Teaching Your Test Framework to Speak LAVA

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You Already Have Tests

- Wouldn't it be great if:
  - LAVA could auto-discover them?
  - You could run the same commands for a developer as for Continuous Integration?
    - KISS "Keep it simple smarty-pants"
  - You didn't need to rewrite your tests for LAVA?
    - DRY "Don't repeat yourself"
  - You didn't need to write a post-processor to parse your results?

Life Cycle of a Test Case

output
debug
results

- Once the test run has begun, LAVA is just observing

1. Start of Test Case
2. End of Test Case
3. Test Case Result

```
+ lava-test-case ping-test --shell ping -W1 -c1 www.example.com
<LAVA_SIGNAL_STARTTC ping-test>                                          (1)
PING www.example.com (93.184.216.34): 56 data bytes.
--- www.example.com ping statistics ---
1 packets transmitted, 0 received, 100% packet loss, time 0ms
<LAVA_SIGNAL_ENDTC ping-test>                                            (2)
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=ping-test RESULT=fail>                (3)
```

```
Received signal: <STARTTC> ping-test
Received signal: <ENDTC> ping-test
Received signal: <TESTCASE> TEST_CASE_ID=ping-test RESULT=fail
```

```
case: ping-test
case_id: 12345678
definition: 1_smoke-tests
result: fail
```

Emit Signals LAVA Needs to See

output
debug
results

- Once the test run has begun, LAVA is just observing

❶ Start of Test Case

```
setup() {
    print (’<LAVA_SIGNAL_STARTTC $testname>’)
}
```

❷ End of Test Case

```
teardown() {
    print (‘<LAVA_SIGNAL_ENDTC $testname>’)
```

❸ Test Case Result

```
    print (‘<LAVA_SIGNAL_TESTCASE \
            TEST_CASE_ID=$testname \
            RESULT=$result’>)
}
```

```
+ my-test-runner my-test-case
<LAVA_SIGNAL_STARTTC my-test-case>          ❶
assert 1 == 1
PASS
<LAVA_SIGNAL_ENDTC my-test-case>            ❷
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=my-test-case RESULT=pass>  ❸
```

```
Received signal: <STARTTC> my-test-case
Received signal: <ENDTC> my-test-case
Received signal: <TESTCASE> TEST_CASE_ID=my-test-case RESULT=pass
```

```
case: ping-test
case_id: 12345678
definition: 1_smoke-tests
result: pass
```

Measurements and Units

output
debug
results

- LAVA can also support results which have:

❶ Measurements (a numeric value)

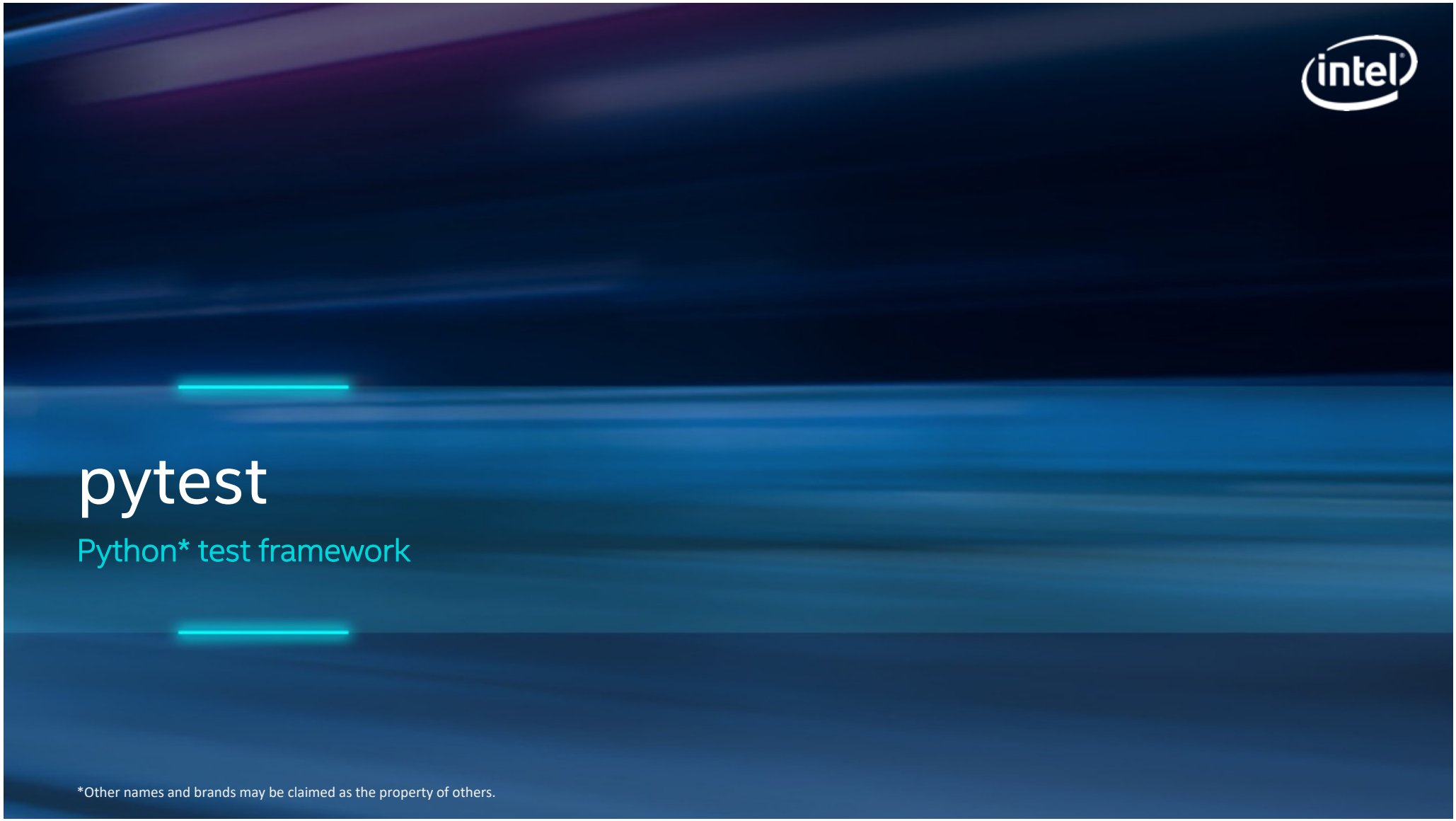
```
+ my-test-runner pi-test
<LAVA_SIGNAL_STARTTC pi-test>
pi = 3.14159
PASS
<LAVA_SIGNAL_ENDTC pi-test>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=pi-test RESULT=pass MEASUREMENT=3.14159>
```

❶

❷ Units (optional)

```
+ my-test-runner speed-test
<LAVA_SIGNAL_STARTTC speed-test>
speed = 60 kph
PASS
<LAVA_SIGNAL_ENDTC speed-test>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=speed-test RESULT=pass MEASUREMENT=60 UNITS=kph>
```

❶ ❷


intel
pytest
Python* test framework
*Other names and brands may be claimed as the property of others.

conftest.py

- At the root of the directory where you call ‘pytest’

```
# conftest.py
#
# Copyright (C) 2018 Intel Corporation
# SPDX-License-Identifier: MIT

def lava_result_convert(pytest_outcome):
    """ Convert the pytest outcome to the string expected by LAVA.
    """
    if pytest_outcome is 'passed':
        return 'pass'
    elif pytest_outcome is 'skipped':
        return 'pass'
    elif pytest_outcome is 'xfailed':
        return 'pass'
    else:
        return 'fail'
```

conftest.py (cont'd)

- Allows you to override pytest defaults

```
def pytest_report_teststatus(report):
    """ Insert strings that LAVA expects to capture test results.
    """
    # Get pytest test name and remove the 'test_' prefix
    test_name = report.location[2][5:]

    if report.when is 'setup':
        print('\n')
        print('<LAVA_SIGNAL_STARTTC ' + test_name + '>')
    elif report.when is 'call':
        test_result = lava_result_convert(report.outcome)

        print('\n')
        print('<LAVA_SIGNAL_ENDTC ' + test_name + '>')
        print('<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=' + test_name +
              ' RESULT=' + test_result + '>')
```

A Simple LAVA Test Definition with pytest


```
metadata:
    format: Lava-Test Test Definition 1.0
    name: python3-six-tests
    description: "Run the python3-six \
                  pytests"
    os:
        - oe
    scope:
        - functional
    devices:
        - x86

run:
    steps:
        - lava-test-case python3-six-tests \
          --shell pytest
```

```
metadata:
    format: Lava-Test Test Definition 1.0
    name: python3-six-tests-lava
    description: "Run the python3-six \
                  pytests, with LAVA \
                  signals enabled."
    os:
        - oe
    scope:
        - functional
    devices:
        - x86

run:
    steps:
        - pytest
```

pytest Output (before)

output
debug
results

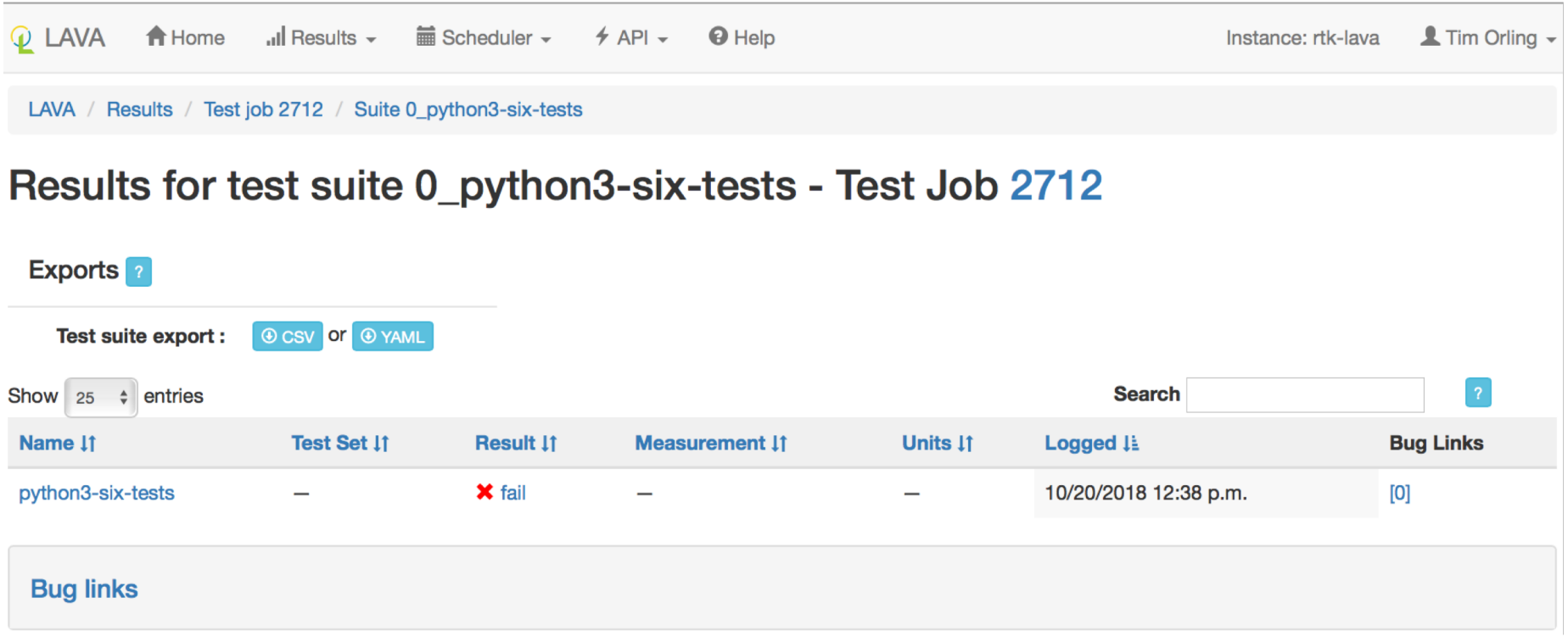
```
<LAVA_SIGNAL_STARTTC python3-six-tests>
Received signal: <STARTTC> python3-six-tests
============================= test session starts ==============================
platform linux -- Python 3.5.6, pytest-3.4.2, py-1.6.0, pluggy-0.6.0
rootdir: /lava-2712/0/tests/0_python3-six-tests, inifile: setup.cfg
collected 195 items
test_six.py .............................s.................sssssss [ 30%]
sssssss.................................................................. [ 67%]
.....................................................s.....F....          [100%]
=================================== FAILURES ===================================
_____________________________ test_add_metaclass_nested _____________________________
def test_add_metaclass_nested():
[…]
test_six.py:895: AssertionError
============== 1 failed, 177 passed, 17 skipped in 3.07 seconds ==============
<LAVA_SIGNAL_ENDTC python3-six-tests>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=python3-six-tests RESULT=fail>
Received signal: <ENDTC> python3-six-tests
Received signal: <TESTCASE> TEST_CASE_ID=python3-six-tests RESULT=fail
case: python3-six-tests
case_id: 47840
definition: 0_python3-six-tests
result: fail
```

pytest Output (after)

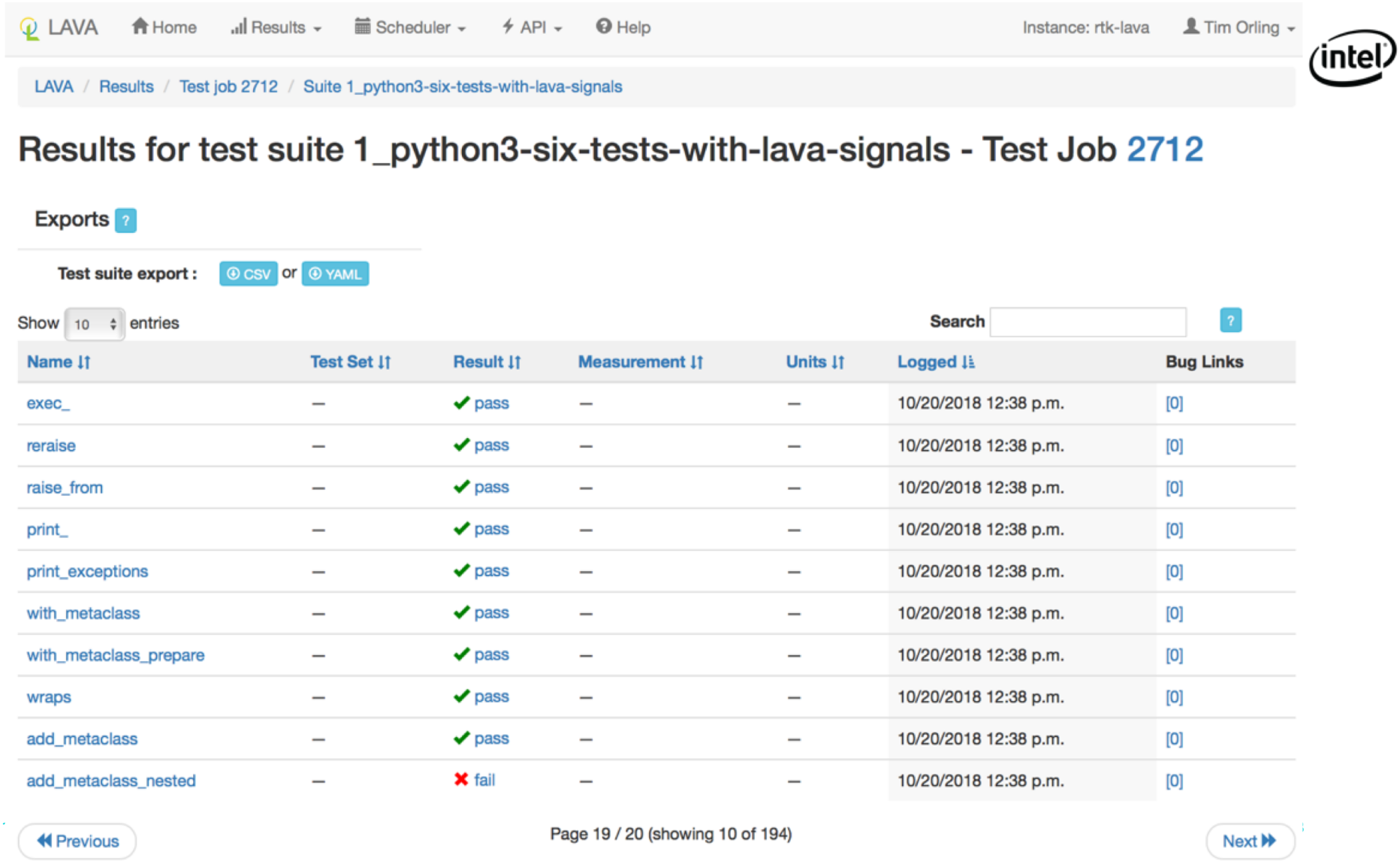
output
debug
results

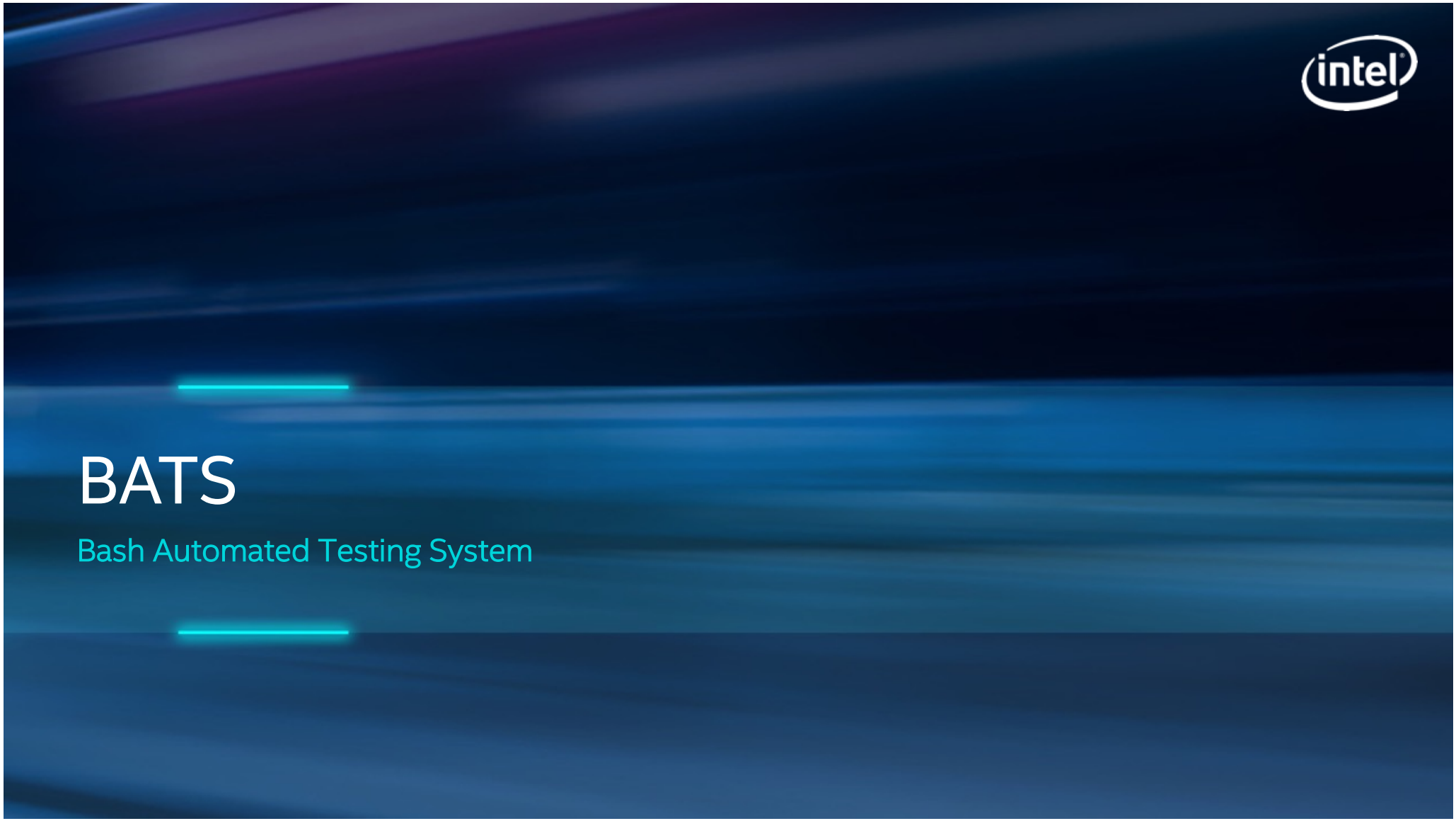
```
[…]
<LAVA_SIGNAL_STARTTC add_metaclass>
Received signal: <STARTTC> add_metaclass
.
<LAVA_SIGNAL_ENDTC add_metaclass>
Received signal: <ENDTC> add_metaclass
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=add_metaclass RESULT=pass>
Received signal: <TESTCASE> TEST_CASE_ID=add_metaclass RESULT=pass
case: add_metaclass
case_id: 48265
definition: 1_python3-six-tests-with-lava-signals
result: pass
<LAVA_SIGNAL_STARTTC add_metaclass_nested>
Received signal: <STARTTC> add_metaclass_nested
F
<LAVA_SIGNAL_ENDTC add_metaclass_nested>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=add_metaclass_nested RESULT=fail>
Received signal: <ENDTC> add_metaclass_nested
Received signal: <TESTCASE> TEST_CASE_ID=add_metaclass_nested RESULT=fail
case: add_metaclass_nested
case_id: 48266
definition: 1_python3-six-tests-with-lava-signals
result: fail
[…]
```

pytest Results (before)



pytest Results (after)




intel
BATS
Bash Automated Testing System

libexec/bats-core/bats

```
diff --git a/libexec/bats-core/bats b/libexec/bats-core/bats
index d3e2f47..7a4976c 100755
--- a/libexec/bats-core/bats
+++ b/libexec/bats-core/bats
@@ -20,7 +20,7 @@ usage() {
   while IFS= read -r line; do
     printf '%s\n' "$line"
   done <<END_OF_HELP_TEXT
-Usage: $cmd [-cr] [-f <regex>] [-p | -t] <test>...
+Usage: $cmd [-cr] [-f <regex>] [-l | -p | -t] <test>...
        $cmd [-h | -v]

   <test> is the path to a Bats test file, or the path to a directory
```

libexec/bats-core/bats (cont'd)

```
@@ -29,6 +29,7 @@ Usage: $cmd [-cr] [-f <regex>] [-p | -t] <test>...
   -c, --count      Count the number of test cases without running any tests
   -f, --filter     Filter test cases by names matching the regular expression
   -h, --help       Display this help message
+  -l, --lava       Emit signals for LAVA integration
   -p, --pretty     Show results in pretty format (default for terminals)
   -r, --recursive  Include tests in subdirectories
   -t, --tap        Show results in TAP format
@@ -80,8 +81,9 @@ done
 set -- "${arguments[@]}"
 arguments=()

-unset flags pretty recursive
+unset flags lava pretty recursive
 flags=()
+lava=
 pretty=
 recursive=
 if [[ -z "${CI:-}" && -t 0 && -t 1 ]] && command -v tput >/dev/null; then
```

libexec/bats-core/bats (cont'd)

```
@@ -109,6 +111,9 @@ while [[ "$#" -ne 0 ]]; do
    -r|--recursive)
      recursive=1
      ;;
+   -l|--lava)
+     lava=1
+     ;;
    -t|--tap)
      pretty=
      ;;
@@ -159,6 +164,8 @@ fi
 set -o pipefail execfail
 if [[ -z "$pretty" ]]; then
    exec "$command" "${flags[@]}" "${filenames[@]}"
+elif [[ "$lava" -eq 1 ]]; then
+  exec "$command" -x "${flags[@]}" "${filenames[@]}" | bats-format-lava-stream
 else
    exec "$command" -x "${flags[@]}" "${filenames[@]}" | bats-format-tap-stream
 fi
```

libexec/bats-core/bats-format-lava-stream

```
--- bats-format-tap-stream   2018-10-20 10:15:06.130047652 -0700
+++ bats-format-lava-stream  2018-10-20 10:12:46.886044973 -0700
@@ -9,6 +9,9 @@
   index=0
   failures=0
   skipped=0
+  result=
+  measurement=
+  units=
   name=
   count_column_width=$(( ${#count} * 2 + 2 ))
 else
@@ -27,6 +30,7 @@

 begin() {
   go_to_column 0
+  setup
   buffer_with_truncation $(( $count_column_left - 1 )) '   %s' "$name"
   clear_to_end_of_line
   go_to_column $count_column_left
```

libexec/bats-core/bats-format-lava-stream


```
@@ -37,6 +41,7 @@
 pass() {
   go_to_column 0
   buffer ' ✓ %s' "$name"
+  result="pass"
   advance
 }

@@ -47,6 +52,7 @@
   fi
   go_to_column 0
   buffer ' - %s (skipped%s)' "$name" "$reason"
+  result="pass" # lava only has pass/fail
   advance
 }
```

libexec/bats-core/bats-format-lava-stream

```
@@ -54,6 +60,7 @@
    go_to_column 0
    set_color 1 bold
    buffer ' ✗ %s' "$name"
+   result="fail"
    advance
  }

@@ -63,6 +70,11 @@
    clear_color
  }

+setup() {
+   escaped_name="${name// /_}"
+   buffer '\n<LAVA_SIGNAL_STARTTC %s>\n' "$escaped_name"
+}
+
  summary() {
    buffer '\n%d test' "$count"
    if [[ "$count" -ne 1 ]]; then
```

libexec/bats-core/bats-format-lava-stream


```
@@ -81,6 +93,20 @@
   buffer '\n'
 }

+teardown() {
+  escaped_name="${name// /_}"
+  buffer '\n<LAVA_SIGNAL_ENDTC %s>\n' "$escaped_name"
+  # It is valid to have a measurement without units, but not a units without a measuremnt
+  if [[ "$measurement" != "" ]] && [[ "$units" != "" ]]; then
+    buffer '\n<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=% MEASUREMENT=%s UNITS=%s>\n' "$escaped_name"
```

A Simple LAVA Test Definition with BATS

```
metadata:
    format: Lava-Test Test Definition 1.0
    name: bats-core-test
    description: "Run the bats-core tests"
    os:
        - debian
    scope:
        - functional
    devices:
        - qemu

run:
    steps:
        - lava-test-case bats-core-tap \
          --shell bin/bats -t test
```

```
metadata:
    format: Lava-Test Test Definition 1.0
    name: bats-core-test-lava
    description: "Run the bats-core tests, \
                  with LAVA signals enabled."
    os:
        - debian
    scope:
        - functional
    devices:
        - qemu

run:
    steps:
        - bin/bats -l test
```

BATS Output (before)

output
debug
results

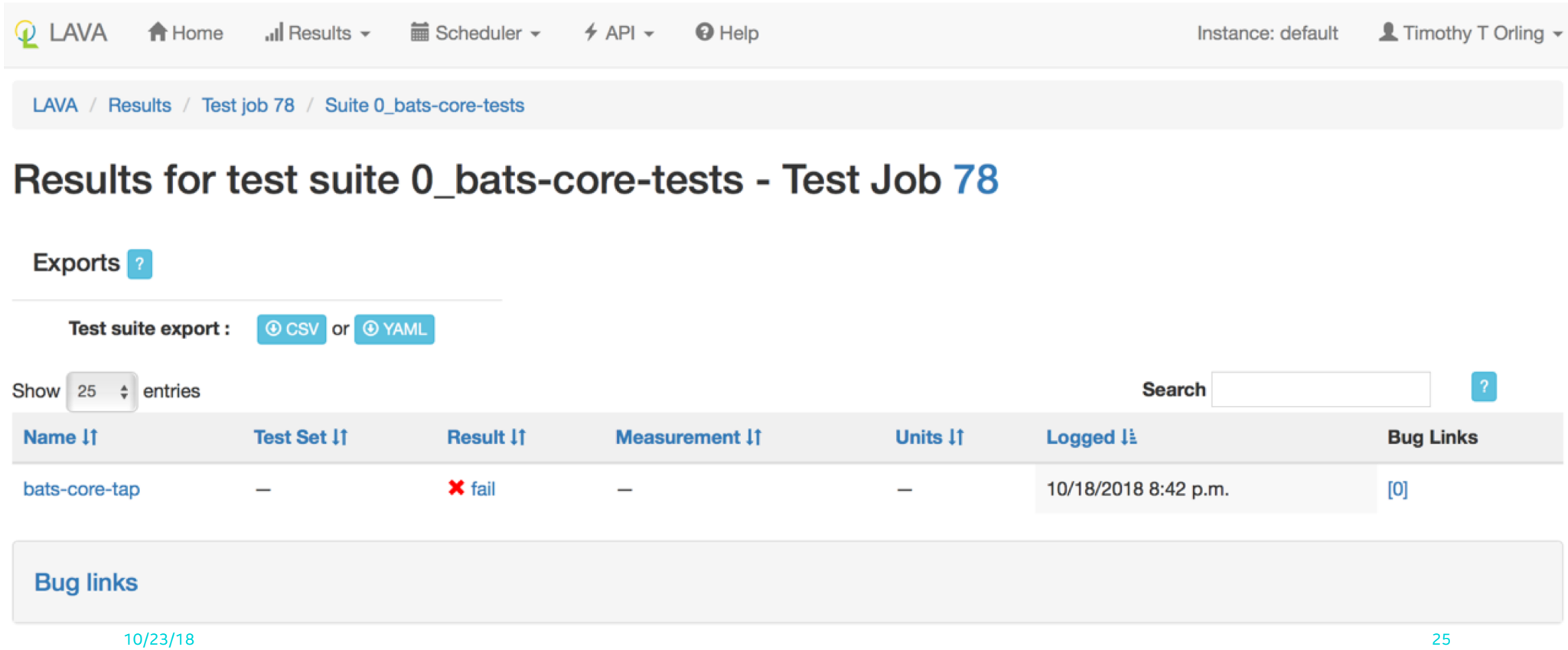
```
<LAVA_SIGNAL_STARTTC bats-core-tap>
Received signal: <STARTTC> bats-core-tap
1..70
ok 1 no arguments prints message and usage instructions
[…]
not ok 56 #113: set BATS_ROOT when /bin is a symlink to /usr/bin
# (from function `setup' in test file test/root.bats, line 21)
# `\"$BATS_ROOT/install.sh\" \"opt/bats-core\"' failed
# /tmp/bats.869.src: line 21: /lava-78/0/tests/0_bats-core-tests/install.sh: No such file or directory
not ok 57 set BATS_ROOT with extreme symlink resolution
# (from function `setup' in test file test/root.bats, line 21)
# `\"$BATS_ROOT/install.sh\" \"opt/bats-core\"' failed
# /tmp/bats.869.src: line 21: /lava-78/0/tests/0_bats-core-tests/install.sh: No such file or directory
[…]
ok 70 --filter can handle regular expressions that start with ^
<LAVA_SIGNAL_ENDTC bats-core-tap>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=bats-core-tap RESULT=fail>
Received signal: <ENDTC> bats-core-tap
Received signal: <TESTCASE> TEST_CASE_ID=bats-core-tap RESULT=fail
case: bats-core-tap
case_id: 642
definition: 0_bats-core-tests
result: fail
```

BATS Output (after)

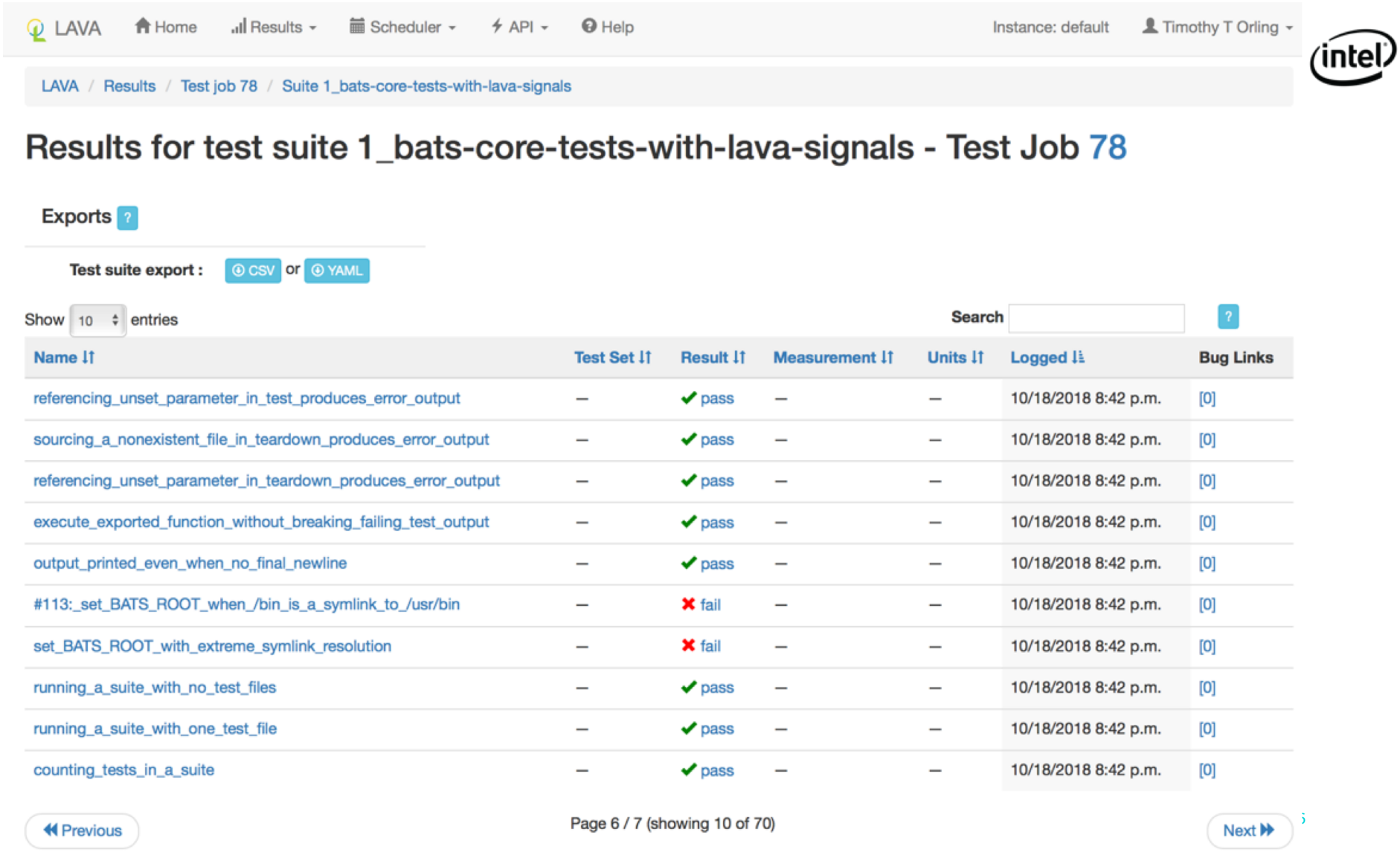
output
debug
results

```
[…]
<LAVA_SIGNAL_STARTTC output_printed_even_when_no_final_newline>
Received signal: <STARTTC> output_printed_even_when_no_final_newline
output printed even when no final newline
✓ output printed even when no final newline
<LAVA_SIGNAL_ENDTC output_printed_even_when_no_final_newline>
Received signal: <ENDTC> output_printed_even_when_no_final_newline
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=output_printed_even_when_no_final_newline RESULT=pass>
Received signal: <TESTCASE> TEST_CASE_ID=output_printed_even_when_no_final_newline RESULT=pass
case: output_printed_even_when_no_final_newline
case_id: 698
definition: 1_bats-core-tests-with-lava-signals
result: pass
<LAVA_SIGNAL_STARTTC #113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin>
Received signal: <STARTTC> #113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin
 #113: set BATS_ROOT when /bin is a symlink to /usr/bin
✗ #113: set BATS_ROOT when /bin is a symlink to /usr/bin
<LAVA_SIGNAL_ENDTC #113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin>
Received signal: <ENDTC> #113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=#113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin RESULT=fail>
Received signal: <TESTCASE> TEST_CASE_ID=#113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin RESULT=fail
case: #113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin
case_id: 699
definition: 1_bats-core-tests-with-lava-signals
result: fail
[…]
```

BATS Results (before)



BATS Results (after)



LAVA Home Results Scheduler API Help Instance: default Timothy T Orling

LAVA / Results / Test job 78 / Suite 1_bats-core-tests-with-lava-signals

Results for test suite 1_bats-core-tests-with-lava-signals - Test Job 78

Exports

Test suite export : CSV or YAML

Show 10 entries Search

Name	Test Set	Result	Measurement	Units	Logged	Bug Links
referencing_unset_parameter_in_test_produces_error_output	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
sourcing_a_nonexistent_file_in_teardown_produces_error_output	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
referencing_unset_parameter_in_teardown_produces_error_output	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
execute_exported_function_without_breaking_failing_test_output	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
output_printed_even_when_no_final_newline	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
#113:_set_BATS_ROOT_when_/bin_is_a_symlink_to_/usr/bin	–	fail	–	–	10/18/2018 8:42 p.m.	[0]
set_BATS_ROOT_with_extreme_symlink_resolution	–	fail	–	–	10/18/2018 8:42 p.m.	[0]
running_a_suite_with_no_test_files	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
running_a_suite_with_one_test_file	–	pass	–	–	10/18/2018 8:42 p.m.	[0]
counting_tests_in_a_suite	–	pass	–	–	10/18/2018 8:42 p.m.	[0]

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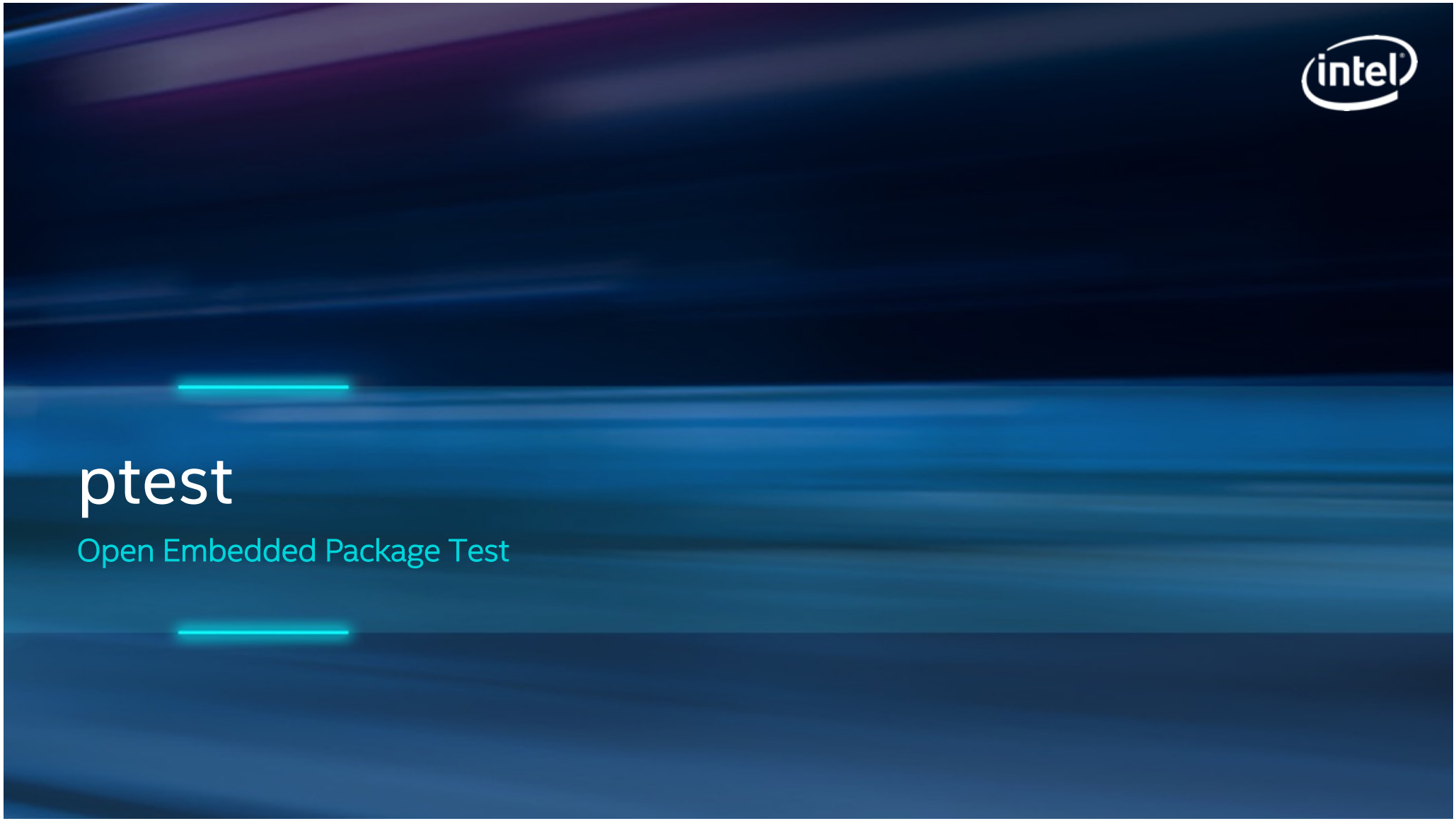

intel
ptest
Open Embedded Package Test

ptest-runner2/flags.h

```
diff --git a/flags.h b/flags.h
new file mode 100644
index 0000000..8595138
--- /dev/null
+++ b/flags.h
@@ -0,0 +1,11 @@
+/* Copyright (c) 2018 Intel Corporation */
+/* SPDX-License-Identifier: GPL-2.0 */
+
+/* Flag bit definitions */
+
+#ifndef __FLAGS_H__
+#define __FLAGS_H__
+
+#define LAVA_SIGNAL_ENABLE     (0x0001)
+
+#endif                         /* __FLAGS_H__ */
```

ptest-runner2/main.c

```
diff --git a/main.c b/main.c
index 83600b7..3a2158f 100644
--- a/main.c
+++ b/main.c
@@ -36,6 +36,7 @@
 #endif

 #include "utils.h"
+#include "flags.h"

 #define DEFAULT_DIRECTORY "/usr/lib"
 #define DEFAULT_TIMEOUT 300
@@ -44,7 +45,7 @@ static inline void
 print_usage(FILE *stream, char *progname)
 {
        fprintf(stream, "Usage: %s [-d directory] [-e exclude] [-l list] [-t timeout]"
-                       " [-x xml-filename] [-h] [ptest1 ptest2 ...]\n", progname);
+                       " [-x xml-filename] [-L] [-h] [ptest1 ptest2 ...]\n", progname);
 }

 int
```

ptest-runner2/main.c (cont'd)

```
@@ -70,8 +71,9 @@ main(int argc, char *argv[])
        opts.timeout = DEFAULT_TIMEOUT;
        opts.ptests = NULL;
        opts.xml_filename = NULL;
+       opts.flags = 0;

-       while ((opt = getopt(argc, argv, "d:e:lt:x:h")) != -1) {
+       while ((opt = getopt(argc, argv, "d:e:lt:x:Lh")) != -1) {
                switch (opt) {
                        case 'd':
                                free(opts.directory);
@@ -118,6 +120,11 @@ main(int argc, char *argv[])
                                opts.xml_filename = strdup(optarg);
                                CHECK_ALLOCATION(opts.xml_filename, 1, 1);
                        break;
+                       case 'L':
+                               // set LAVA signal mode
+                               opts.flags |= LAVA_SIGNAL_ENABLE;
+                               fprintf(stdout, "LAVA_SIGNAL_ENABLE == %d\n", opts.flags);
+                       break;
                        default:
                                print_usage(stdout, argv[0]);
                                exit(1);
```

ptest-runner2/utils.c

```
diff --git a/utils.c b/utils.c
index ed2eff7..0fd1da6 100644
--- a/utils.c
+++ b/utils.c
@@ -39,6 +39,7 @@

 #include "ptest_list.h"
 #include "utils.h"
+#include "flags.h"

 #define GET_STIME_BUF_SIZE 1024
 #define WAIT_CHILD_POLL_TIMEOUT_MS 200
@@ -358,6 +359,7 @@ run_ptests(struct ptest_list *head, const struct ptest_options opts,
                fprintf(fp, "START: %s\n", progname);
                PTEST_LIST_ITERATE_START(head, p);
                        char *ptest_dir = strdup(p->run_ptest);
+                       char *ptest = strdup(p->ptest);
                        if (ptest_dir == NULL) {
                                rc = -1;
                                break;
```

ptest-runner2/utils.c (cont'd)

```
@@ -376,6 +378,11 @@ run_ptests(struct ptest_list *head, const struct ptest_options opts,
                                int fds[2]; fds[0] = pipefd_stdout[0]; fds[1] = pipefd_stderr[0];
                                FILE *fps[2]; fps[0] = fp; fps[1] = fp_stderr;

+                               char result[5]; // pass\0, fail\0, skip\0
+
+                               if (opts.flags & LAVA_SIGNAL_ENABLE) {
+                                       fprintf(stdout, "<LAVA_SIGNAL_STARTTC %s>\n", ptest);
+                               }
                                fprintf(fp, "%s\n", get_stime(stime, GET_STIME_BUF_SIZE));
                                fprintf(fp, "BEGIN: %s\n", ptest_dir);
```

ptest-runner2/utils.c (cont'd)

```
@@ -389,6 +396,14 @@ run_ptests(struct ptest_list *head, const struct ptest_options opts,

                                fprintf(fp, "END: %s\n", ptest_dir);
                                fprintf(fp, "%s\n", get_stime(stime, GET_STIME_BUF_SIZE));
+                               if (opts.flags & LAVA_SIGNAL_ENABLE) {
+                                       if (status)
+                                               sprintf(result, "fail");
+                                       else
+                                               sprintf(result, "pass");
+                                       fprintf(stdout, "<LAVA_SIGNAL_ENDTC %s>\n", ptest);
+                                       fprintf(stdout, "<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=%s \
+                                               RESULT=%s>\n", ptest, result);
+                               }
                        }
                PTEST_LIST_ITERATE_END;
                fprintf(fp, "STOP: %s\n", progname);
```

ptest-runner2/utils.h

```
diff --git a/utils.h b/utils.h
index ee85163..06d4c10 100644
--- a/utils.h
+++ b/utils.h
@@ -37,9 +37,9 @@ struct ptest_options {
         int timeout;
         char **ptests;
         char *xml_filename;
+        unsigned int flags;
 };

-
 extern void check_allocation1(void *, size_t, char *, int, int);
 extern struct ptest_list *get_available_ptests(const char *);
 extern int print_ptests(struct ptest_list *, FILE *);
```

A Simple LAVA Test Definition with ptest


```
metadata:
    format: Lava-Test Test Definition 1.0
    name: ptest-tests
    description: "Run enabled Package Test (ptest) \
                  tests"
    os:
        - oe
    scope:
        - functional
    devices:
        - qemu

run:
    steps:
        - lava-test-case ptest-tests --shell ptest-runner \
          libcapture-tiny-perl libcgi-perl \
          libcrypt-openssl-rsa-perl libdbd-sqlite-perl \
          libdbi-perl libdigest-hmac-perl
```

```
metadata:
    format: Lava-Test Test Definition 1.0
    name: ptest-tests-with-lava-signals
    description: "Run enabled Package Test (ptest) \
                  tests with lava signals enabled.."
    os:
        - oe
    scope:
        - functional
    devices:
        - qemu

run:
    steps:
        - ptest-runner -L libcapture-tiny-perl \
          libcgi-perl libcrypt-openssl-rsa-perl \
          libdbd-sqlite-perl libdbi-perl \
          libdigest-hmac-perl
```

ptest Output (before)

output
debug
results

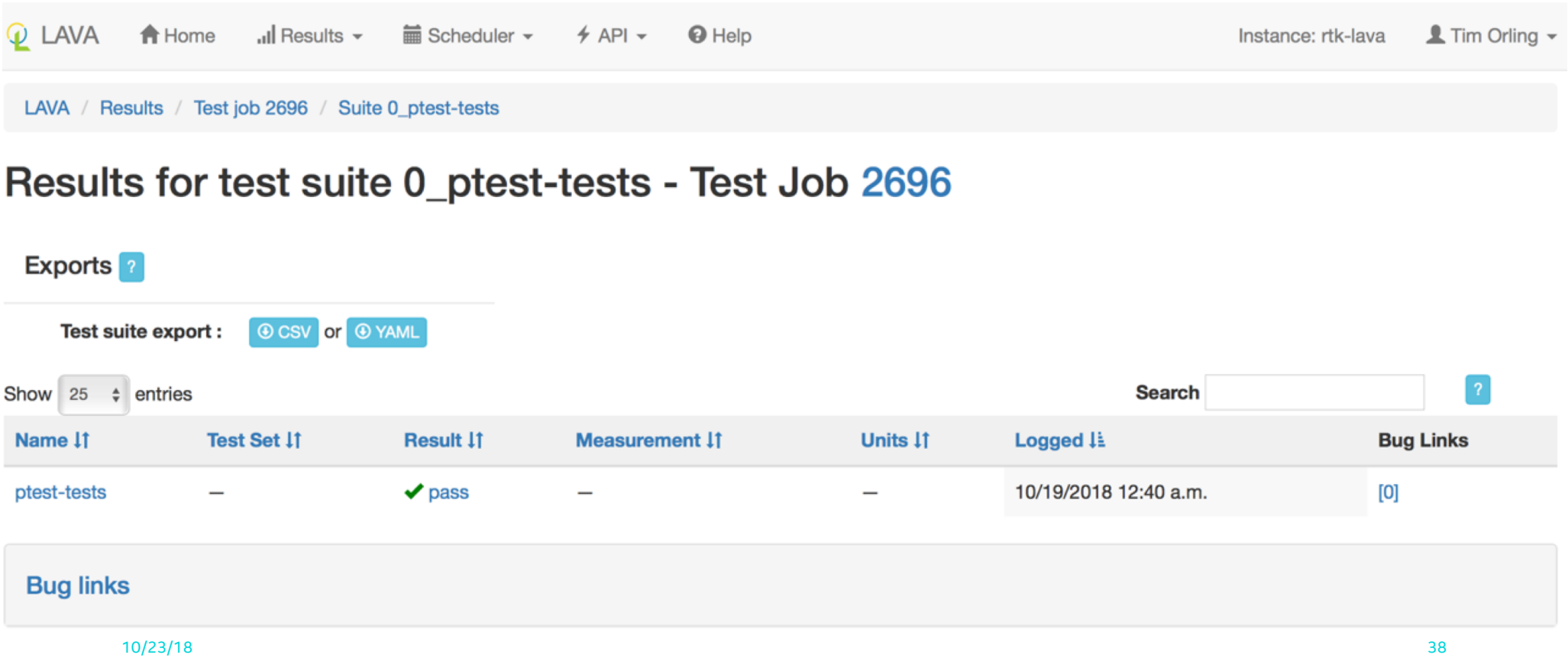
```
<LAVA_SIGNAL_STARTTC ptest-tests>
Received signal: <STARTTC> ptest-tests
START: ptest-runner
2018-10-18T23:16
BEGIN: /usr/lib/libcapture-tiny-perl/ptest
ok 1 - STDERR is tied
ok 2 - capture|perl|stderr|multiline - got STDOUT
ok 3 - capture|perl|stderr|multiline - got STDERR
ok 4 - capture|perl|stderr|short - got STDOUT
[…]
ok 13
PASS: t/rfc2202
END: /usr/lib/libdigest-hmac-perl/ptest
2018-10-18T23:19
STOP: ptest-runner
<LAVA_SIGNAL_ENDTC ptest-tests>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=ptest-tests RESULT=pass>
Received signal: <ENDTC> ptest-tests
Received signal: <TESTCASE> TEST_CASE_ID=ptest-tests RESULT=pass
case: ptest-tests
case_id: 47268
definition: 0_ptest-tests
result: pass
```

ptest Output (after)

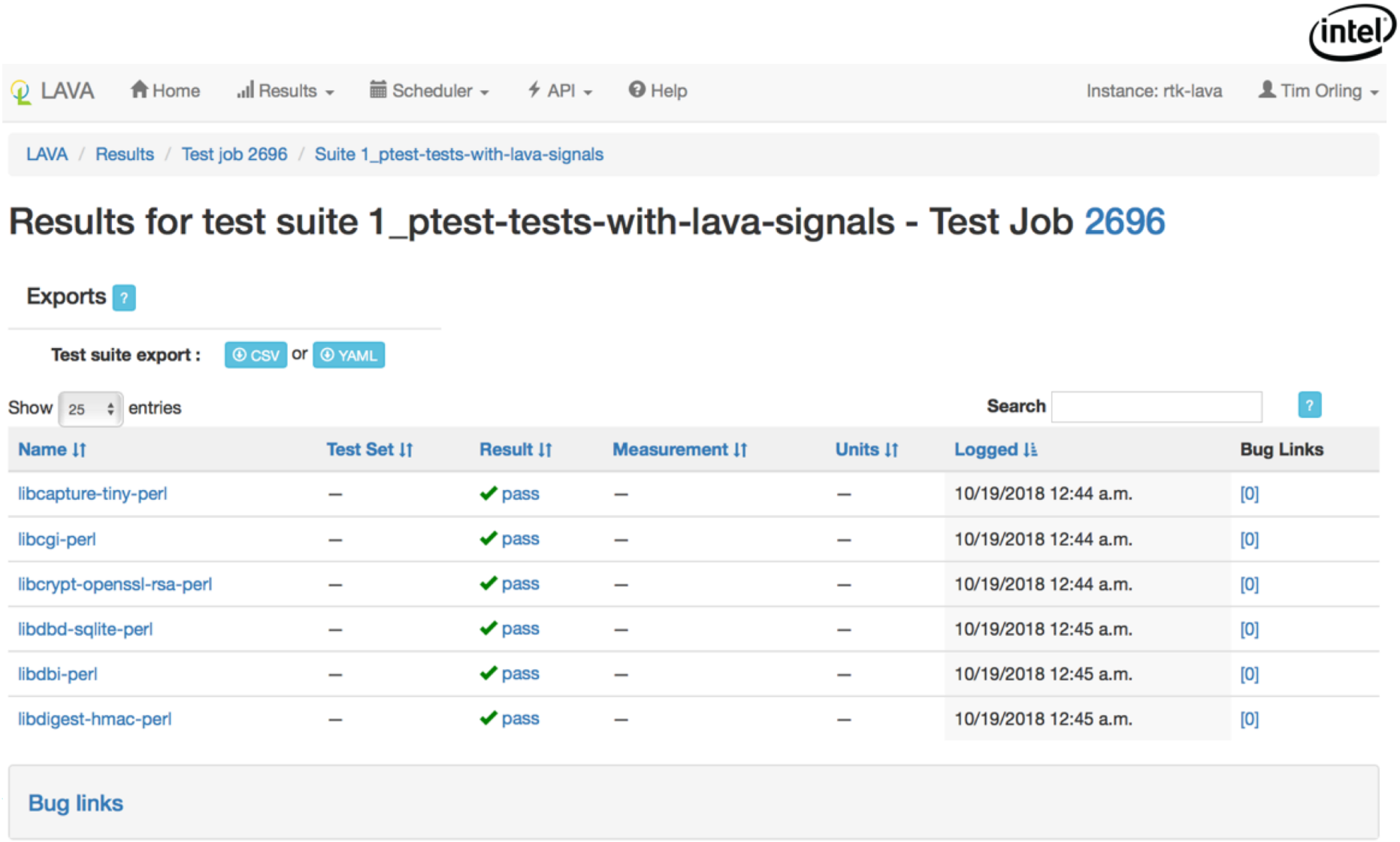
output
debug
results

```
[…]
<LAVA_SIGNAL_STARTTC output_printed_even_when_no_final_newline>
Received signal: <STARTTC> libcapture-tiny-perl
LAVA_SIGNAL_STARTTC libcapture-tiny-perl>
2018-10-18T23:19
BEGIN: /usr/lib/libcapture-tiny-perl/ptest
ok 1 - STDERR is tied
ok 2 - capture|sys|empty|short - got STDOUT
[…]
ok 19 - no file descriptors leaked
PASS: t/18-custom-capture
END: /usr/lib/libcapture-tiny-perl/ptest
2018-10-18T23:20
<LAVA_SIGNAL_ENDTC libcapture-tiny-perl>
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=libcapture-tiny-perl RESULT=pass>
Received signal: <ENDTC> libcapture-tiny-perl
<LAVA_SIGNAL_TESTCASE TEST_CASE_ID=libcapture-tiny-perl RESULT=pass>
Received signal: <TESTCASE> TEST_CASE_ID=libcapture-tiny-perl RESULT=pass
case: libcapture-tiny-perl
case_id: 47270
definition: 1_ptest-tests-with-lava-signals
result: pass
[…]
case: libcapture-tiny-perl
case_id: 47270
definition: 1_ptest-tests-with-lava-signals
result: pass
[…]
```

ptest Results (before)

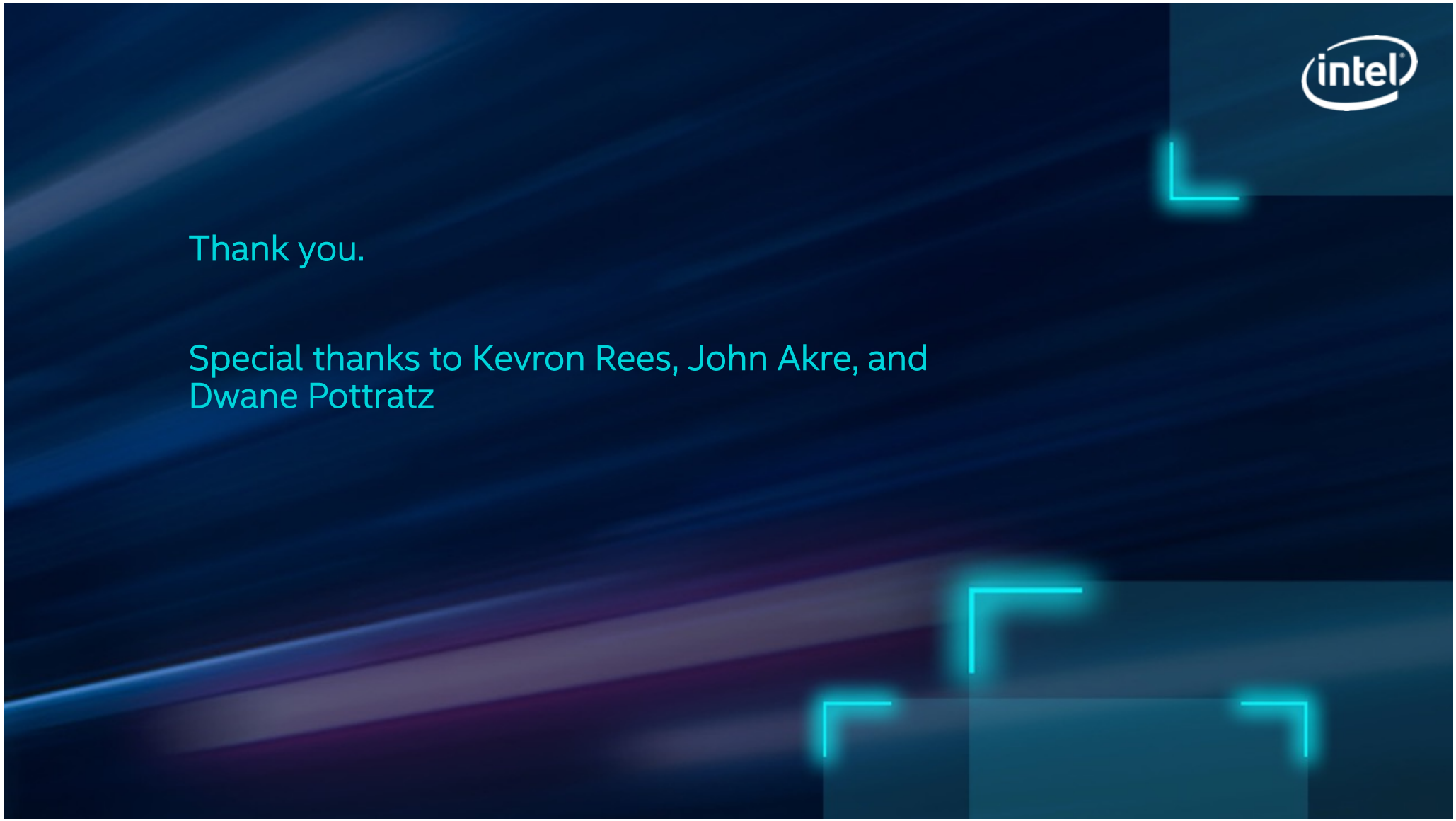


ptest Results (after)



Summary and Future Work

- Simple concept dramatically improves the LAVA dashboard experience and simplifies test definitions
- Much easier to find the cause of test failures
- **pytest**
  - Works well, although output gets a bit cluttered
  - A proper pytest plugin is desirable and in the works
  - The measurement_decorator in the Appendix is not implemented yet in the plugin environment
- **BATS**
  - Works surprisingly well
  - Would be nice to have TAP output (currently –l and –t options are exclusive)
  - Measurements and units functionality is not yet tested
  - Not a commonly used testing framework?
- **ptest**
  - Really each “test case” for ptest-runner is a “test suite”
  - Break out individual actual test case results?
  - Some failures might be hidden if the underlying run-ptest script does not properly expose them (e.g. set –x)
- Enable LAVA signals in even more test runners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Thank you.
Special thanks to Kevron Rees, John Akre, and Dwane Pottratz

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Appendix: pytest

With Measurements and Units

conftest.py (with Measurements)

- At the root of the directory where you call ‘pytest’

```
# conftest.py
#
# Copyright (C) 2018 Intel Corporation
# SPDX-License-Identifier: MIT

import measurement_decorator

def lava_result_convert(pytest_outcome):
    """ Convert the pytest outcome to the string expected by LAVA.
    """
    if pytest_outcome is 'passed':
        return 'pass'
    elif pytest_outcome is 'skipped':
        return 'pass'
    elif pytest_outcome is 'xfailed':
        return 'pass'
    else:
        return 'fail'
```

conftest.py (cont'd)

- Allows you to override pytest defaults

```
def pytest_report_teststatus(report):
    """ Insert strings that LAVA expects to capture test results.
    """
    # Get pytest test name and remove the 'test_' prefix
    test_name = report.location[2][5:]

    if report.when is 'setup':
        print('\n')
        print('<LAVA_SIGNAL_STARTTC ' + test_name + '>')
    elif report.when is 'call':
        test_result = lava_result_convert(report.outcome)

        print('\n')
        print('<LAVA_SIGNAL_ENDTC ' + test_name + '>')

        measurement_text = ""
```

conftest.py (cont'd)

```
for measured_test in measurement_decorator.Measurement.tests.keys():
        if measured_test.__name__ == report.location[2]:
            val = measurement_decorator.Measurement.tests[measured_test]
            meas = val.measurement
            units = val.units
            measurement_text = "MEASUREMENT={} UNITS={}".format(meas, units)

    print('\n')
    print('<LAVA_SIGNAL_ENDTC ' + test_name + '>')
    print('<LAVA_SIGNAL_TESTCASE TEST_CASE_ID={} RESULT={} {}>'.format(
           test_name, test_result, measurement_text))
```

measurement_decorator.py

- At the root of the directory where you call ‘pytest’

```
# measurement_decorator.py
#
# Copyright (C) 2018 Intel Corporation
# SPDX-License-Identifier: MIT


class Measurement(object):

    tests = {}

    def __init__(self, f):
        self.f = f
        self.measurement = None
        self.units = None

        Measurement.tests[f] = self
```

measurement_decorator.py (cont'd)

```
def export_measurement(the_test):

    measurement = Measurement(the_test)

    def wrapper:
        measurement.measurement, measurement.units = the_test()

    return wrapper
```

test_measurement.py

```
# test_measurement.py
#
# Copyright (C) 2018 Intel Corporation
# SPDX-License-Identifier: MIT

""" Example usage of measurement_decorator"""
@measurement_decorator.export_measurement
def test_boiling():

    boiling_point_of_water = 100

    return boiling_point_of_water, "°C"
```

pytest with Measurements Thoughts

- The test cases themselves have to be modified (adding the measurement_decorator and returning <measurement>,<units>).
- This somewhat breaks the original intent (keep the tests unmodified for LAVA).


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