

Testing using WebDriverIO and Cucumber in JavaScript

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Overview

In this tutorial, we will create UI tests as Cucumber Scenario(s)/Scenario Outline(s) and use [WebDriverIO](#) to implement the tests in JavaScript.

- code is available in [GitHub](#)

Requirements

- nodejs
- WebDriverIO

Description

For the purpose of this tutorial, we'll use a [dummy website](#) provided by Heroku. In our case, it contains just a few pages to support login features which we will be testing.

To start using WebDriverIO please follow the [Get Started](#) documentation.

WebDriverIO provides a client that after being installed will guide you through bootstrapping a *Hello World* test suite into your project, for this tutorial we will use the code generated by this tool for simplicity (with page objects).

The test consists in validating the login feature (with valid and invalid credentials) of the [demo site](#), for that we have created a feature file that will have the description of the test supported by a base page that contains all methods and functionality that is shared across all page objects, a login page, that will extend the base page, that will have all the methods for interacting with the login page and a result page that will have the methods to interact in the page that is loaded after the login operation.

We have followed the [documentation](#) and executed the command to install the WebDriverIO test runner:

```
npm install @wdio/cli
```

Then we answered a series of questions that will define the code to be generated using:

```
npx wdio config
```

The output of the questionnaire will look like this:

WDIO Configuration Helper

```
=====
? Where is your automation backend located? On my local machine
? Which framework do you want to use? cucumber
? Do you want to use a compiler? No!
? Where are your feature files located? ./features/**/*.feature
? Where are your step definitions located? ./features/step-definitions/steps.js
? Do you want WebdriverIO to autogenerate some test files? Yes
? Do you want to use page objects (https://martinfowler.com/bliki/PageObject.html)? Yes
? Where are your page objects located? ./features/pageobjects/**/*.js
? Which reporter do you want to use? spec
? Do you want to add a service to your test setup? chromedriver
? What is the base url? http://localhost
=====
```

This will automatically generate the following files:

./pageobjects/page.js

```
const Page = require('./page');

/**
 * sub page containing specific selectors and methods for a specific page
 */
class LoginPage extends Page {
  /**
   * define selectors using getter methods
   */
  get inputUsername () { return $('#username') }
  get inputPassword () { return $('#password') }
  get btnSubmit () { return $('button[type="submit"]') }

  /**
   * a method to encapsule automation code to interact with the page
   * e.g. to login using username and password
   */
  async login (username, password) {
    await (await this.inputUsername).setValue(username);
    await (await this.inputPassword).setValue(password);
    await (await this.btnSubmit).click();
  }

  /**
   * overwrite specifc options to adapt it to page object
   */
  open () {
    return super.open('login');
  }
}

module.exports = new LoginPage();
```

./pageobjects/login.page.js

```
/**
 * main page object containing all methods, selectors and functionality
 * that is shared across all page objects
 */
module.exports = class Page {
  /**
   * Opens a sub page of the page
   * @param path path of the sub page (e.g. /path/to/page.html)
   */
  open (path) {
    return browser.url(`https://the-internet.herokuapp.com/${path}`)
  }
}
```

./pageobjects/secure.page.js

```
const Page = require('./page');

/**
 * sub page containing specific selectors and methods for a specific page
 */
class SecurePage extends Page {
  /**
   * define selectors using getter methods
   */
  get flashAlert () { return $('#flash') }
}

module.exports = new SecurePage();
```

And a feature file where we describe the tests:

login.feature

Feature: As a user, I can log into the secure area

Scenario Outline: As a user, I can log into the secure area

Given I am on the login page

When I login with <username> and <password>

Then I should see a flash message saying <message>

Examples:

	username		password		message	
	tomsmith		SuperSecretPassword!		You logged into a secure area!	
	foobaz		barfoo		Your username is invalid!	

With the respective code behind

./step-definitions/steps.js

```
const { Given, When, Then } = require('@cucumber/cucumber');

const LoginPage = require('../pageobjects/login.page');
const SecurePage = require('../pageobjects/secure.page');

const pages = {
  login: LoginPage
}

Given(/^I am on the (\w+) page$/, async (page) => {
  await pages[page].open()
});

When(/^I login with (\w+) and (.+)\$/, async (username, password) => {
  await LoginPage.login(username, password)
});

Then(/^I should see a flash message saying (.*)$/, async (message) => {
  await expect(SecurePage.flashAlert).toBeExisting();
  await expect(SecurePage.flashAlert).toHaveTextContaining(message);
});
```

The last two steps to have everything configured is to define that we will use the CucumberJS framework, for that we execute the following command:

```
npm install wdio-cucumberjs-json-reporter --save-dev
```

And in the wdio.conf.js we have added, in the reporters area, the following CucumberJS definition:

./wdio.conf.js

```
...
  reporters: ['spec',
    ['cucumberjs-json', {
      jsonFolder: '.tmp/json/',
      language: 'en',
    }],
  ],
...

```

Once the code is implemented (and we will make it fail on purpose on one test, to show the failure reports), it can be executed with the following command:

```
npx wdio run ./wdio.conf.js
```

The results are immediately available in the terminal

```

"spec" Reporter:
[chrome 91.0.4472.101 mac os x #0-0] Running: chrome (v91.0.4472.101) on mac os x
[chrome 91.0.4472.101 mac os x #0-0] Session ID: e8e95c6b49c2e352d7162f4ba3b64217
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] > /features/login.feature
[chrome 91.0.4472.101 mac os x #0-0] As a user, I can log into the secure area
[chrome 91.0.4472.101 mac os x #0-0] As a user, I can log into the secure area
[chrome 91.0.4472.101 mac os x #0-0] ✓ Given I am on the login page
[chrome 91.0.4472.101 mac os x #0-0] ✓ When I login with tomsmith and SuperSecretPassword!
[chrome 91.0.4472.101 mac os x #0-0] ✓ Then I should see a flash message saying You logged into a secure area!
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] As a user, I can log into the secure area
[chrome 91.0.4472.101 mac os x #0-0] ✓ Given I am on the login page
[chrome 91.0.4472.101 mac os x #0-0] ✓ When I login with foofoo and barfoo
[chrome 91.0.4472.101 mac os x #0-0] ✗ Then I should see a flash message saying Your username is invalid.
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] 5 passing (14.8s)
[chrome 91.0.4472.101 mac os x #0-0] 1 failing
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] 1) As a user, I can log into the secure area Then I should see a flash message saying Your username is invalid.
[chrome 91.0.4472.101 mac os x #0-0] Error: Expect $('flash') to have text containing
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] - Expected - 1
[chrome 91.0.4472.101 mac os x #0-0] + Received + 2
[chrome 91.0.4472.101 mac os x #0-0]
[chrome 91.0.4472.101 mac os x #0-0] - Your username is invalid
[chrome 91.0.4472.101 mac os x #0-0] + Your username is invalid
[chrome 91.0.4472.101 mac os x #0-0] ✗
[chrome 91.0.4472.101 mac os x #0-0] at World.<anonymous> (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/features/step-definitions/steps.js:20:41)
[chrome 91.0.4472.101 mac os x #0-0] at processTicksAndRejections (internal/process/task_queues.js:93:5)
[chrome 91.0.4472.101 mac os x #0-0] at World.executeAsync (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/shim.js:136:16)
[chrome 91.0.4472.101 mac os x #0-0] at World.testFrameworkFnWrapper (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/test-framework/testFnWrapper.js:52:18)
[chrome 91.0.4472.101 mac os x #0-0]

Spec Files: 0 passed, 1 failed, 1 total (100% completed) in 00:00:18

```

In case you need to interact with the Xray REST API at low-level using scripts (e.g. Bash/shell scripts), this tutorial uses auxiliary files that will handle those interactions.

Example of cloud_auth.json used in this tutorial

```

- export_features.sh
- import_features.sh
- import_results.sh
- run_all_git_workflow.sh
- run_all_standard_workflow.sh

```

Now we need to decide which workflow to use: do you want to use Xray/Jira as the master for writing the declarative specification (i.e. the Gherkin based Scenarios), or do you want to manage those outside using some editor and store them in Git, for example?



Learn more

Please see [Testing in BDD with Gherkin based frameworks \(e.g. Cucumber\)](#) for an overview of the possible workflows.

The place that you'll use to edit the Cucumber Scenarios will affect your workflow. There are teams that prefer to edit Cucumber Scenarios in Jira using Xray, while there are others that prefer to edit them by writing the .feature files by hand using some IDE.

Using Jira and Xray as master

This section assumes using Xray as master, i.e. the place that you'll be using to edit the specifications (e.g. the scenarios that are part of .feature files).

The overall flow would be something like this:

1. create Scenario/Scenario Outline as a Test in Jira; usually, it would be linked to an existing "requirement"/Story (i.e. created from the respective issue screen)
2. implement the code related to Gherkin statements/steps and store it in Git, for example
3. generate .feature files based on the specification made in Jira
4. checkout the code from Git
5. run the tests in the CI
6. import the results back to Jira

Usually, you would start by having a Story, or similar (e.g. "requirement"), to describe the behavior of a certain feature and use that to drive your testing.

If you have it, then you can just use the "Create Test" on that issue to create the Scenario/Scenario Outline and have it automatically linked back to the Story/"requirement."

Otherwise, you can create the Test using the standard (issue) Create action from Jira's top menu.



Xray Tutorials / XT-225

Demo Login feature



Edit



Comment

Assign

More ▾

To Do

In Progress

Done

Admin ▾

▼ Details

Type:

 Story

Status:

TO DO [\(View Workflow\)](#)

Priority:

☐ Trivial

Resolution:

Unresolved

Labels:

None

Requirement Status:

UNCOVERED

▼ Description

Click to add description

▼ Test Coverage

Create Test

Create Sub-Test Execution

+ Link ▾

No Tests were found testing the requirement.

▼ Attachments

...



Drop files to attach, or [browse](#).

> Structure



In this case, we'll create a Cucumber Scenario.

We need to create the Test issue first and fill out the Gherkin statements later on in the Test issue screen.

Create Issue

⚙️ **Configure Fields** ▼

Project Xray Tutorials (XT)

Issue Type Test

General

Test Details

Test Sets

Pre-Conditions

Test Plans

Link Issues

Summary • Test login feature

Description

Style ▾

B

I

U

A

4

- **Stress**
- **Stress**
- **Stress**



—

 \approx

Visual Text

Reporter Xpand IT Admin

Start typing to get a list of possible matches.

Assignee  Automatic

Assign to me

Fix Version/s **None**

Priority ☐ Trivial

Component/s **None**

Attachment

 Drop files to attach, or [browse](#).

☐ Create another


Create

Cancel

Create Issue

⚙️ Configure Fields ▾

Project*  Xray Tutorials (XT) ▾

Issue Type*  Test ▾ ?

General **Test Details** Test Sets Pre-Conditions Test Plans Link Issues

Test Type

✓ Manual

Cucumber

Generic

Steps

Grid ▾



+ Add Step

1

Action*

Style ▾

B

I

U

A ▾

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 ▾

 ▾





 ▾

+ ▾



Visual

Text

Data

Enter value...

Expected Result

☐ Create another

Create

Cancel

After the Test is created it will impact the coverage of related "requirement," if any.

The coverage and the test results can be tracked on the "requirements" side (e.g. user story). In this case, you may see that coverage changed from being UNCOVERED to NOTRUN (i.e. covered and with at least one test not run).

Xray Tutorial / XT-225

Demo Login feature

[Edit](#) [Comment](#) [Assign](#) [More](#) [To Do](#) [In Progress](#) [Done](#) [Admin](#)

Details

Type: **Story** Status: **TO DO** [\(View Workflow\)](#)
Priority: **Trivial** Resolution: **Unresolved**
Labels: **None**
Requirement Status: **NOTRUN**

Description

[Click to add description](#)

Test Coverage

[Create Test](#) [Create Sub-Test Execution](#) [+ Link](#)

TEST COVERAGE FOR THE FOLLOWING ANALYSIS SCOPE

Scope: Version; Version: None - latest execution; Environment: All Environments

NOT RUN

[Filter\(s\)](#)



Show **10** entries Columns

P	Status	Resolution	Key	Summary	Test Runs	Test Status
<input type="checkbox"/>	TO DO	<i>Unresolved</i>	XT-226	Test Login feature		TODO

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#) [Next](#) [Last](#)

Additional tests could be created and eventually linked to the same Story or linked to another one (e.g. logout).

The related statement's code is managed outside of Jira and stored in Git, for example.

In our source code, test code is stored under `steps-definitions` directory, which itself can contain several other directories or files. In this case, we've only one referring to the login feature:

./step-definitions/steps.js

```
const { Given, When, Then } = require('@cucumber/cucumber');

const LoginPage = require('../pageobjects/login.page');
const SecurePage = require('../pageobjects/secure.page');

const pages = {
  login: LoginPage
}

Given(/^I am on the (\w+) page$/, async (page) => {
  await pages[page].open()
});

When(/^I login with (\w+) and (.+)\$/, async (username, password) => {
  await LoginPage.login(username, password)
});

Then(/^I should see a flash message saying (.*)$/, async (message) => {
  await expect(SecurePage.flashAlert).toBeExisting();
  await expect(SecurePage.flashAlert).toHaveTextContaining(message);
});


After((scenario) => {
  const path = '.tmp/screenshots/Error.png';
  if(scenario.result.status == 6){
    browser.saveScreenshot(path);
    const cucumberJson = require('wdio-cucumberjs-json-reporter').default;
    const data = fs.readFileSync(path);
    if (data) {
      const base64Image = Buffer.from(data, 'binary').toString('base64')
      cucumberJson.attach(base64Image, 'image/png');
    }
  }
});
```

Notice that we have added an After scenario that will be executed after each scenario. After validating that an error occurred it will take a screenshot and attach it to the report.

You can then export the specification of the test to a Cucumber .feature file via the REST API, or the **Export to Cucumber** UI action from within the Test /Test Execution issue or even based on an existing saved filter. A plugin for your CI tool of choice can be used to ease this task.

So, you can either:

- use the UI


Xray Tutorials / XT-226

Test Login feature

Edit
Comment
Assign
More
To Do
In Progress
Done
Admin

Details

Type: Test
Priority: Trivial
Labels: None

Description

Click to add description

Test Details

Type: Cucumber
Scenario Type: Scenario
Scenario: Given I am logged in
When I log in with invalid credentials
Then I should see an error message

Example

```

Given I am logged in
When I log in with invalid credentials
Then I should see an error message

Move
Link
Clone
Labels
Delete
Reset TestRunStatus
Export to Cucumber
Export Test to XML
Export Test Runs to CSV

```

Status: TO DO (View Workflow)

Resolution: Unresolved

```

Given I am logged in
When I log in with invalid credentials
Then I should see an error message

Move
Link
Clone
Labels
Delete
Reset TestRunStatus
Export to Cucumber
Export Test to XML
Export Test Runs to CSV

```

Create Pre-Condition

Associate Pre-Conditions

Create Pre-Condition

Associate Pre-Conditions

- use one of the available CI/CD plugins (e.g. see an example of [Integration with Jenkins](#))

features/1_XT-225.feature

@REQ_XT-225

Feature: Login feature

@TEST_XT-226

Scenario: Test Login feature

Scenario Outline: As a user, I can log into the secure area

Given I am on the login page

When I login with <username> and <password>

Then I should see a flash message saying <message>

Examples:

	username	password	
message			
area!	tomsmith	SuperSecretPassword!	You logged into a secure
invalid.	foobar	barfoo	Your username is

To run the tests and produce Cucumber JSON reports(s), we can either use the same command as before.

```
npx wdio run ./wdio.conf.js
```

This will produce one results file that will hold the test results.

The CucumberJson reporter does not produce reports containing the screenshots embedded.

However, we have added an After scenario to do so, but you can use the HTML or Cucumber reporter that allows you to add those as you can find more info [here](#).

After running the tests, results can be imported to Xray via the REST API, or the **Import Execution Results** action within the Test Execution, or by using one of the available CI/CD plugins (e.g. see an example of [Integration with Jenkins](#)).

import_results.sh

```
#!/bin/bash
JIRA_BASEURL=https://192.168.0.168
JIRA_USERNAME=admin
JIRA_PASSWORD=admin

curl -H "Content-Type: application/json" -X POST -u $JIRA_USERNAME:$JIRA_PASSWORD --data @"./tmp/json/login-feature.json" $JIRA_BASEURL/rest/raven/2.0/import/execution/cucumber
```

Which Cucumber endpoint/"format" to use?

To import results, you can use two different endpoint/"formats" (endpoints described in [Import Execution Results - REST](#)):

1. the "standard cucumber" endpoint
2. the "multipart cucumber" endpoint

The standard cucumber endpoint (i.e. `/import/execution/cucumber`) is simpler but more restrictive: you cannot specify values for custom fields on the Test Execution that will be created. This endpoint creates new Test Execution issues unless the Feature contains a tag having an issue key of an existing Test Execution.

The multipart cucumber endpoint will allow you to customize fields (e.g. Fix Version, Test Plan) if you wish to do so, on the Test Execution that will be created. Note that this endpoint always creates new Test Executions (as of Xray v4.2).

In sum, if you want to customise the Fix Version, Test Plan and/or Test Environment of the Test Execution issue that will be created, you'll have to use the "multipart cucumber" endpoint.

A new Test Execution will be created (unless you originally exported the Scenarios/Scenario Outlines from a Test Execution).



Xray Tutorials / XT-153

Execution results [1624004965566]

 Edit  Comment Assign More  To Do In Progress Done Admin 

Details

Type:  Test Execution Status: **TO DO** [\(View Workflow\)](#)
Priority:  Trivial Resolution: Unresolved
Labels: None
Test Plan: None
Test Environments: None

Description

[Click to add description](#)

Tests

 Add 

Overall Execution Status



1 FAIL

Total Tests: 1


 Filter(s)



Apply Rank

Show entries

Columns 

	Rank	Key	Summary	Test Type	#Req	#Def	Assignee	Status	
<input type="checkbox"/>	1	XT-142	login feature	Cucumber	1	0	Xpand IT Admin	FAIL	 ...

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#) [Next](#) [Last](#)

The tests have failed (on purpose).

The execution screen details of the Test Run will provide overall status information and Gherkin statement-level results, therefore we can use it to analyze the failing test.



Xray Tutorials / XT-153

Execution results [1624004965566]

[Edit](#) [Comment](#) [Assign](#) [More](#) [To Do](#) [In Progress](#) [Done](#) [Admin](#)

Details

Type: ▶ Test Execution Status: TO DO ([View Workflow](#))
Priority: ☐ Trivial Resolution: Unresolved
Labels: None
Test Plan: None
Test Environments: None

Xporter

[Template](#)
[Output format](#)

Description

[Click to add description](#)

People

[Assignee:](#)
[Reporter:](#)
[Votes:](#)
[Watchers:](#)

Tests

[+ Add](#)

Overall Execution Status

1 FAIL

Total Tests: 1

[Filter\(s\)](#)



[Apply Rank](#)

Show entries

[Columns](#)

	Rank	Key	Summary	Test Type	#Req	#Def	Assignee	Status
<input type="checkbox"/>	1	XT-142	login feature	Cucumber	1	0	Xpand IT Admin	FAIL

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#)

[Execution Details](#)

EXECUTE INLINE

PASS

Attachments

Xray Tutorials / Test Execution: XT-153 / Test: XT-142

login feature

[Import Execution Results](#)

[Export to Cucumber](#)

[Return to Test Execution](#)

Test Details

Test Type: Cucumber
Scenario Type: Scenario Outline
Scenario:

```
1 Given I am on the login page
2 When I login with <username> and <password>
3 Then I should see a flash message saying <message>
4
5 Examples:
6 | username | password | message |
7 | tomsmith | SuperSecretPassword! | You logged into a secure area! |
8 | foobar | barfoo | Your username is invalid. |
```

Examples

<username>	<password>	<message>	Duration	Status
tomsmith	SuperSecretPassword!	You logged into a secure area!	3861.000 ms	PASS
foobar	barfoo	Your username is invalid.	10952.000 ms	FAIL

A given example can be expanded to see all Gherkin statements and, if available, it is possible to see also the attached stack trace.

<username>	<password>	<message>	Duration	Status
▶ tomsmith	SuperSecretPassword!	You logged into a secure area!	3861.000 ms	PASS
▼ foobar	barfoo	Your username is invalid.	10952.000 ms	FAIL
Steps				
Before			2.000 ms	PASS
Given I am on the login page			166.000 ms	PASS
When I login with foobar and barfoo			484.000 ms	PASS
Then I should see a flash message saying Your username is invalid.			10036.000 ms	FAIL
Error: Expect `\$(`#flash`)` to have text containing <pre> - Expected - 1 + Received + 2 - Your username is invalid. + Your username is invalid! + x at World.<anonymous> (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/features/step-definitions/steps.js:22:41) at processTicksAndRejections (internal/process/task_queues.js:93:5) at World.executeAsync (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/shim.js:136:16) at World.testFrameworkFnWrapper (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/test-framework/testFnWrapper.js:52:18) </pre>				
After			263.000 ms	PASS
After			1.000 ms	PASS

Note: in this case, the bug was on the Scenario Outline example which was expecting an invalid message.

Results are reflected on the covered item (e.g. Story). On its issue screen, coverage now shows that the item is NOK based on the latest testing results, this can also be tracked within the Test Coverage panel below.

Xray Tutorials / XT-143

login feature

Edit

Comment

Assign

More

To Do

In Progress

Done

Admin

Details

Type: Story

Priority: Trivial

Labels: None

Requirement Status: **NOK**

Status: **TO DO** (View Workflow)

Resolution: Unresolved

Description

Click to add description

Test Coverage

Create Test

Create Sub-Test Execution

+ Link

TEST COVERAGE FOR THE FOLLOWING ANALYSIS SCOPE

Scope: Version; Version: None - latest execution; Environment: All Environments

Filter(s)

Showing 1 to 1 of 1 entries

P	Status	Resolution	Key	Summary	Test Runs	Test Status
<input type="checkbox"/>	<input type="radio"/>	TO DO	Unresolved	XT-143	login feature	FAIL

Showing 1 to 1 of 1 entries

FAIL

Using Git or other VCS as master

You can edit your .feature files using your IDE outside of Jira (eventually storing them in your VCS using Git, for example) alongside the remaining test code.

In any case, you'll need to synchronize your .feature files to Jira so that you can have visibility of them and report results against them.

The overall flow would be something like this:

1. look at the existing "requirement"/Story issue keys to guide your testing; keep their issue keys
2. specify Cucumber/Gherkin .feature files in your IDE and store it in Git, for example
3. implement the code related to Gherkin statements/steps and store it in Git, for example
4. import/synchronise the .feature files to Xray to provision or update corresponding Test entities
5. export/generate .feature files from Jira, so that they contain references to Tests and requirements in Jira
6. checkout the WebDriverIO related code from Git
7. run the tests in the CI
8. import the results back to Jira

Usually, you would start by having a Story, or similar (e.g. "requirement"), to describe the behaviour of a certain feature and use that to drive your testing.

Xray Tutorials / XT-225

Demo Login feature

[Edit](#) [Comment](#) [Assign](#) [More](#) [To Do](#) [In Progress](#) [Done](#) [Admin](#)

Details

Type: **Story** Status: **TO DO** ([View Workflow](#))

Priority: **Trivial** Resolution: **Unresolved**

Labels: **None**

Requirement Status: **UNCOVERED**

Description

[Click to add description](#)

Test Coverage

[Create Test](#) [Create Sub-Test Execution](#) [+ Link](#)

No Tests were found testing the requirement.

Attachments

Drop files to attach, or [browse](#).

Structure

Having those to guide testing, we could then move to our code to describe and implement the Cucumber test scenarios.

Test code is stored inside the `step-definitions` directory. We also have other directories present, to hold for instance the page object definitions in the `pageobjects` directory.

In this case, we've organized them as follows:

- `step-definitions/steps.js`: step implementation files, in JavaScript.

- **step-definitions/steps.js**

```
const { Given, When, Then } = require('@cucumber/cucumber');

const LoginPage = require('../pageobjects/login.page');
const SecurePage = require('../pageobjects/secure.page');

const pages = {
  login: LoginPage
}

Given(/^I am on the (\w+) page$/, async (page) => {
  await pages[page].open()
});

When(/^I login with (\w+) and (.+)\$/, async (username, password) => {
  await LoginPage.login(username, password)
});

Then(/^I should see a flash message saying (.*)$/, async (message) => {
  await expect(SecurePage.flashAlert).toBeExisting();
  await expect(SecurePage.flashAlert).toHaveTextContaining(message);
});
```

- pageobjects: abstraction of different pages, somehow based on the page-objects model

- **pageobjects/page.js**

```
/**
 * main page object containing all methods, selectors and functionality
 * that is shared across all page objects
 */
module.exports = class Page {
  /**
   * Opens a sub page of the page
   * @param path path of the sub page (e.g. /path/to/page.html)
   */
  open (path) {
    return browser.url(`https://the-internet.herokuapp.com/${path}`)
  }
}
```

◦ **pageobjects/login-page.js**

```
const Page = require('./page');

/**
 * sub page containing specific selectors and methods for a specific page
 */
class LoginPage extends Page {
  /**
   * define selectors using getter methods
   */
  get inputUsername () { return $('#username') }
  get inputPassword () { return $('#password') }
  get btnSubmit () { return $('button[type="submit"]') }

  /**
   * a method to encapsule automation code to interact with the page
   * e.g. to login using username and password
   */
  async login (username, password) {
    await (await this.inputUsername).setValue(username);
    await (await this.inputPassword).setValue(password);
    await (await this.btnSubmit).click();
  }

  /**
   * overwrite specifc options to adapt it to page object
   */
  open () {
    return super.open('login');
  }
}

module.exports = new LoginPage();
```

◦ **pageobjects/secure-page.js**

```
const Page = require('./page');

/**
 * sub page containing specific selectors and methods for a specific page
 */
class SecurePage extends Page {
  /**
   * define selectors using getter methods
   */
  get flashAlert () { return $('#flash') }
}

module.exports = new SecurePage();
```

- **features/login.feature:** Cucumber .feature files, containing the tests as Gherkin Scenario(s)/Scenario Outline(s). Please note that each "Feature: <...>" section should be tagged with the issue key of the corresponding "requirement"/story in Jira. You may need to add a prefix (e.g. "REQ_") before the issue key, depending on an [Xray global setting](#).

o features/login.feature

@REQ_XT-225

Feature: Login feature

Scenario: Test Login feature

Scenario Outline: As a user, I can log into the secure area

Given I am on the login page

When I login with <username> and <password>

Then I should see a flash message saying <message>

Examples:

message		username		password	
into a secure area!		tomsmith		SuperSecretPassword!	You logged
is invalid.		foobar		barfoo	Your username

Before running the tests in the CI environment, you need to import your .feature files to Xray/Jira; you can invoke the REST API directly or use one of the available plugins/tutorials for CI tools.

example of a shell script to import/synchronize Scenario(s)/Background(s) from .features to Jira and Xray

```
#!/bin/bash
```

```
JIRA_BASEURL=https://192.168.0.168
```

```
JIRA_USERNAME=admin
```

```
JIRA_PASSWORD=admin
```

```
PROJECT=XT
```

```
FILE=features.zip
```

```
zip -r $FILE features/ -i \*.feature
```

```
curl -H "Content-Type: multipart/form-data" -u $JIRA_USERNAME:$JIRA_PASSWORD -F "file=@$FILE" "$JIRA_BASEURL/rest/raven/1.0/import/feature?projectKey=$PROJECT"
```



Please note


Each Scenario of each .feature will be created as a Test issue that contains unique identifiers, so that if you import once again then Xray can update the existent Test and don't create any duplicated tests.

Afterward, you can export those features out of Jira based on some criteria, so they are properly tagged with corresponding issue keys; this is important because results need to contain these references.

You can then export the specification of the test to a Cucumber .feature file via the REST API, or the **Export to Cucumber** UI action from within the Test /Test Execution issue or even based on an existing saved filter. A plugin for your CI tool of choice can be used to ease this task.

So, you can either:

- use the UI


Xray Tutorials / XT-226

Test Login feature

Edit
Comment
Assign
More
To Do
In Progress
Done
Admin

Details

Type: Test
Priority: Trivial
Labels: None

Description

Click to add description

Test Details

Type: Cucumber
Scenario Type: Scenario
Scenario: Given I am logged in
When I log in with my username and password
Then I should see the login message

Pre-Conditions

This test is not associated with Pre-Conditions

Test Sets

This test is not associated with Test Sets

Log work
Agile Board
Rank to Top
Rank to Bottom
Archive
Attach files
Attach Screenshot
Voters
Stop watching
Watchers
Create sub-task
Convert to sub-task
Move
Link
Clone
Labels
Delete
Reset TestRunStatus
Export to Cucumber
Export Test to XML
Export Test Runs to CSV

Status: TO DO (View Workflow)
Resolution: Unresolved

```

Given I am logged in
When I log in with my username and password
Then I should see the login message

Example:
| username | password | message |
| admin    | 123456   | You logged into a secure area! |
| invalid  | 123456   | Your username is invalid!      |

```

Edit Steps

Create Pre-Condition
Associate Pre-Conditions

Associate Test Sets

- use one of the available CI/CD plugins (e.g. see an example of [Integration with Jenkins](#))

For CI only purposes, we will export the features to a new temporary directory named `features/` on the root folder of your project. Please note that while implementing the tests, `.feature` files should be edited inside their respective folder.

features/1_COM_19.feature

@REQ_XT-225

Feature: Login feature

@TEST_XT-226

Scenario Outline: As a user, I can log into the secure area

Given I am on the login page

When I login with <username> and <password>

Then I should see a flash message saying <message>

Examples:

username	password	message
tomsmith	SuperSecretPassword!	You logged into a secure area!
foobar	barfoo	Your username is invalid.

To run the tests and produce Cucumber JSON reports(s), we will use the following command:

```
npx wdio run ./wdio.conf.js
```

This will produce one Cucumber JSON report in `.tmp/json` directory per each `.feature` file.

After running the tests, results can be imported to Xray via the REST API, or the **Import Execution Results** action within the Test Execution, or by using one of the available CI/CD plugins (e.g. see an example of [Integration with Jenkins](#)).

Example of shell script to import results (e.g. `import_results_cloud.sh`)

```
#!/bin/bash
```

```
JIRA_BASEURL=https://192.168.0.168
```

```
JIRA_USERNAME=admin
```

```
JIRA_PASSWORD=admin
```

```
curl -H "Content-Type: application/json" -X POST -u $JIRA_USERNAME:$JIRA_PASSWORD --data @"./tmp/json/login-  
feature.json" $JIRA_BASEURL/rest/raven/2.0/import/execution/cucumber
```



Which Cucumber endpoint/"format" to use?

To import results, you can use two different endpoints/"formats" (endpoints described in [Import Execution Results - REST](#)):

1. the "standard cucumber" endpoint
2. the "multipart cucumber" endpoint

The standard cucumber endpoint (i.e. `/import/execution/cucumber`) is simpler but more restrictive: you cannot specify values for custom fields on the Test Execution that will be created. This endpoint creates new Test Execution issues unless the Feature contains a tag having an issue key of an existing Test Execution.

The multipart cucumber endpoint will allow you to customize fields (e.g. Fix Version, Test Plan) if you wish to do so, on the Test Execution that will be created. Note that this endpoint always creates new Test Executions (as of Xray v4.2).

In sum, if you want to customize the Fix Version, Test Plan and/or Test Environment of the Test Execution issue that will be created, you'll have to use the "multipart cucumber" endpoint.

A new Test Execution will be created (unless you originally exported the Scenarios/Scenario Outlines from a Test Execution).



Execution results [1624004965566]

[Edit](#) [Comment](#) [Assign](#) [More](#) [To Do](#) [In Progress](#) [Done](#) [Admin](#)

Details

Type: Test Execution Status: **TO DO** ([View Workflow](#))
Priority: Trivial Resolution: Unresolved
Labels: None
Test Plan: None
Test Environments: None

Description

[Click to add description](#)

Tests

[+ Add](#)

Overall Execution Status



1 FAIL

Total Tests: 1

[Filter\(s\)](#)



[Apply Rank](#)

Show entries

[Columns](#)

	Rank	Key	Summary	Test Type	#Req	#Def	Assignee	Status	
<input type="checkbox"/>	1	XT-142	login feature	Cucumber	1	0	Xpand IT Admin	FAIL	▶ ...

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#) [Next](#) [Last](#)

One of the tests fails (on purpose).

The execution screen details of the Test Run will provide overall status information and Gherkin statement-level results, therefore we can use it to analyse the failing test.



Test Details

Test Type: Cucumber

Scenario Type: Scenario Outline

Scenario:

```

1 Given I am on the login page
2 When I login with <username> and <password>
3 Then I should see a flash message saying <message>
4
5 Examples:
6 | username | password | message |
7 | tomsmith | SuperSecretPassword! | You logged into a secure area! |
8 | foobar | barfoo | Your username is invalid. |

```

Examples

<username>	<password>	<message>	Duration	Status
▶ tomsmith	SuperSecretPassword!	You logged into a secure area!	3861.000 ms	PASS
▶ foobar	barfoo	Your username is invalid.	10952.000 ms	FAIL

Examples

<username>	<password>	<message>	Duration	Status
▶ tomsmith	SuperSecretPassword!	You logged into a secure area!	3861.000 ms	PASS
▼ foobar	barfoo	Your username is invalid.	10952.000 ms	FAIL

Steps

Before	2.000 ms	PASS
Given I am on the login page	166.000 ms	PASS
When I login with foobar and barfoo	484.000 ms	PASS
Then I should see a flash message saying Your username is invalid.	10036.000 ms	FAIL

Error: Expect \$('flash') to have text containing

```

- Expected - 1
+ Received + 2

```

```

- Your username is invalid.
+ Your username is invalid!
+ x

```

```

at World.<anonymous> (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/features/step-definitions/steps.js:22:41)
at processTicksAndRejections (internal/process/task_queues.js:93:5)
at World.executeAsync (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/shim.js:136:16)
at World.testFrameworkFnWrapper (/Users/cristianocunha/Documents/Projects/cucumber_webdriverio/node_modules/@wdio/utils/build/test-framework/testFnWrapper.js:52:18)

```

After	(1) 263.000 ms	PASS
After	1.000 ms	PASS

Results are reflected on the covered item (e.g. Story). On its issue screen, coverage now shows that the item is OK based on the latest testing results, that can also be tracked within the Test Coverage panel below.



login feature

[Edit](#) [Comment](#) [Assign](#) [More](#) [To Do](#) [In Progress](#) [Done](#) [Admin](#)

Details

Type: [Story](#) Status: **TO DO** ([View Workflow](#))
Priority: [Trivial](#) Resolution: Unresolved
Labels: None
Requirement Status: **NOK**

Description

[Click to add description](#)

Test Coverage

[Create Test](#) [Create Sub-Test Execution](#) [+ Link](#)

TEST COVERAGE FOR THE FOLLOWING ANALYSIS SCOPE

Scope: Version; Version: None - latest execution; Environment: All Environments

NOK[Filter\(s\)](#)Show [10](#) entries Columns

P	Status	Resolution	Key	Summary	Test Runs	Test Status
<input type="checkbox"/>	TO DO	Unresolved	XT-142	login feature		FAIL

Showing 1 to 1 of 1 entries

[First](#) [Previous](#) [1](#) [Next](#) [Last](#)

If we change the specification (i.e. the Gherkin scenarios), we need to import the .feature(s) once again.

Therefore, in the CI we always need to start by importing the .feature file(s) to keep Jira/Xray on synch.

FAQ and Recommendations

Please see [this page](#).

References

- [WebDriverIO](#)
- [WebDriverIO documentation](#)