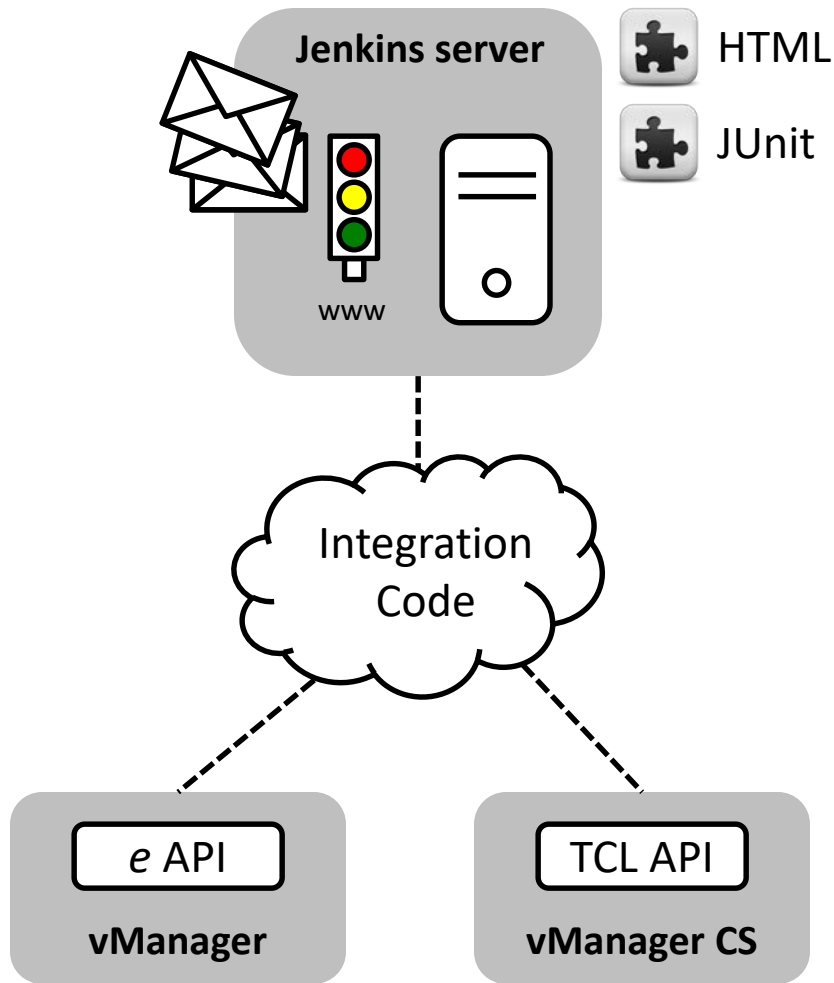
Presented by: Jason Sprott, Verilab

Other authors:

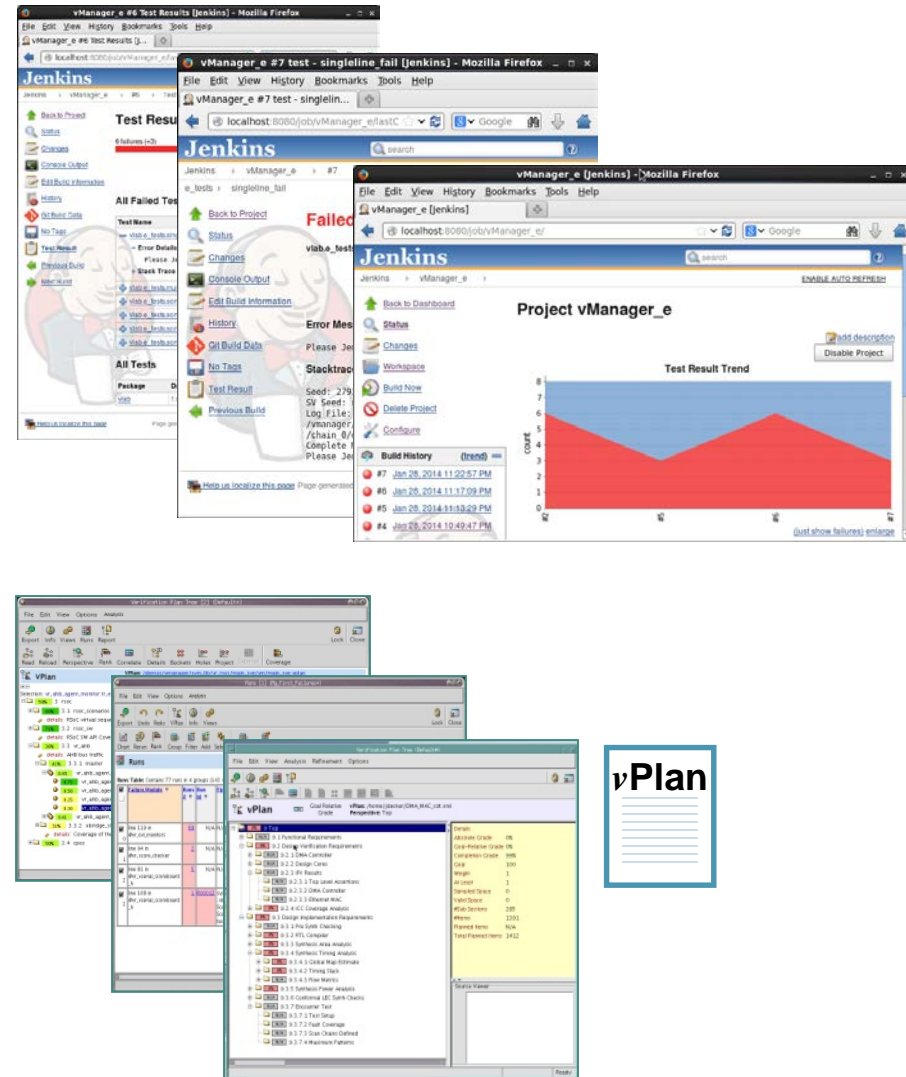
Gordon McGregor, Nitero

André Winkelman, Verilab

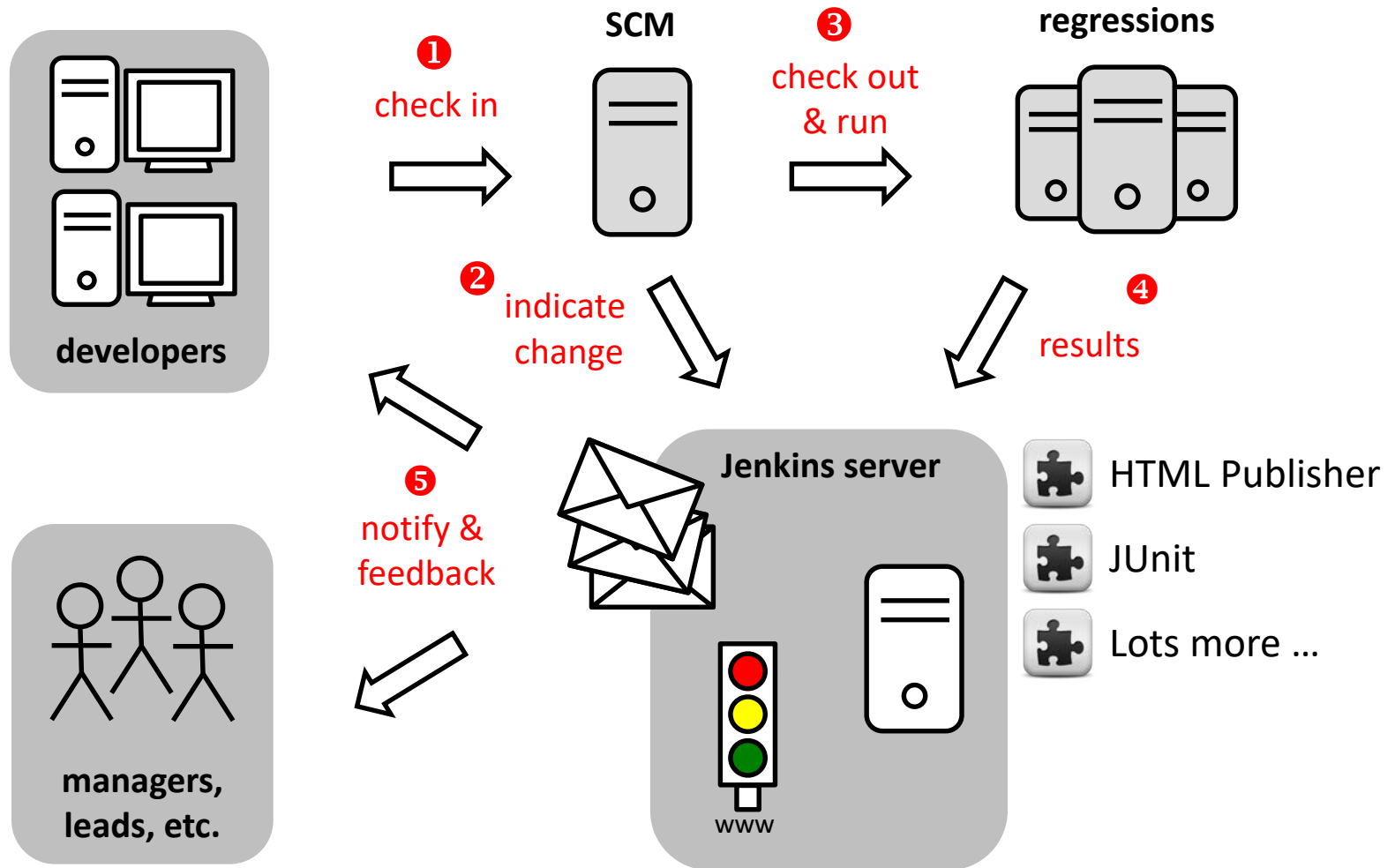
# Jenkins & vManager



Two Examples



# Jenkins(CI) Refresher



See: DVCON 2012 “30 Minute Project Makeover Using Continuous Integration”, Gray & McGregor

# MDV vs CI

## CI (Jenkins)

- Code health
- Keep main branch passing
- Release early & often
- Quickly spot and fix issues
- Integrated with SCM
- Automates test execution
- Communicates status
- PASS/FAIL dashboards

## MDV (vManager)

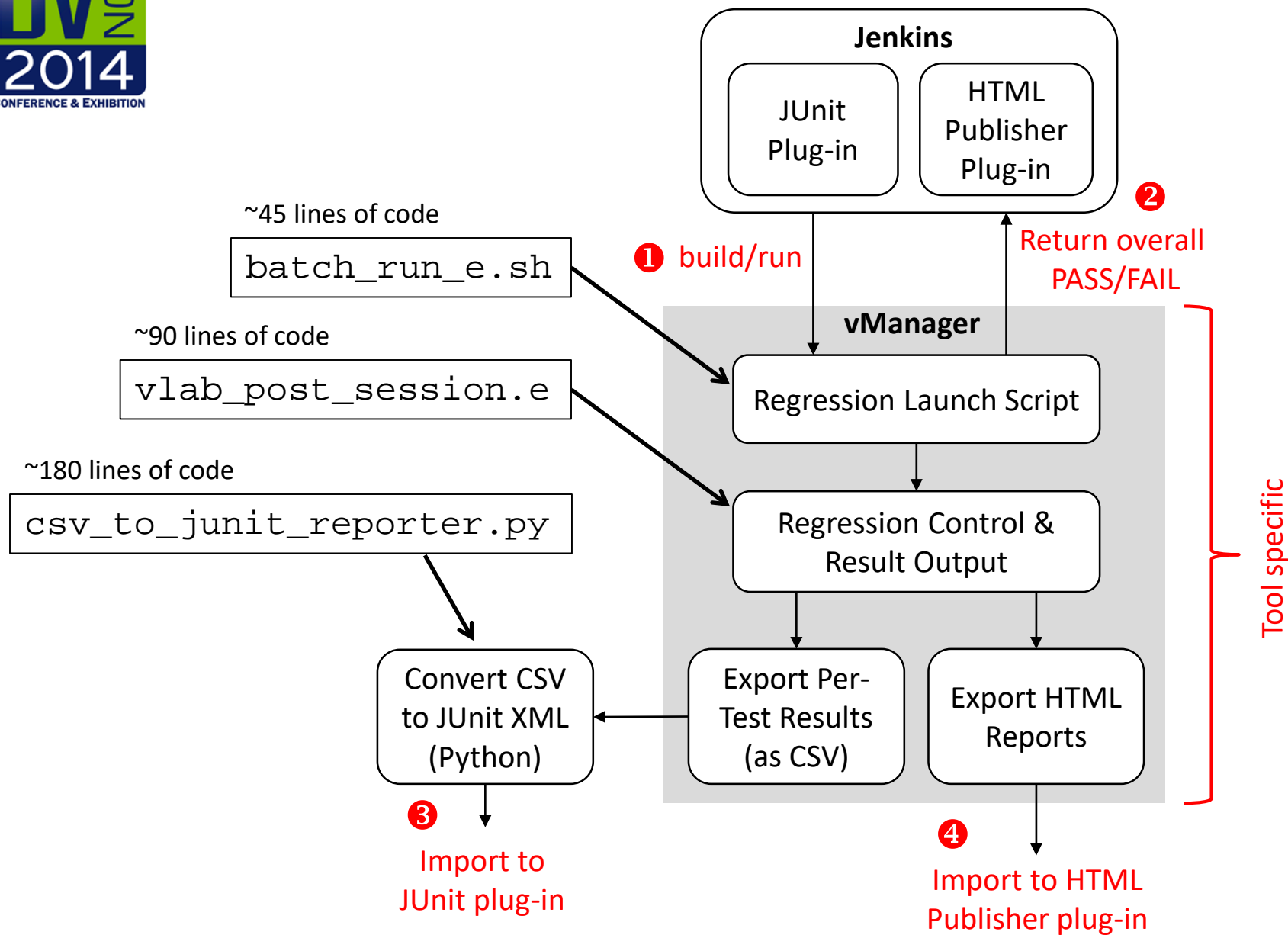
- Finding RTL bugs
- Managing complexity
- Integrated with verification language features
- Verification closure
- Integrates with vplan
- Verification specific results
- Specialized analysis tools

# Key Requirements

- Same results on Jenkins as standalone sims
  - Common PASS/FAIL parsing
  - If build fails whole regression is a FAIL
  - CSV or JUnit XML missing is a FAIL
- Regression must run in batch mode
- No return until all threads complete

# Two Examples

- Demonstrates generic and specific code
- Generic: `csv_to_junit_reporter.py`
- Ex. 1 (vManager) using a e-language API
  - Specific: initial launch script
  - Specific: e code to control exit and export results
- Ex 2 (vManager CS) using TCL API
  - Specific: initial launch script
  - Specific: TCL to control exit and export results



# CSV Output from vManager

```
Test Group,Test Name,Seed,SV Seed,Status,CPU Time (ms.),Log File,First Failure Description
vlab.e_tests,singleline_fail,279134982,random,failed,12.17,.../run_1/local_log.log,"Please Jenkins, show this error message!"
vlab.e_tests,passing,1216575217,random,passed,13.48,.../run_2/local_log.log,""
vlab.e_tests,multiline_fail,259841377,random,failed,12.66,.../run_3/local_log.log,"Please Jenkins, show this error message!
Let us see more details of the error.
What could have gone wrong?
... no idea ..."
vlab.e_tests,sometimes_fail,1266469697,random,failed,13.54,.../run_4/local_log.log,"Unlucky, the test did fail!"
vlab.e_tests,sometimes_fail,863826133,random,passed,13.48,.../run_5/local_log.log,""
vlab.e_tests,sometimes_fail,511941856,random,passed,12.30,.../run_6/local_log.log,""
vlab.e_tests,sometimes_fail,2105296490,random,passed,12.20,.../run_7/local_log.log,""
vlab.e_tests,sometimes_fail,628890105,random,passed,11.43,.../run_8/local_log.log,""
```

Slightly clearer in excel:

	A	B	C	D	E	F	G	H
1	Test Group	Test Name	Seed	SV Seed	Status	CPU Time (ms.)	Log File	First Failure Description
2	vlab.e_tests	singleline_fail	279134982	random	failed	12.17	.../run_1/local_log.log	Please Jenkins, show this error message!
3	vlab.e_tests	passing	1216575217	random	passed	13.48	.../run_2/local_log.log	
4	vlab.e_tests	multiline_fail	259841377	random	failed	12.66	.../run_3/local_log.log	Please Jenkins, show this error message! Let us see more details of the error. What could have gone wrong? ... no idea ...
5	vlab.e_tests	sometimes_fail	1266469697	random	failed	13.54	.../run_4/local_log.log	Unlucky, the test did fail!
6	vlab.e_tests	sometimes_fail	863826133	random	passed	13.48	.../run_5/local_log.log	
7	vlab.e_tests	sometimes_fail	511941856	random	passed	12.3	.../run_6/local_log.log	
8	vlab.e_tests	sometimes_fail	2105296490	random	passed	12.2	.../run_7/local_log.log	
9	vlab.e_tests	sometimes_fail	628890105	random	passed	11.43	.../run_8/local_log.log	



# XML Input to Junit Plugin

Output from csv\_to\_junit\_reporter.py

```
<?xml version='1.0' encoding='UTF-8'?>
<testsuites name="results">
  <testsuite failures="3" id="0" name="vlab.e_tests" passes="5" time="">
    <testcase classname="vlab.e_tests" name="singleline_fail" time="12.17">
      <failure message="Please Jenkins, show this error message!" type="Fail">
Seed: 279134982
SV Seed: random
Log File: /path_to_test/e_tests/run_1/local_log.log
Complete Message:
Please Jenkins, show this error message!
      </failure>
    </testcase>
    <testcase classname="vlab.e_tests" name="passing" time="13.48" />
    <testcase classname="vlab.e_tests" name="multiline_fail" time="12.66">
      <failure message="Please Jenkins, show this error message!" type="Fail">
Seed: 259841377
SV Seed: random
Log File: /path_to_test/run_3/local_log.log
Complete Message:
Please Jenkins, show this error message!
Let us see more details of the error.
What could have gone wrong?
... no idea ...
      </failure>
    </testcase>
    <testcase classname="vlab.e_tests" name="sometimes_fail" time="13.54">
      <failure message="Unlucky, the test did fail!" type="Fail">
Seed: 1266469697
SV Seed: random
Log File: /path_to_test/run_4/local_log.log
Complete Message:
Unlucky, the test did fail!
      </failure>
    </testcase>
    <testcase classname="vlab.e_tests" name="sometimes_fail" time="13.48" />
    <testcase classname="vlab.e_tests" name="sometimes_fail" time="12.30" />
    <testcase classname="vlab.e_tests" name="sometimes_fail" time="12.20" />
    <testcase classname="vlab.e_tests" name="sometimes_fail" time="11.43" />
  </testsuite>
</testsuites>
```

Custom data in the failure message

# Project Status in Jenkins

## Jenkins

Jenkins ▸ JenkinsIntegration ▸

ENABLE AUTO REFRESH

[Back to Dashboard](#)

[Status](#)

[Changes](#)

[Workspace](#)

[Build Now](#)

[Delete Project](#)

[Configure](#)

[HTML Report](#)

[Subversion Polling Log](#)

### Project JenkinsIntegration

Project used for paper preparation regarding Jenkins and vManager integration

[edit description](#)  
Disable Project

[HTML Report](#)

[Workspace](#)

[Recent Changes](#)

[Latest Test Result](#) (20 failures / +1)

#### Build History [\(trend\)](#)

#22	<a href="#">Jan 16, 2014 9:36:17 AM</a>
#21	<a href="#">Jan 13, 2014 9:36:20 AM</a>
#20	<a href="#">Jan 10, 2014 9:36:19 AM</a>
#19	<a href="#">Jan 8, 2014 11:19:23 AM</a>
#18	<a href="#">Jan 8, 2014 8:48:46 AM</a>
#17	<a href="#">Jan 8, 2014 7:06:28 AM</a>
#16	<a href="#">Jan 7, 2014 10:55:38 PM</a>
#15	<a href="#">Jan 7, 2014 10:13:27 PM</a>
#14	<a href="#">Dec 16, 2013 1:36:33 PM</a>
#13	<a href="#">Nov 20, 2013 9:36:06 AM</a>
#12	<a href="#">Nov 19, 2013 7:09:38 PM</a>
#11	<a href="#">Nov 19, 2013 3:07:16 PM</a>
#10	<a href="#">Nov 19, 2013 2:53:33 PM</a>
#9	<a href="#">Nov 19, 2013 2:42:15 PM</a>
#8	<a href="#">Nov 19, 2013 2:35:03 PM</a>
#7	<a href="#">Nov 19, 2013 1:45:37 PM</a>
#6	<a href="#">Nov 19, 2013 1:42:44 PM</a>

#### Test Result Trend

(just show failures) [enlarge](#)

#### Permalinks

- [Last build \(#22\), 21 days ago](#)
- [Last stable build \(#16\), 29 days ago](#)
- [Last successful build \(#16\), 29 days ago](#)
- [Last failed build \(#22\), 21 days ago](#)
- [Last unstable build \(#14\), 1 mo 21 days ago](#)
- [Last unsuccessful build \(#22\), 21 days ago](#)

# Results in Jenkins

vManager\_e #6 Test Results [Jenkins] - Mozilla Firefox

File Edit View History Bookmarks Tools Help

vManager\_e #6 Test Results [J...]

localhost:8080/job/vManager\_e/lastCompleted

**Jenkins** search

Jenkins > vManager\_e > #6 > Test Results [ENABLE AUTO REFRESH](#)

[Back to Project](#) [Status](#) [Changes](#) [Console Output](#) [Edit Build Information](#) [History](#) [Git Build Data](#) [No Tags](#) [Test Result](#) [Previous Build](#) [Next Build](#)

## Test Result

6 failures (+3)

8 tests (±0)  
Took 1 min 39 sec.  
[add description](#)

### All Failed Tests

Test Name	Duration	Age
<a href="#">vlab.e_tests.singleline_fail</a>		
- Error Details		
Please Jenkins, show this error message!	12 sec	5
+ Stack Trace		
<a href="#">vlab.e_tests.multiline_fail</a>	13 sec	5
<a href="#">vlab.e_tests.sometimes_fail</a>	12 sec	5
<a href="#">vlab.e_tests.sometimes_fail</a>	12 sec	5
<a href="#">vlab.e_tests.sometimes_fail</a>	13 sec	5
<a href="#">vlab.e_tests.sometimes_fail</a>	12 sec	5

### All Tests

Package	Duration	Fail	(diff)	Skip	(diff)	Total	(diff)
<a href="#">vlab</a>	1 min 39 sec	6	+3	0		8	

[Help us localize this page](#) Page generated: Jan 28, 2014 11:23:53 PM [REST API](#) [Jenkins ver. 1.544](#)

vManager\_e #7 test - singleline\_fail [Jenkins] - Mozilla Firefox

File Edit View History Bookmarks Tools Help

vManager\_e #7 test - singlelin...

localhost:8080/job/vManager\_e/lastC

**Jenkins** search

Jenkins > vManager\_e > #7 > Test Results > vlab > [ENABLE AUTO REFRESH](#)

[Back to Project](#) [Status](#) [Changes](#) [Console Output](#) [Edit Build Information](#) [History](#) [Git Build Data](#) [No Tags](#) [Test Result](#) [Previous Build](#)

## Failed

vlab.e\_tests.singleline\_fail

Failing for the past 6 builds (Since ● #2 )  
Took 12 sec.  
[add description](#)

### Error Message

Please Jenkins, show this error message!

### Stacktrace

Seed: 279134982  
SV Seed: random  
Log File: /var/lib/jenkins/jobs/vManager\_e/workspace/vmanager/regression/vlab.jenkins.14\_01\_28\_23\_23\_01\_7479/chain\_0/e\_tests/run\_1/local\_log.log  
Complete Message:  
Please Jenkins, show this error message!

[Help us localize this page](#) Page generated: Jan 28, 2014 11:26:36 PM [REST API](#) [Jenkins ver. 1.544](#)

# Getting the Code

<https://bitbucket.org/verilab/jenkinsintegration>



The screenshot shows the Bitbucket repository page for 'JenkinsIntegration' by 'verilab'. The page has a header with the repository name and a 'Share' button. Below the header is a navigation bar with tabs: 'Overview', 'Source', 'Commits', 'Branches', 'Pull requests', and 'Issues'. The 'Source' tab is selected. Below the navigation bar is a dropdown menu for branches, currently showing 'master', and a download button. The main content area shows the repository structure with folders 'e', 'scripts', 'sv', 'vmanager', and 'vmanagercs', and a file 'README'. The 'scripts' folder is highlighted with a red box.

File/Folder	Size	Modified
e		
scripts		
sv		
vmanager		
vmanagercs		
README	2.5 KB	2014-01-15

Location of `csv_to_junit_reporter.py`

# Running vManager

From: vmanager/batch\_run\_e.sh

```
vm_launch.pl \  
-vsif ../e/e_tests.vsis \  
-batch \  
-command "load scripts/vlab_post_session.e; sys.vlab_post_session_analysis();" \  
-output_mode log_only
```

```
python ../scripts/csv_to_junit_reporter.py regression_tests.csv junit.xml  
grep PASS regression_result.txt
```

A bit of messing around for tidy HTML reports

```
# Create links to latest HTML report if it exists  
SESSION_DIR=`ls -1rt $MY_REGRESSION_AREA | tail -n 1`  
if [ -e "$MY_REGRESSION_AREA/$SESSION_DIR/Regression_Report.html" ]; then  
    rm -rf html_report  
    mkdir html_report  
    cp $MY_REGRESSION_AREA/$SESSION_DIR/Regression_Report.html      html_report/Regression_Report.html  
    ln -s $MY_REGRESSION_AREA/$SESSION_DIR/Regression_Report.html.files html_report/Regression_Report.html.files  
fi
```

# vManager e API

Excerpt from: vmanager/scripts/vlab\_post\_session.e

```
vlab_post_session_analysis() is {  
  
    out("Waiting until all tests have been executed");  
    vm_util.trace_all_sessions_to_finish();  
    out("All tests should be done by now. Starting post session analysis.");  
  
    vlab_vsof = vm_manager.get_all_sessions()[0]; // or load a specific vsof  
    vlab_runs = vlab_vsof.get_runs();  
  
    vlab_out_session_result();  
    vlab_out_test_results();  
};
```

There's about 80 lines of supporting code in total

# Running vManager CS

From: vmanagerscs/batch\_run\_e.sh

```
vmanager -cs -profile ${MY_VMANAGER_CS_PROFILE} -exec scripts/run.tcl  
python ../scripts/csv_to_junit_reporter.py regression_tests.csv junit.xml
```

From: vmanagerscs/scripts/run.tcl

```
launch -wait -load -vsif ../e/e_tests.vsif  
csv_export -runs -view vlabCSV(awg) -out regression_tests.csv -overwrite  
report_tests -out tests_report -overwrite
```

# Jenkins Project Configuration

## Build

### Execute shell

```
#!/bin/bash -x
. /etc/bashrc
set -e
cd SimpleDemo/vm_basic
export MY_REGRESSION_AREA=`pwd`/regression
./batch_run.sh
```

See [the list of available environment variables](#)

Delete

Add build step ▾

## Post-build Actions

### Publish HTML reports

HTML directory to archive

Index page[s]

Report title

Keep past HTML reports

Allow missing report

SimpleDemo/vm\_basic/html\_report

Regression\_Report.html

HTML Report



Delete

Add

Delete

### Publish JUnit test result report

Test report XMLs

SimpleDemo/vm\_basic/junit.xml

**ERROR**

[Fileset 'includes'](#) setting that specifies the generated raw XML report files, such as 'myproject/target/test-reports/\*.xml'. Basedir of the fileset is [the workspace root](#).

☐ Retain long standard output/error

Delete



# Summary

- CI and MDV are complementary
- Two Jenkins integration examples shown
  - Different APIs
- There are some integration requirements
  - e.g. Pass/Fail and exit handling are important
- Generic JUnit XML generation code provided
- CI not just about the tools
  - Cultural change is required