Cross Platform
Progressive Web Apps
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Maintaining Open Source While Maintaining Your Sanity

HONG KONG OPEN SOURCE CONFERENCE 2018
What is a Progressive Web App?
“Progressive Web Apps use modern web capabilities to deliver an app-like user experience.”
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“They evolve from pages in browser tabs to immersive, top-level apps, maintaining the web's low friction at every moment."
“So they're just web pages?”
Progressive

Works for every user, regardless of browser choice because it's built with progressive enhancement as a core tenet.
Responsive

Fits any form factor: desktop, mobile, tablet, or whatever is next.
Connectivity Independent

Enhanced with service workers to work offline or on low-quality networks.
App Like

Feels like an app, because the app shell model separates the application functionality from application content.
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Feels like an app, because the app shell model separates the application functionality from application content.
Safe

Served via HTTPS to prevent snooping and to ensure content hasn't been tampered with
Re-engagable

Makes re-engagement easy through features like push notifications.
Installable

Allows users to add apps they find most useful to their home screen without the hassle of an app store.
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Linkable

Easily share the application via URL, does not require complex installation.
Discoverable

Is identifiable as an "application" thanks to W3C manifest and service worker registration scope, allowing search engines to find it.

// index.html
<link rel="manifest" href="/manifest.json">

// manifest.json
{
  "short_name": "AirHorner",
  "name": "Kinlan's AirHorner of Infamy",
  "icons": [  
    {"src": "launcher-icon-1x.png",
      "type": "image/png",
      "sizes": "48x48"
    },
    {"src": "launcher-icon-2x.png",
      "type": "image/png",
      "sizes": "96x96"
    },
    {"src": "launcher-icon-4x.png",
      "type": "image/png",
      "sizes": "192x192"
    }
  ],
  "start_url": "index.html?launcher=true"}
It all starts with

```html
<link rel="manifest" href="manifest.json">
```
manifest.json

"short_name": "PWA Test",
"name": "PWA Test",
"start_url": "index.html",
"display": "standalone",
"background_color": "#fff",
"theme_color": "#2196F3",
"description": "A sample PWA.",
"icons": [
  {
    "src": "img/logo-192.png",
    "sizes": "192x192",
    "type": "image/png"
  },
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  }
]
if (matchMedia('(display-mode: standalone)').matches) {
  // Android and iOS 11.3+
  isPWAInBrowser = false;
} else if ('standalone' in navigator) {
  // useful for iOS < 11.3
  isPWAInBrowser = !navigator.standalone;
}
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    "sizes": "512x512",
    "type": "image/png"
  }
]
let installPromptEvent;
window.addEventListener('beforeinstallprompt', function(event) {
  event.preventDefault();
  installPromptEvent = event;
});

function callInstallPrompt() {
  // We can't fire the dialog before preventing default browser dialog
  if (installPromptEvent !== undefined) {
    installPromptEvent.prompt();
  }
}
App Shell Architecture
Cached shell loads **instantly** on repeat visits.

Dynamic content then populates the view.
Service Workers
Service Workers

“A service worker is a script that your browser runs in the background, separate from a web page.”
Registration

```javascript
if ('serviceWorker' in navigator) {
    window.addEventListener('load', function() {
        navigator.serviceWorker.register('./service-worker.js');
    });
}
```
Installation

```javascript
var CACHE_VERSION = 'v1';
var CACHE_LIST = ['index.html', 'css/main.css', 'js/main.js'];

self.addEventListener('install', function(event) {
    event.waitUntil(caches.open(CACHE_VERSION)
        .then(function(cache) {
            return cache.addAll(CACHE_LIST);
        }));
});
```
Activation

```javascript
self.addEventListener('activate', function(event) {
    var cacheWhitelist = ['v2'];

    event.waitUntil(
        caches.keys().then(function(keyList) {
            return Promise.all(keyList.map(function(key) {
                if (cacheWhitelist.indexOf(key) === -1) {
                    return caches.delete(key);
                }
            }));
        }));
});
```
self.addEventListener('fetch', function(event) {
    console.log('Handling fetch event for ' + event.request.url);
    event.respondWith(
        caches.match(event.request).then(function(response) {
            if (response) {
                console.log('Found response in cache:', response);
                return response;
            }
            console.log('No response found in cache. Fetch from network...');
            return fetch(event.request);
        })
    );
});
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    "type": "image/png"
  }
]
```

index.html

```
<meta name="apple-mobile-web-app-title" content="PWA Test"/>
```
manifest.json

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    "sizes": "512x512",
    "type": "image/png"
  }
]
```

index.html

```
<meta name="apple-mobile-web-app-capable" content="yes" />
```
manifest.json

```
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```

---

index.html

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<meta name="apple-mobile-web-app-capable" content="yes">
```

Supported in iOS 11.3
manifest.json

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  },
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    "src": "img/logo-512.png",
    "sizes": "512x512",
    "type": "image/png"
  }
]

index.html

<meta name="apple-mobile-web-app-status-bar-style" content="black">
manifest.json

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    "sizes": "512x512",
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  }
]

index.html

<link rel="apple-touch-icon" href="img/icons/apple-touch-icon.png">
manifest.json

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index.html

<link rel="apple-touch-icon" href="img/icons/apple-touch-icon.png">

Still needed in iOS 11.3
manifest.json

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  }
]
```

index.html

```
<link
  rel="apple-touch-startup-image"
  href="img/Default-Portrait.png">
```
manifest.json

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    }
]

index.html

<link
    rel="apple-touch-startup-image"
    href="img/Default-Portrait.png">

Still needed in iOS 11.3,
no splashscreen support
Breaks file type in input tag
Breaks file type in input tag
Breaks integration with camera
Breaks file type in input tag
Breaks integration with camera
No support for getUserMedia
Breaks file type in input tag
Breaks integration with camera
No support for getUserMedia

Workaround: Remove

<meta
    name="apple-mobile-web-app-capable"
    content="yes"/>
is SERVICEMOWKER ready?

Status * Spec * Intro * Resources * GitHub

ServiceWorker enthusiasm

The first thing any implementation needs.

Chrome: Shipped.

Firefox: Shipped.

Samsung Internet: Shipped. Based on Chromium 44.2403 with some additions and changes. (See "Service Worker" section.)

Safari: Under consideration, Brief positive signals in five year plan.

Edge: In development.

Support does not include iOS versions of third-party browsers on that platform (see Safari support).
is SERVICEWORKER ready?

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Service Workers

A method for browsers to run JavaScript in the background to handle network requests and manage cached responses. Service Workers offers a replacement for Application Cache.

Reference: w3c.github.io...

Contact: @bradeeoh - Brady Eidson

Firefox: Shipped.

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Safari: In development.

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Support does not include iOS versions of third-party browsers on that platform (see Safari support).
Not "Always" Persistent

“To keep only the stored information that is useful to the user, WebKit will remove unused service worker registrations after a period of a few weeks. Caches that do not get opened after a few weeks will also be removed. Web Applications must be resilient to any individual cache, cache entry or service worker being removed.”

https://webkit.org/blog/8090/workers-at-your-service/
Weird Behaviour

"Every time you get out of the PWA, you will lose the context, and when the user goes back, the PWA will load from scratch."
Other missing features
Other missing features

- Push Notifications
Other missing features

- Push Notifications
- Background Sync
Other missing features

- Push Notifications
- Background Sync
- Background code execution
Other missing features

- Push Notifications
- Background Sync
- Background code execution
- etc.
Other missing features

- Push Notifications
- Background Sync
- Background code execution
- etc.
- etc.
I'M SO EMBARRASSED.
FACE PALM
Always bet on the web.

7:08 AM - 26 Feb 2016

17 Retweets  36 Likes
Recommended Reading

- Hey, Hey, Cloud Four is a PWA! (article)
- Responsive Web Design (book)
- Web Push Notifications (video)
- Don’t use iOS meta tags irresponsibly in your Progressive Web Apps (article)
- Comscore Mobile App Report (article)
- Building Progressive Web Apps (book)
- Progressive Web Apps on iOS (article)