# Angular Testing

*... but faster*

**Sections in this chapter:**

1. Welcome
2. Why this talk?
3. Identifying what to test
4. Shallow rendering
5. Getting simpler
6. Getting faster

1-1. Welcome

## Stephen Lau

1-1-1

Background in driver and graphics programming for the mobile industry.

Have spent the last few years working at Edument.

Lots of travel to China as well as teaching and consulting in Sweden and Germany.

1-1-2

1-2. Why this talk?

## Why This talk

- Currently consulting on an Angular project
  - Testing needed to be improved
  - Unit testing took > 3 min
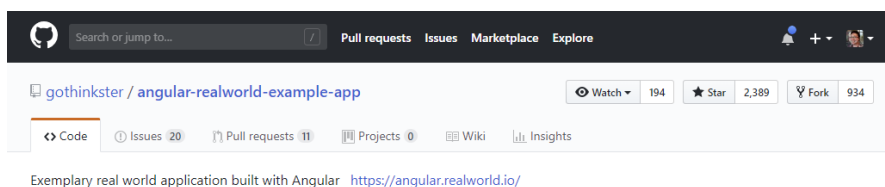- Difficult to find "good" examples

## Lets look for some good tests!

## 25 Amazing Angular Open Source Projects for the Past Year (v.2018)

**For the past year**, we've compared nearly 2,500 Angular open source projects to pick Top 25 (1% chance).

- *angular-realworld-example-app*
- *yatrum* - Travel guides (Ng 4.0.0)
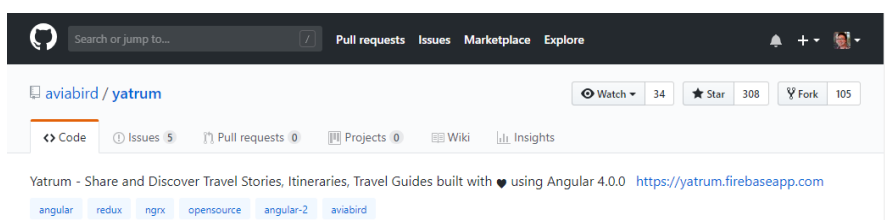- *echoes-player* - Media player for YouTube (Ng +6)
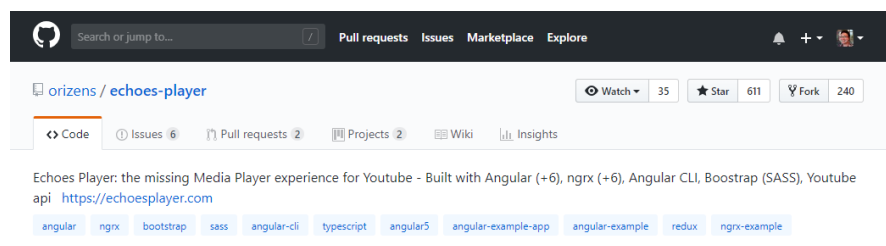- *Angular.io*

```
stephen@ubuntu-vm:~/code/ng-test-talk/yatrum$ npm test

> Yatrum@1.0.0 test /home/stephen/code/ng-test-talk/yatrum
> ng test

10 11 2018 13:01:04.286:ERROR [config]: Error in config file!
{ Error: Cannot find module 'karma-remap-istanbul'
    at Function.Module._resolveFilename (module.js:543:15)
    at Function.Module._load (module.js:470:25)
    at Module.require (module.js:593:17)
    at require (internal/module.js:11:18)
    at module.exports (/home/stephen/code/ng-test-talk/yatrum/karma.conf.js:11:7)
    at Object.parseConfig (/home/stephen/code/ng-test-talk/yatrum/node_modules/karma/lib/config.js:396:5)
    at new Server (/home/stephen/code/ng-test-talk/yatrum/node_modules/karma/lib/server.js:56:20)
    at Promise (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/tasks/test.js:45:33)
    at new Promise (<anonymous>)
    at Class.run (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/tasks/test.js:23:16)
    at Class.run (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/commands/test.js:122:25)
    at resolve (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/models/command.js:2
61:20)
    at new Promise (<anonymous>)
    at Class.validateAndRun (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/models
/command.js:240:12)
    at Promise.resolve.then.then (/home/stephen/code/ng-test-talk/yatrum/node_modules/@angular/cli/ember-cli/lib/c
li/cli.js:140:24)
    at <anonymous> code: 'MODULE_NOT_FOUND' }
npm ERR! Test failed.  See above for more details.
stephen@ubuntu-vm:~/code/ng-test-talk/yatrum$
```
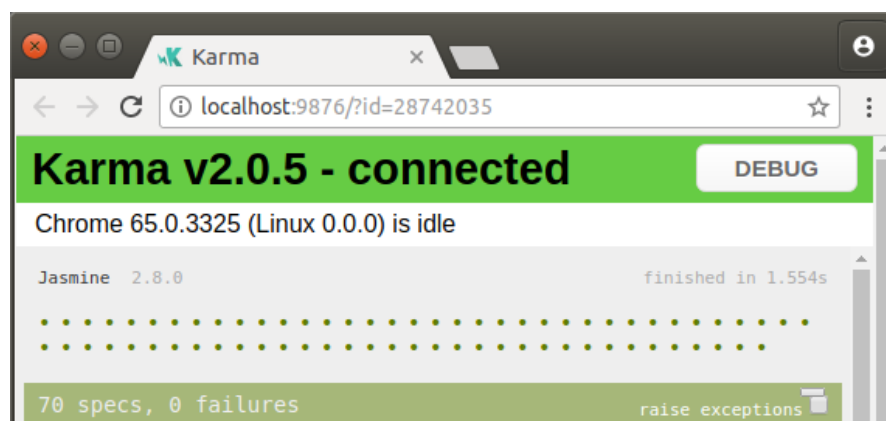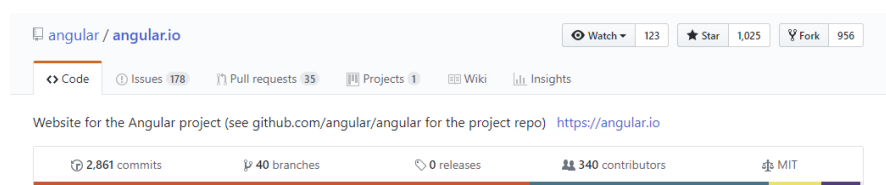
Search or jump to...    Pull requests   Issues   Marketplace   Explore

orizens / **echoes-player**    Watch ▾ 35   ★ Star 611   Fork 240

<> Code   ⓘ Issues 6   Pull requests 2   Projects 2   Wiki   Insights

Echoes Player: the missing Media Player experience for Youtube - Built with Angular (+6), ngrx (+6), Angular CLI, Boostrap (SASS), Youtube api  https://echoesplayer.com

angular   ngrx   bootstrap   sass   angular-cli   typescript   angular5   angular-example-app   angular-example   redux   ngrx-example

Karma    ×

← → C   ⓘ localhost:9876/?id=28742035   ☆   ⋮

**Karma v2.0.5 - connected**    DEBUG

Chrome 65.0.3325 (Linux 0.0.0) is idle

Jasmine  2.8.0                              finished in 1.554s

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70 specs, 0 failures                       raise exceptions

angular / **angular.io**    Watch ▾ 123   ★ Star 1,025   Fork 956

<> Code   ⓘ Issues 178   Pull requests 35   Projects 1   Wiki   Insights

Website for the Angular project (see github.com/angular/angular for the project repo)  https://angular.io

⊙ 2,861 commits   ⑂ 40 branches   ◇ 0 releases   ⚌ 340 contributors   ⚖ MIT

```
stephen@ubuntu-vm: ~/code/ng-test-talk/angular.io
File Edit View Search Terminal Tabs Help
stephen@ubuntu-v...   stephen@ubuntu-v...   stephen@ubuntu-v...   stephen@ubuntu-v...   stephen@ubuntu-v...
stephen@ubuntu-vm:~/code/ng-test-talk/angular.io$ npm test

> angular.io@0.0.0 test /home/stephen/code/ng-test-talk/angular.io
> echo "Error: no test specified" && exit 1

Error: no test specified
npm ERR! Test failed.  See above for more details.
stephen@ubuntu-vm:~/code/ng-test-talk/angular.io$
```
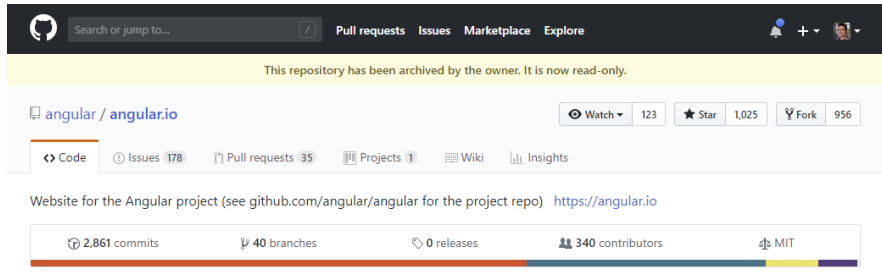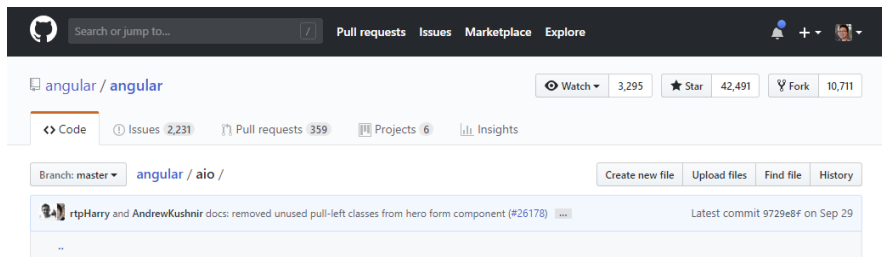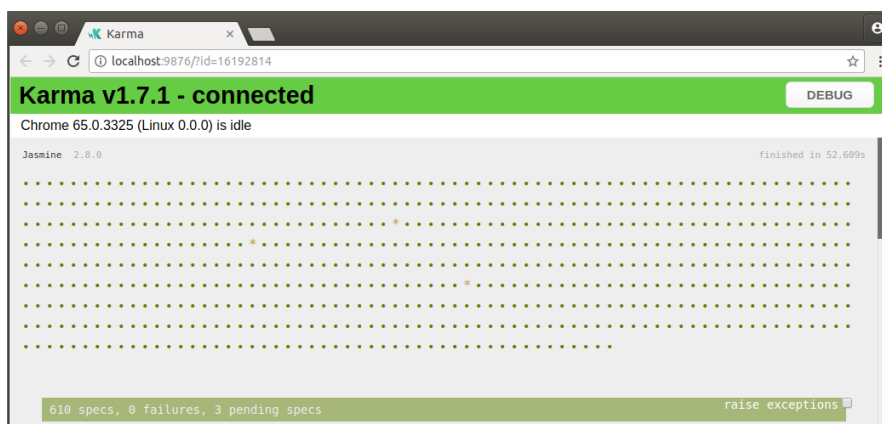
## Demo

Karma

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### 1-3. Identifying what to test

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## Today we'll focus on:

- **Component unit tests**

## We'll leave these alone:

- Service unit tests
- Integration tests
- E2E tests
- Manual testing

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```
it('should instantiate ok', () => {
  expect(instance).to.exist;
});
```
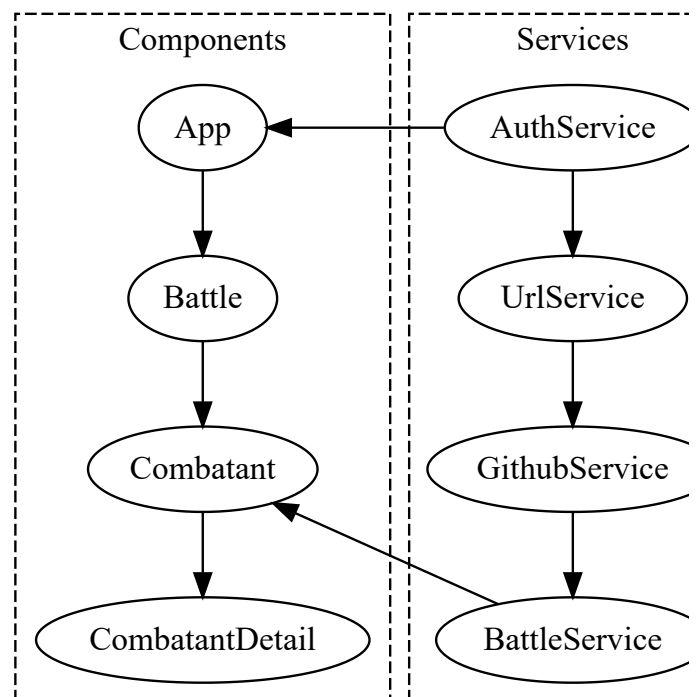
## A simpler example:

http://githubbattle.netlify.com/

```
return forkJoin(user$, repo$).pipe(map( ([user,list]) => {
  const cheat = user.login === 'toshi38';
  if(cheat) {
    console.log("This user is Stephen! Entering cheating mode!")
  }
};
```

```
<App>
  <Battle>
    <Combatant>
      <CombatantDetail>
    </Combatant>
  </Battle>
</App>
```



## Components are our units!

Test the API

**Avoid Fingerprinting**

Battle component

## Our current list

- Uses child components correctly
  - **Inputs []**
  - **Outputs ()**
  - **In/Out [()]**

## Combatant component

## New Additions:

- Component API
  - **Output `@Output`**
- Dependencies
  - **Found in `constructor()`**
- Template Logic
  - **Conditional rendering... etc**

## Our Testing List

### Child Components:

- Inputs []
- Outputs ()
- In/Out [()]
- @ViewChild
- local variable #

### Template Logic

### Dependencies:

- Check constructor()

### Inputs/Outputs:

- @Input()
- @Output()

## How to test:

A.io - Component interaction

A.io - Testing

```
1-4. Shallow rendering
```

```
<App>
  <Battle>
    <Combatant>
      <CombatantDetail>
    </Combatant>
  </Battle>
</App>
```

```
Components          Services

    App  ◄────────  AuthService
     │                  │
     ▼                  ▼
  Battle            UrlService
     │                  │
     ▼                  ▼
  Combatant ◄──    GithubService
     │        \        │
     ▼         \       ▼
  CombatantDetail   BattleService
```
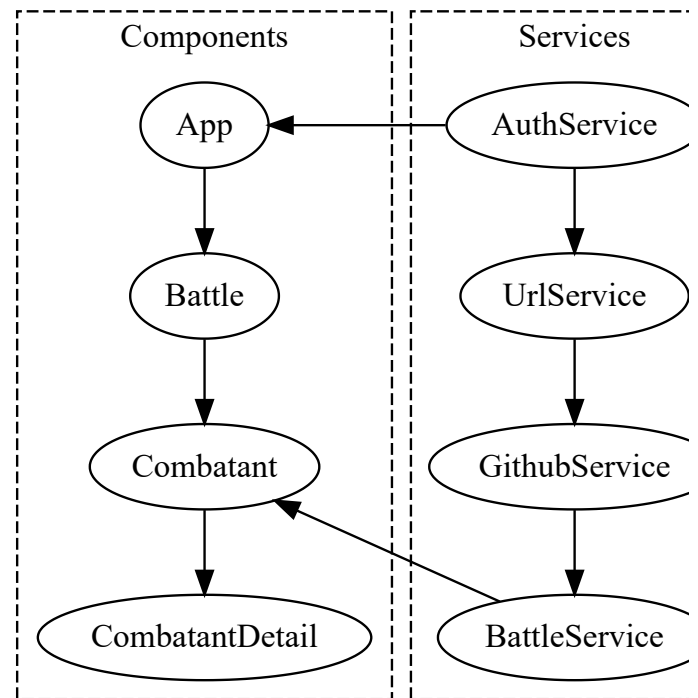
## Battle Component Spec

1-4-2

```typescript
@Component({
  selector: 'combatant',
  template: ''
})
class FakeCombatant {
  @Output() stars = new EventEmitter<number>()
}


const testModuleConfig = {
  imports: [CommonModule],
  declarations: [BattleComponent, FakeCombatant]
}
```

1-4-3

## Emitting Output

```typescript
//Find
let combatant1: FakeCombatant = debugElement
                        .query(By.css('combatant'))
                        .componentInstance;
combatant1.stars.emit(456);
```

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# No Errors

```
const testModuleConfig = {
  imports: [CommonModule],
  declarations: [AppComponent],
  schemas: [NO_ERRORS_SCHEMA],
  providers: [{provide: AuthService, useValue: fakeAuthService}]
}


describe('When logged in', () => {
  it('should render a battle component', () => {
      expect(nativeElement.querySelector('battle')).to.exist;
  });
})
```

# ng-mocks

# ng-mocks Battle Component Spec

```
import { MockComponent, MockedComponent } from 'ng-mocks';

const testModuleConfig = {
  imports: [CommonModule],
  declarations: [BattleComponent, MockComponent(CombatantComponent)]
}


//Find
let combatant1: MockedComponent<CombatantComponent> = debugElement
                                     .query(By.css('combatant'))
                                     .componentInstance;
combatant1.stars.emit(456);
```

# Mocking Services

```
const fakeBattleServiceObservable = {
  subscribe: sinon.stub()
};

const fakeBattleService = {
  battleInfoForUser: sinon.stub().returns(fakeBattleServiceObservable)
};


const testModuleConfig = {
  imports: [FormsModule, CommonModule],
  declarations: [
    CombatantComponent, MockComponent(CombatantDetailComponent)
  ],
  providers: [{provide: BattleService, useValue: fakeBattleService}]
}
```
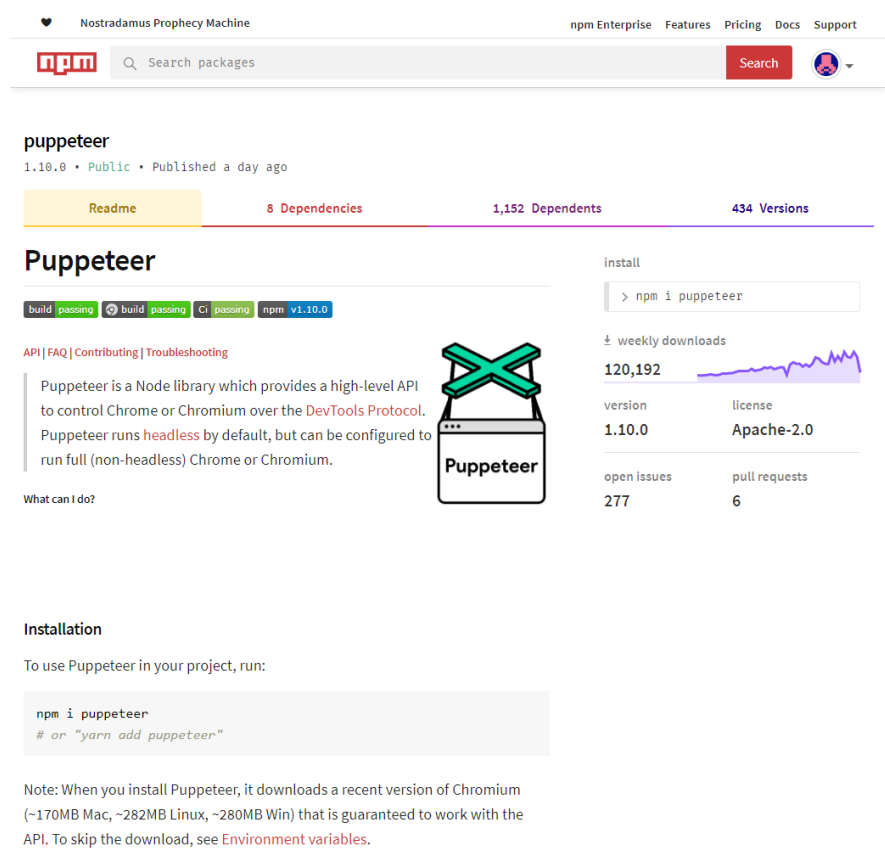
> ## 1-5. Getting simpler

Karma has a **browser** dependency.

```
diff --git a/aio/package.json b/aio/package.json
index 885efc4..4c1ee2c 100644
--- a/aio/package.json
+++ b/aio/package.json
@@ -143,6 +143,7 @@
     "protractor": "^5.2.0",
+    "puppeteer": "^1.10.0",
     "rehype": "^6.0.0",
diff --git a/aio/src/karma.conf.js b/aio/src/karma.conf.js
index 0d2fed3..4f90298 100644
--- a/aio/src/karma.conf.js
+++ b/aio/src/karma.conf.js
@@ -1,6 +1,9 @@
 // https://karma-runner.github.io/1.0/config/configuration-file.html
+process.env.CHROME_BIN = require('puppeteer').executablePath();
 module.exports = function (config) {
   config.set({
@@ -25,14 +28,8 @@ module.exports = function (config) {
     autoWatch: true,
-    browsers: ['CustomChrome'],
+    browsers: ['ChromeHeadless'],
     singleRun: false,
```

## Demo

Puppeteer

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1-6. Getting faster

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## jestjs.io
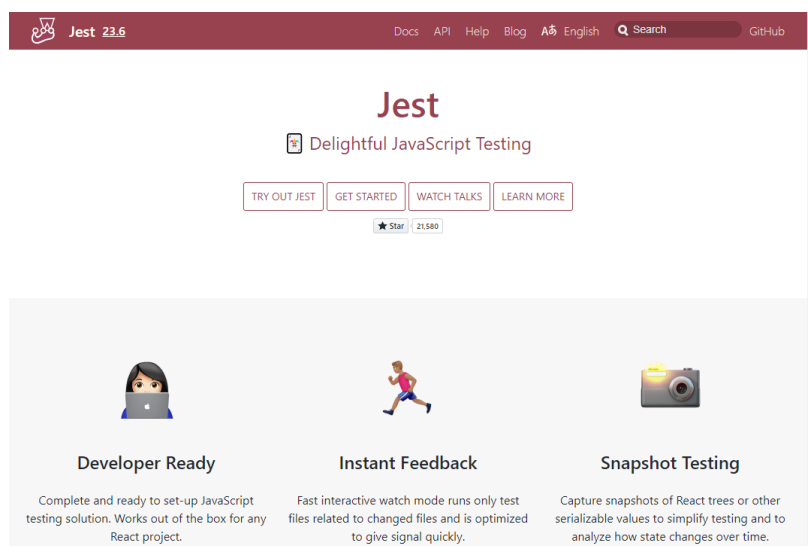
## Install Jest

```
yarn add --dev jest jest-preset-angular @types/jest
```

## jest.config.js

```js
module.exports = {
  preset: "jest-preset-angular",
  roots: ['src'],
  setupTestFrameworkScriptFile: "<rootDir>/src/setupJest.ts",
  moduleNameMapper: {
    'testing/(.*)': '<rootDir>/src/testing/$1'
  }
};
```

## setupJest.ts

```ts
import 'jest-preset-angular';
import './jestGlobalMocks';
```

# jestGlobalMocks.ts

```ts
global['CSS'] = null;

const mock = () => {
  //...
};

Object.defineProperty(window, 'localStorage', {value: mock()});
Object.defineProperty(window, 'sessionStorage', {value: mock()});
Object.defineProperty(document, 'doctype', {
  value: '<!DOCTYPE html>'
});
//...
```

## Demo

Jest

| Before (Jasmine): | After (Jest): | |
|---|---|---|
| `jasmine.createSpy('blah')` | `jest.fn()` | *1-6-7* |
| `` `spyOn(something, 'blah') `` | `jest.spyOn(something, 'blah')*` | |
| `.and.returnValue()` | `.mockReturnValue()` | |
| `.and.callFake(()=>{})` | `.mockImplementation(()=>{})` | |
| `jasmine.createSpyObj('blah', ['prop'])` | `blah = {prop: jest.fn()}` | |
| `jasmine.any` | `expect.any` | |
| `jasmine.objectContaining` | `expect.objectContaining` | |
| `spy.calls.mostRecent().args[1]` | `spy.mock.calls[spy.mock.calls.length - 1][1]` | |

## Traps

- `jest.spyOn()` doesn't replace function
- Differences in mock call accessing
- js-dom scroll support
- js-dom custom element support
- Replacing spy(s) in jest does not reset them

### Mac 8 Cores

■ Original  ■ Puppeteer  ■ Jest  ■ Jest Test Split
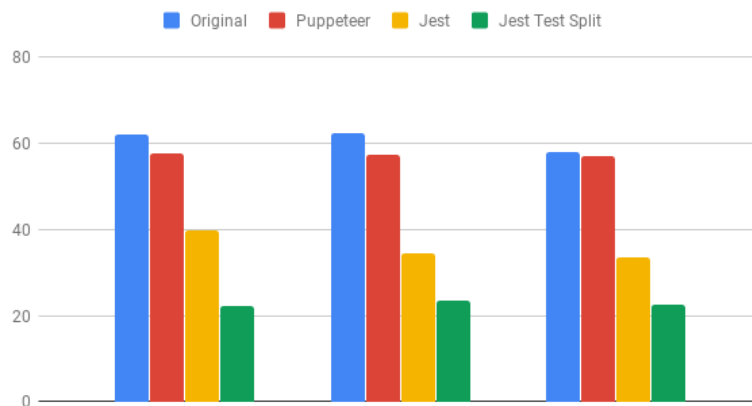
## Disadvantages

- Harder to find examples
- May need to extend jsdom
- No one will visit your page with jsdom

jest-preset-angular

# External links