

Nightwatch at Tilt

San Francisco Selenium Meetup
March 4th, 2015

About Me

- NJ -> UIUC -> Penn State -> Blacksburg VA -> SF Bay Area
- Grad School -> WebDev -> DevOps Lead -> Frontend Lead
- Java -> Python -> JavaScript
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- Blog, etc: tildedave.com





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**Tilt is a social crowd-funding
company**



CAMPAIGN ORGANIZER



Conan O'Brien

Official

+ Follow

Facebook

See All Campaigns

Send a Message

Nick Offerman's Limited Edition Wood Emojis

with Team Coco for the Children's Defense Fund

To date

105 sold

Expired December 8, 2014

Sold out

Tilted at 100 sold

Limited quantity available

Estimated delivery date: January 2015



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“Move Fast and Break Things”

It turns out that this statement is a lie



Golden Features

- Login
- Signup
- Contribution Flow
- Commenting
- Admin Payouts
- ... really no user flow can ever break acceptably



Selenium at Tilt



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History of Selenium at Tilt

- CI/CD environment - push code to production daily
- No dedicated QA resources as part of the development team
- Must not break core flows



History of Selenium at Tilt

- Pre-History: PhantomJS/PhantomProxy - no visibility on failures
- February 2013 - Introduce Selenium for functional testing (2.31.0)
- June 2014 - Selenium tests vs staging/production as a ‘health check’ of deployed code (2.42.2)



Ancient Code: Phantom JS

```
promiseIt('can contribute to regular campaign', function(p) {  
  return p  
    .withPrimedCampaign()  
    .thenOpenCampaignPage()  
    .thenLightboxClick('.campaign-tilt-info .btn')  
    .thenType('#amount_lightbox', '2.00')  
    .thenClickAndwaitForDocumentReady('#contribute-continue')  
    .thenVerifyElementContents('#display-total', '2.05')  
    .thenFillCCForm()  
    .thenClickAndWaitAndFailIfLightboxCloses('#confirm-btn')  
    .thenWait(1000)  
    .thenVerifyElementVisible('#just_contributed')  
    .thenCancelCampaign();  
});
```



Today: Nightwatch Tests

```
'Can contribute as admin': function(client) {
  var selectors = client.page.campaign().selectors;
  client.page.homepage().load()
    .createFBUserAndLogIn()
    .createCampaignAPI({}, function(campaign) {
      return client.page.campaign().load(campaign.title);
    })
    .page.campaign().clickContribute()
    .page.contributionFlow().enterContributionAmount('2')
    .page.contributionFlow().checkOut()
    .page.contributionFlow().skipInviteAndShare()
    // admins don't get asked to comment
    .verify.elementNotPresent(selectors.lightboxTitle)
    .end();
}
```



Nightwatch at Tilt

- September 2014
 - Selenium suite run on every branch before merge
 - Lots of flapping tests - developers often rerun tests until green
 - Test suite expansion seems like a nightmare - lots of selectors in tests, copy/pasted setup, etc
- October 2014 - We start investigating better solutions



Nightwatch.js



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Nightwatch

- <http://nightwatchjs.org/>
- Better interface to selenium-webdriver
- Library provides Custom Commands, Page Objects, and Assertions
- It's in JavaScript!



Why Nightwatch for Tilt?

- It's in JavaScript
 - Using Ruby just for tests is a hard sell
 - Easily use npm modules as part of your tests
- Builds in important concepts that Tilt had rolled itself (custom commands) or should have (page objects)
- Old suite had too much technical debt to be saved

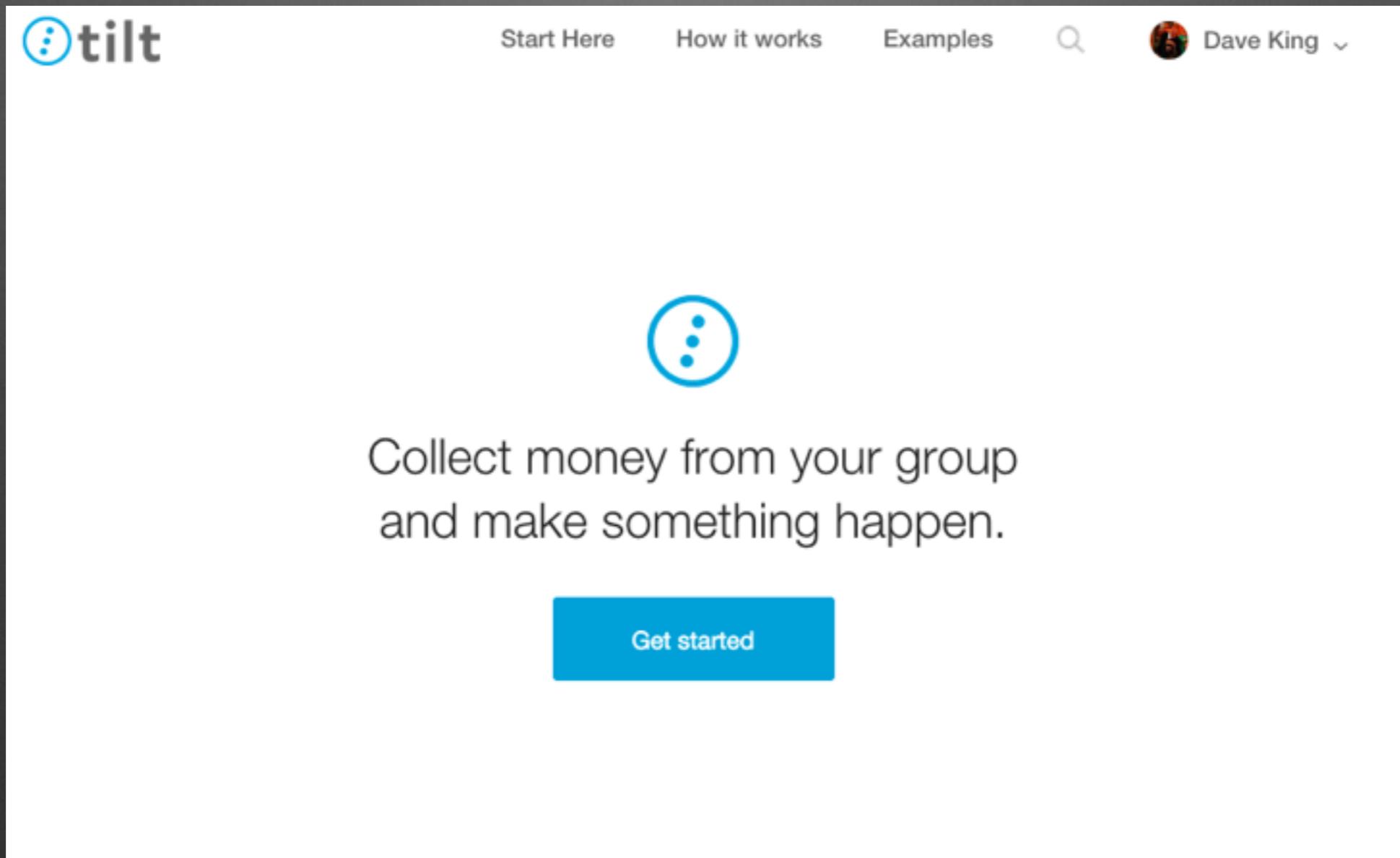


Tiltcabulary

- **Users** - users of the site
- **Campaigns** - crowdfunding campaigns



Basic Nightwatch Test for tilt.com

A screenshot of the tilt.com homepage. The page has a white background with a dark grey header bar at the top. The header contains the tilt logo (a blue circle with three vertical dots), navigation links for "Start Here", "How it works", "Examples", a search icon, and a user profile for "Dave King". Below the header, there is a large central area featuring a blue circular icon with three vertical dots. The text "Collect money from your group and make something happen." is displayed below the icon. A blue button labeled "Get started" is located at the bottom of this section.

Start Here How it works Examples   Dave King

Collect money from your group and make something happen.

Get started



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Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com': function(client) {
    var title = 'Collect money from your group';
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.hero-title', 1000)
      .verify.containsText('.hero-title',
                           title)
      .end();
  }
};
```



Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com': function(client) {
    var title = 'Collect money from your group';
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.hero-title', 1000)
      .verify.containsText('.hero-title',
        title)
      .end();
  }
};
```

Arrange



Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com': function(client) {
    var title = 'Collect money from your group';
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.hero-title', 1000)
      .verify.containsText('.hero-title',
        title)
      .end();
  }
};
```

Assert

```
.waitForElementVisible('.hero-title', 1000)
      .verify.containsText('.hero-title',
        title)
```

```
.end();
```



Basic Nightwatch Test for tilt.com

- We have a video on our homepage. Probably it shouldn't break.

Happening Now

 Jeremy H. contributed to 2m
Private Campaign

Details from this campaign are hidden

 Rob Allred contributed to 2m
Let's Record A New Daraja Album!

\$2,000.00 of \$3,000.00 collected

 Ali D. contributed to 2m
Private Campaign

Details from this campaign are hidden

Learn more





Basic Nightwatch Test for [tilt.com](#)



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Basic Nightwatch Test for [tilt.com](#)

```
module.exports = {
  'Tilt.com Video': function(client) {
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.video-link', 1000)
      .pause(3000) // vidyard JS must have loaded
      .click('.video-link')
      .waitForElementVisible('.vidyard_tclose', 3000)
      .click('.vidyard_tclose')
      .end();
  }
};
```



Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com Video': function(client) {
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.video-link', 1000)
      .pause(3000) // vidyard JS must have loaded
      .click('.video-link')
      .waitForElementVisible('.vidyard_tclose', 3000)
      .click('.vidyard_tclose')
      .end();
  }
};
```

Arrange



Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com Video': function(client) {
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.video-link', 1000)
      .pause(3000) // vidyard JS must have loaded
      .click('.video-link') Act
      .waitForElementVisible('.vidyard_tcclose', 3000)
      .click('.vidyard_tcclose')
      .end();
  }
};
```



Basic Nightwatch Test for tilt.com

```
module.exports = {
  'Tilt.com Video': function(client) {
    client
      .url('https://www.tilt.com')
      .waitForElementVisible('.video-link', 1000)
      .pause(3000) // vidyard JS must have loaded
      .click('.video-link')
      .waitForElementVisible('.vidyard_tclose', 3000)
      .click('.vidyard_tclose')
      .end();
  }
};
```

Assert



Basic Homepage Page Object

```
module.exports = function (client) {
  var selectors = {
    title: '.hero-title',
    video: '.vidyard_tbox',
    videoLink: '.video-link',
    videoClose: '.vidyard_tcclose'
  };
  this.selectors = selectors;

  this.openVideo = function() {
    return client
      .waitForElementVisible(selectors.videoLink, 1000)
      .click(selectors.videoLink)
      .waitForElementVisible(selectors.videoClose, 5000);
  };

  this.closeVideo = function() {
    return client
      .waitForElementVisible(selectors.videoClose, 1000)
      .click(selectors.videoClose)
      .waitForElementNotVisible(selectors.videoClose, 5000);
  };
};
```



Basic Homepage Page Object

```
module.exports = function (client) {
  var selectors = {
    title: '.hero-title',
    video: '.vidyard_tbox',
    videoLink: '.video-link',
    videoClose: '.vidyard_tcose'
  };
  this.selectors = selectors;

  this.openVideo = function() {
    return client
      .waitForElementVisible(selectors.videoLink, 1000)
      .click(selectors.videoLink)
      .waitForElementVisible(selectors.videoClose, 5000);
  };

  this.closeVideo = function() {
    return client
      .waitForElementVisible(selectors.videoClose, 1000)
      .click(selectors.videoClose)
      .waitForElementNotVisible(selectors.videoClose, 5000);
  };
};
```

Unify DOM selectors
as variables



Basic Homepage Page Object

```
module.exports = function (client) {
  var selectors = {
    title: '.hero-title',
    video: '.vidyard_tbox',
    videoLink: '.video-link',
    videoClose: '.vidyard_tcose'
  };
  this.selectors = selectors;

  this.openVideo = function() {
    return client
      .waitForElementVisible(selectors.videoLink, 1000)
      .click(selectors.videoLink)
      .waitForElementVisible(selectors.videoClose, 5000);
  };

  this.closeVideo = function() {
    return client
      .waitForElementVisible(selectors.videoClose, 1000)
      .click(selectors.videoClose)
      .waitForElementNotVisible(selectors.videoClose, 5000);
  };
};
```

Utility Methods for Tests



Basic Page Objects

```
module.exports = {

  'Tilt.com Video': function(client) {
    var title = 'Collect money from your group';
    client
      .url('https://www.tilt.com')
      .page.homepage().openVideo()
      .verify.elementPresent(
        client.page.homepage().selectors.video
      )
      .page.homepage().closeVideo()
      .end();
  }

};
```



Basic Page Objects

```
module.exports = {  
  
  'Tilt.com Video': function(client) {  
    var title = 'Collect money from your group';  
    client  
      .url('https://www.tilt.com')  
      .page.homepage().openVideo()  
      .verify.elementPresent(  
        client.page.homepage().selectors.video  
      )  
      .page.homepage().closeVideo()  
      .end();  
  }  
};
```

No selectors in tests



Basic Page Objects

```
module.exports = {  
  'Tilt.com Video': function(client) {  
    var title = 'Collect money from your group';  
    client  
      .url('https://www.tilt.com')  
      .page.homepage().openVideo()  
      .verify.elementPresent(  
        client.page.homepage().selectors.video  
      )  
      .page.homepage().closeVideo()  
      .end();  
  };  
};
```

Waits common
to the page now inside
the page object



Why Nightwatch?

- Three features you would otherwise build yourself
- Page Objects
- Custom Commands
- Custom Assertions



Page Objects

- Basic design pattern - abstract page behavior out of selectors
- Add in common functions for interacting with page
- In our repo: abstract different desktop/mobile behavior into the page object



Page Object Example: “Contribution Flow”

```
this.enterContributionAmount = function(amount) {  
  var sels = (client.globals.isDesktop) ?  
    selectors.desktop : selectors.mobile;  
  return client  
    .waitForElementVisible(sels.contributeAmountField,  
      client.globals.timeout)  
    .setValue(sels.contributeAmountField, amount)  
    .pause(500)  
    .click(seles.contributeStep1Submit)  
    .waitForElementNotVisible(  
      sels.contributeStep1Submit,  
      client.globals.timeout  
    );  
};
```



Page Objects: Desktop vs Mobile

Contribution **\$5.00**

FREE for debit cards, 3% fee for credit cards

Card number

mm/yy cvv billing zip

Contribution [edit](#) **\$5.00**

FREE for debit cards, 3% fee for credit cards

Card number

MM YY CVV zip (postal)



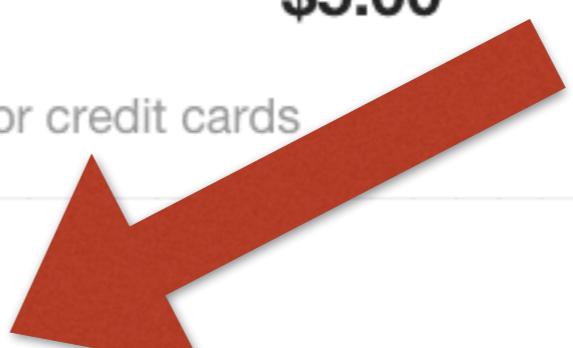
Page Objects: Desktop vs Mobile

Contribution \$5.00

FREE for debit cards, 3% fee for credit cards

Card number

VISA MasterCard American Express Discover
mm/yy cvv billing zip



Expiration is one field

Expiration is two fields



Contribution [edit](#) \$5.00

FREE for debit cards, 3% fee for credit cards

Card number

MM YY CVV zip (postal)



Page Objects: Desktop vs Mobile

```
this.enterCreditCard = function(cardNumber, expirationMonth,
                                expirationYear, cvc, zip) {
    var platformSelectors = (client.globals.isDesktop) ?
        selectors.desktop :
        selectors.mobile;
    var d = client
        .waitForElementVisible(platformSelectors.cardNumber,
                               client.globals.timeout)
        .setValue(platformSelectors.cardNumber,
                  [cardNumber, client.Keys.TAB]);
    if (client.globals.isDesktop) {
        d = d.setValue(platformSelectors.expiration,
                      [expirationMonth + '/' + expirationYear,
                       client.Keys.TAB]);
    } else {
        d = d
            .setValue(platformSelectors.expirationMonth, [expirationMonth,
                                              client.Keys.TAB])
            .setValue(platformSelectors.expirationYear, [expirationYear,
                                              client.Keys.TAB]);
    }
    return d
        .setValue(platformSelectors.cvc, [cvc, client.Keys.TAB])
        .setValue(platformSelectors.zip, [zip, client.Keys.TAB]);
}
```



Custom Commands

- Build business-specific language for your tests
- Example commands from our repository:
 - `createEmailUser`
 - `createEmailUserAndLogIn`
 - `createFacebookTestUser`
 - `setCountry`



Custom Assertions

- Add specific assertions to your tests
- We don't use these as much - examples from our repo:
 - isLoggedIn
 - linkMatches(text, href)
 - lightboxHasHeader



Test Suite Benefits



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Bootstrapping JavaScript

- Tilt runs on a hybrid stack
- Old code uses jQuery/jQuery UI for frontend widgets
- New code uses React
 - Server-side rendering with a node.js service



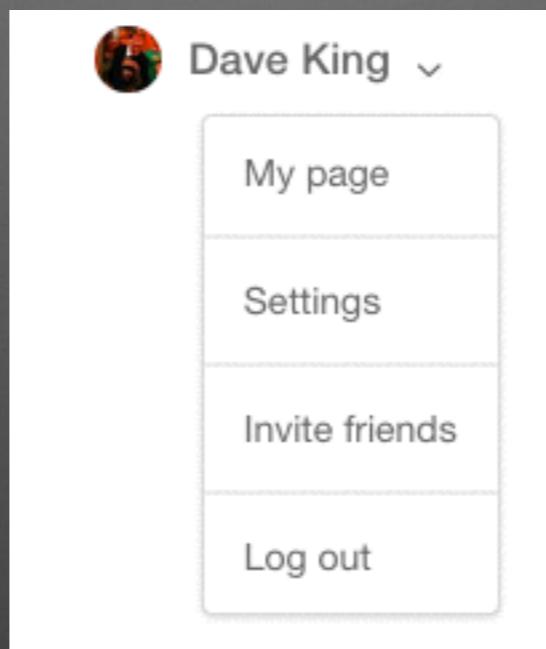
Server-side Rendering Challenges

- Elements in the DOM but not functional
- Elements visible but not functional



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Opening the User Menu



Opening the User Menu

```
this.openUserMenu = function(callback) {
  return client
    .waitForElementVisible(
      this.selectors.menuToggle,
      client.globals.timeout
    )
    // completely arbitrary wait time so that menu JS
    // initializes
    .pause(5000)
    .click(this.selectors.menuToggle)
    .waitForElementVisible('.user-menu', 1000, callback);
};
```



Opening the User Menu

JavaScript must have
initialized before menu is

```
this.openUserMenu = function(callback) {    functional!
  return client
    .waitForElementVisible(
      this.selectors.menuToggle,
      client.globals.timeout)
    )
    // completely arbitrary wait time so that menu JS
    // initializes
    .pause(5000)
    .click(this.selectors.menuToggle)
    .waitForElementVisible('.user-menu', 1000, callback);
};
```

Old Code

```
window.rewireReact = function() {
  $('[data-mount-as]').each(function() {
    var $this = $(this),
        name = $this.attr('data-mount-as'),
        props = JSON.parse($this.attr('data-props'));

    $thisremoveAttr('data-mount-as');

    // This causes event handlers on the component
    // to become functional
    var component = ReactComponents[name];
    React.render(React.createElement(component, props),
                 $this.get(0));
  });
};

$(document).ready(window.rewireReact);
```



Old Code

Menus only functional
after document ready!

```
window.rewireReact = function() {
  $('[data-mount-as]').each(function() {
    var $this = $(this),
        name = $this.attr('data-mount-'),
        props = JSON.parse($this.attr('data-props'));

    $thisremoveAttr('data-mount-as')

      // This causes event handlers on the component
      // to become functional
    var component = ReactComponents[name];
    React.render(React.createElement(component, props),
      $this.get(0))

  });
};

$(document).ready(window.rewireReact);
```



New Code

```
<!-- Tilt JavaScript bundle -->
<script src="https://d25y59nqso5bzg.cloudfront.net/built/home-
ce348751.js"></script>
<!-- all JS is loaded, make the page functional -->
<script type="text/javascript">window.rewireReact();</script>
```



New Code

```
<!-- Tilt JavaScript bundle -->
<script src="https://d25y59nqso5bzg.cloudfront.net/built/home-  
ce348751.js"></script>
<!-- all JS is loaded, make the page functional -->
<script type="text/javascript">window.rewireReact();</script>
```



No more sticky menus!



Test Suite Suggestions

in case you are green-fielding a new test suite



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Develop and run tests against an integration environment

Staging, production, etc - not someone's local box



Run Tests Constantly



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Run Tests Constantly

- We run our tests every 10 minutes against staging
- When you add a wait time to a test you have asserted that your system always responds in that amount of time
- See how tests behave in an integration environment and adjust



Happy Path Tests First

Sad path tests ... eventually



Single Responsibility Page Objects



Page Objects...

- Don't do test setup
 - they don't make users
 - they don't make campaigns
- Don't orchestrate complex flows between pages
- Do one thing and one thing only
 - (yes this puts more verbosity into your tests)



Problems We've Had With Nightwatch

your mileage may vary!



Hard to run an individual test

Something like mocha —grep would be really great
(currently I just comment out tests)



No Page Object Documentation Yet

We had to dig through the repo to really understand how to use these



Nondeterministic Behavior

Page objects sometimes inherit a stale selenium session, repeating “stale element exception”

Use —verbose to see what’s happening if you are really stumped



waitForElementVisible failures

When running an individual test file, a waitForElementVisible failure causes all the rest of the tests to be skipped



Nightwatch Pull Requests I Really Want Merged

- Distinguish between test failures and selenium errors when taking screenshots: <https://github.com/beatfactor/nightwatch/pull/316>
- Run individual test files in parallel with test workers <https://github.com/beatfactor/nightwatch/pull/317>



Next Steps for Nightwatch at Tilt

- Replicate full functionality of old suite
- Cross-browser testing with Saucelabs
- Shard test suite (currently 2 jobs) into specific suites:
 - Selenium-Nightwatch-Contributution, Selenium-Nightwatch-Login, etc.



Thank You!

- Questions?



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