

Testing ../modules/override_node_options

....

Time: 2.54 minutes, Memory: 6.00MB

OK (4 tests, 65 assertions)

docker@cli:/var/www/core\$

TDD: TEST

DRIVEN DRUPAL

OPDAVI.ES/TDD-TEST-DRIVEN-DRUPAL

- ▶ **Module and theme developers**
- ▶ **Want to know more about automated testing**
- ▶ **Looking to start writing your first tests**
- ▶ **Drupal 8**
- ▶ **PHPUnit**

- ▶ **Why write tests, and what to test**
- ▶ **Types of tests**
- ▶ **How to run tests**
- ▶ **Real life example**
- ▶ **Building a new module with TDD**

- ▶ **Full Stack Web Developer & System Administrator**
- ▶ **Senior Developer at Microserve**
- ▶ **Part-time freelancer**
- ▶ **Acquia certified Drupal 8 Grand Master**
- ▶ **Drupal 7 & 8 core contributor**
- ▶ **Drupal, Symfony, Laravel, Sculpin**
- ▶ **@opdavies**
- ▶ **www.oliverdavies.uk**



- ▶ opdavi.es/talks
- ▶ opdavi.es/twitter
- ▶ opdavi.es/drupal
- ▶ opdavi.es/github

- ▶ <https://microserve.io>
- ▶ <https://www.drupal.org/microserve>
- ▶ <https://github.com/microserve-io>
- ▶ <https://twitter.com/microserveltd>
- ▶ <https://www.linkedin.com/company/microserve-ltd>



TESTDRIVENDRUPAL.COM

Quick Find + 14618 🔔 ⚙️

- Sessions can have more than one speaker
- A session must be assigned a type (e.g. keynote, full, lightning)
- A user can view a list of their own submitted sessions
- Only the submitted user can view a submitted session node
- Users cannot see other user's submitted session list
- Anonymous users cannot see users' submitted sessions
- Sessions cannot be submitted once the cut-off date has passed
- Session closed date must be in the future
- Users cannot create sessions where they are not a speaker
- Only session reviewers can edit the state of a session - e.g. change it from submitted to accepted, accepted to cancelled etc
- A speaker can cancel their confirmed session if they are no longer able to attend
- The current user is pre-populated on the session form as a speaker
- Anonymous users cannot be selected as a speaker

▼ Moderating sessions

- An approval email is sent to the session owner if a session is accepted.
- A rejection email is sent to the session owner if a session is rejected.

**WRITE CUSTOM MODULES
AND THEMES FOR CLIENTS**

**OCCASSIONALLY
CONTRIBUTE TO CORE**

**MAINTAIN AND CONTRIBUTE
TO CONTRIB PROJECTS**



Tim Millwood 

@timmillwood

Following



Anyone wanna become maintainer or co-maintain Override Node Options [#Drupal](#) module?

6:29 PM - 23 Feb 2012

OVERRIDE NODE OPTIONS

- ▶ Become maintainer in 2012
- ▶ Had some existing tests
- ▶ Used on **11,046 sites** in October 2012 (**84 D5, 7,094 D6, 3,868 D7**)
- ▶ Used on **30,572 sites** in March 2019 (**10 D5, 1,180 D6, 24,057 D7, 5,335 D8**)
- ▶ **#230** most used module on Drupal.org
- ▶ Crucial to preventing regressions

WHY WRITE TESTS?

WHY WRITE TESTS?

- ▶ Catch bugs earlier
- ▶ Peace of mind
- ▶ Prevent regressions
- ▶ Write less code
- ▶ Documentation
- ▶ Drupal core requirement - <https://www.drupal.org/core/gates#testing>
- ▶ More important with regular D8 releases

CORE TESTING GATE

- ▶ **New features should be accompanied by automated tests.**
- ▶ **If the feature does not have an implementation, provide a test implementation.**
- ▶ **Bug fixes should be accompanied by changes to a test (either modifying an existing test case or adding a new one) that demonstrate the bug.**



Anna "Legacy Strategist" Filina

@afilina

Following



- "We can code features faster without tests."
- "Yeah but did you take into account the time you spend debugging after you're done coding? How much time do you waste trying to reproduce production bugs? How many bugs you don't even know about that are impacting the company?"

10:20 PM - 26 Feb 2019

TESTING IN DRUPAL

- ▶ **Drupal 7** - SimpleTest (testing) module provided as part of core
- ▶ **Drupal 8** - PHPUnit added as a core dependency
- ▶ **PHPUnit Initiative** - SimpleTest to be deprecated and removed in Drupal 9

Simpletest Countdown

Remaining Simpletests

```
Drupal\block\Tests\NewDefaultThemeBlocksTest
Drupal\system\Tests\Block\SystemMenuBlockTest
Drupal\block_content\Tests\BlockContentCacheTagsTest
Drupal\block_content\Tests\BlockContentPageViewTest
Drupal\block_content\Tests\BlockContentRevisionsTest
Drupal\block_content\Tests\BlockContentSaveTest
Drupal\block_content\Tests\PageEditTest
Drupal\book\Tests\BookBreadcrumbsTest
Drupal\book\Tests\BookTest
Drupal\block_content\Tests\BlockContentCacheTagsTest
```

Total: 1

- Drupal\file\Tests\FileFieldWidgetTest

WRITING TESTS (DRUPAL 8)

- ▶ PHP class with `.php` extension
- ▶ `tests/src` directory within each module
- ▶ Within the `Drupal\Tests\module_name` namespace
- ▶ Class name must match the filename
- ▶ Namespace must match the directory structure
- ▶ One test class per feature

1. ARRANGE

2. ACT

3. ASSERT

3. ASSERT
2. ACT
1. ARRANGE

```
// modules/example/tests/src/Functional/ExampleTest.php
```

```
namespace Drupal\Tests\example\Functional;
```

```
use Drupal\Tests\BrowserTestBase;
```

```
class ExampleTest extends BrowserTestBase {
```

```
    public function testSomething() {
```

```
        // Arrange
```

```
        // Act
```

```
        // Assert
```

```
    }
```

```
}
```



```
public function testSomething() {}
```

```
public function test_something() {}
```

```
/** @test */
```

```
public function it_does_something() {}
```

WHAT TO TEST?

- ▶ **Creating nodes with data from an API**
- ▶ **Calculating attendance figures for an event**
- ▶ **Determining if an event is purchasable**
- ▶ **Promotions and coupons for new users**
- ▶ **Cloning events**
- ▶ **Queuing private message requests**
- ▶ **Emails for new memberships**
- ▶ **Closed support tickets are re-opened when comments are added**
- ▶ **Custom form validation rules**

WHAT TO TEST FIRST?

- ▶ **What is the core piece of functionality?**
- ▶ **What provides the most value to the client?**
- ▶ **What would you not like to be fixing on a Friday afternoon or after hours?**



Povilas@LaravelDaily

@DailyLaravel

Following



No.1 automatic test you should write is for the function that would make you lose your job, if it breaks. [#quoteOfTheDay](#) by [@stauffermatt](#) at [@LaravelLiveUK](#)

10:33 AM - 12 Jun 2018

WHAT TO TEST FIRST?

- ▶ Write a **new test** when adding any **new functionality**
- ▶ Write a **regression test** when **fixing a bug**

TYPES OF TESTS

- ▶ **Unit**
- ▶ **Kernel (integration)**
- ▶ **Functional / FunctionalJavascript (web, browser, feature)**

UNIT TESTS

- ▶ **Tests PHP logic**
- ▶ **No database interaction**
- ▶ **Fast to run**
- ▶ **Need to mock dependencies**
- ▶ **Can become tightly coupled**
- ▶ **Can be hard to refactor**

```
// tests/src/Unit/JobTest.php

namespace Drupal\Tests\advancedqueue\Unit;

use Drupal\advancedqueue\Job;
use Drupal\Tests\UnitTestCase;

class JobTest extends UnitTestCase {

    public function testCreate() {
        $job = Job::create('test', ['my' => 'data']);

        $this->assertEquals('test', $job->getType());
        $this->assertEquals(['my' => 'data'], $job->getPayload());
        $this->assertEquals(Job::STATE_QUEUED, $job->getState());
    }
}
```



```
// tests/src/Unit/JobTest.php

namespace Drupal\Tests\advancedqueue\Unit;

use Drupal\advancedqueue\Job;
use Drupal\Tests\UnitTestCase;

class JobTest extends UnitTestCase {

    public function testCreate() {
        $job = Job::create('test', ['my' => 'data']);

        $this->assertEquals('test', $job->getType());
        $this->assertEquals(['my' => 'data'], $job->getPayload());
        $this->assertEquals(Job::STATE_QUEUED, $job->getState());
    }

}
```

```
// tests/src/Unit/JobTest.php

namespace Drupal\Tests\advancedqueue\Unit;

use Drupal\advancedqueue\Job;
use Drupal\Tests\UnitTestCase;

class JobTest extends UnitTestCase {

    public function testCreate() {
        $job = Job::create('test', ['my' => 'data']);

        $this->assertEquals('test', $job->getType());
        $this->assertEquals(['my' => 'data'], $job->getPayload());
        $this->assertEquals(Job::STATE_QUEUED, $job->getState());
    }
}
```

KERNEL TESTS

- ▶ **Integration tests**
- ▶ **Can install modules, interact with services, container, database**
- ▶ **Minimal Drupal bootstrap**
- ▶ **Faster than functional tests**
- ▶ **More setup required**

```
// tests/src/Kernel/ProcessorTest.php

namespace Drupal\Tests\advancedqueue\Kernel;

use Drupal\advancedqueue\Entity\Queue;
use Drupal\advancedqueue\Job;
use Drupal\KernelTests\KernelTestBase;

class ProcessorTest extends KernelTestBase {

    ...

}
```

```
// tests/src/Kernel/ProcessorTest.php

protected function setUp() {
    parent::setUp();

    $this->installSchema('advancedqueue', ['advancedqueue']);

    $this->queue = Queue::create([
        'id' => 'test',
        'label' => 'Test queue',
        'backend' => 'database',
        'backend_configuration' => [
            'lease_time' => 5,
        ],
    ]);
    $this->queue->save();

    $this->processor = $this->container->get('advancedqueue.processor');
}
```

```
// tests/src/Kernel/ProcessorTest.php

protected function setUp() {
    parent::setUp();

    $this->installSchema('advancedqueue', ['advancedqueue']);

    $this->queue = Queue::create([
        'id' => 'test',
        'label' => 'Test queue',
        'backend' => 'database',
        'backend_configuration' => [
            'lease_time' => 5,
        ],
    ]);
    $this->queue->save();

    $this->processor = $this->container->get('advancedqueue.processor');
}
```

```
// tests/src/Kernel/ProcessorTest.php

protected function setUp() {
    parent::setUp();

    $this->installSchema('advancedqueue', ['advancedqueue']);

    $this->queue = Queue::create([
        'id' => 'test',
        'label' => 'Test queue',
        'backend' => 'database',
        'backend_configuration' => [
            'lease_time' => 5,
        ],
    ]);
    $this->queue->save();

    $this->processor = $this->container->get('advancedqueue.processor');
}
```

```
// tests/src/Kernel/ProcessorTest.php

protected function setUp() {
    parent::setUp();

    $this->installSchema('advancedqueue', ['advancedqueue']);

    $this->queue = Queue::create([
        'id' => 'test',
        'label' => 'Test queue',
        'backend' => 'database',
        'backend_configuration' => [
            'lease_time' => 5,
        ],
    ]);
    $this->queue->save();

    $this->processor = $this->container->get('advancedqueue.processor');
}
```



```
// tests/src/Kernel/ProcessorTest.php

public function testProcessor() {
    $first_job = Job::create('simple', [
        'test' => '1',
    ]);

    $second_job = Job::create('flexible', [
        'expected_state' => Job::STATE_SUCCESS,
        'expected_message' => 'Done!',
    ]);

    $third_job = Job::create(
        'flexible', ['expected_exception' => 'DB down!'],
    );

    $fourth_job = Job::create('flexible', [
        'expected_state' => Job::STATE_FAILURE,
        'expected_message' => 'Failed!',
    ]);

    ...
}
```

```
// tests/src/Kernel/ProcessorTest.php
```

```
public function testProcessor() {
```

```
    ...
```

```
    $this->queue->enqueueJob($first_job);
```

```
    $this->queue->enqueueJob($second_job);
```

```
    $this->queue->enqueueJob($third_job);
```

```
    $this->queue->enqueueJob($fourth_job);
```

```
    $num_processed = $this->processor->processQueue($this->queue);
```

```
    $this->assertEquals(4, $num_processed);
```

```
}
```

```
// tests/src/Kernel/ProcessorTest.php
```

```
public function testProcessor() {
```

```
    ...
```

```
    $this->queue->enqueueJob($first_job);
```

```
    $this->queue->enqueueJob($second_job);
```

```
    $this->queue->enqueueJob($third_job);
```

```
    $this->queue->enqueueJob($fourth_job);
```

```
    $num_processed = $this->processor->processQueue($this->queue);
```

```
    $this->assertEquals(4, $num_processed);
```

```
}
```

FUNCTIONAL TESTS

- ▶ **Tests end-to-end functionality**
- ▶ **UI testing**
- ▶ **Interacts with database**
- ▶ **Full Drupal installation**
- ▶ **Slower to run**
- ▶ **With/without JavaScript**

```
// tests/src/Functional/QueueTest.php
```

```
namespace Drupal\Tests\advancedqueue\Functional;
```

```
use Drupal\advancedqueue\Entity\Queue;
```

```
use Drupal\advancedqueue\Entity\QueueInterface;
```

```
use Drupal\Tests\BrowserTestBase;
```

```
class QueueTest extends BrowserTestBase {
```

```
    ...
```

```
}
```

```
// tests/src/Functional/QueueTest.php
```

```
protected function setUp() {  
    parent::setUp();
```

```
    $this->placeBlock('local_tasks_block');
```

```
    $this->placeBlock('local_actions_block');
```

```
    $this->placeBlock('page_title_block');
```

```
    $this->adminUser = $this->drupalCreateUser(['administer advancedqueue']);
```

```
    $this->drupalLogin($this->adminUser);
```

```
}
```

```
// tests/src/Functional/QueueTest.php

protected function setUp() {
    parent::setUp();

    $this->placeBlock('local_tasks_block');
    $this->placeBlock('local_actions_block');
    $this->placeBlock('page_title_block');

    $this->adminUser = $this->drupalCreateUser(['administer advancedqueue']);
    $this->drupalLogin($this->adminUser);
}
```

```
// tests/src/Functional/QueueTest.php

public function testQueueDeletion() {
    $queue = Queue::create([
        'id' => 'test',
        'label' => 'Test',
        'backend' => 'database',
        'processor' => QueueInterface::PROCESSOR_DAEMON,
        'processing_time' => 100,
    ]);
    $queue->save();
    $this->drupalGet('admin/config/system/queues/manage/' . $queue->id() . '/delete');
    $this->submitForm([], 'Delete');
    $this->assertSession()->addressEquals('admin/config/system/queues');

    $queue_exists = (bool) Queue::load('test');
    $this->assertEmpty($queue_exists, 'The queue has been deleted from the database.');
```



```
// tests/src/Functional/QueueTest.php

public function testQueueDeletion() {
    $queue = Queue::create([
        'id' => 'test',
        'label' => 'Test',
        'backend' => 'database',
        'processor' => QueueInterface::PROCESSOR_DAEMON,
        'processing_time' => 100,
    ]);
    $queue->save();
    $this->drupalGet('admin/config/system/queues/manage/' . $queue->id() . '/delete');
    $this->submitForm([], 'Delete');
    $this->assertSession()->addressEquals('admin/config/system/queues');

    $queue_exists = (bool) Queue::load('test');
    $this->assertEmpty($queue_exists, 'The queue has been deleted from the database.');
```

```
// tests/src/Functional/QueueTest.php

public function testQueueDeletion() {
    $queue = Queue::create([
        'id' => 'test',
        'label' => 'Test',
        'backend' => 'database',
        'processor' => QueueInterface::PROCESSOR_DAEMON,
        'processing_time' => 100,
    ]);
    $queue->save();
    $this->drupalGet('admin/config/system/queues/manage/' . $queue->id() . '/delete');
    $this->submitForm([], 'Delete');
    $this->assertSession()->addressEquals('admin/config/system/queues');

    $queue_exists = (bool) Queue::load('test');
    $this->assertEmpty($queue_exists, 'The queue has been deleted from the database.');
```

HOW DO I KNOW

WHICH TYPE OF TEST TO USE?

NEED A BROWSER?

USE A FUNCTIONAL TEST

INTERACT WITH OTHER SERVICES?

USE A KERNEL TEST

ISOLATED PHP CODE?

USE A UNIT TEST

**SHOULD YOU TEST THAT
A BLOCK IS RENDERED
CORRECTLY?**

**OR SHOULD YOU TEST
YOUR RENDER ARRAY TO
GENERATE THE BLOCK?**

SETUP (FUNCTIONAL)

drupalCreateUser()

drupalCreateRole()

drupalLogin()

drupalLogout()

drupalGet()

drupalPost()

drupalPostForm()

SETUP (KERNEL)

```
# UserCreationTrait
```

```
createUser()
```

```
createAdminRole()
```

```
createRole()
```

```
checkPermissions()
```

```
# CommentTestTrait
```

```
addDefaultCommentField()
```

```
# AssertMailTrait
```

```
getMails()
```

```
assertMail()
```

ASSERTIONS

`assertTrue()`

`assertFalse()`

`assertEquals()`

`assertSame()`

`assertNull()`

`assertNotNull()`

`assertCount()`

`assertEmpty()`

`assertArraySubset()`

ASSERTIONS (FUNCTIONAL)

`assertSession()`

`pageTextContains()`

`pageTextNotContains()`

`linkByHrefExists()`

`linkByHrefNotExists()`

`statusCodeEquals()`

`statusCodeNotEquals()`

REAL LIFE

EXAMPLE



broadbean
technology

SPECIFICATION

- ▶ **Job adverts created in Broadbean UI, needs to create nodes in Drupal**
- ▶ **Application URL links users to separate application system**
- ▶ **Jobs need to be linked to offices**
- ▶ **Job length specified in number of days**
- ▶ **Path is specified as a field in the API**
- ▶ **Application URL constructed from domain, includes role ID as a GET parameter and optionally UTM parameters**

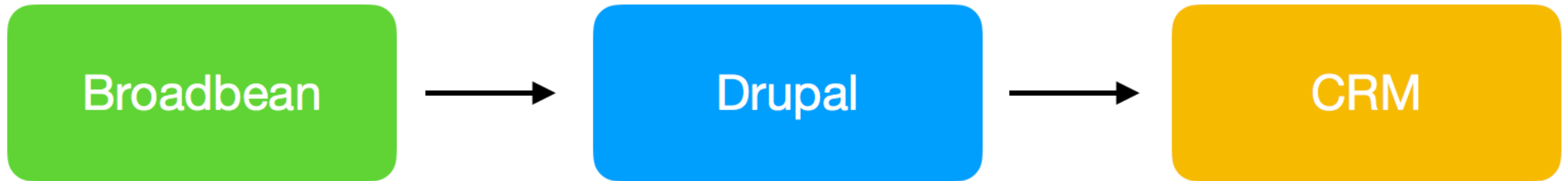
Broadbean

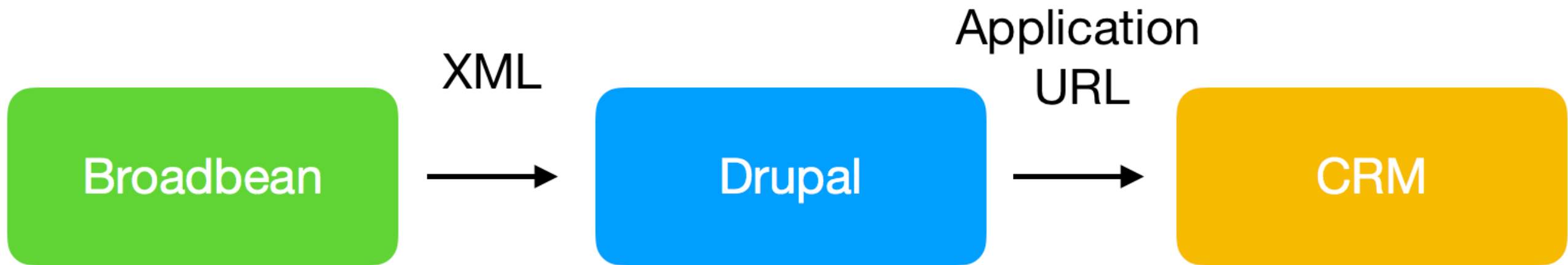


Drupal



CRM





```
$data = [  
  'command' => 'add',  
  'username' => 'bobsmith',  
  'password' => 'p455w0rd',  
  'active_for' => '365',  
  'application_email' => 'bob.12345.123@smith.aplitrak.com',  
  'branch_address' => '123 Fake St, Bristol, BS1 2AB',  
  'branch_name' => 'Test',  
  'contract' => 'Temporary',  
  'details' => 'This is the detailed description.',  
  'job_id' => 'abc123_1234567',  
  'job_title' => 'Healthcare Assistant (HCA)',  
  'job_type' => 'Care at Home',  
  'keywords' => 'flexible, Bristol, part-time',  
  'locations' => 'Bath, Devizes',  
  'role_id' => 'A/52/86',  
  'salary' => '32,000.00 per annum',  
  'salary_prefix' => 'Basic Salary',  
  'status' => 'Part time',  
  'summary' => 'This is the short description.',  
  'url_alias' => 'healthcare-assistant-aldershot-june17',  
];
```

IMPLEMENTATION

- ▶ Added route to accept data from API as XML
- ▶ Added system user with API role to authenticate
- ▶ **active_for** converted from number of days to UNIX timestamp
- ▶ **branch_name** and **locations** converted from plain text to entity reference (job node to office node)
- ▶ **url_alias** property mapped to **path**

IMPLEMENTATION

- ▶ **If no error, create the job node, return OK response to Broadbean**
- ▶ **If an Exception is thrown, return an error code and message**

TESTING GOALS

- ▶ Ensure job nodes are **successfully created**
- ▶ Ensure that fields are **mapped correctly**
- ▶ Ensure that **calculations are correct**
- ▶ Ensure that entity references are **linked correctly**

TYPES OF TESTS

- ▶ **Unit:** ensure number of days are converted to timestamps correctly
- ▶ **Kernel:** job nodes can be added and deleted, expired job nodes are deleted, application URL is generated correctly
- ▶ **Functional:** job nodes are created with the correct URL and the correct response code is returned
- ▶ **FunctionalJavaScript:** application URL is updated with JavaScript based on UTM parameters (hosting)

RESULTS

- ▶ **0 bugs!**
- ▶ **Reduced debugging time**
- ▶ **Easier to identify where issues occurred and responsibilities**

RUNNING TESTS

OPTION 1

SIMPLETEST MODULE (UI)

- ▶ ParamConverter
- ▶ path
- ▶ Path
- ▶ PathProcessor
- ▶ PhpStorage
- ▶ PHPUnit
- ▶ phpunit_example
- ▶ Plugin
- ▶ plugin_type_example
- ▶ PrivateKeyTest
- ▶ proxy_builder
- ▶ Queue
- ▶ queue_example
- ▶ quickedit
- ▶ rdf

- utility
- Uuid
- validation
- Validation
- Variable
- views
- Views
- views_ui
- workflows

Run tests

CLEAN TEST ENVIRONMENT
Clean environment
Remove tables with the prefix "test" followed by digits and temporary directories that are left over from tests that crashed. This is intended for developers when creating tests.

Running tests ☆



Running tests ☆

Processed test 1 of 4 - *Drupal\Tests\phpunit_example\Functional\PHPUnitExampleMenuTest.*

Overall results: 2 passes, 0 fails, 0 exceptions

- *Drupal\Tests\phpunit_example\Functional\PHPUnitExampleMenuTest*: 2 passes, 0 fails, 0 exceptions



25%

Running tests ☆

Processed test 4 of 4 - *Drupal\Tests\phpunit_example\Unit\ProtectedPrivatesTest*.

Overall results: 34 passes, 0 fails, 0 exceptions

- *Drupal\Tests\phpunit_example\Unit\ProtectedPrivatesTest*: 4 passes, 0 fails, 0 exceptions
- *Drupal\Tests\phpunit_example\Unit\DisplayManagerTest*: 1 pass, 0 fails, 0 exceptions
- *Drupal\Tests\phpunit_example\Unit\AddClassTest*: 27 passes, 0 fails, 0 exceptions
- *Drupal\Tests\phpunit_example\Functional\PHPUnitExampleMenuTest*: 2 passes, 0 fails, 0 exceptions



Test result ☆

Home » Administration » Configuration » Development » Testing

✓ The test run finished in 1 min 19 sec.

ACTIONS
Filter: All (4) [Return to list](#)

RESULTS
34 passes, 0 fails, 0 exceptions

- ▶ Drupal\Tests\phpunit_example\Functional\PHPUnitExampleMenuTest
- ▶ Drupal\Tests\phpunit_example\Unit\AddClassTest
- ▶ Drupal\Tests\phpunit_example\Unit\DisplayManagerTest
- ▶ Drupal\Tests\phpunit_example\Unit\ProtectedPrivatesTest

▼ Drupal\Tests\phpunit_example\Unit\AddClassTest

AddClass units tests.
27 passes, 0 fails, 0 exceptions

MESSAGE	GROUP	FILENAME	LINE	FUNCTION	STATUS
	Other	AddClassTest.php	46	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAdd()	✓
	Other	AddClassTest.php	87	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithDataProvider with data set #0()	✓
	Other	AddClassTest.php	87	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithDataProvider with data set #1()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #0()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #1()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #2()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #3()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #4()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #5()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #6()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #7()	✓
	Other	AddClassTest.php	114	Drupal\Tests\phpunit_example\Unit\AddClassTest->testAddWithBadDataProvider with data set #8()	✓

OPTION 2

CORE SCRIPT

```
$ php core/scripts/run-tests.sh
```

```
$ php core/scripts/run-tests.sh --module example
```

```
$ php core/scripts/run-tests.sh --class ExampleTest
```

OPTION 3

PHPUNIT

PREREQUISITE (CREATING A PHPUNIT.XML FILE)

- ▶ **Configures PHPUnit**
- ▶ **Needed to run some types of tests**
- ▶ **Ignored by Git by default**
- ▶ **Copy `core/phpunit.xml.dist` to `core/phpunit.xml`**
- ▶ **Add and change as needed**
 - ▶ `SIMPLETEST_BASE_URL, SIMPLETEST_DB, BROWSERTEST_OUTPUT_DIRECTORY`
 - ▶ `stopOnFailure="true"`

```
vendor/bin/phpunit \  
-c core \  
modules/contrib/examples/phpunit_example
```

```
cd core
```

```
../vendor/bin/phpunit \
```

```
../modules/contrib/examples/phpunit_example
```

--filter

--testsuite

--group

--colors

--stop-on-failure

--verbose --debug

DOCKSAL

```
fin addon install phpunit
```

```
fin phpunit modules/custom
```


drupal-testing-workshop [~/Code/os/drupal-testing-workshop] - .../web/modules/contrib/examples/phpunit_example/tests/src/Functional/PHPUnitExampleMenuTest.php [drupal-testing-workshop]

Project

- js_example
- menu_example
- node_type_example
- page_example
- pager_example
- phpunit_example
 - src
 - templates
 - tests
 - src
 - Functional
 - PHPUnitExampleMenuTest.php
 - Unit
 - Subclasses
 - AddClassTest.php
 - DisplayManagerTest.php
 - ProtectedPrivatesTest.php
 - phpunit_example.info.yml
 - phpunit_example.links.menu.yml
 - phpunit_example.module
 - phpunit_example.routing.yml
- plugin_type_example

```
57     $this->drupalGet($page);
58     $this->assertLinkByHref($path);
59 }
60 }
61
62 /**
63  * Tests phpunit_example menus.
64 */
65 public function testPhpUnitExampleMenu() {
66     $this->drupalGet('/examples/phpunit-example');
67     $this->assertResponse(200, 'Description page exists.');
```

Run: tests x

Tests passed: 34 of 34 tests – 29 s 240 ms

Time: 46.62 seconds, Memory: 6.00MB

OK (34 tests, 41 assertions)

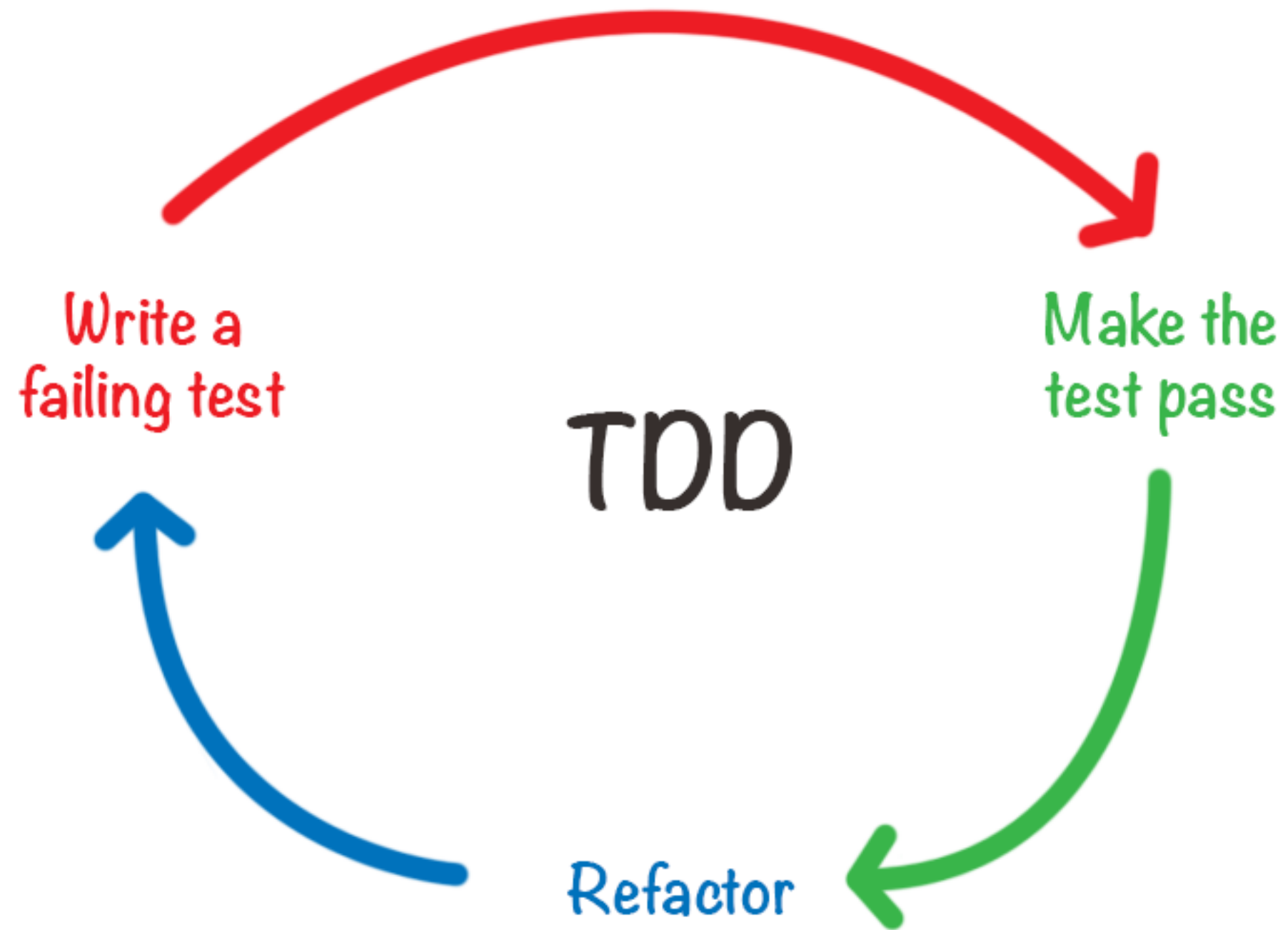
Process finished with exit code 0

- ✓ /var/www/web/modules/contrib/exa 29 s 240 ms
 - ✓ Drupal\Tests\phpunit_example\Fu 29 s 60 ms
 - ✓ testPhpUnitExampleLink 15 s 570 ms
 - ✓ testPhpUnitExampleMenu 13 s 490 ms
 - ▶ ✓ Drupal\Tests\phpunit_example\Unit\A 40 ms
 - ✓ Drupal\Tests\phpunit_example\Unit\I 120 ms
 - ✓ testSimpleMockDisplayManager 120 ms
 - ✓ Drupal\Tests\phpunit_example\Unit\P 20 ms
 - ▶ ✓ testPrivateAdd 10 ms
 - ▶ ✓ testPrivateAddBadData 0 ms
 - ✓ testProtectedAdd 10 ms
 - ✓ with data set #0 10 ms
 - ▶ ✓ testProtectedAddBadData 0 ms
 - ✓ with data set #0 0 ms

TEST DRIVEN DEVELOPMENT

TEST DRIVEN DEVELOPMENT

- ▶ **Write a test**
- ▶ **Test fails**
- ▶ **Write code**
- ▶ **Test passes**
- ▶ **Refactor**
- ▶ **Repeat**



RED, GREEN, REFACTOR

PORTING MODULES TO DRUPAL 8

- ▶ **Make a new branch**
- ▶ **Add/update the tests**
- ▶ **Write code to make the tests pass**
- ▶ **Refactor**
- ▶ **Repeat**

HOW I WRITE TESTS - "OUTSIDE IN"

- ▶ **Start with functional tests**
- ▶ **Drop down to integration or unit tests where needed**
- ▶ **Programming by wishful thinking**
- ▶ **Write comments first, then fill in the code**
- ▶ **Sometimes write assertions first**

BUILDING A NEW DRUPAL 8 MODULE WITH TEST DRIVEN DEVELOPMENT

ACCEPTANCE CRITERIA

- ▶ **As a site visitor**
- ▶ **I want to see a list of published articles at /blog**
- ▶ **Ordered by post date**

TASKS

- ▶ **Ensure the blog page exists**
- ▶ **Ensure only published articles are shown**
- ▶ **Ensure the articles are shown in the correct order**

IMPLEMENTATION

- ▶ **Use views module**
- ▶ **Do the minimum amount at each step, make no assumptions, let the tests guide us**
- ▶ **Start with functional test**

STEP 1

CREATE THE MODULE

```
# tdd_blog.info.yml
```

```
name: 'TDD Blog'
```

```
core: '8.x'
```

```
type: 'module'
```

STEP 2

**ENSURE THE BLOG PAGE
EXISTS**

```
// tests/src/Functional/BlogPageTest.php

namespace Drupal\Tests\tdd_blog\Functional;

use Drupal\Tests\BrowserTestBase;

class BlogPageTest extends BrowserTestBase {

    protected static $modules = ['tdd_blog'];

    public function testBlogPageExists() {
        $this->drupalGet('/blog');

        $this->assertSession()->statusCodeEquals(200);
    }
}
```

```
// tests/src/Functional/BlogPageTest.php

namespace Drupal\Tests\tdd_blog\Functional;

use Drupal\Tests\BrowserTestBase;

class BlogPageTest extends BrowserTestBase {

    protected static $modules = ['tdd_blog'];

    public function testBlogPageExists() {
        $this->drupalGet('/blog');

        $this->assertSession()->statusCodeEquals(200);
    }
}
```



```
// tests/src/Functional/BlogPageTest.php

namespace Drupal\Tests\tdd_blog\Functional;

use Drupal\Tests\BrowserTestBase;

class BlogPageTest extends BrowserTestBase {

    protected static $modules = ['tdd_blog'];

    public function testBlogPageExists() {
        $this->drupalGet('/blog');

        $this->assertSession()->statusCodeEquals(200);
    }
}
```

```
// tests/src/Functional/BlogPageTest.php

namespace Drupal\Tests\tdd_blog\Functional;

use Drupal\Tests\BrowserTestBase;

class BlogPageTest extends BrowserTestBase {

    protected static $modules = ['tdd_blog'];

    public function testBlogPageExists() {
        $this->drupalGet('/blog');

        $this->assertSession()->statusCodeEquals(200);
    }
}
```

```
// tests/src/Functional/BlogPageTest.php

namespace Drupal\Tests\tdd_blog\Functional;

use Drupal\Tests\BrowserTestBase;

class BlogPageTest extends BrowserTestBase {

    protected static $modules = ['tdd_blog'];

    public function testBlogPageExists() {
        $this->drupalGet('/blog');

        $this->assertSession()->statusCodeEquals(200);
    }

}
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core/modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E                                                                    1 / 1 (100%)
```

```
Time: 19.31 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Behat\Mink\Exception\ExpectationException: Current response status code is 404, but 200 expected.
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:768
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:130
```

```
/var/www/web/modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php:13
```

```
ERRORS!
```

```
Tests: 1, Assertions: 3, Errors: 1.
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E                                                                    1 / 1 (100%)
```

```
Time: 19.31 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

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Behat\Mink\Exception\ExpectationException: Current response status code is 404, but 200 expected.
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```
/var/www/vendor/behat/mink/src/WebAssert.php:768
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:130
```

```
/var/www/web/modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php:13
```

```
ERRORS!
```

```
Tests: 1, Assertions: 3, Errors: 1.
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E 1 / 1 (100%)
```

```
Time: 19.31 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Behat\Mink\Exception\ExpectationException: Current response status code is 404, but 200 expected.
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:768
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:130
```

```
/var/www/web/modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php:13
```

```
ERRORS!
```

```
Tests: 1, Assertions: 3, Errors: 1.
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E                                                                    1 / 1 (100%)
```

```
Time: 19.31 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Behat\Mink\Exception\ExpectationException: Current response status code is 404, but 200 expected.
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:768
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:130
```

```
/var/www/web/modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php:13
```

```
ERRORS!
```

```
Tests: 1, Assertions: 3, Errors: 1.
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E                                                                    1 / 1 (100%)
```

```
Time: 19.31 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Behat\Mink\Exception\ExpectationException: Current response status code is 404, but 200 expected.
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:768
```

```
/var/www/vendor/behat/mink/src/WebAssert.php:130
```

```
/var/www/web/modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php:13
```

```
ERRORS!
```

```
Tests: 1, Assertions: 3, Errors: 1.
```


- ▶ **The view has not been created**
- ▶ **Create a new view, page display**
- ▶ **Set the path**
- ▶ **Export the config**
- ▶ **Copy it into the module's `config/install` directory**

Add view

[Home](#) » [Administration](#) » [Structure](#) » [Views](#)

VIEW BASIC INFORMATION

View name *

Machine name: `blog` [\[Edit\]](#)

Description

VIEW SETTINGS

Show: of type: tagged with: sorted by:

PAGE SETTINGS

Create a page

BLOCK SETTINGS

Create a block

Blog (Content) ☆

Home » Administration » Structure » Views » Blog » Edit

Displays

Page + Add
Edit view name/description

Display name: Page View Page

TITLE
Title: None

FORMAT
Format: Unformatted list | Settings
Show: Fields | Settings

FIELDS Add ▼
Content: Title

FILTER CRITERIA Add ▼
Content: Published (= Yes)

SORT CRITERIA Add

PAGE SETTINGS
Path: /blog
Menu: No menu
Access: Permission | View published content

HEADER Add

FOOTER Add

NO RESULTS BEHAVIOR Add

PAGER
Use pager: Mini | Mini pager, 10 items
More link: No

▶ **ADVANCED**

Save Cancel

```
drush cex -y
```

```
cp ../config/default/views.view.blog.yml \  
modules/custom/tdd_blog/config/install
```

```
# views.view.blog.yml

- uuid: 84305edf-7aef-4109-bc93-e87f685fb678
langcode: en
status: true
dependencies:
  config:
    - node.type.article
  module:
    - node
    - user
- _core:
- default_config_hash: iGZkqLWpwWN0Rq6_fy6v_Kn_KE4BjYHqj9vpgQsWJCs
id: blog
...
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core/modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E 1 / 1 (100%)
```

```
Time: 16.02 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Drupal\Core\Config\UnmetDependenciesException: Configuration objects provided by <em class="placeholder">tdd_blog</em>
have unmet dependencies: <em class="placeholder">views.view.blog (node.type.article, node, views)</em>
```

```
/var/www/web/core/lib/Drupal/Core/Config/UnmetDependenciesException.php:98
```

```
/var/www/web/core/lib/Drupal/Core/Config/ConfigInstaller.php:469
```

```
/var/www/web/core/lib/Drupal/Core/ProxyClass/Config/ConfigInstaller.php:132
```

```
/var/www/web/core/lib/Drupal/Core/Extension/ModuleInstaller.php:145
```

```
/var/www/web/core/lib/Drupal/Core/ProxyClass/Extension/ModuleInstaller.php:83
```

```
/var/www/web/core/lib/Drupal/Core/Test/FunctionalTestSetupTrait.php:437
```

```
/var/www/web/core/tests/Drupal/Tests/BrowserTestBase.php:1055
```

```
/var/www/web/core/tests/Drupal/Tests/BrowserTestBase.php:490
```

```
ERRORS!
```

```
Tests: 1, Assertions: 0, Errors: 1.
```

```
# tdd_blog.info.yml
```

```
name: 'TDD Blog'
```

```
description: 'A demo module to show test driven module development.'
```

```
core: 8.x
```

```
type: module
```

```
dependencies:
```

- 'drupal:node'
- 'drupal:views'

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core/modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
E 1 / 1 (100%)
```

```
Time: 20 seconds, Memory: 6.00MB
```

```
There was 1 error:
```

```
1) Drupal\Tests\tdd_blog\Functional\BlogPageTest::testBlogPageExists
```

```
Drupal\Core\Config\UnmetDependenciesException: Configuration objects provided by <em class="placeholder">tdd_blog</em>
have unmet dependencies: <em class="placeholder">views.view.blog (node.type.article)</em>
```

```
/var/www/web/core/lib/Drupal/Core/Config/UnmetDependenciesException.php:98
```

```
/var/www/web/core/lib/Drupal/Core/Config/ConfigInstaller.php:469
```

```
/var/www/web/core/lib/Drupal/Core/ProxyClass/Config/ConfigInstaller.php:132
```

```
/var/www/web/core/lib/Drupal/Core/Extension/ModuleInstaller.php:145
```

```
/var/www/web/core/lib/Drupal/Core/ProxyClass/Extension/ModuleInstaller.php:83
```

```
/var/www/web/core/lib/Drupal/Core/Test/FunctionalTestSetupTrait.php:437
```

```
/var/www/web/core/tests/Drupal/Tests/BrowserTestBase.php:1055
```

```
/var/www/web/core/tests/Drupal/Tests/BrowserTestBase.php:490
```

```
ERRORS!
```

```
Tests: 1, Assertions: 0, Errors: 1.
```


▶ **Add the article content type**

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core modules/custom/tdd_blog
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog
```

```
. 1 / 1 (100%)
```

```
Time: 23.36 seconds, Memory: 6.00MB
```

```
OK (1 test, 3 assertions)
```

TASKS

- ▶ ~~Ensure the blog page exists~~
- ▶ Ensure only published articles are shown
- ▶ Ensure the articles are shown in the correct order

STEP 3

**ENSURE ONLY PUBLISHED
ARTICLES ARE SHOWN**

```
public function testOnlyPublishedArticlesAreShown() {  
    // Given I have a mixture of published and unpublished articles,  
    // as well as other types of content.  
  
    // When I view the blog page.  
  
    // I should only see the published articles.  
}
```

OPTION 1

FUNCTIONAL TESTS

```
// modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php

public function testOnlyPublishedArticlesAreShown() {
    // Given I have a mixture of published and unpublished articles,
    // as well as other types of content.
    $node1 = $this->drupalCreateNode(['type' => 'page', 'status' => 1]);
    $node2 = $this->drupalCreateNode(['type' => 'article', 'status' => 1]);
    $node3 = $this->drupalCreateNode(['type' => 'article', 'status' => 0]);

    // When I view the blog page.
    $this->drupalGet('/blog');

    // I should only see the published articles.
    $assert = $this->assertSession();
    $assert->pageTextContains($node2->label());
    $assert->pageTextNotContains($node1->label());
    $assert->pageTextNotContains($node3->label());
}
```

```
// modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php

public function testOnlyPublishedArticlesAreShown() {
    // Given I have a mixture of published and unpublished articles,
    // as well as other types of content.
    $node1 = $this->drupalCreateNode(['type' => 'page', 'status' => 1]);
    $node2 = $this->drupalCreateNode(['type' => 'article', 'status' => 1]);
    $node3 = $this->drupalCreateNode(['type' => 'article', 'status' => 0]);

    // When I view the blog page.
    $this->drupalGet('/blog');

    // I should only see the published articles.
    $assert = $this->assertSession();
    $assert->pageTextContains($node2->label());
    $assert->pageTextNotContains($node1->label());
    $assert->pageTextNotContains($node3->label());
}
```



```
// modules/custom/tdd_blog/tests/src/Functional/BlogPageTest.php
```

```
public function testOnlyPublishedArticlesAreShown() {  
    // Given I have a mixture of published and unpublished articles,  
    // as well as other types of content.  
    $node1 = $this->drupalCreateNode(['type' => 'page', 'status' => 1]);  
    $node2 = $this->drupalCreateNode(['type' => 'article', 'status' => 1]);  
    $node3 = $this->drupalCreateNode(['type' => 'article', 'status' => 0]);  
  
    // When I view the blog page.  
    $this->drupalGet('/blog');  
  
    // I should only see the published articles.  
    $assert = $this->assertSession();  
    $assert->pageTextContains($node2->label());  
    $assert->pageTextNotContains($node1->label());  
    $assert->pageTextNotContains($node3->label());  
}
```

OPTION 2

KERNEL TESTS

```
namespace Drupal\Tests\tdd_blog\Kernel;

use Drupal\KernelTests\Core\Entity\EntityKernelTestBase;
use Drupal\Tests\node\Traits\NodeCreationTrait;

class BlogPageTest extends EntityKernelTestBase {

    use NodeCreationTrait;

    public static $modules = ['node'];

    public function testOnlyPublishedArticlesAreShown() {
        $this->createNode(['type' => 'page', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 0]);
    }

}
```

```
namespace Drupal\Tests\tdd_blog\Kernel;

use Drupal\KernelTests\Core\Entity\EntityKernelTestBase;
use Drupal\Tests\node\Traits\NodeCreationTrait;

class BlogPageTest extends EntityKernelTestBase {

    use NodeCreationTrait;

    public static $modules = ['node'];

    public function testOnlyPublishedArticlesAreShown() {
        $this->createNode(['type' => 'page', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 0]);
    }

}
```



```
namespace Drupal\Tests\tdd_blog\Kernel;

use Drupal\KernelTests\Core\Entity\EntityKernelTestBase;
use Drupal\Tests\node\Traits\NodeCreationTrait;

class BlogPageTest extends EntityKernelTestBase {

    use NodeCreationTrait;

    public static $modules = ['node'];

    public function testOnlyPublishedArticlesAreShown() {
        $this->createNode(['type' => 'page', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 1]);
        $this->createNode(['type' => 'article', 'status' => 0]);
    }

}
```

```
docker@cli:/var/www/web$ ../vendor/bin/phpunit -c core/modules/custom/tdd_blog/tests/src/Kernel/
PHPUnit 6.5.8 by Sebastian Bergmann and contributors.
```

```
Testing modules/custom/tdd_blog/tests/src/Kernel/
```

```
E                                                                    1 / 1 (100%)
```

```
Time: 6.22 seconds, Memory: 6.00MB
```

There was 1 error:

1) Drupal\Tests\tdd_blog\Kernel\BlogPageTest::testOnlyPublishedArticlesAreShown

Error: Call to a member function id() on boolean

/var/www/web/core/modules/filter/filter.module:212

/var/www/web/core/modules/node/tests/src/Traits/NodeCreationTrait.php:73

/var/www/web/modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php:13

ERRORS!

Tests: 1, Assertions: 2, Errors: 1.

```
public function testOnlyPublishedArticlesAreShown() {  
    $this->installConfig(['filter']);  
  
    $this->createNode(['type' => 'page', 'status' => 1]);  
    $this->createNode(['type' => 'article', 'status' => 1]);  
    $this->createNode(['type' => 'article', 'status' => 0]);  
}
```



```
public function testOnlyPublishedArticlesAreShown() {  
    $this->installConfig(['filter']);  
  
    $this->createNode(['type' => 'page', 'status' => 1]);  
    $this->createNode(['type' => 'article', 'status' => 1]);  
    $this->createNode(['type' => 'article', 'status' => 0]);  
  
    $results = views_get_view_result('blog');  
}
```

...

```
public static $modules = ['node', 'tdd_blog', 'views'];

public function testOnlyPublishedArticlesAreShown() {
    $this->installConfig(['filter', 'tdd_blog']);

    $this->createNode(['type' => 'page', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 0]);

    $results = views_get_view_result('blog');

    $this->assertCount(1, $results);
    $this->assertEquals(2, $results[0]->_entity->id());
}
```

```
...

public static $modules = ['node', 'tdd_blog', 'views'];

public function testOnlyPublishedArticlesAreShown() {
    $this->installConfig(['filter', 'tdd_blog']);

    $this->createNode(['type' => 'page', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 0]);

    $results = views_get_view_result('blog');

    $this->assertCount(1, $results);
    $this->assertEquals(2, $results[0]->_entity->id());
}
```

```
...

public static $modules = ['node', 'tdd_blog', 'views'];

public function testOnlyPublishedArticlesAreShown() {
    $this->installConfig(['filter', 'tdd_blog']);

    $this->createNode(['type' => 'page', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 1]);
    $this->createNode(['type' => 'article', 'status' => 0]);

    $results = views_get_view_result('blog');

    $this->assertCount(1, $results);
    $this->assertEquals(2, $results[0]->_entity->id());
}
```

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

F 1 / 1 (100%)

Time: 2.16 seconds, Memory: 6.00MB

There was 1 failure:

1) Drupal\Tests\tdd_blog\Kernel\BlogPageTest::testOnlyPublishedArticlesAreShown
Failed asserting that actual size 2 matches expected size 1.

/Users/opdavies/Code/drupal-testing-workshop/web/modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php:23

FAILURES!

Tests: 1, Assertions: 4, Failures: 1.

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

F 1 / 1 (100%)

Time: 2.16 seconds, Memory: 6.00MB

There was 1 failure:

1) Drupal\Tests\tdd_blog\Kernel\BlogPageTest::testOnlyPublishedArticlesAreShown
Failed asserting that actual size 2 matches expected size 1.

/Users/opdavies/Code/drupal-testing-workshop/web/modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php:23

FAILURES!

Tests: 1, Assertions: 4, Failures: 1.

TITLE


Title: [None](#)

FORMAT

Format: [Unformatted list](#) | [Settings](#)


Show: [Fields](#) | [Settings](#)

FIELDS

Add 

Content: [Title](#)

FILTER CRITERIA

Add 

Content: [Published \(= Yes\)](#)

SORT CRITERIA

Add

- ▶ **There is no content type filter on the view**
- ▶ **Add the filter**
- ▶ **Re-export and save the view**

TITLE

Title: [None](#)

FORMAT

Format: [Unformatted list](#) | [Settings](#)

Show: [Fields](#) | [Settings](#)

FIELDS

Add



[Content: Title](#)

FILTER CRITERIA

Add



[Content: Published \(= Yes\)](#)

[Content: Content type \(= Article\)](#)

SORT CRITERIA

Add

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

. 1 / 1 (100%)

Time: 2.02 seconds, Memory: 6.00MB

OK (1 test, 6 assertions)

TASKS

- ▶ ~~Ensure the blog page exists~~
- ▶ ~~Ensure only published articles are shown~~
- ▶ Ensure the articles are shown in the correct order

STEP 4

**ENSURE THE ARTICLES ARE
ORDERED BY DATE**

```
// modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php
```

```
public function testArticlesAreOrderedByDate() {
```

```
    // Given that I have numerous articles with different post dates.
```

```
    // When I go to the blog page.
```

```
    // The articles are ordered by post date.
```

```
}
```

```
// modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php

public function testArticlesAreOrderedByDate() {
    // Given that I have numerous articles with different post dates.
    $this->createNode(['type' => 'article', 'created' => (new \DateTime('+1 day'))->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime('+1 month'))->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime('+3 days'))->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime('+1 hour'))->getTimestamp()]);

    // When I go to the blog page.

    // The articles are ordered by post date.
}
```

```
$this->createNode([  
    'type' => 'article',  
    'created' => (new \DateTime())->modify('+1 day')->getTimestamp(),  
]);
```

```
// modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php

public function testArticlesAreOrderedByDate() {
    // Given that I have numerous articles with different post dates.
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 day')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 month')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+3 days')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 hour')->getTimestamp()]);

    // When I go to the blog page.
    $results = views_get_view_result('blog');

    // The articles are ordered by post date.
}
```



```
// modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php

public function testArticlesAreOrderedByDate() {
    // Given that I have numerous articles with different post dates.
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 day')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 month')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+3 days')->getTimestamp()]);
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 hour')->getTimestamp()]);

    // When I go to the blog page.
    $results = views_get_view_result('blog');

    $nids = array_map(function(ResultRow $result) {
        return $result->_entity->id();
    }, $results);

    // The articles are ordered by post date.
}
```

```
// modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php
```

```
public function testArticlesAreOrderedByDate() {
```

```
    // Given that I have numerous articles with different post dates.
```

```
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 day')->getTimestamp()]);
```

```
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 month')->getTimestamp()]);
```

```
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+3 days')->getTimestamp()]);
```

```
    $this->createNode(['type' => 'article', 'created' => (new \DateTime())->modify('+1 hour')->getTimestamp()]);
```

```
    // When I go to the blog page.
```

```
    $results = views_get_view_result('blog');
```

```
    $nids = array_map(function(ResultRow $result) {
```

```
        return $result->_entity->id();
```

```
    }, $results);
```

```
    // The articles are ordered by post date.
```

```
    $this->assertEquals([4, 1, 3, 2], $nids);
```

```
}
```

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

F

1 / 1 (100%)

Time: 1.42 seconds, Memory: 6.00MB

There was 1 failure:

1) Drupal\Tests\tdd_blog\Kernel\BlogPageTest::testArticlesAreOrderedByDate

Failed asserting that two arrays are equal.

--- Expected

+++ Actual

@@ @@

Array (

- 0 => 4

- 1 => 1

- 2 => 3

- 3 => 2

+ 0 => '1'

+ 1 => '2'

+ 2 => '3'

+ 3 => '4'

/Users/opdavies/Code/drupal-testing-workshop/web/core/tests/Drupal/KernelTests/KernelTestBase.php:1114

/Users/opdavies/Code/drupal-testing-workshop/web/modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php:43

FAILURES!

Tests: 1, Assertions: 4, Failures: 1.

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

F 1 / 1 (100%)

Time: 1.42 seconds, Memory: 6.00MB

There was 1 failure:

1) Drupal\Tests\tdd_blog\Kernel\BlogPageTest::testArticlesAreOrderedByDate

Failed asserting that two arrays are equal.

--- Expected

+++ Actual

@@ @@

Array (

- 0 => 4

- 1 => 1

- 2 => 3

- 3 => 2

+ 0 => '1'

+ 1 => '2'

+ 2 => '3'

+ 3 => '4'

/Users/opdavies/Code/drupal-testing-workshop/web/core/tests/Drupal/KernelTests/KernelTestBase.php:1114

/Users/opdavies/Code/drupal-testing-workshop/web/modules/custom/tdd_blog/tests/src/Kernel/BlogPageTest.php:43

FAILURES!

Tests: 1, Assertions: 4, Failures: 1.

TITLE

Title: [None](#)

FORMAT

Format: [Unformatted list](#) | [Settings](#)

Show: [Fields](#) | [Settings](#)

FIELDS

Add



[Content: Title](#)

FILTER CRITERIA

Add



[Content: Published \(= Yes\)](#)

[Content: Content type \(= Article\)](#)

SORT CRITERIA

Add

- ▶ **There is no sort order defined on the view**
- ▶ **Add the sort order**
- ▶ **Re-export the view**

TITLE

Title: [None](#)

FORMAT

Format: [Unformatted list](#) | [Settings](#)

Show: [Fields](#) | [Settings](#)

FIELDS

Add



[Content: Title](#)

FILTER CRITERIA

Add



[Content: Published \(= Yes\)](#)

[Content: Content type \(= Article\)](#)

SORT CRITERIA

Add



[Content: Authored on \(desc\)](#)

PHPUnit 6.5.8 by Sebastian Bergmann and contributors.

Testing web/modules/custom/tdd_blog/tests/src/Kernel

. 1 / 1 (100%)

Time: 1.74 seconds, Memory: 6.00MB

OK (1 test, 5 assertions)

TASKS

- ▶ ~~Ensure the blog page exists~~
- ▶ ~~Ensure only published articles are shown~~
- ▶ ~~Ensure the articles are shown in the correct order~~

- folder tdd_blog
 - folder config
 - folder install
 - node.type.article.yml
 - views.view.blog.yml
 - tdd_blog.info.yml
 - folder tests
 - folder src
 - folder Functional
 - BlogPageTest.php
 - folder Kernel
 - BlogPageTest.php



[Drupal Testing Workshop](#)

[Blog post 1](#)

[Blog post 2](#)

[Blog post 4](#)

Tools

- [Add content](#)

Administration

- [Administration](#)



TAKE AWAYS

- ▶ Testing has made me a **better developer**
- ▶ Testing can produce **better quality code**
- ▶ Use the **right type of test** for the right situation
- ▶ Use the **right base class**, use available **traits**
- ▶ Writing tests is an **investment**
- ▶ OK to **start small**, introduce tests gradually
- ▶ Easier to **refactor**
- ▶ Tests can pass, but things can **still be broken**. Tests only report on what they cover.

**HAVING TESTS DOES NOT MEAN
THERE WILL BE NO BUGS**

YOU MIGHT BE TESTING THE WRONG THING
MAYBE IT DOESN'T WORK THE
WAY YOU THINK IT DOES

HAVE YOU WRITTEN ENOUGH ASSERTIONS?

**HAVE YOU ONLY COVERED THE
'HAPPY PATH' SCENARIOS?**

OTHER MODULES CAN AFFECT THINGS

**TESTS MAY PASS, BUT FAIL
WHEN OTHER MODULES ARE
ENABLED**

**TESTING MAY ADD TIME NOW
BUT SAVE MORE TIME IN THE FUTURE**

**HOW DO YOU GET QUICKER AT WRITING TESTS?
BY WRITING MORE TESTS**

START SMALL

SOME TESTS ARE BETTER

THAN NO TESTS



Oliver Davies

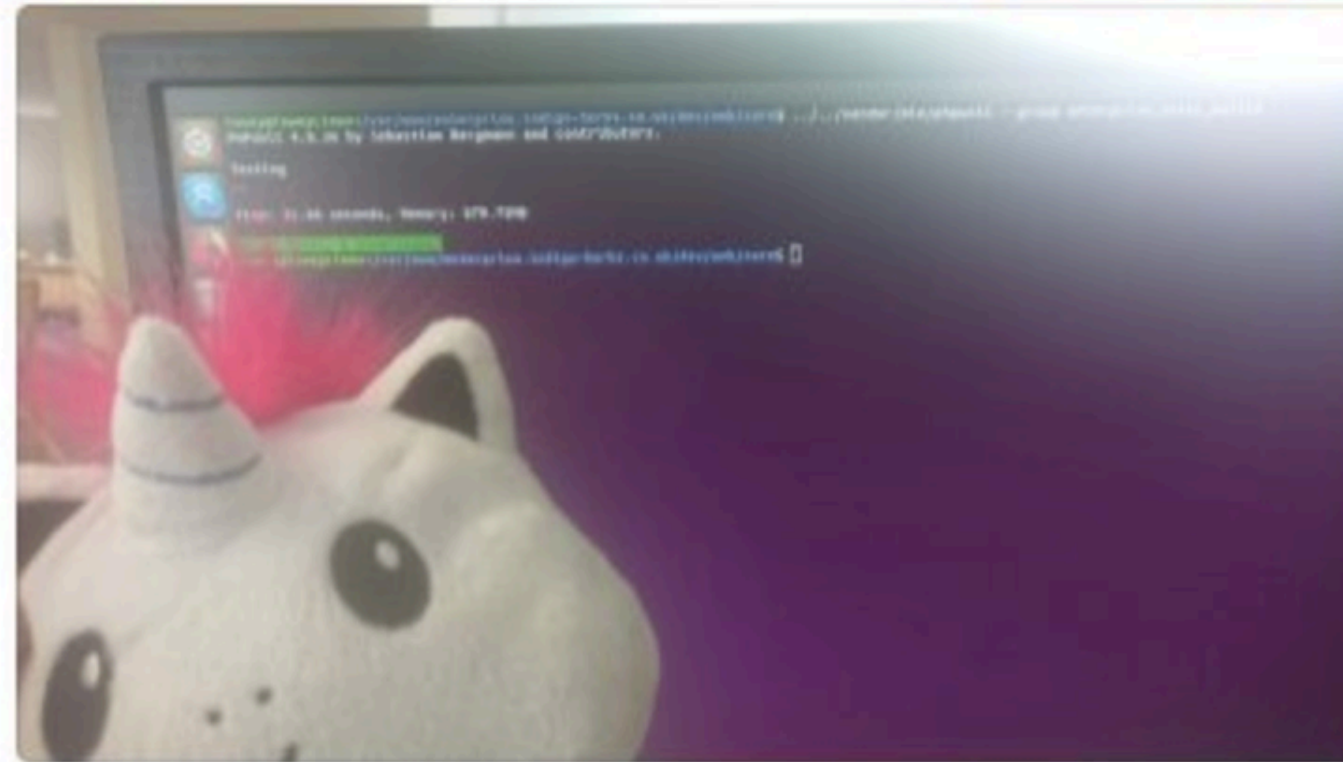
@opdavies



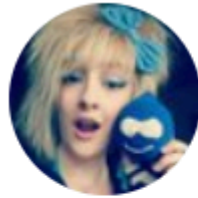
Made my day. 😊 @littlepixiez
@drupalsomerset

Tawny Bartlett Woo tests!!

Tawny Bartlett uploaded this image: [IMG_20180619_153539.jpg](#) ▼



7:41 PM - 19 Jun 2018



Tawny Bartlett

@littlepixiez

Following



Replying to [@opdavies](#) [@drupalsomerset](#)

Terrible quality photo but the talk drove me to test and it's great so far, it's really helped give me peace of mind and helped me uncover a bug I wouldn't have otherwise :) so thank you 😊

10:41 PM - 19 Jun 2018

WHEN YOU DO THINGS RIGHT

**PEOPLE WON'T BE SURE YOU'VE
DONE ANYTHING AT ALL**

QUESTIONS?

THANKS

@OPDAVIES

OLIVERDAVIES.UK