



A TECHWELL EVENT

W13

Test Frameworks

Wednesday, October 17th, 2018 3:00 PM

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

Presented by:

Eran Kinsbruner


Brought to you by:



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Eran Kinsbruner

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, Sun Microsystems, General Electric, Texas Instruments and NeuStar. He holds various industry certifications from ISTQB, CMMI, and others. Eran is a recognized mobile testing influencer and thought leader, as well as an experienced speaker in the major software engineering conferences. He is also a patent-holding inventor for a test exclusion automated mechanism for mobile J2ME testing, public speaker, researcher, and blogger. He can be found all over social media, including on Facebook, Twitter (@ek121268), LinkedIn, and his professional mobile testing blog.



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A TECHWELL EVENT

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

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About Me



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

Weekly Podcast - [Testiumpod](#)

Agenda



- Web Market Overview
- Organizational vs. Technology Tools Selection Criteria
- Mapping the OSS Tools Landscape
- RWD vs. PWA
- Q & A



EVERY BROWSER HAS UNIQUE CAPABILITIES



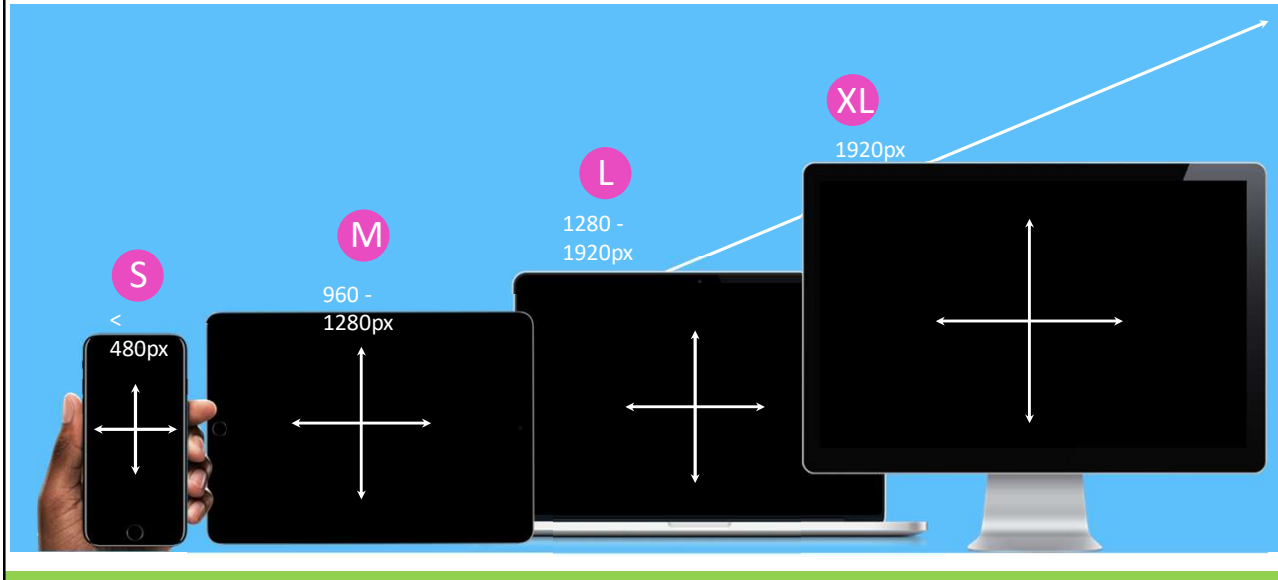
✓ Feature available in your current browser			✗ Feature not available in your current browser		
Camera & Microphone <ul style="list-style-type: none"> AUDIO & VIDEO CAPTURE ✓ ADVANCED CAMERA CONTROLS ✓ RECORDING MEDIA ✓ REAL TIME COMMUNICATION ✓ 	Native Behaviors <ul style="list-style-type: none"> LOCAL NOTIFICATIONS ✓ PUSH MESSAGES ✓ HOME SCREEN INSTALLATION ✓ FOREGROUND DETECTION ✓ PERMISSIONS ✓ 	Seamless Experience <ul style="list-style-type: none"> OFFLINE MODE ✓ BACKGROUND SYNC ✓ INTER-APP COMMUNICATION ✗ PAYMENTS ✓ CREDENTIALS ✓ 			
Advertisements <p>slack All the tools your team needs in one place. Slack. Where work happens. ads via Carbon</p>	Operating System <ul style="list-style-type: none"> OFFLINE STORAGE ✓ FILE ACCESS ✓ CONTACTS ✗ SMS ✗ STORAGE QUOTAS ✓ TASK SCHEDULING ✗ 	Location & Position <ul style="list-style-type: none"> GEOLOCATION ✓ GEOFENCING ✗ DEVICE POSITION ✓ DEVICE MOTION ✓ PROXIMITY SENSORS ✗ 			
Surroundings <ul style="list-style-type: none"> BLUETOOTH ✗ USB ✓ NFC ✗ AMBIENT LIGHT ✗ 	Input <ul style="list-style-type: none"> TOUCH GESTURES ✓ SPEECH RECOGNITION ✓ CLIPBOARD (COPY & PASTE) ✓ POINTING DEVICE ADAPTATION ✓ 	Screen & Output <ul style="list-style-type: none"> VIRTUAL & AUGMENTED REALITY ✓ FULLSCREEN ✓ SCREEN ORIENTATION & LOCK ✓ WAKE LOCK ✗ PRESENTATION FEATURES ✓ 			
Device Features <ul style="list-style-type: none"> NETWORK TYPE & SPEED ✓ ONLINE STATE ✓ VIBRATION ✓ BATTERY STATUS ✓ DEVICE MEMORY ✓ 					

Chrome on Windows 10 - Desktop

✓ Feature available in your current browser			✗ Feature not available in your current browser		
Camera & Microphone <ul style="list-style-type: none"> AUDIO & VIDEO CAPTURE ✓ ADVANCED CAMERA CONTROLS ✗ RECORDING MEDIA ✗ REAL TIME COMMUNICATION ✓ 	Native Behaviors <ul style="list-style-type: none"> LOCAL NOTIFICATIONS ✓ PUSH MESSAGES ✓ HOME SCREEN INSTALLATION ✗ FOREGROUND DETECTION ✓ PERMISSIONS ✗ 	Seamless Experience <ul style="list-style-type: none"> OFFLINE MODE ✓ BACKGROUND SYNC ✗ INTER-APP COMMUNICATION ✗ PAYMENTS ✓ CREDENTIALS ✗ 			
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Edge 17 on Windows 10 - Desktop

COVERAGE IS MORE THAN DEVICE/OS COMBINATIONS



CROSS-BROWSER TESTING != DESKTOP WEB TESTING



THERE IS NO WEB TESTING VS. MOBILE TESTING



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

NOT ALL CARRIERS BEHAVE THE SAME (BRAZIL)

Awards Table

OpenSignal Awards

	Download Speed: 4G	Download Speed: 3G	Download Speed: Overall	Latency: 4G	Latency: 3G	Availability: 4G
 Claro						
 Nextel						
 Oi						
 TIM						
 Vivo						

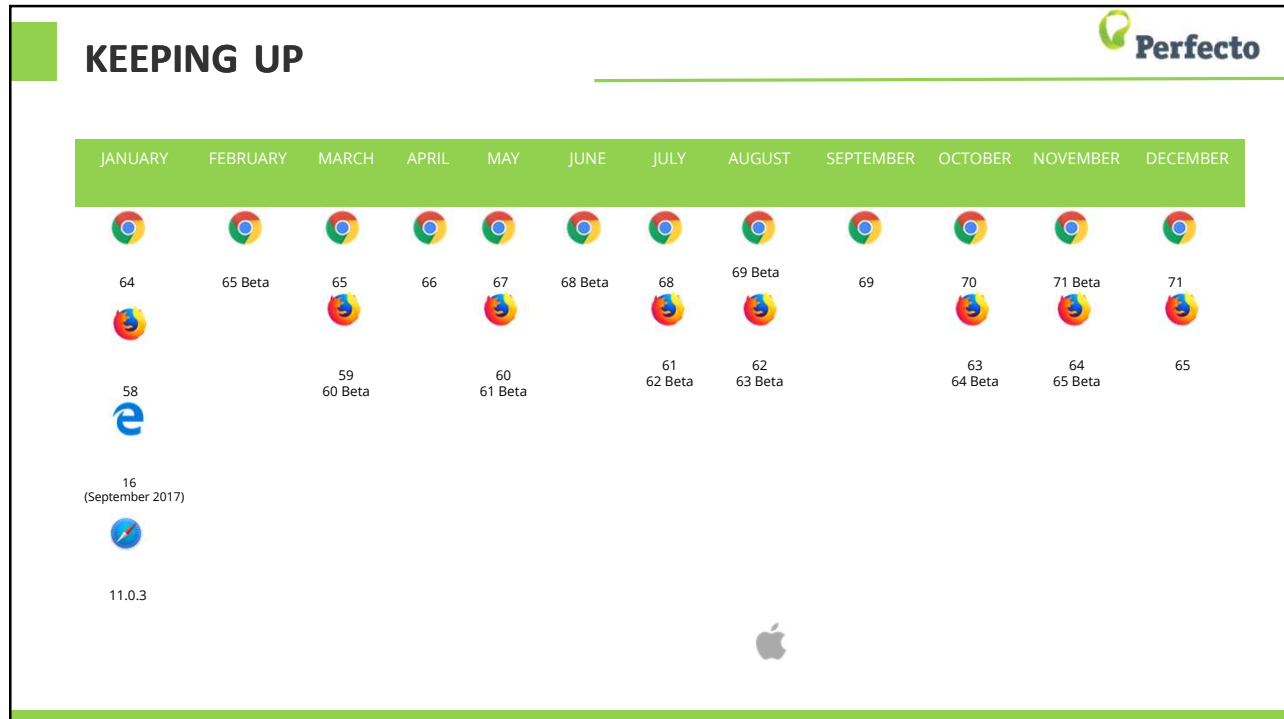
Source: [Open Signal](#)

12/31/2016

DESKTOP WEB PERMUTATIONS


ESSENTIAL WEB FAMILY	ENHANCED WEB FAMILY	EXTENDED WEB FAMILY
Chrome Latest / Win 10	Chrome Beta / Win 7	Chrome Latest / Win 8.1
Chrome Latest / MacOS Latest	Chrome-1 / Win 7	Chrome Beta / Win 8.1
Firefox Latest / Win 10	Firefox Beta / Win 10	Chrome-1 / Win 8.1
IE 11 / Win 10	Firefox Latest / Win 7	Firefox Latest / Win 8.1
Safari Latest / MacOS Latest	Firefox-1 / Win 10	Firefox-1 / Win 8.1
Edge Latest / Win 10	Safari Latest / MacOS -1	Firefox Beta / Win 8.1
Chrome Beta / Win 10	IE 11 / Win 7	Safari-1 / MacOS Latest
Chrome Latest / Win 7	IE 11 / Win 8.1	Safari-1 / MacOS - 1
Firefox-1 / Win 7	IE 9 / Win-7	Firefox Beta / MacOS Latest
Chrome-1 / Win 10	Chrome-1 / MacOS-1	Chrome Beta / MacOS Latest
	Chrome Latest / MacOS-1	IE 8 / WIN 7
Total 10 Browser Permutations	Total 12 Browsers Permutations	Total 11 Browsers Permutations

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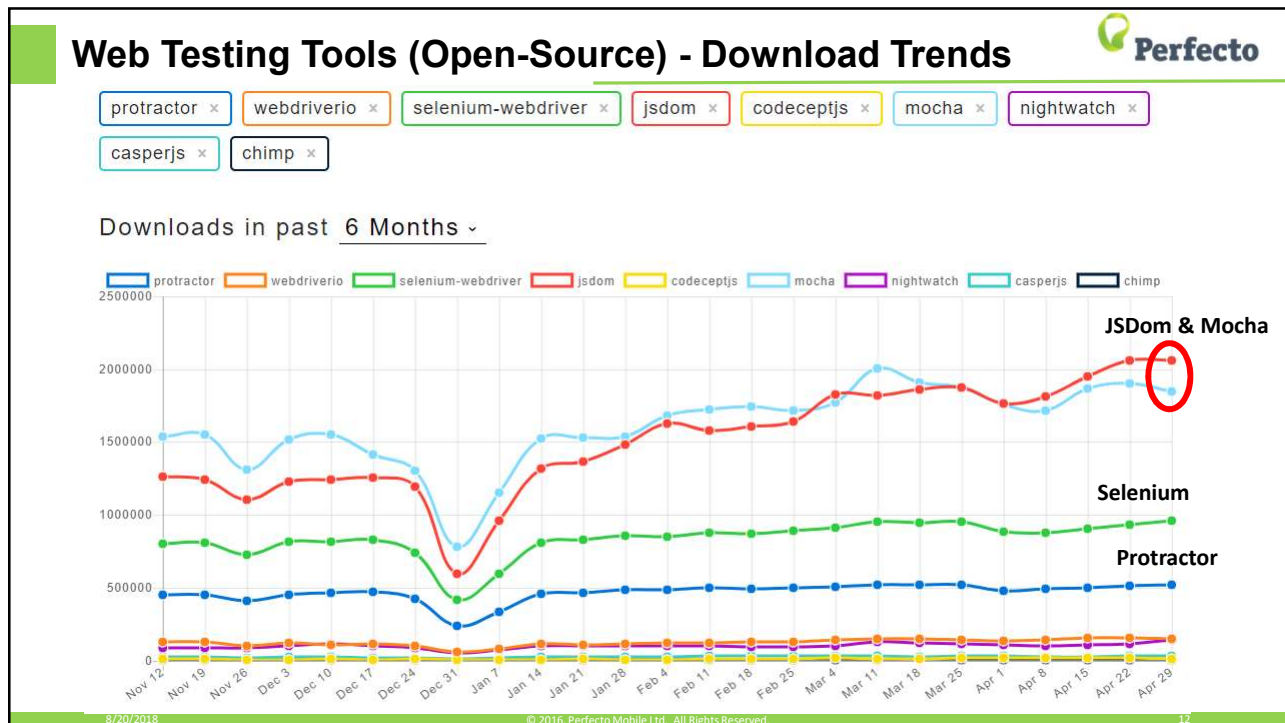
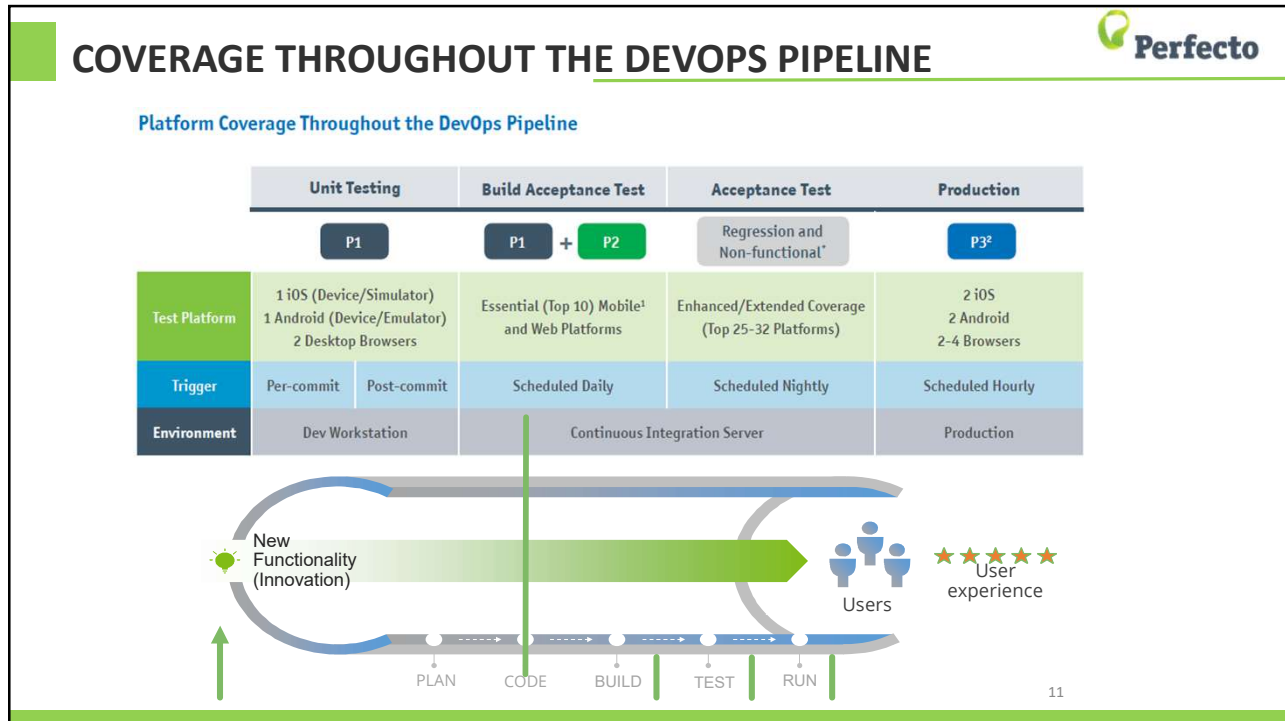


WHAT TO CONSIDER WHEN SELECTING A CROSS-BROWSER TOOL?

- Resources and skill set
- SDLC Process (ATDD, BDD, Agile)
- Feedback loop and reporting capabilities
- Test automation maintainability



- Supported integrations (Jira, Slack, Jenkins, Git etc.)
- Community, Documentation, Usability
- Supported features and test coverage (visual, sensors, etc.)
- Supported platforms (mobile, web)



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
Automation Robustness and Maintainability	Config File Generation
	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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Additional Categorization of JS Tools



- Tools that provide a **testing structure (BDD/ATDD)** ([Mocha](#), [Jasmine](#), [Jest](#), [Cucumber](#))
- Tools that provide **assertions functions** ([Chai](#), [Jasmine](#), [Jest](#), [Unexpected](#))
- Tools to generate, **display, and watch** test results ([Mocha](#), [Jasmine](#), [Jest](#), [Karma](#))
- Tools that generate **code coverage** reports ([Istanbul](#), [Jest](#), [Blanket](#))
- Tools that provide a **browser or browser-like environment** with a control on their scenarios execution, UI testing and more ([Protractor](#), [Nightwatch](#), [Phantom](#), [Casper](#), [Selenium](#), [WebDriver.IO](#), [TestCafe](#))
- Provide **mocks, spies, and stubs** ([Sinon](#), [Jasmine](#), [enzyme](#), [Jest](#), [testdouble](#))

Source: [Medium.com](#)

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JS Acceptance Testing with Codecept.JS



```

1  Scenario('login with generated password', async (I) => {
2    I.fillField('email', 'miles@davis.com');
3    I.click('Generate Password');
4    const password = await I.grabTextFrom('#password');
5    I.click('Login');
6    I.fillField('email', 'miles@davis.com');
7    I.fillField('password', password);
8    I.click('Log in!');
9    I.see('Hello, Miles');

```

Source: [Codecept.JS Git](#)

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JS Code Coverage (Istanbul with Mocha.JS)



\$ npm install --save-dev nyc

```

{
  "scripts": {
    "test": "nyc mocha"
  }
}

```

File	% Stmts	% Branch	% Funcs	% Lines	Uncovered Lines
All files	98.92	94.36	99.49	100	
yargs	99.17	93.95	100	100	
index.js	100	100	100	100	
yargs.js	99.15	93.86	100	100	
yargs/lib	98.7	94.72	99.07	100	
command.js	99.1	98.51	100	100	
completion.js	100	95.83	100	100	
obj-filter.js	87.5	83.33	66.67	100	
usage.js	97.89	92.59	100	100	
validation.js	100	95.56	100	100	

Source: [Istanbul.js.org](#)

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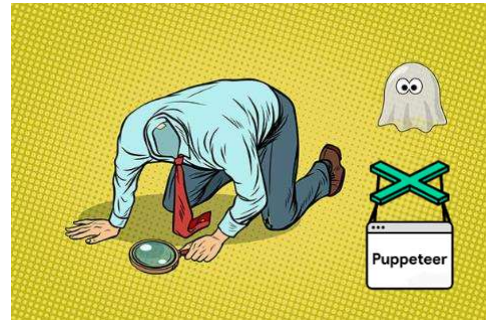
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Headless Browsers Role



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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Headless Browsers – Puppeteer Example



```
'use strict';
const puppeteer = require('puppeteer');
const devices = require('puppeteer/DeviceDescriptors');
(async() => {
const browser = await puppeteer.launch();
const page = await browser.newPage();
await page.emulate(devices['iPhone 6']);
await page.goto('https://www.nytimes.com/');
await page.screenshot({path: 'full.png', fullPage: true});
await browser.close();
})();
```

<https://github.com/GoogleChrome/puppeteer>



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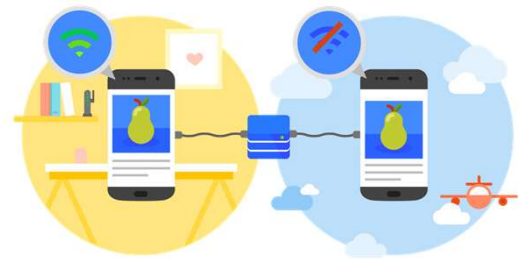
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Progressive Web App - Definition



*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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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)

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PWA Stats

<p>Treebo launched a PWA and saw a 4x increase in conversion rate year-over-year. Conversion rates for repeat users saw a 3x increase and their median interactive time on mobile dropped to 1.5s.</p> <p>#Conversions #Offline #Performance #Service Worker #Travel</p>	<p>The Best Western River North Hotel sees 300% increase in revenue with new Progressive Web App.</p> <p>#Conversions #Home Screen #Offline #Service Worker #Travel</p>	<p>OpenSooq's new PWA is only 28.3KB and has improved engagement with a 25% increase in average time on page resulting in 260% more leads.</p> <p>#App Shell #Classified #Engagement #Home Screen #Notifications #Service Worker</p>
<p>Petlove's PWA resulted in a 2.8x increase in conversion and a 2.8x increase in time spent on site. Using simplified signup and auto sign back in, 2x more users go to checkout already signed in.</p> <p>#Conversions #Credential Management #E-commerce #Engagement #Home Screen #Notifications #Service Worker</p>	<p>Grand Velas Riviera Maya resort increased its Black Friday conversion rate by 53% due to its progressive web app's speed and notifications.</p> <p>#Conversions #Leisure #Home Screen #Notifications #Service Worker #Travel</p>	<p>Tinder cut load times from 11.91 seconds to 4.69 seconds with their new PWA. The PWA is 90% smaller than Tinder's native Android app. User engagement is up across the board on the PWA.</p> <p>#Engagement #Home Screen #Notifications #Service Worker #Social</p>
<p>Trivago saw an increase of 150% for people who add its PWA to the home screen. Increased engagement led to a 97% increase in clickouts to hotel offers. Users who go offline while browsing can</p> <p>#Conversions #Home Screen #Notifications #Service Worker</p>	<p>Uber's PWA was designed to be fast even on 2G. The core app is only 50k zipped and takes less than 3</p> <p>#Conversions #Home Screen #Notifications #Service Worker</p>	<p>West Elm's progressive web app saw a 15% increase in average time spent on site and a 9% lift in revenue</p> <p>#Conversions #Home Screen #Notifications #Service Worker</p>

PWA Stats: <https://www.pwastats.com/>

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Installation Process

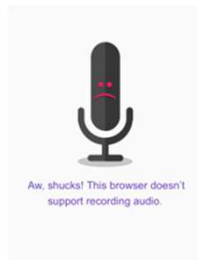
***iOS Hybrid App (not running from Safari + special permissions) vs. Android APK)**

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PWA on iOS is Different than 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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Responsive Web App – Test Plan Strategy: 6 Steps



Choose The Right Platforms

Assure Visual Web Pages Across Platforms

Functionality of Navigation Flows and Menus

Client Side Performance Testing

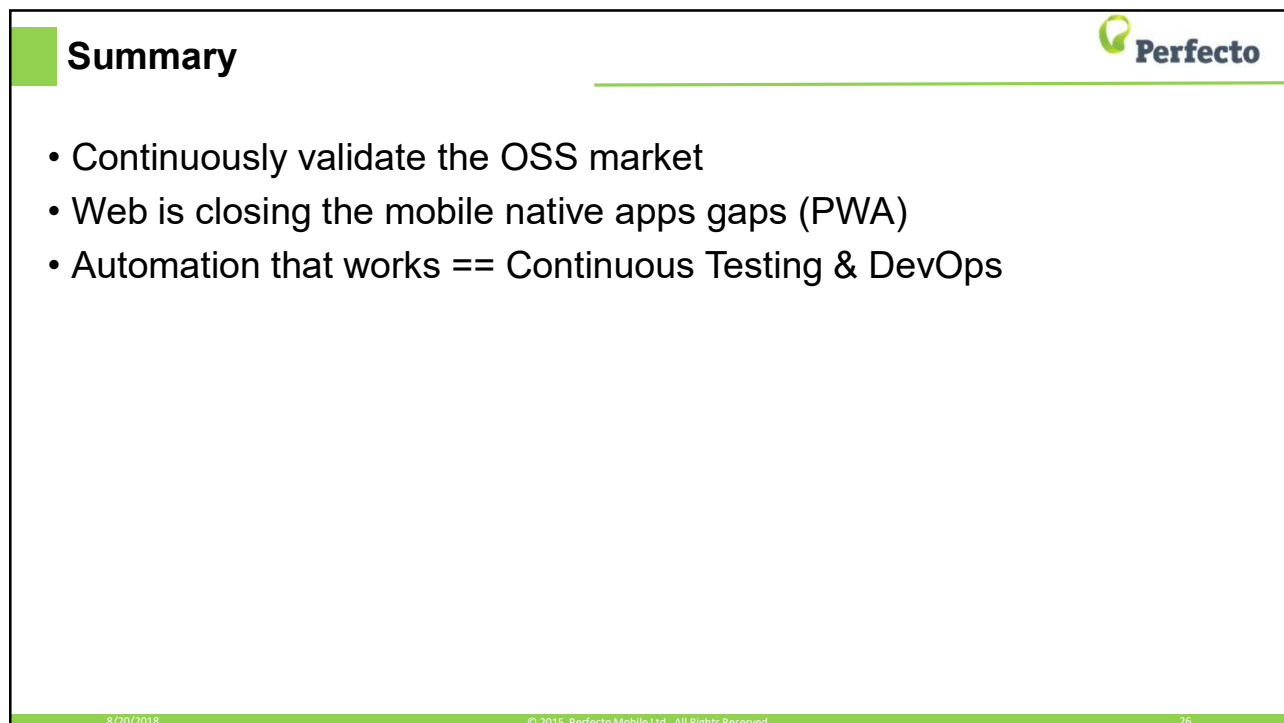
Test Accessibility for Mobile and Web

Test Environment Conditions (Networks, Sensors)

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Thank You

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