

Class: INF-654

Name: Lim Seanglong

Date: 9/2/2024

What is Progressive Web Development?

Progressive web development is the process of building a Progressive Web Application or PWAs which combines the features of web and native mobile apps. It's built using web building languages such as CSS and HTML, but it includes features such as offline access, push notifications and accessing hardware features.

The difference between Native Mobile App Development & Progressive Web Development

PWAs: According to Turing, PWAs are web apps that can work seamlessly on any device, regardless of the platform, be it mobile, desktop, or tablet. PWAs offer a native app-like experience with the convenience of a website. They leverage modern web capabilities like service workers, and web app manifests to deliver a seamless user experience. PWAs can be easily installed on a user's home screen, allowing them to access the app quickly without the need to go through the app store (2024) [1].

Native Apps: According to TechTarget, A native application is a software program developers build for use on a particular platform or device. Because developers build a native app for use on a particular device and its OS, it has the ability to use device-specific hardware and software. Native apps can provide optimized performance and take advantage of the latest technology, such as GPS, compared to web apps or mobile cloud apps developed to be generic across multiple systems (2024) [2].

Key Difference [3]:

1. **Languages:** Native Apps uses Swift/Objective-C and Java for Android. PWAs uses web languages such as HTML, CSS and JavaScript.
2. **Costs:** PWAs are cheaper since it's easier to deploy while Native Apps requires approval and submissions from App Stores (iOS, Android).
3. **Security:** PWAs are more secure than traditional web apps due to HTTPs requirements, While Native Apps Can offer more security features like multi-factor authentication and certificate pinning.
4. **Discoverability:** Native Apps are reliant on app store and PWAs are found on SEO (Search Engine Optimization).

Discuss different concepts to implement as a Web Developer:

1. **Offline Functionality:** As a web developer this feature of can help with user's experience since the user will never need the internet, especially if the content is dynamic, and user will get some content before the server updates and will not see unpleasant errors as often occurs in mobile apps. [3]
2. **High Speed: By Optimizing:** This feature is also very important to user's experience as PWA optimization standard requires the highest website loading speed, even with a weak internet connection. So images and content are optimized, and the user gets the page loaded in just a few seconds. [3]
3. **Push Notifications:** Implementing push notifications in web applications, especially PWAs, can significantly enhance user engagement. With PWA push notifications, your server sends push notifications to a user's device even when they aren't actively using your web application. The alerts appear just like native app alerts but without the need to download yet another app to the user's device. [4]
4. **Security:** As a web developer, it's important to implement a tight security to measures and protect user data and prevent malicious attack. To enhance PWA security, developers should follow best practices such as implementing HTTPS, using service workers for offline support, sanitizing user input to prevent XSS attacks, and employing strong authentication methods. Regular security audits and updates are essential to mitigate emerging threats in the dynamic landscape of PWA development. [5]
5. **Accessibility:** Ensuring websites are accessible and usable for everyone should be a primary concern for anyone who works within the online space. When websites aren't accessible it can make it incredibly difficult for some users to perform necessary tasks or find the information they are looking for. The website has to follow 4 principles known as POUR: Perceivable, Operable, Understandable and Robust.
 - a. **Perceivable:** This includes making websites accessible to screen readers by supplying text alternatives and a logical structure.
 - b. **Operable:** This also includes allowing enough time for users to complete any given task.
 - c. **Understandable:** Users need to be able to understand the information displayed on a webpage, as well as clearly understand the user interface and navigate the site.
 - d. **Robust:** To be robust, a website must be able to be accessed and interpreted by different technologies and platforms, including screen readers. [6]

Conclusion

For web developers we can find it hard to meet user's needs but with web development evolving rapidly with the rise of Progressive Web Applications (PWAs), offering a blend of web and native app functionalities that enhance user experience across various platforms. By implementing PWAs, developers can meet user's needs easily and more effectively.

References:

1. <https://www.turing.com/blog/progressive-web-apps-vs-native-apps>
2. <https://www.techtarget.com/searchsoftwarequality/definition/native-application-native-app>
3. <https://maddevs.io/blog/you-want-to-develop-a-mobile-application-are-you-sure/#pwa-vs-native-app-key-differences>
4. <https://www.magicbell.com/blog/using-push-notifications-in-pwas>
5. <https://reverbico.com/blog/pwa-security/>
6. <https://www.searchenginejournal.com/seo-accessibility/379582/>