

Agile Dev Better Software DevOps **WEST**

A TECHWELL EVENT

BW6

Test Automation

Wednesday, June 6th, 2018, 1:30 PM

Strategies for Selecting the Right Open Source Framework for Cross-Browser Testing

Presented by:

Eran Kinsbruner

Perfecto

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350 Corporate Way, Suite 400, Orange Park, FL 32073
888-268-8770 · 904-278-0524 - info@techwell.com - <https://www.techwell.com/>

Eran Kinsbruner

Perfecto

Eran Kinsbruner is the mobile evangelist at Perfecto and the author of the digital quality handbook, as well as a monthly columnist at InfoWorld.com. He is a software engineering professional with nearly twenty years of experience at companies such as Matrix, Qulicke & Soffa, Sun Microsystems, General Electric, Texas Instruments, and NeuStar. He holds various industry certifications, including from ISTQB and CMMI. Eran is a recognized mobile testing influencer and thought leader, as well as an experienced speaker at the major software engineering conferences. He is also a patent-holding inventor (test exclusion automated mechanism for mobile J2ME testing), researcher, and blogger. Eran can be found all over social media, including on Facebook, Twitter (@ek121268), LinkedIn, and his professional mobile testing blog.

Strategy For Selecting the Right Cross—Browser Testing Tools



DevOps WEST
A TECHWELL EVENT

TestCafé

buster.js

Se

Protractor
end to end testing for AngularJS

Perfecto
Seek Perfection

About Me

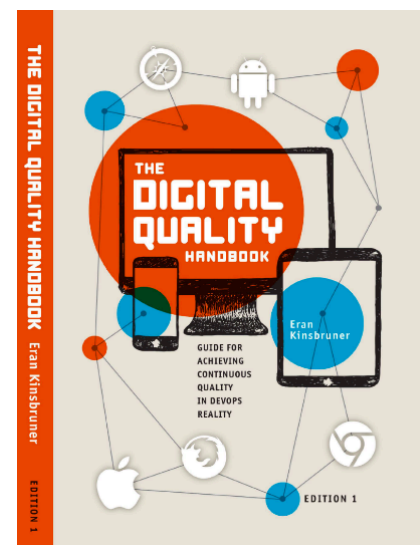
- Lead Technical Evangelist at Perfecto
- Blogger and Speaker
 - <http://continuoustesting.blog>
 - <https://www.infoworld.com/author/Eran-Kinsbruner/>
- 18+ Years in Development & Testing
- Author of *The Digital Quality Handbook*



Weekly Podcast - [Testiumpod](#)

Twitter: @ek121268

Email: Ernk@perfectomobile.com



Agenda



- A word about the digital transformation
- RWD & PWA Testing As The De-Facto Web App Types
- Cross-Browser Testing Landscape and Criteria
- Q&A

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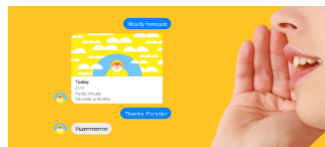
Lack of Mobile Capabilities in Web Browser



BT/BLE



Mic



Camera



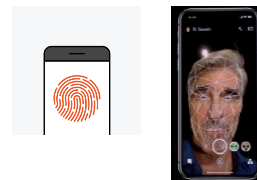
Notification




Network



Device auth





Cross-Browser Testing != Desktop Web Testing




There is no Web Testing vs. Mobile Testing

DESKTOP vs **MOBILE**






Responsive Web Design

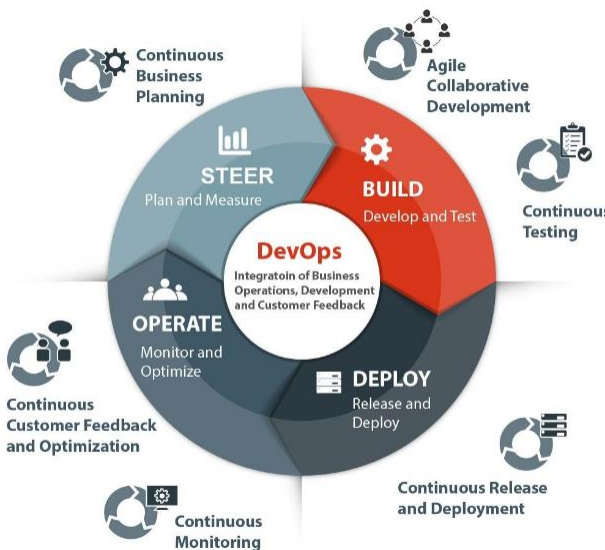


Mobile First Web Design

- 4 out of 10 transactions today take place on multiple devices
- 48% of users today complain that the websites they use are not optimized for their smartphones and tablets

DevOps == Continuous Everything



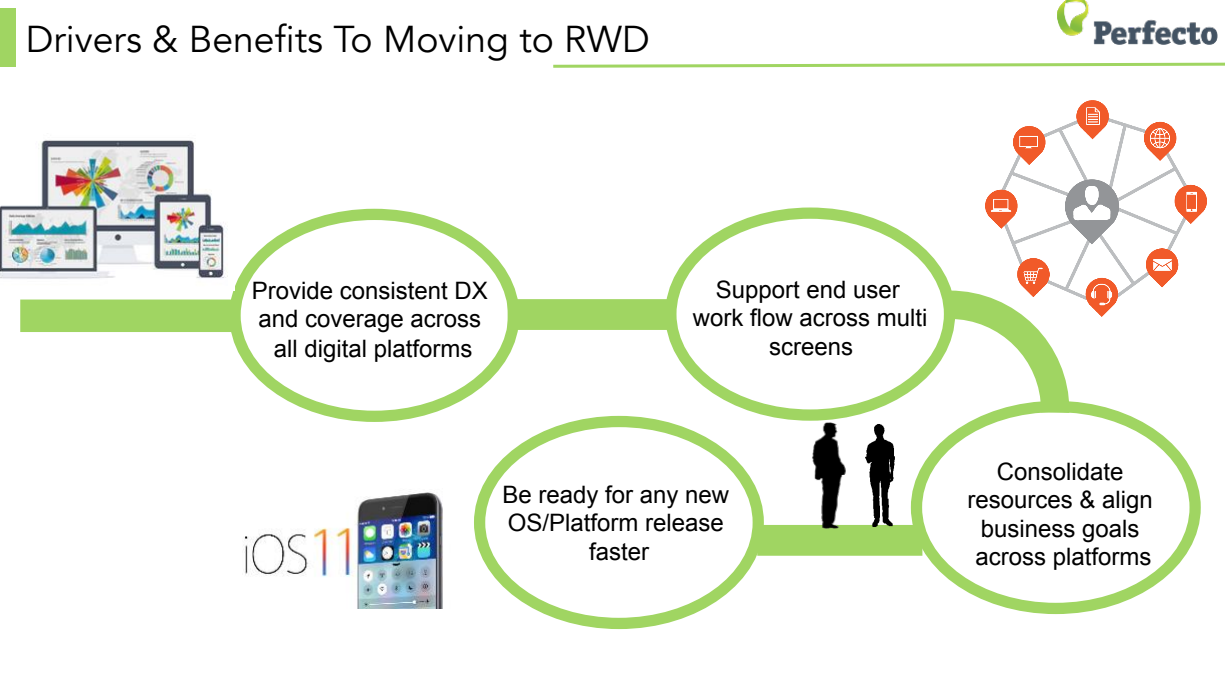


Credit: TestingWhiz



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Fundamentals of RWD Testing

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Drivers & Benefits To Moving to RWD

- Provide consistent DX and coverage across all digital platforms
- Support end user work flow across multi screens
- Be ready for any new OS/Platform release faster
- Consolidate resources & align business goals across platforms

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Resonsive Web Design (RWD) – Tools are already here Perfecto

JS

Write Failing FEATURE → **BDD** → Write Failing Test → **TDD** → Make Test Pass → **Refactor** → Write Failing FEATURE

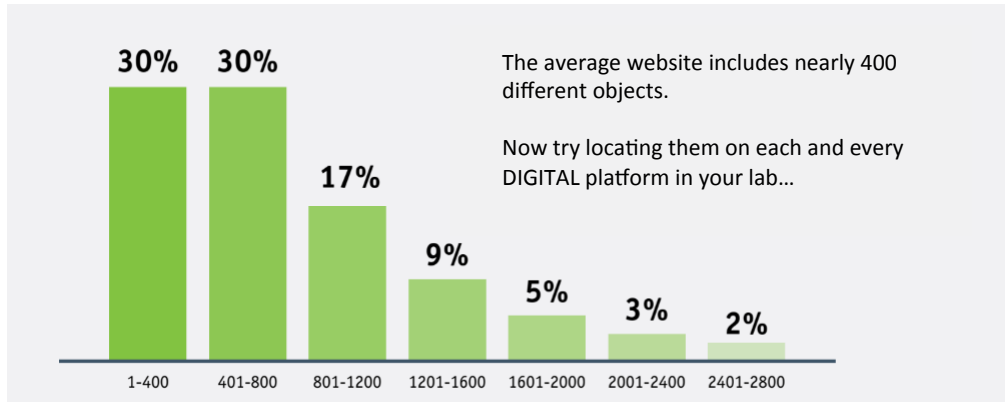
n cycles → **Cucumber** → **gauge** → **appium**

Responsive Web App – Test Plan Strategy: 6 Steps Perfecto

Choose The Right Platforms	Assure Visual Web Pages Across Platforms
Functionality of Navigation Flows and Menus	Client Side Performance Testing
Test Accessibility for Mobile and Web	Test Environment Conditions (Networks, Sensors)

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Responsive Web Design (RWD) - Objects



- Identify your object in a robust fashion that fits all digital Platforms
- Build object repository and use smart locators

Responsive Web Design (RWD) – visual validation w/ Screenshots



Device	OS Version	Test Action	Status	Timestamp
Samsung Galaxy S5 SM-G900A	6.0.1	Clicking on Pop-Up Webpage.Element.Find	PASSED	Feb 22, 00:56
Apple iPhone-6	11.1.2	Clicking on Pop-Up Webpage.Element.Find	PASSED	Feb 22, 00:57
Windows VM	10	Verify visibility of Health insurance page WebDriver.FindElement	PASSED	Feb 22, 00:59
Windows VM	16	Clicking on Pop-Up WebDriver.FindElement	PASSED	Feb 22, 08:01

- Take screenshot and use Visual Checkpoint/assertion to validate responsive aspects



Seek Perfection

Uber and YouTube 'Progressive Web Apps' (PWA)
pop up in the Microsoft Store

Both apps follow the first group of PWAs to hit the Microsoft Store last week.

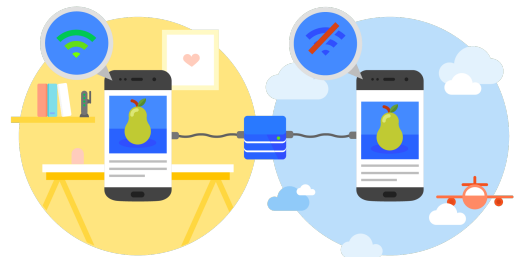
Fundamentals of PWA Testing

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Progressive Web App - Definition



*Progressive Web Apps (PWAs) are web applications that are regular web pages or websites, but can appear to the user like traditional applications or native **mobile applications**. The application type attempts to combine features offered by most modern **browsers** with the benefits of a mobile experience ([Wikipedia](#))*



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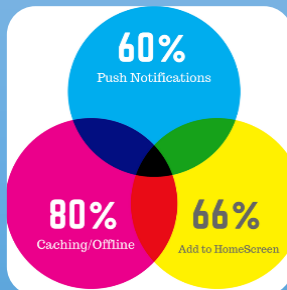
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The Rise of PWAs – Challenging Native Mobile Apps



A Progressive Web App is



Source : medium.com

- Progressive - Works for every user
- Responsive - Fits any form factor
- Connectivity independent
- App-like - Feels like an app
- Safe - Served via HTTPS
- Search Friendly - allowing search engines to find it.
- Re-engageable - Support push notifications.
- Linkable - does not require complex installation (store access)

Progressive Web App – The Offline Network Benefit



Since you're offline, some actions are disabled. We've provided you with the last product that you've visited, below.

You're back online. Continue shopping for the perfect item.

ebay

Microsoft Xbox One with Kinect 500GB Black Console (7UV-00077)
★★★★★ 1232 product ratings

Brand new	New (other)	Refurbished	Pre-owned
\$268.94	\$225.00*	\$182.99	\$220.00*

ebay

Microsoft Xbox One with Kinect 500GB Black Console (7UV-00077)
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12 viewed per hour

XBOX ONE

Brand new; lowest price
\$236.99 + \$31.95 Shipping

Add to cart

12 viewed per hour

XBOX ONE

Brand new; lowest price
\$236.99 + \$31.95 Shipping

View in cart

ebay MONEY BACK GUARANTEE

ebay MONEY BACK GUARANTEE

Source: VentureBeat

Progressive Web App - Architecture



- A PWA App consists of few key components
 - **Manifest.Json** - That's the file within the PWA that describes the app, provides metadata specific to the app like icons, splash screens, and more
 - **Service Workers** – A service worker is a script that your browser runs in the background, separate from a web page, opening the door to features that don't need a web page or user interaction. Today, service workers already include features like push notifications and background sync Service worker push notification

```
// Check that service workers are supported, if so, progressively
// enhance and add push messaging support, otherwise continue without
it.
if ('serviceWorker' in navigator) {
  navigator.serviceWorker.register('/service-worker.js')
  .then(initialiseState);
} else {
  console.warn('Service workers aren't supported in this browser.');
```

```
{
  "short_name": "Eran K.",
  "name": "Eran Kinsbruner PWA Manifest",
  "icons": [
    {
      "src": "Erank-icon-1x.png",
      "type": "image/png",
      "sizes": "48x48"
    },
    {
      "src": "Erank-icon-2x.png",
      "type": "image/png",
      "sizes": "96x96"
    }
  ],
  "start_url": "index.html?launcher=true"
}
```



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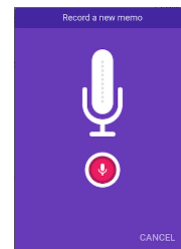
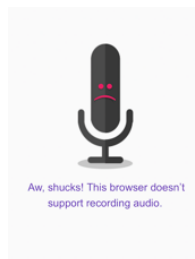
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PWA on iOS is Different than on Android



	iOS	Android
App type	shortcut	apk
Offline data	Deleted after idle time	No limit
Offline storage (browser based)	Safari < 50Mb	Chrome 6% available storage
Sensors support	Limited (BT)	All
access to private information	No	Yes
Payment system	No supported	Supported
Voice support	No	Yes



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Progressive Web App – Test Plan Strategy: 6 Steps

Validate PWA Manifest

Validate PWA Service Workers

Validate PWA Specific Capabilities

Properly Test Across Platforms (RWD)


Object Identification Strategy

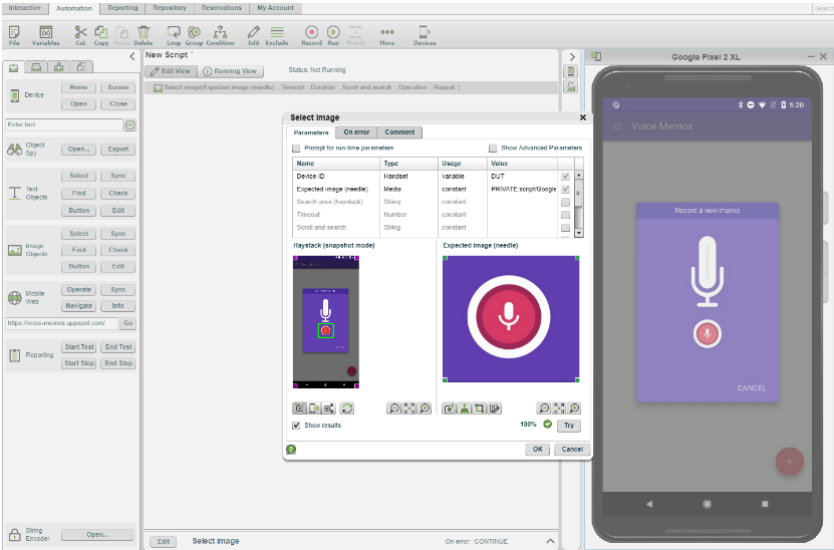
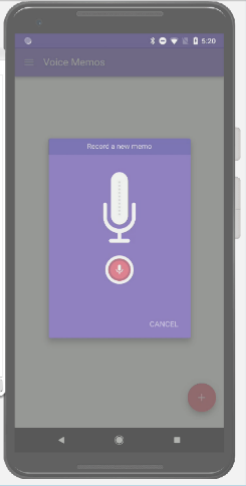
Google’s PWA Checklist Compliance

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Progressive Web App – Test Plan Strategy: Step 5

Object Identification Strategy



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Progressive Web App – Test Plan Strategy: Step 6



Validate Your Testing Plans Against Google’s PWA Checklist (Lighthouse)

- <https://developers.google.com/web/progressive-web-apps/checklist>

Site is served over HTTPS

To Test Use Lighthouse to verify Served over HTTPS

To Fix Implement HTTPS and check out letsencrypt.org to get started.

Pages are responsive on tablets & mobile devices

To Test

- Use Lighthouse to verify Yes to all of **Design is mobile-friendly**, although manually checking can also be helpful.
- Check the [Mobile Friendly Test](#)

To Fix Look at implementing a [responsive design](#), or adaptively serving a viewport-friendly site.

All app URLs load while offline

To Test Load various pages in the PWA with an airplane mode enabled. Ensure the app presents some content even when offline. Use Lighthouse to verify the start URL responds with a 200 when offline.

To Fix Use a [Service Worker](#).

Metadata provided for Add to Home screen

To Test Use Lighthouse to verify User can be prompted to Add to Home screen is all Yes.

To Fix Add a [Web App Manifest](#) file to your project.

First load fast even on 3G

To Test Use Lighthouse on a Nexus 5 (or similar) to verify time to interactive <10s for first visit on a simulated 3G network.

Progressive Web App 64

These checks validate the aspects of a Progressive Web App, as specified by the baseline [PWA Checklist](#).

4 Failed Audits

- Does not respond with a 200 when offline
 If you're building a Progressive Web App, consider using a service worker so that your app can work offline. [Learn more](#)
✖

WARNING: You may be failing this check because your test URL (<https://twitter.com/ek121268>) was redirected to ["https://mobile.twitter.com/ek121268"](https://mobile.twitter.com/ek121268). Try testing the second URL directly.
- User will not be prompted to install the Web App
 Browsers can proactively prompt users to add your app to their homescreen, which can lead to higher engagement. [Learn more](#)
✖

Failure: No manifest was fetched, Service worker does not successfully serve the manifest's startUrl.
- Is not configured for a custom splash screen
 A themed splash screen ensures a high-quality experience when users launch your app from their homescreens. [Learn more](#)
✖

Failure: No manifest was fetched.
- Address bar does not match brand colors
 The browser address bar can be themed to match your site. [Learn more](#)
✖

Failure: No manifest was fetched, No <meta name="theme-color"> tag found.

7 Passed Audits

Additional items to manually check

Accessibility 50

These checks highlight opportunities to [improve the accessibility of your web app](#). Only a subset of accessibility issues can be automatically detected so manual testing is also encouraged.

Elements Use Attributes Correctly

These are opportunities to improve the configuration of your HTML elements.

- Image elements do not have [alt] attributes

✖

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Tool Selection Strategy

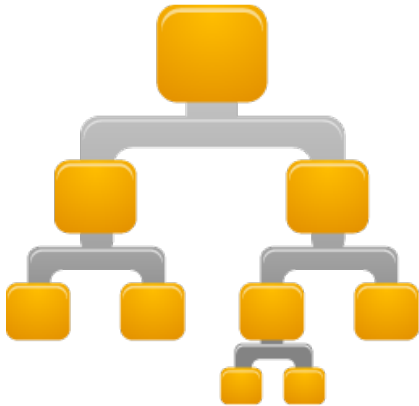


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How to select the right testing framework?



Organizational Fit

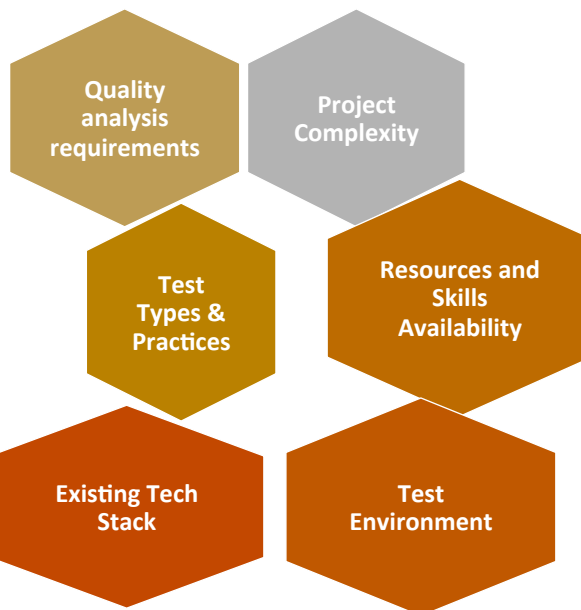


Technical Fit


&




Selection Criteria: Organizational Fit Requirements



Selection Criteria: Technical Fit Requirements





Community size, support and Doc's

SDLC Process Fit (Integrations, Plugins, etc.)

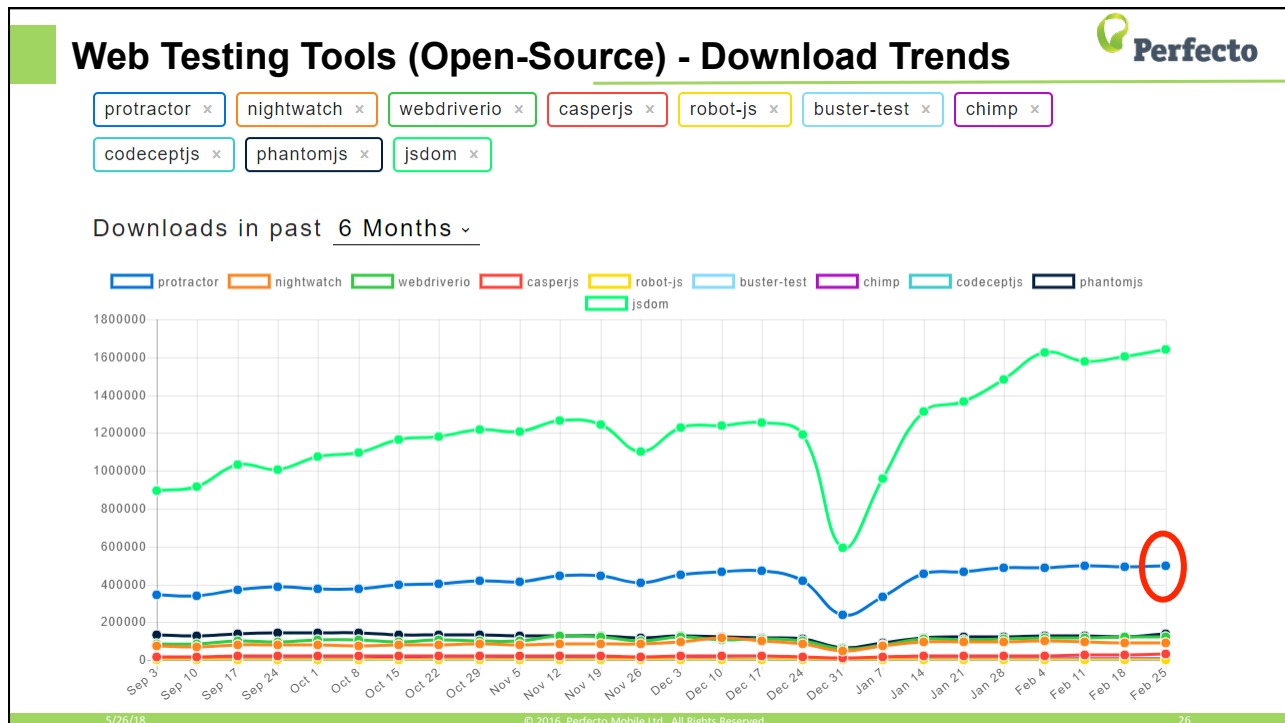
Feedback Loop and Reporting

Automation Coverage


Automation Robustness and Maintainability

Cloud and Automation at Scale


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Web Market Testing – Selection Criteria




Automation Coverage	Visual navigation testing
	Take screenshots
	Network monitoring, Har File
	Memory and Performance Profiling
	Code Coverage Analysis
	Testing Types
SDLC Process Fit	Plugins/Integrations
	BDD/ATDD Friendly
	Dev Language Support
	Config File Generation
Automation Robustness and Maintainability	Page Object Model Creation
	Execution Speed
	Sync
Feedback Loop and Reporting	Reporters
Community Strength	Documentation
	Contributors
Cloud and Automation at Scale	Cloud Support



[Read More Here](#)

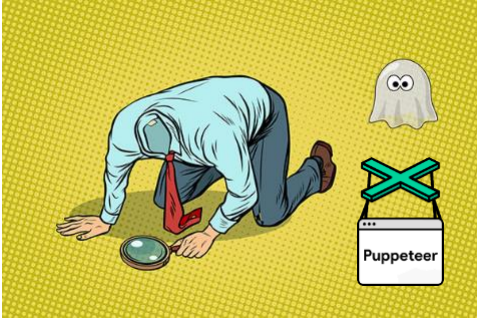
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Headless Browsers Role




Motivation

- Receive fast feedback (Unit and basic functional tests) – Mostly Dev
- Easy environment setup, no IT dependencies
- Uses standard JS language
- Supported and promoted by browser vendors (Google, Mozilla)
- Additional use cases to cover:
 - HAR File
 - Performance testing
 - Basic UI
 - Security









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Grouping The Tools



Real Browser (WebDriver)








Used for:


- End to end testing
- Functional testing

Headless

JSDOM

JSDom




Headless browser SW
(can used as standalone)

Used for:

- Fast CI – Short cycle
- Basic functional testing
- Backend services testing
- Performance / network traffic

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Tool Selection Case Study (USAA)



- Define needed capabilities

Selection Criteria

End to End Testing


BDD/ATDD Friendly

Tool Documentation

Visual Navigation Testing

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USAA Tool Selection




- Define needed capabilities
- Identify importance (weight capabilities)

Weight	Selection Criteria
5 (High importance)	End to End Testing
3 (Medium importance)	BDD/ATDD Friendly
5 (High importance)	Tool Documentation
1 (Low importance)	Visual Navigation Testing

Weight Key
1 – Low importance
3 – Medium importance
5 – High importance

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USAA Tool Selection



- Define needed capabilities
- Identify importance (weight capabilities)
- Define scoring key

Weight	Selection Criteria	Tool X	Tool Y	Tool Z
5 (High importance)	End to End Testing	3	3	3
3 (Medium importance)	BDD/ATDD Friendly	3	2	3
5 (High importance)	Tool Documentation	0	2	2
1 (Low importance)	Visual Navigation Testing	3	3	2

Scoring Key
0 – Did not meet expectations
2 – Met expectations
3 – Exceeded expectations

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USAA Tool Selection



- Define needed capabilities
- Identify importance (weight capabilities)
- Define scoring key

Scoring Key	
0	– Did not meet expectations
2	– Met expectations
3	– Exceeded expectations

Weight	Selection Criteria	Tool X	(weighted)	Tool Y	(weighted)	Tool Z	(weighted)
5 (High importance)	End to End Testing	3	5 x 3 = 15	3	5 x 3 = 15	3	5 x 3 = 15
3 (Medium importance)	BDD/ATDD Friendly	3	3 x 3 = 9	2	3 x 2 = 6	3	3 x 3 = 9
5 (High importance)	Tool Documentation	0	5 x 0 = 0	2	5 x 2 = 10	2	5 x 2 = 10
1 (Low importance)	Visual Navigation Testing	3	1 x 3 = 3	3	1 x 3 = 3	2	1 x 2 = 2
	Total		27		34		36

Infrastructure as a Freeway



