Progressive Web Apps

~Prakhar Doshi

It's hard to see anyone without a phone in the modern world. People want everything on the phone, it has become more than just a device it has become a lifeline. The reason that phone has became the integral part is it's power to give the user the opportunity to connect, share, access entertainment, shop etc. anywhere and anytime. The success of phone also enticed companies to design websites such that it allows users access from phone. What is it that has made phone the most attractive? Apps which provide smooth, fast solutions for various daily tasks.

Progressive Web app is nothing but a website made using HTML, CSS and JavaScript that can also behave like an app on your phone.
Let' first look into what are the most popular types of App available in the market?

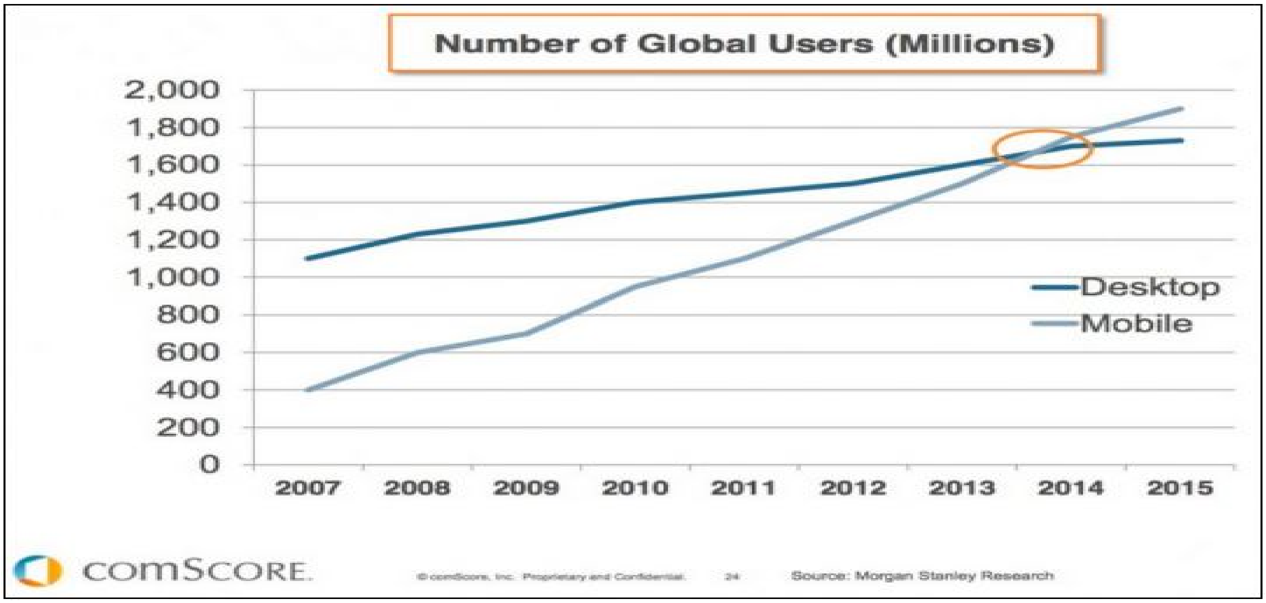
Native apps are made for a specific mobile platform. The most know platform in the market right now are iOS, Android and Windows. These apps require the developers to use tools and language that are compatible with respective platform (e.g., Xcode and Objective-C/Swift with iOS, Eclipse and Java with Android). Native apps are needed to be packaged(ex. Android .apk) and hosted in the particular app store so that it is available to users. Good examples of native apps can be AirDroid which is an Remote Desktop App made solely for android , Camera+ an app for iOS users for editing images.

Hybrid apps are apps developed using web technologies which can be made to work as a native application. It is not purely a native application as it is developed using web standards HTML5, CSS and JavaScript which is then wrapped into native code using a middleware. Apache Cordova /PhoneGap is an example of a frameworks that helps build hybrid apps. The kind of apps are not entirely web/native because of the development using web standards, the need to transpile the source code and packaging for installing as native app to get access to device API. Hybrid apps are ubiquitous but requires pieces of technologies to integrate to make it work.

Now certainly question would arise "isn't progressive web app same as a hybrid app?" No. The best part with progressive web apps is that it lives in the browser i.e. no middleware. The user of the website starts using it like a regular website and if he/she keeps on visiting the website repeatedly the website starts to transform into a regular app on the phone for the faster and easier use. The fancy name here can actually be broken down as Progressive(reforming with time), Web(It's working on the web), App(It behaves like an App). Examples : AliExpress, Flipkart

Why Progressive Web Apps?

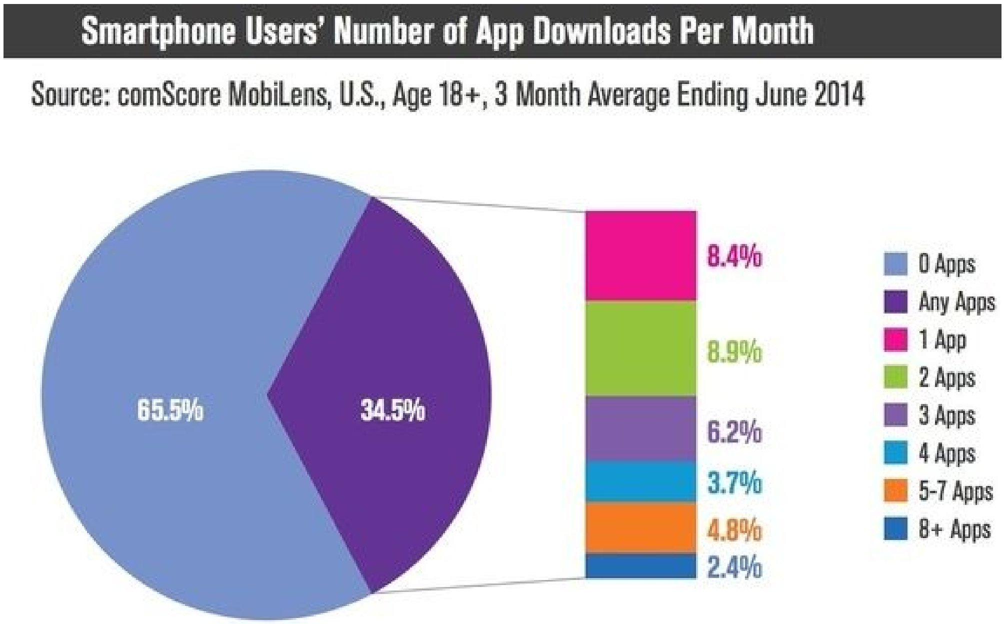
➢ Most web traffic these days comes from mobile devices, with at least over 7 billion mobile devices in the world it’s not surprising to know that over 60% of all web traffic comes from mobile devices. Data analysis show that in past decade internet access from mobile has surpassed desktop.



Number of Global Users (Millions)

Source: Morgan Stanley Research

- ➢ Apps on the phone are attractive but it is observed that a user downloads between 0–3 new apps per month, on average. In general most users only tend to download the most popular apps like social media, maps etc. Various big companies invest on development of apps for iOS/ android to keep a loyal base of customers and also have a website. These companies are investing millions on app development but it is not really fruitful.



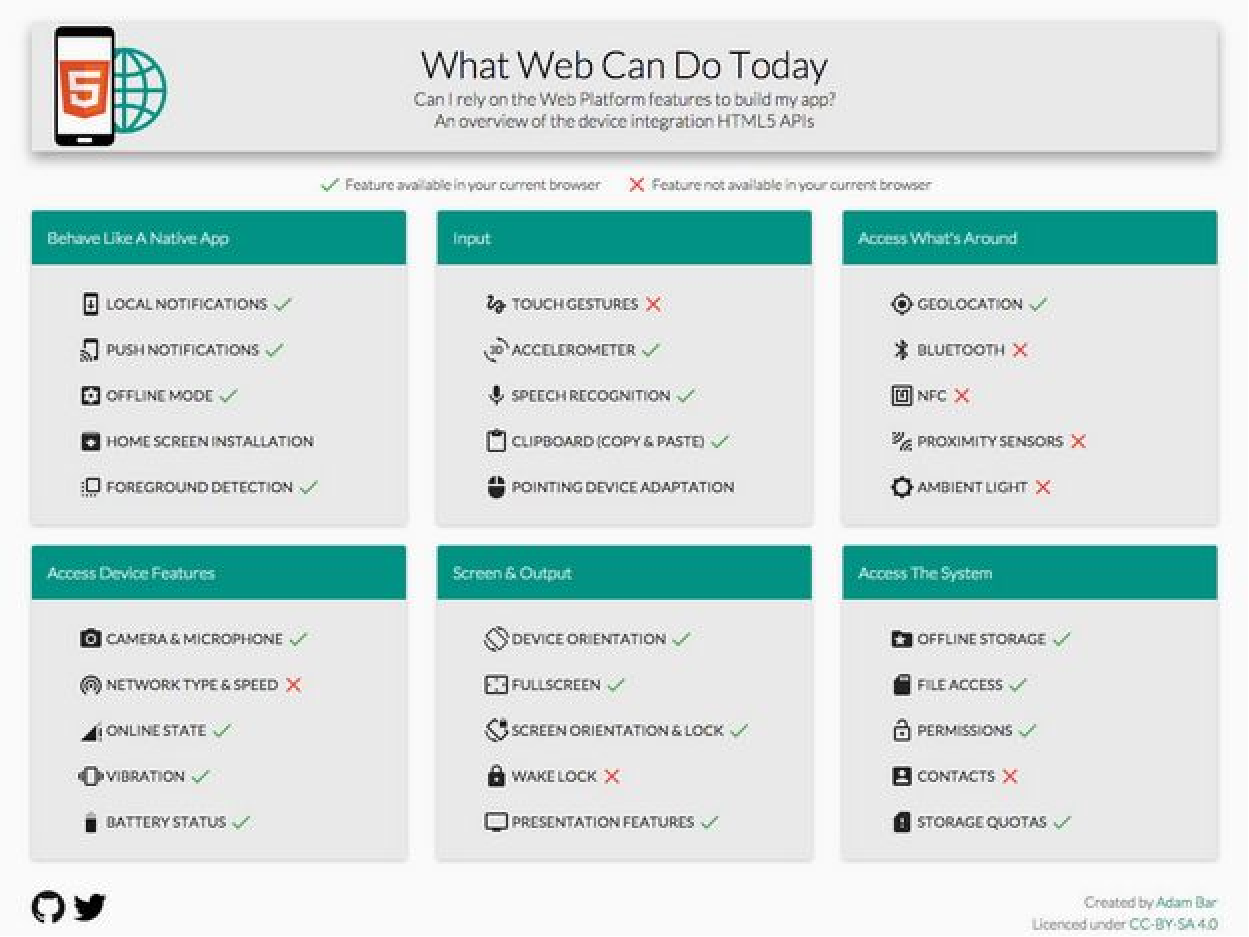
Smartphone Users' Number of App Downloads Per Month

Source: comScore MobiLens, U.S., Age 18+, 3 Month Average Ending June 2014

It can be concluded for the above two reasons that a smartphone user is not inclined towards searching for app except some popular apps and also that more and more people are leaning towards mobile browsers to access websites but it is sometimes inconvenient for the user to repeatedly load the web page by searching from browser and also deal with the network latency.

The solution is progressive web apps. Their is a good probability of coming across good web resources on the internet that are of interest to user. Progressive web apps will consume the user's affinity towards a website and if the user repeatedly visits the website it will ask whether they will like to use the website like an app? If the users allows then the website starts to function like a App.

"What do I mean by like an app?" The progressive web app will have an icon on the phone and work without browser meaning no URL and navigation. It will also support local notifications , push messages, audio and video capture, geolocation, etc. Below is a snippet of what web apps can do with native API



What Web Can Do Today

Can I rely on the Web Platform features to build my app?
An overview of the device integration HTML5 APIs

✓ Feature available in your current browser ✗ Feature not available in your current browser

Behave Like A Native App

- LOCAL NOTIFICATIONS ✓
- PUSH NOTIFICATIONS ✓
- OFFLINE MODE ✓
- HOME SCREEN INSTALLATION
- FOREGROUND DETECTION ✓

Input

- TOUCH GESTURES ✗
- ACCELEROMETER ✓
- SPEECH RECOGNITION ✓
- CLIPBOARD (COPY & PASTE) ✓
- POINTING DEVICE ADAPTATION

Access What's Around

- GEOLOCATION ✓
- BLUETOOTH ✗
- NFC ✗
- PROXIMITY SENSORS ✗
- AMBIENT LIGHT ✗

Access Device Features

- CAMERA & MICROPHONE ✓
- NETWORK TYPE & SPEED ✗
- ONLINE STATE ✓
- VIBRATION ✓
- BATTERY STATUS ✓

Screen & Output

- DEVICE ORIENTATION ✓
- FULLSCREEN ✓
- SCREEN ORIENTATION & LOCK ✓
- WAKE LOCK ✗
- PRESENTATION FEATURES ✓

Access The System

- OFFLINE STORAGE ✓
- FILE ACCESS ✓
- PERMISSIONS ✓
- CONTACTS ✗
- STORAGE QUOTAS ✓

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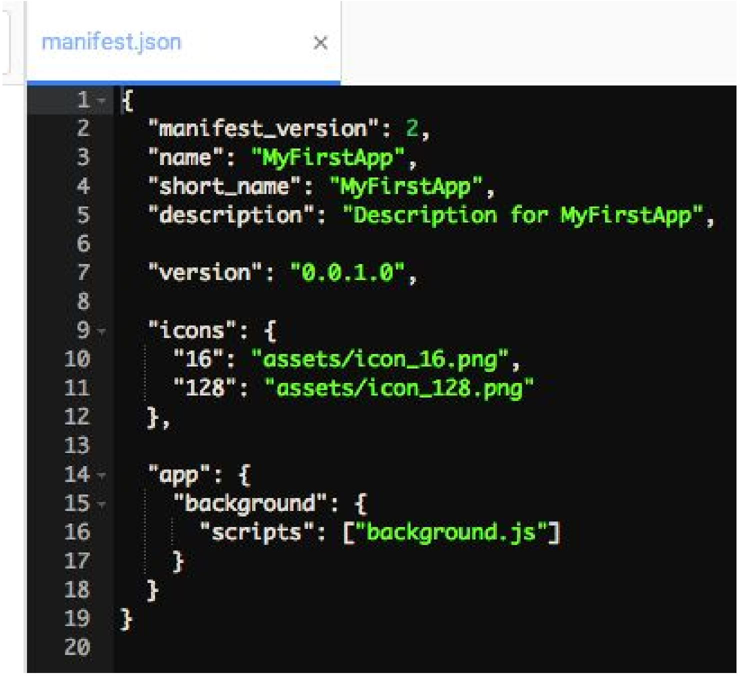
How does Progressive Web App work?

Progressive web applications are mobile friendly secure websites. It requires the web application to be secure i.e. working over HTTPS .

In broad sense progressive web apps work using :

- Manifest file
- Service Worker

The manifest is a JSON file that contains the metadata like the name for the web app on the phone, various path to the images for icons and starting point of the application etc. The web app stores icons in different dimensions for it to be responsive to the type of device.It most importantly points to the service worker script.



```
{
  "manifest_version": 2,
  "name": "MyFirstApp",
  "short_name": "MyFirstApp",
  "description": "Description for MyFirstApp",

  "version": "0.0.1.0",

  "icons": {
    "16": "assets/icon_16.png",
    "128": "assets/icon_128.png"
  },

  "app": {
    "background": {
      "scripts": ["background.js"]
    }
  }
}
```

A service worker is a javascript program that is registered with the progressive web app and runs in the background. It periodically caches the web app data to the phone using the localStorage API. It controls the interaction of the user with web page/site, intercepts/hijacks the network requests and modifies navigation in case of offline access to fetch from the locally stored resources. The primary reason progressive web apps only work over HTTPS is because of the service worker security standards. Service worker is the one responsible for making the progressive web app feel seamless online/offline by various performance enhancements, for example pre-fetching resources that the user is likely to need in the near future, such as the next few pictures in a photo album.

Conclusion

Progressive web apps are still relatively new and it has lot of functional requirements to fulfill to reach the level of traditional apps. Native/Hybrid apps are still more powerful and are going to be the market leaders for sometime . But progressive web apps are promising to be the future of apps because of its attractive features like availability of most updated version of the app, reliability, fast, easily shareable via the link and most importantly as it is a better solution to ubiquitous app development since it is all javascript.

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