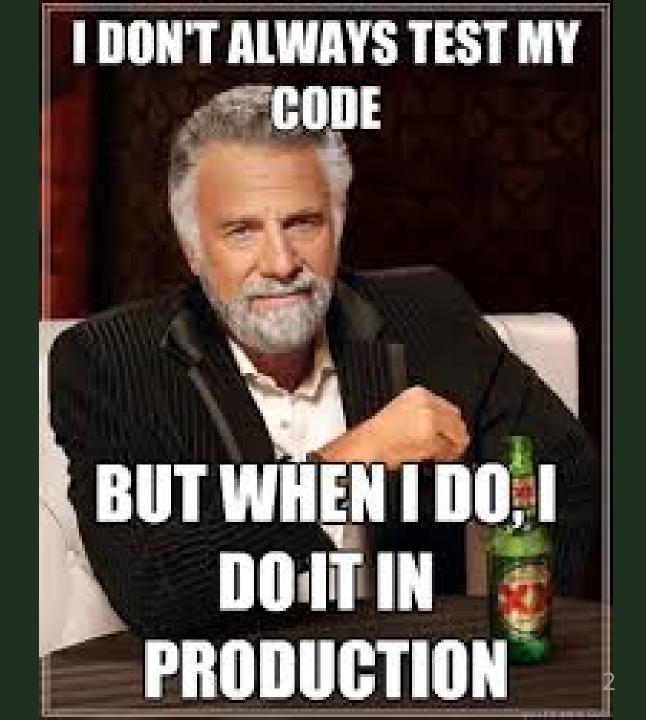


OSADO Unit testing

[an introduction]

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- What? 🤔
- Why? 📣
- Who ? 🔓 (you!)
- How? ••



What's unit testing?

- Unit testing, a.k.a. component or module testing, is a form of software testing by which isolated portions of source code is tested to validate expected behavior.
- We do a lot of testing in our daily job, but we (almost) never test our code.
- A typical unit testing example is to ensure a given function returns the expected value or errors given some predefined inputs.

Why Unit Tests?

- they can catch early-stage bugs
- They function as regression validator
- Run much faster and require less resource than Integration Tests
- Easy to run automatically
- The act as "live documentation"
- Great way to "explore" and refactor a unknown codebase

An example

```
sub get_java_versions {
    # on newer version we need legacy module for openidk 11, but is not available
    # on SLERT/SLED, can't test openjdk 11. On 15-SP7 17 is also in legacy module
    return '21' if (is_rt || is_sled) && is_sle('>=15-SP7');
    return '11 17 21' if (is_sle '>=15-SP6');
    return '17 21' if ((is_rt || is_sled) && is_sle('>=15-SP6'));
    return '11 17';
sub run {
   my $self = @_;
   my @java_versions = split(' ', get_java_versions);
```

from openjdk_fips.pm

1. move the function to a separate library lib/security/openjdk_utils.pm

```
package security::openjdk_utils;
use strict;
use warnings;
use version_utils qw(is_sle is_sled is_rt);
use base 'Exporter';
our @EXPORT = qw(get_java_versions);
sub get_java_versions {
    # on newer version we need legacy module for openidk 11, but is not available
    # on SLERT/SLED, can't test openigdk 11. On 15-SP7 17 is also in legacy module
    return '21' if (is_rt || is_sled) && is_sle('>=15-SP7');
    return '11 17 21' if (is_sle '>=15-SP6');
    return '17 21' if ((is_rt || is_sled) && is_sle('>=15-SP6'));
    return '11 17';
1;
```

2. import the library in the test module and everything keeps running as before

```
# openjdk_fips.pm
use security::openjdk_utils qw(get_java_versions);
sub run {
   my $self = @_;
   my @java_versions = split(' ', get_java_versions);
   ...
```

3. create first unit test t/36_openjdk.t

```
use strict;
use warnings;
use Test::More;
use Test::Warnings;
use Test::MockModule;
use List::Util qw(any none);
use testapi;
use security::openjdk_utils 'get_java_versions';
subtest '[dummy]' => sub {
    my \quad \$dummy = 3 + 3;
    ok(\$dummy == 6, 'check that 3+3 == 6 (setup works)');
};
```

4. run it from osado:

```
$ 'make prepare'
$ sudo zypper in perl-App-cpanminus
$ export PERL5LIB=~/perl5:~/Work/os-autoinst:~/Work/os-autoinst-distri-opensuse/lib
$ export PERL5OPT=-MCarp::Always

# run a sample existing test, to check it all works:
$ time prove --time --verbose -l t/33_qam.t

# run our dummy test
$ time prove --time --verbose -l t/36_openjdk.t
```

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5. improve the unit tests

```
subtest '[default behavior]' => sub {
  my $java_versions = get_java_versions();
  ok($java_versions eq '11 17',
    'check that 11 and 17 are returned by default');
};
```

Dependencies issue!

The get_java_versions function will indirectly call is_rt(), is_sled() and so on, and these functions will return significant values only when the code is run inside openQA, depending on the exact product version under testing.

How do I create a fake is_sle('16') and so on?

Mocking (basic)

```
subtest '[test for any SLE, no RT, no SLED]' => sub {
    my $mocked_module = Test::MockModule->new('security::openjdk_utils');
    $mocked_module->redefine(
        'is_sle' => sub { return 1; },
        'is_rt' => sub { return 0; },
        'is_sled' => sub { return 0; });
    my $java_versions = get_java_versions();
    note "Java versions: $java_versions\n";
    ok($java_versions eq '11 17 21',
        'check that 11 17 21 are returned by default SLE');
};
```

reference: https://metacpan.org/pod/Test::MockModule

Mocking (with forced args)

```
subtest '[test for any SLE, no RT, no SLED]' => sub {
    my $mocked_module = Test::MockModule->new('security::openjdk_utils');
    $mocked_module->redefine(
        'is_sle' => sub { return ($_[0] eq '16+') ? 1 : 0 }, # <-
        'is_rt' => sub { return 0; },
        'is_sled' => sub { return 0; });
    my $java_versions = get_java_versions();
    note "Java versions: $java_versions\n";
    ok($java_versions eq '11 17 21',
        'check that 11 17 21 are returned by default SLE');
};
```

Mocking (and testing args)

example with the classic openQA test module that just does a bunch of

```
assert_script_run
```

```
package security::openssl;
use strict;
use warnings;
use base 'Exporter';
our @EXPORT = qw(do_ssl_testing);
sub do_ssl_testing {
    assert_script_run 'systemctl ...'
    assert_script_run 'openssl ...'
```

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Mocking (and testing args)

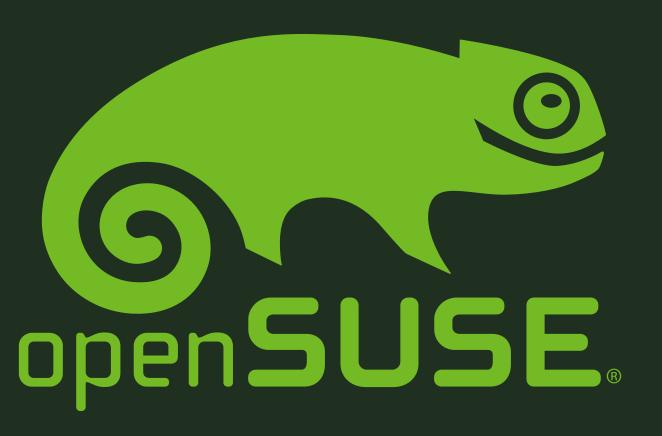
we can mock <code>assert_script_run</code> and check the command called are the one expected, and return the value we want

```
subtest '[test for any SLE, no RT, no SLED]' => sub {
 my $func = Test::MockModule->new('security::openssl', no_auto => 1);
 my @calls;
 $func->redefine(assert_script_run =>
    sub { push @calls, ['', $_[0]]; return; });
 $func->redefine(script_output =>
    sub { return 'the very long string command output'; });)
 ok(($#calls > 0), "There are some command called");
 ok((any { /systemctl / } @cmds),
    'executed commands contains systemctl');
```

Further references

- OSADO unit tests
- Tutorial on UT in Perl
- EXP Chapter 13: Unit Testing





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Thanks for watching!

Questions?