

Automating Visual Regression Testing with BackstopJS

@angelariggs_

PNSQC | October 2018

How It's Useful and How We Used It

@angelariggs_

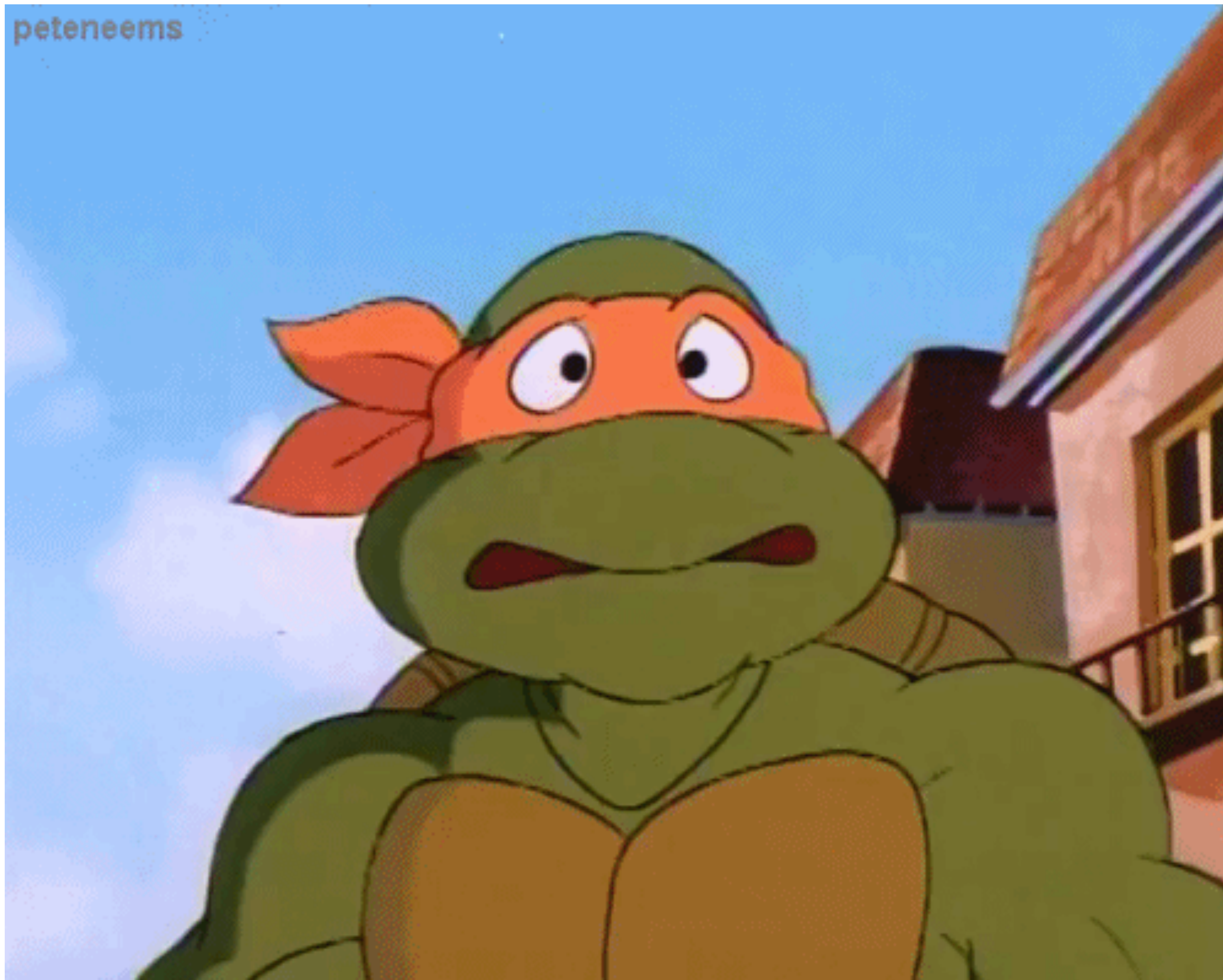
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Front-end testing is hard

Mobile
Desktop
Tablet

Fonts
Images
Layout

Fragile CSS ecosystems



Front-end testing is hard

The Problem:

Disappearing content on deploys

Manual testing was tedious & ineffective

BackstopJS

- Open-source package

- Open-source package
- Before & after screenshots

- Open-source package
- Before & after screenshots
- Chrome Headless, PhantomJS, or Slimmer

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- Chrome Headless, PhantomJS, or Slimmer
- UI simulations

- Open-source package
- Before & after screenshots
- Chrome Headless, PhantomJS, or Slimer
- UI simulations
- HTML report for comparison

```
{
  "id": "project_environment_config",
  "viewports": [
    {
      "name": "desktop",
      "width": 1600,
      "height": 2000
    },
    {
      "name": "mobile",
      "width": 575,
      "height": 2000
    }
  ],
}
```

```
{  
  "id": "project_environment_config",  
  "viewports": [  
    {  
      "name": "desktop",  
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      "height": 2000  
    },  
    {  
      "name": "mobile",  
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      "height": 2000  
    }  
  ],  
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      "name": "mobile",
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```



```
"scenarios": [  
  {  
    "label": "projectEnvironment-descriptor",  
    "url": "",  
    "hideSelectors": [],  
    "removeSelectors": [],  
    "selectors": [  
      "document"  
    ],  
    "delay": 1000,  
    "misMatchThreshold" : 0.1  
  },  
],
```

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    "selectors": [  
      "document"  
    ],  
    "delay": 1000,  
    "misMatchThreshold" : 0.1  
  },  
],
```



```
"paths": {  
  "bitmaps_reference": "./backstop_data/environment_reference",  
  "bitmaps_test": "./backstop_data/environment_test",  
  "html_report": "./backstop_data/environment_html_report",  
  "ci_report": "./backstop_data/environment_ci_report"  
},
```

```
"casperFlags": [  
  "--ignore-ssl-errors=true",  
  "--ssl-protocol=any"  
],  
"engine": "slimerjs",  
"report": ["browser"],  
"cliExitOnFail": false,  
"debug": false  
}
```



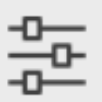

all

2 passed

0 failed

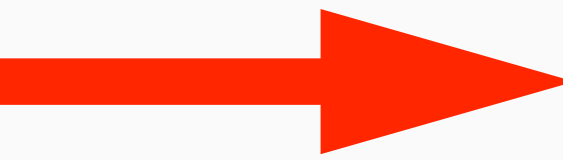


Filter tests with search...



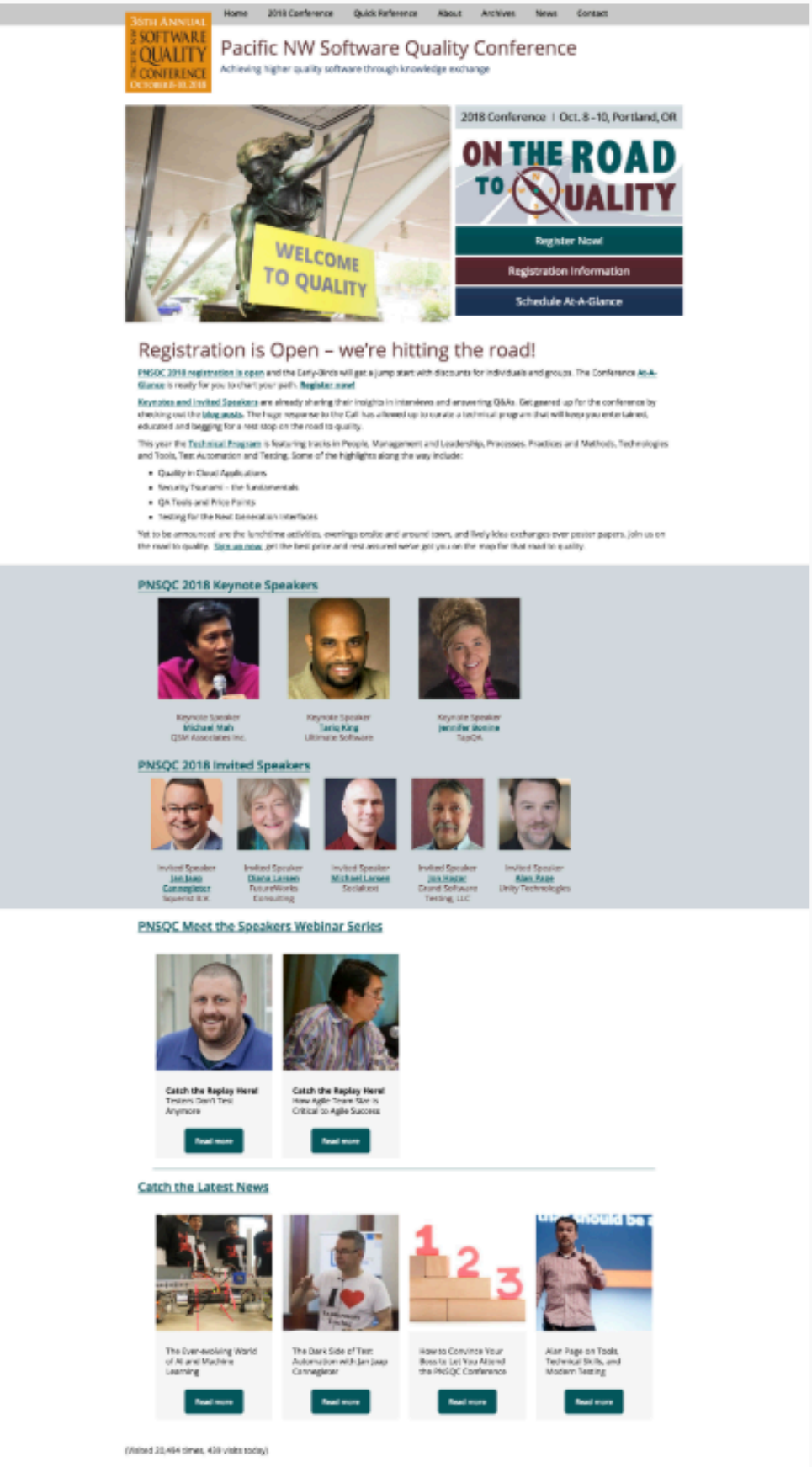
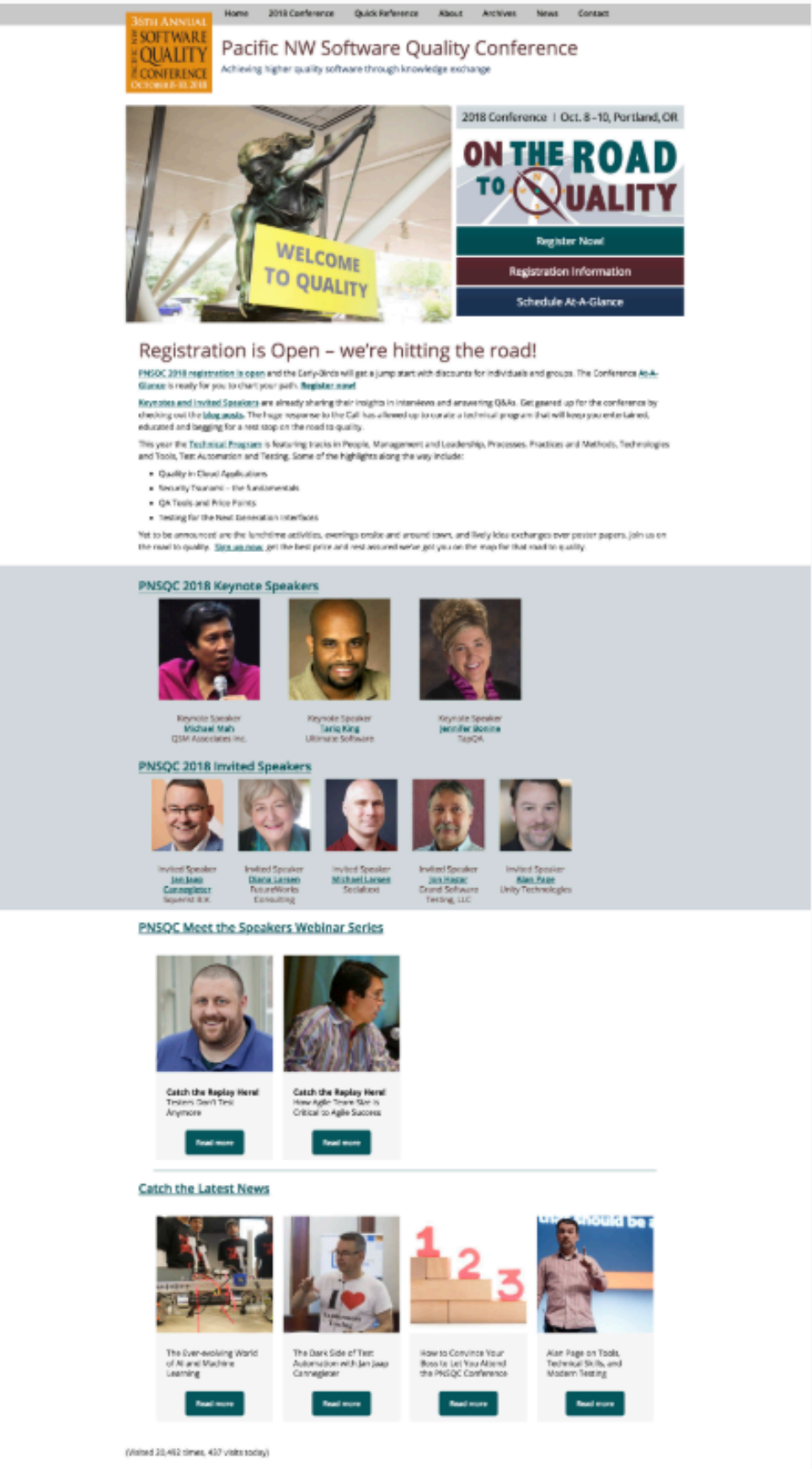
filename: project_local_config__0_document_0_desktop.png

SHOW DIFFS



REFERENCE

TEST





all

2 passed

0 failed



Filter tests with search...



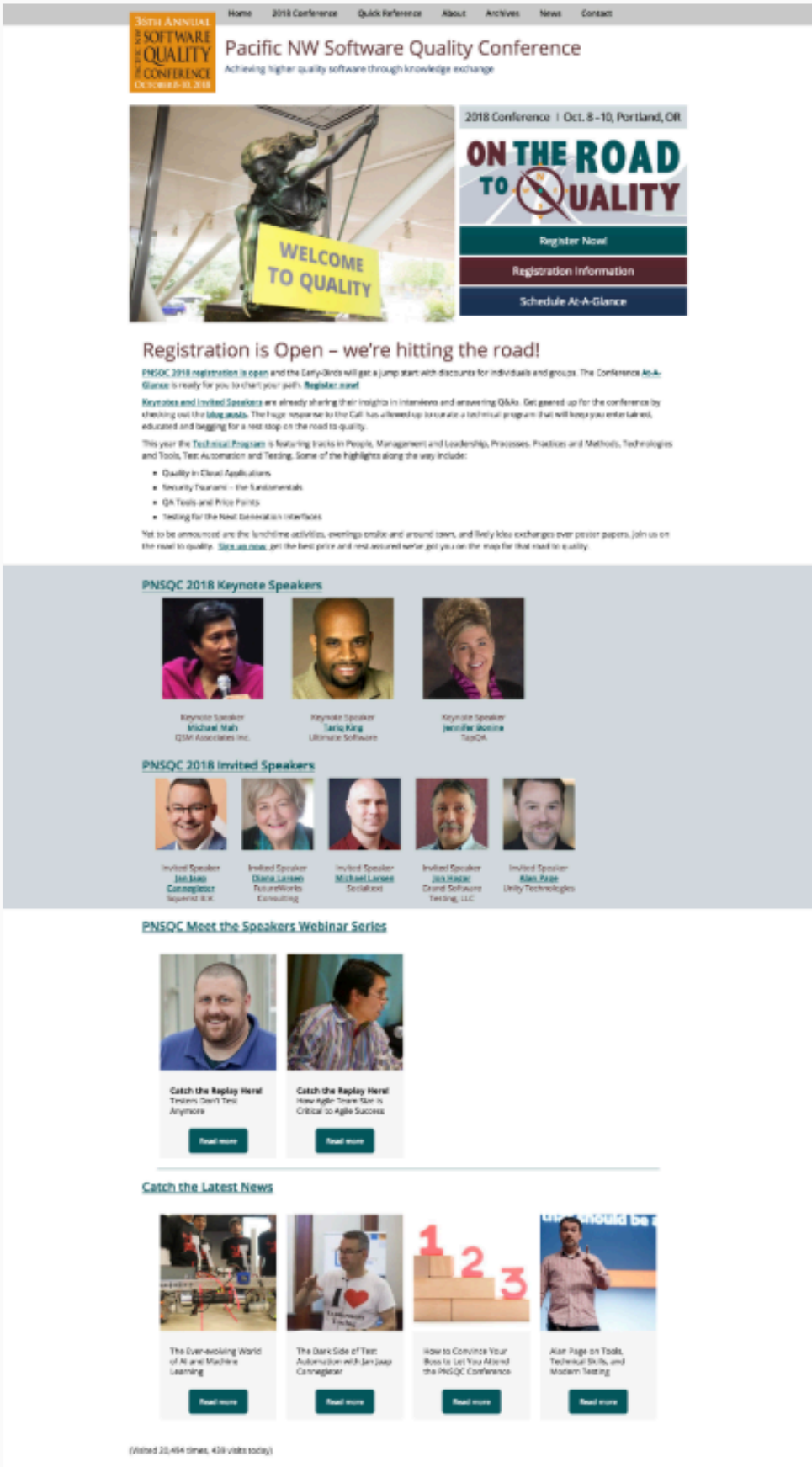
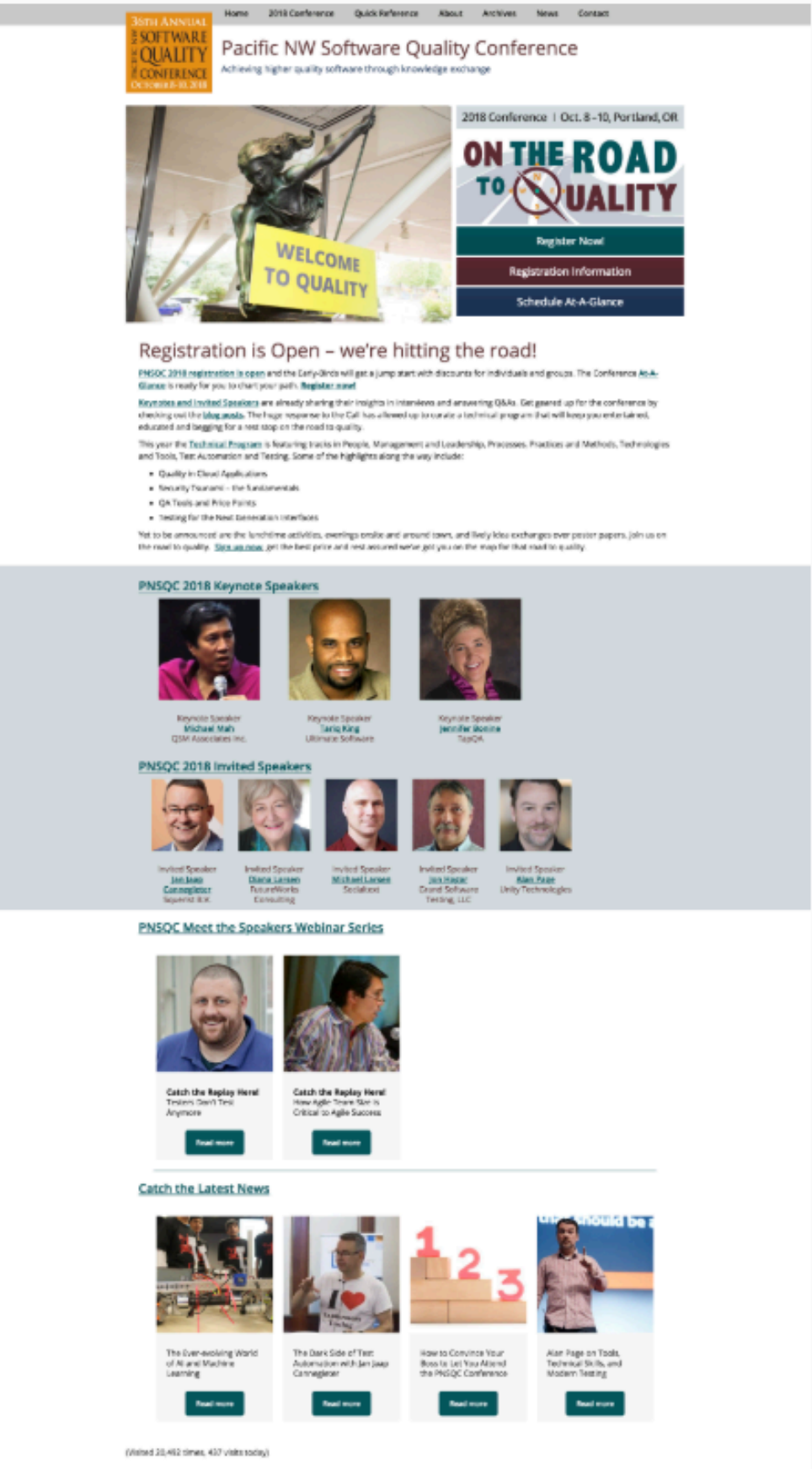
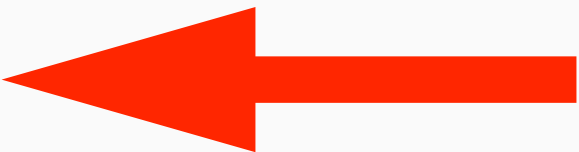
filename: project_local_config__0_document_0_desktop.png

SHOW DIFFS



REFERENCE

TEST



Success:

Automated visual regression testing
helped us find and fix regressions
before it became the client's problem

But...


```
"scenarios": [  
  {  
    "label": "projectEnvironment-descriptor",  
    "url": "",  
    "hideSelectors": [],  
    "removeSelectors": [],  
    "selectors": [  
      ".header",  
      ".main-content",  
      ".footer"  
    ],  
  },  
]
```

```
"scenarios": [  
  {  
    "label": "projectEnvironment-descriptor",  
    "url": "",  
    "hideSelectors": [],  
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  },  
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      ".footer"  
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  },  
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```




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      ".main-content",  
      ".footer"  
    ],  
  },  
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"scenarios": [  
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]
```



70 URLs

70 URLs
x 3 CSS selectors

70 URLs
x 3 CSS selectors
x 2 viewports

70 URLs
x 3 CSS selectors
x 2 viewports
420 screenshots



1. Run screenshot references

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2. Go play Towerfall for 35 minutes

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3. Developer deploys

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4. Run screenshot tests

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5. Go have lunch

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7. Feedback to developer

1. Run screenshot references*
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* Remember to include “no-timeout” parameter



1. Run screenshot references
2. Go play Towerfall for 35 minutes
3. Developer deploys
4. Run screenshot tests
5. Go have lunch
6. Review report*
7. Feedback to developer

"Automated"

Narrowing the Scope

```
{
  "id": "project_environment_config",
  "viewports": [
    {
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      "width": 1600,
      "height": 3000
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      "width": 575,
      "height": 3000
    }
  ],
}
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{
  "id": "project_environment_config",
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      "name": "desktop",
      "width": 1600,
      "height": 3000
    },
    {
      "name": "mobile",
      "width": 575,
      "height": 3000
    }
  ],
}
```



- Increase viewport height to grab entire page
- One CSS selector per URL
- Remove URLs that use the same template

420 screenshots

420 screenshots → 40 screenshots



1. Run screenshot references*
2. Go play Towerfall for 35 minutes
3. Developer deploys
4. Run screenshot tests*
5. Go have lunch
6. Review report*
7. Feedback to developer

1. Tester runs screenshot references
2. Developer deploys
3. Tester runs screenshot test
4. Review report
5. Feedback to developer

Smoke test for all staging and prod deploys

But...

- Four separate configuration files

- Four separate configuration files
- Lots of back & forth between developer and tester



More automated
Still tedious

- Developers oversee deploys

- Developers oversee deploys
- Developers should oversee deploy tests

Make it Easy

Custom JavaScript configuration

```
var args = require('minimist')(process.argv.slice(2)); // grabs the process args
var dotenv = require('dotenv').config(); // if sites have basic auth
var defaultPaths = ['/']; // default path just checks the homepage
var scenarios = []; // The array that'll have the URL paths to check
```



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var args = require('minimist')(process.argv.slice(2)); // grabs the process args
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var dotenv = require('dotenv').config(); // if sites have basic auth
var defaultPaths = ['/']; // default path just checks the homepage
var scenarios = []; // The array that'll have the URL paths to check
```

```
var environments = {  
  'local': 'http://local-site.com',  
  'dev': 'http://dev-site.com',  
  'staging': 'https://staging-site.com',  
  'prod': 'https://site.com'  
}
```

```
// Site for reference screenshots
if (!args.refHost) {
    args.refHost = environments[args.env];
}

// Site for test screenshots
if (!args.testHost) {
    args.testHost = environments[args.env];
}
```

```
// Site for reference screenshots
if (!args.refHost) {
    args.refHost = environments[args.env];
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// Site for test screenshots
if (!args.testHost) {
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}
```

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var environments = {  
  'local': 'http://local-site.com',  
  'dev': 'http://dev-site.com',  
  'staging': 'https://staging-site.com',  
  'prod': 'https://site.com'  
}
```

```
// Setting the directories to save screenshots
var saveDirectories = {
  "bitmaps_reference": "./backstop_data/" + args.env + "_reference",
  "bitmaps_test": "./backstop_data/" + args.env + "_test",
  "html_report": "./backstop_data/" + args.env + "_html_report",
  "ci_report": "./backstop_data/" + args.env + "_ci_report"
};
```

```
--env=prod
```

```
// Setting the directories to save screenshots
var saveDirectories = {
  "bitmaps_reference": "./backstop_data/" + args.env + "_reference",
  "bitmaps_test": "./backstop_data/" + args.env + "_test",
  "html_report": "./backstop_data/" + args.env + "_html_report",
  "ci_report": "./backstop_data/" + args.env + "_ci_report"
};
```

```
// Setting the directories to save screenshots
var saveDirectories = {
  "bitmaps_reference": "./backstop_data/prod_reference",
  "bitmaps_test": "./backstop_data/"+args.env+"_test",
  "html_report": "./backstop_data/"+args.env+"_html_report",
  "ci_report": "./backstop_data/"+args.env+"_ci_report"
};
```



```
var environments = {  
  'local': 'http://local-site.com',  
  'dev': 'http://dev-site.com',  
  'staging': 'https://staging-site.com',  
  'prod': 'https://site.com'  
}
```



```
// Work out which paths to use: an array from a file, a supplied array, or the default
// We'll be using the array from the `paths.js` file
if (args.pathFile) {
  var pathConfig = require('./'+args.pathFile+'.js'); // use paths.js file
  var paths = pathConfig.array;
}
```

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  var paths = pathConfig.array;
}
```

```
var pathConfig = {};  
  
pathConfig.array = [  
    '/', // homepage  
    // include other relative URL paths in this array  
]  
  
module.exports = pathConfig;
```

```
var args = require('minimist')(process.argv.slice(2)); // grabs the process args
var dotenv = require('dotenv').config(); // if sites have basic auth
var defaultPaths = ['/']; // default path just checks the homepage
var scenarios = []; // The array that'll have the URL paths to check
```

```
// Scenarios are a default part of config for BackstopJS
// Explanations for the sections below are at https://www.npmjs.com/package/backstopjs
for (var k = 0; k < paths.length; k++) {
  scenarios.push(
    {
      "label": paths[k],
      "referenceUrl": args.refHost+paths[k],
      "url": args.testHost+paths[k],
      "hideSelectors": [],
      "removeSelectors": [],
      "selectors": ["document"], // "document" will snapshot the entire page
      "delay": 1000,
      "misMatchThreshold" : 0.1
    }
  );
}
```



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      "removeSelectors": [],
      "selectors": ["document"], // "document" will snapshot the entire page
      "delay": 1000,
      "misMatchThreshold" : 0.1
    }
  );
}
```

```
// BackstopJS configuration
module.exports =
{
  "id": "project_"+args.env+"_config",
  "viewports": [
    {
      "name": "desktop",
      "width": 1200,
      "height": 900
    },
    {
      "name": "mobile",
      "width": 375,
      "height": 470
    }
  ],
}
```



```
"engine": "chromy", // alternate can be puppeteer
  "engineOptions": {
    chromeFlags: ["--allow-insecure-localhost"]
  },
"report": ["browser"],
"startingPort": 9333,
"asyncCaptureLimit": 5,
"asyncCompareLimit": 50,
"debug": false
};
```

```
"engine": "chromy", // alternate can be puppeteer
  "engineOptions": {
    chromeFlags: ["--allow-insecure-localhost"]
  },
"report": ["browser"],
"startingPort": 9333,
"asyncCaptureLimit": 5,
"asyncCompareLimit": 50,
"debug": false
};
```

4 config files

4 config files ➡ 1 config file

- detailed README for setup and use
- template repo for quick setup on new projects



But...

```
backstop reference  
--configPath=backstop.js  
--pathFile=paths --env=prod
```

backstop reference

`--configPath=backstop.js`

`--pathFile=paths --env=prod`

backstop reference

--configPath=backstop.js

--pathFile=paths --env=prod

backstop reference

--configPath=backstop.js

--pathFile=paths --env=prod

backstop reference

--configPath=backstop.js

--pathFile=paths --env=prod

--refHost=http://prod-site.com



make prod-reference

```
make prod-test
```



- Smoke tests for **all** deploys on **all** projects

1. Dev runs references
2. Dev deploys
3. Dev runs tests
4. Dev reviews the report

- Smoke tests for **all** deploys on **all** projects
- Regression test during feature testing

1. Run references on master branch
2. Check out feature branch
3. Run tests on feature branch
4. Review the report

- Smoke tests for **all** deploys on **all** projects
- Regression test during feature testing
- Local use during feature development

1. Create and check out feature branch
2. Run references on fresh branch
3. Do local development
4. Run tests on branch periodically
5. Review report

Front-end testing is ~~hard~~ easy

Problem → Solution

Problem → Idea

Problem → Idea → Iterate

Problem → Idea → Iterate → Iterate

Problem → Idea → Iterate → Iterate → Solution

BackstopJS

BackstopJS Refined configuration

Refined config ➡ Customized config

Automation is useful*

Find the right automation
solution for your problem

Automated testing
requires manual work

Front-end testing is ~~easy~~ easier
with the right automation

<https://github.com/angelariggs/visual-regression>

@angelariggs_

PNSQC | October 2018

Thank you!

@angelariggs_

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