Automated testing of your Angular front-end

by Jago de Vreede and Robert Zwerus

devCON

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Agenda

- Introduction
- About UI testing
- Why does it fail so often?
- What makes it a success?
- Architecture of demo app
- Live demo
- Running on CI server
- Conclusions

Presentation and sources available at:
https://github.com/Japio007/ProtractorDemo

Quick question? Just ask!

About us

Robert Zwerus

Jago de Vreede

http://www.luminis-technologies.com/

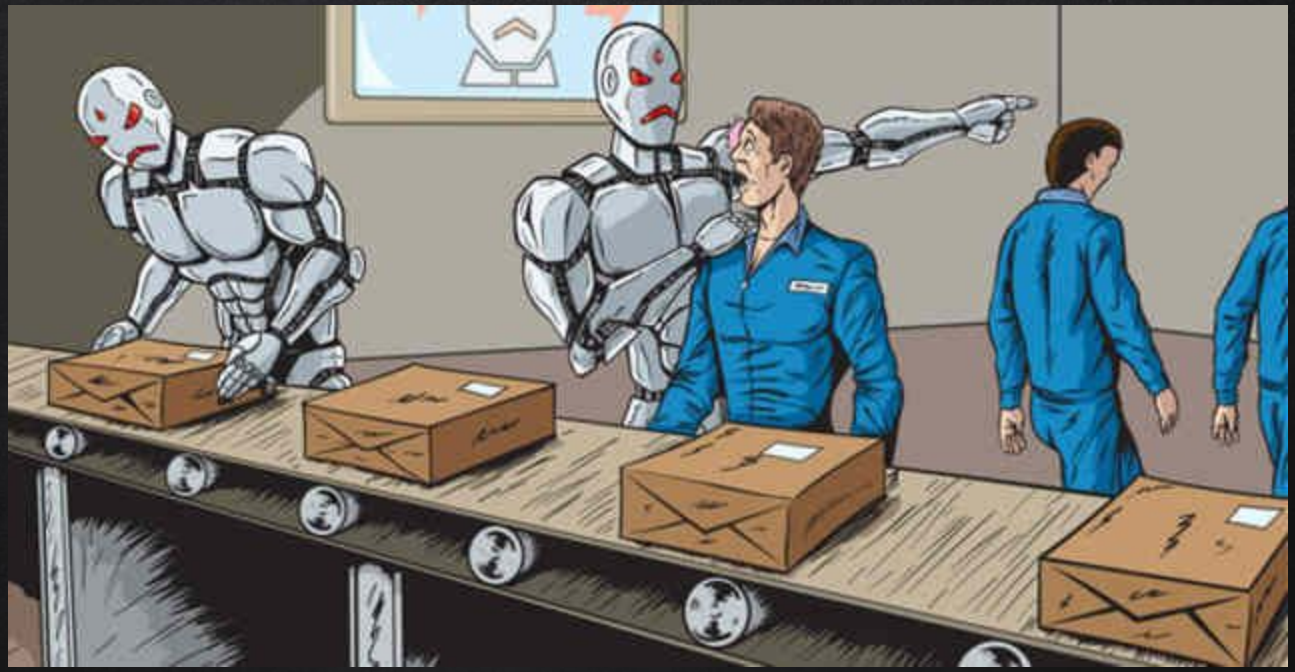
UI testing (a.k.a. automated testing, end2end testing)

Test the entire system like a user would: by interacting with the front-end

Can serve as a quick test to see if anything got broken between deployments

UI testing: why does it fail so often?

The machine can do only so much



The machine can do only so much

Just Todo It Home Register Login Not logged in

Home

Welcome to Just Todo It!

The machine can do only so much

Just Todo It

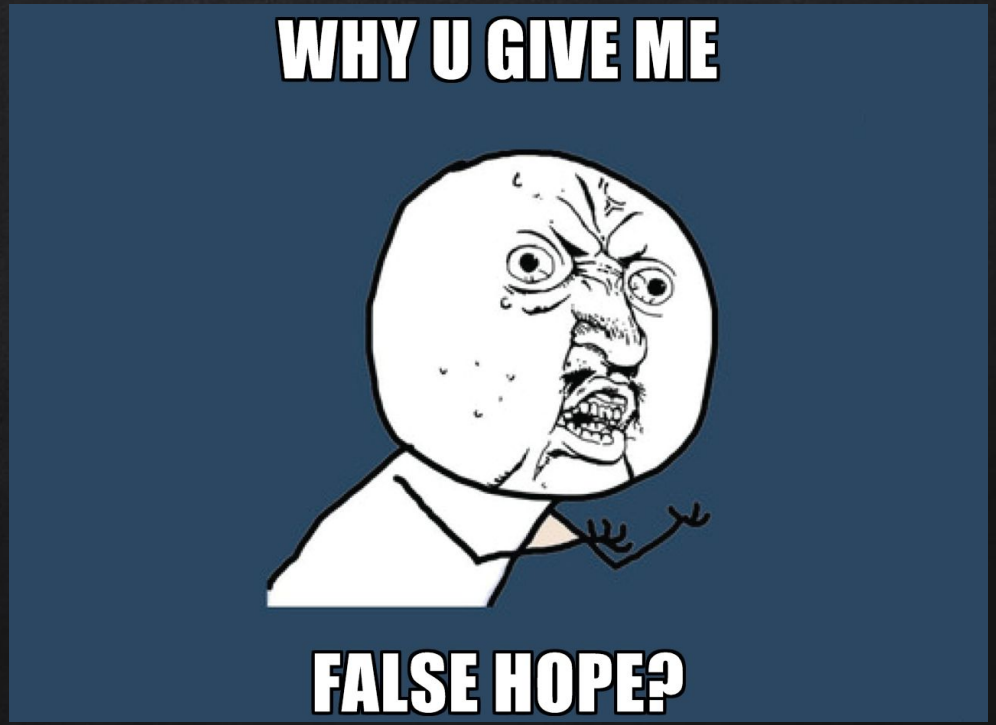
- Home
- Register
- Login

- **Not logged in**
  - Sign In

Home

Welcome to Just Todo It!

UI TESTING: WHY DOES IT FAIL SO OFTEN?



More reasons for failure

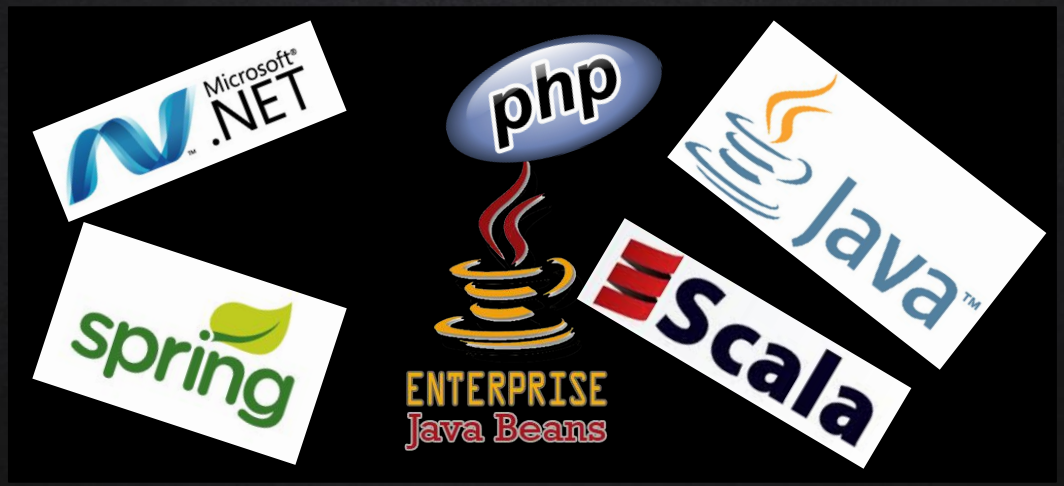
- Almost every change breaks a test -> coupling too tight
- Not ran often enough -> failures ignored
- Recording tests from browser hardly works

UI testing: what makes it a success?

- Integrated in dev workflow
- Integrated on CI server, run after each commit/PR merge
- Suite runs quickly
- Easy to pinpoint cause of errors

HIGH LEVEL ARCHITECTURE

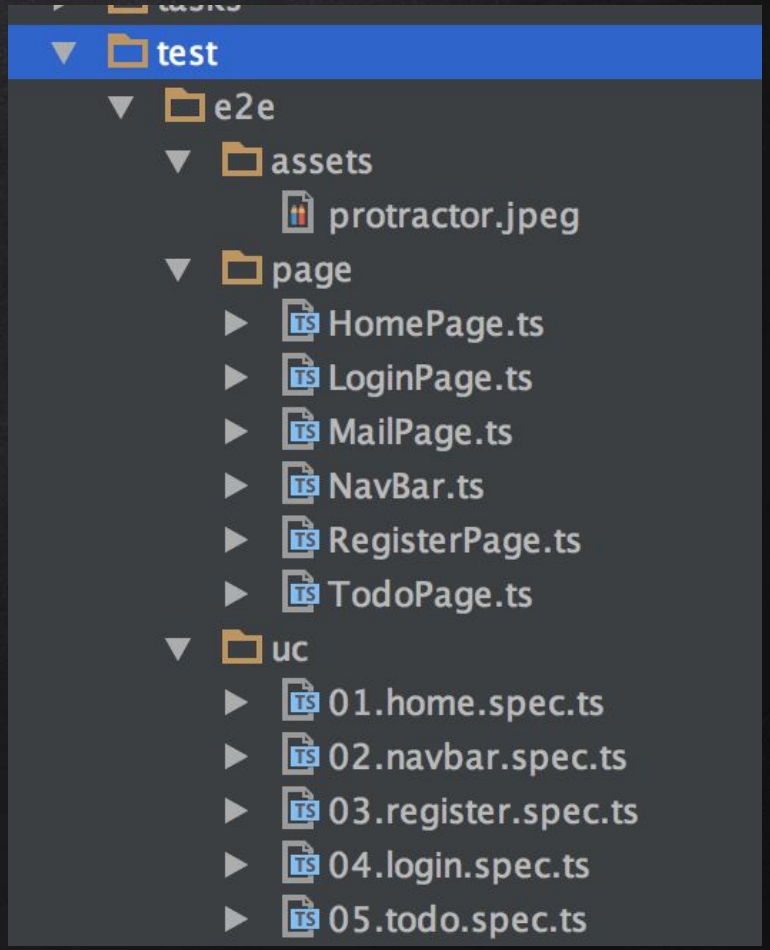
HTML, Angular, TypeScript



TypeScript

- ECMAScript 6
- Compiles to JavaScript
- Compile-time type checking
- Code completion

Test structure



Page objects

- Encapsulate information about a page
- Reusable
- Decouple the tests from implementations

Without page objects

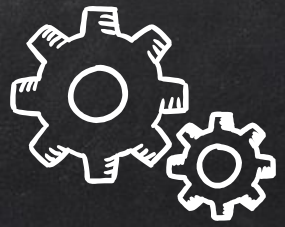
```
describe('Todo page', () => {
    let todoLists = element.all(by.repeater('todoList in todolistCtrl.todos'));

    it('should have one todo list with zero items', () => {
        expect(todoLists.get(0).all(by.xpath('.//ul/li')).count()).toEqual(0);
    });

    it('should be able to add a todo item', () => {
        let inputField = this.todoLists
            .get(0)
            .element(by.model('todoList.todo.name'));
        inputField.clear();
        inputField.sendKeys('test');

        todoLists.get(0).element(by.css('button.btn-primary')).click();
        expect(this.todoLists.get(0).all(by.xpath('.//ul/li')).count()).toEqual(1);
    });
});
```

With page objects

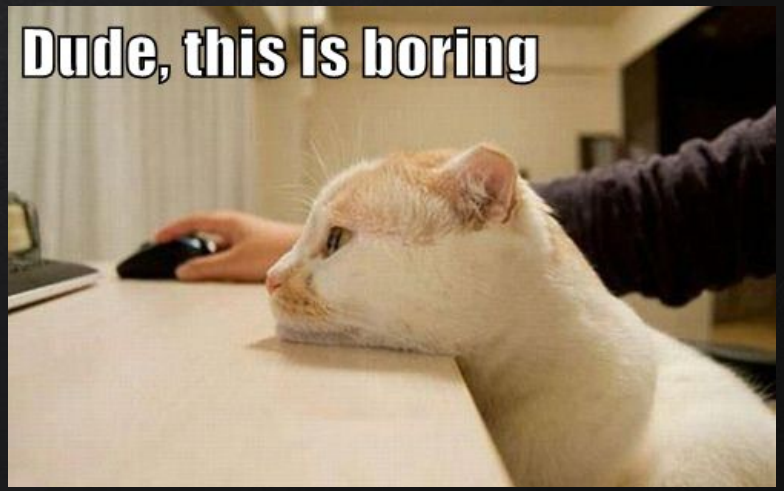
```
import TodoPage = require('../page/TodoPage');

describe('Todo page', () => {
    let todo: TodoPage = new TodoPage();

    it('should have one todo list with zero items', () => {
        expect(todo.getTodos(0).count()).toEqual(0);
    });

    it('should be able to add a todo item', () => {
        todo.addTodoItem(0, 'test todo');
        expect(todo.getTodos(0).count()).toEqual(1);
    });
});
```

With page objects

```
class TodoPage {
    addList = element(by.id('addNewList'));
    todoLists = element.all(by.repeater('todoList in todolistCtrl.todos'));

    getTodos(todoListIndex: number) {
        return this.todoLists.get(todoListIndex).all(by.xpath('.//ul/li'));
    }

    addTodoItem(todoListIndex: number, todoItemDescription: string) {
        let inputField = this.todoLists
            .get(todoListIndex)
            .element(by.model('todoList.todo.name'));
        inputField.clear();
        inputField.sendKeys(todoItemDescription);

        this.todoLists.get(todoListIndex).element(by.css('button.btn-primary')).click();
    }
}

export = TodoPage;
```



Demo time!



10 Minute Mail

Welcome to 10 Minute Mail

Beat spam with the best disposable e-mail service.

c529413@trbvn.com is your temporary e-mail address.

Click here to copy this e-mail address to your clipboard

c529413@trbvn.com

Your e-mail address will expire in 10 minutes.
I need more time! Give me 10 more minutes!

You currently have 0 messages.

```
▼<form id="addyForm" name="addyForm" method="post" action="/10MinuteMail/index.html" enctype="application/x-www-form-urlencoded">
    <input type="hidden" name="addyForm" value="addyForm">
    <input id="addyForm:addressSelect" type="text" name="addyForm:addressSelect" value="b3299382@trbvn.com" size="30" style="font-s
    <input type="hidden" name="javax.faces.ViewState" id="javax.faces.ViewState" value="j_id38471">
  </form>
```

Messages:

Read	From	Subject	Preview	Date

Choose Your Language:

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10 Minute Mail

Welcome to 10 Minute Mail

Beat spam with the best disposable e-mail service.

c529413@trbvn.com is your temporary e-mail address.

Click here to copy this e-mail address to your clipboard

c529413@trbvn.com

Your e-mail address will expire in 8 minutes.
I need more time! Give me 10 more minutes!

You currently have 0 messages.

```
<br>
▶ <h2>…</h2>
▼ <table xmlns="http://www.w3.org/1999/xhtml" id="emailTable" width="700px">
  ▶ <thead>…</thead>
  ▼ <tbody>
    ▼ <tr>
      ▶ <td>…</td>
        <td>r.zwerus@gmail.com</td>
      ▼ <td>
          <a href="/10MinuteMail/index.html?
          dataModelSelection=message%3Aemails%5B0%5D&actionMethod=index.xhtml%3AmailQueue.select" id=
          "emailTable:0:j_id37">Please activate your Just Todo It account</a> == $0
        </td>
        <td></td>
        <td>Apr 17, 2016 4:46:01 AM</td>
      </tr>
```

Messages:

Read	From	Subject	Preview	Date
☐	r.zwerus@gmail.com	Please activate your Just Todo It account		Apr 17, 2016 4:09:01 AM

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Read

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Reply To This Email

Forward

From: r.zwerus@gmail.com
Date: Apr 17, 2016 4:09:01 AM
Subject: Please activate your Just Todo It account

Thanks for signing up! Please open the following link to activate your account:

Activate

If you did not sign up, please ignore this email.

```
▶ <div id="row250">…</div>
  <div style="clear:both"></div>
  <br>
  "Thanks for signing up! Please open the following link to activate
  your account:"
  <br>
  <br>
  <a id="activation-link-protractor-demo" href="http://127.0.0.1:
  8080/login/activate?username=c529413&activationtoken=01c19889-40a9-
  4ecc-86dd-38872842832f">Activate</a> == $0
  <br>
  <br>
```

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How about Angular 2?

- Written in TypeScript
- Created similar Todo app in Angular 2
- Wrote some specs for it, works fine!

```
allScriptsTimeout: 30000,
useAllAngular2AppRoots: true
```

Continuous integration

Requirements:

- App running somewhere
- Job on CI server
- Hosted browser(s) somewhere

Job details | Tasks | Requirements | Artifacts | Miscellaneous

Tasks

A task is a piece of work that is being executed as part of the build. The execution of a script, a shell command, an Ant Task or a Maven goal a

You can use runtime, plan and global variables to parameterize your tasks.

- Source Code Checkout
  Checkout Default Repository
- Script
  start coverage session
- Script
  Perform resetdb
- **Gradle**
  Protractor testrun against Saucelabs (Chrome only)

Final tasks Are always executed even if a previous task fails

- Script
  end coverage session
- Script
  Perform resetdb

Add task

Gradle configuration

Task description

Protractor testrun against Saucelabs (Chrome only)

☐ Disable this task

Executable*

Gradle 2.0 | Add new executable

Script location

File

Script

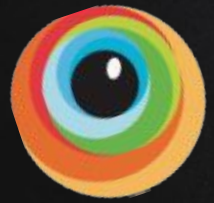
(Optional) Defaults to build.gradle.

Tasks

protractorserverChrome

Hosted browsers

BrowserStack



Sauce Labs

TestingBot

BrowserStack

BrowserStack Live Automate More Docs Help Account

Username and Access Keys +

Parallel tests running: 0 / 1 Add more

Project: All

Search builds or sessions

BrowserStack - Live Web-Based Cross Browser Testing

Build : Smoke tests 100
Project: Yunoo.me
Started: about 1 month ago,
Duration: 41 days 9 hrs 44 mins 46 secs

Build : Manual tests 3
Project: Yunoo.me
Started: about 1 month ago,
Duration: 5 mins 22 secs

Build: Smoke tests

DELETE

Project: Yunoo.me

Started: 08:17 UTC 19 Feb 2016
Duration: 41 days 9 hrs 44 mins 46 secs
Session info: 44 completed , 56 error

Session Matrix

Session	OS	Browser / Device	Duration	Finished
Automated Yunoo.me | Google Chrome latest | OS X 10.9	OS X Mountain Lion	Chrome 49.0	12 mins 25 secs	about 20 hours ago
Automated Yunoo.me | Google Chrome latest | OS X 10.9	OS X Mountain Lion	Chrome 49.0	12 mins 25 secs	about 22 hours ago
Automated Yunoo.me | Google Chrome latest | OS X 10.9	OS X Mountain Lion	Chrome 49.0	15 mins 4 secs	1 day ago
Automated Yunoo.me | Google Chrome latest | OS X 10.9	OS X Mountain Lion	Chrome 49.0	9 mins 31 secs	1 day ago

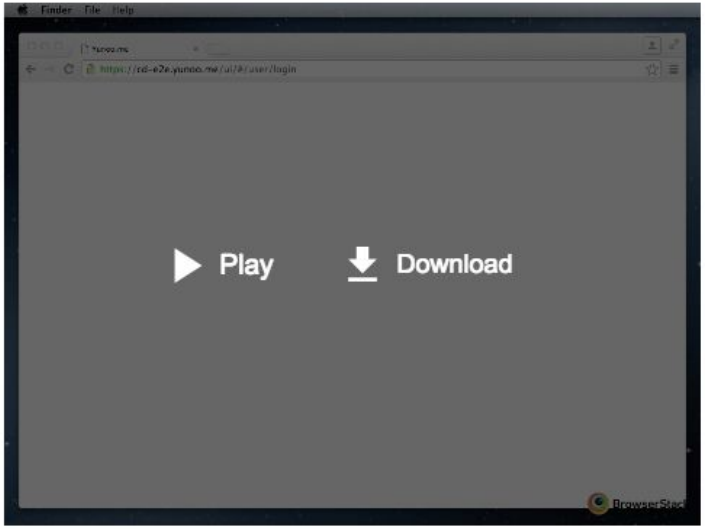
Session: Automated Yunoo.me | Google Chrome latest | OS X 10.9

DELETE SESSION

Project: Yunoo.me, Build: Smoke tests

Started	17:49 UTC 31 Mar 2016
Duration	12 mins 25 secs
Status	Completed (Marked via REST API)
Platform	OS X Mountain Lion
Browser	Chrome 49.0
Local testing	False
User name	Luminis Technologies

Input Capabilities Browser Capabilities



Text Logs | **Visual Logs**

Raw Logs

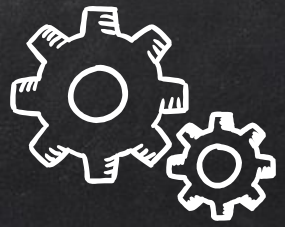
Start	Duration	Action	Expand all
00:00	4	Starting Browser	
00:04	0	Setting timeout for asynchronous scripts 20000	+
00:04	0	Configure the amount of time that a particular type of operation can execute for before they are aborted and a |Timeout| error is returned to the client.	
00:04	2	Open URL https://cd-e2e.yunoo.me/ui/#/user/login	+

test outside app boundaries is possible

use smart, reusable locators

specs independent of each other

tests are code, so think about test structure



No more excuses
GET TESTING!

- Investment pays itself back in the long run
- Even with low test coverage
- Sometimes already while writing the tests

Thanks, any questions?

Presentation and sources available at:

https://github.com/Japio007/ProtractorDemo

Don't forget to vote!