**REVIEW AND COMPERISON OF MAJOR TYPES OF MOBILE APPS**

**INTRODUCTION:**

In the world of mobile application development, three major types of apps dominate the landscape, Native Apps, Progressive Web Apps and Hybrid Apps. Each type has its unique characteristics, advantages, and disadvantages.

**1. Native Apps:**

Native apps are developed specifically for a particular operating system (OS) such as IOS or ANDRIOD. There are build using platform specific programming languages ( for example swift for IOS and Kotlin for Android )

**Advantages of native apps**

**Performance:** native aps offer high performance and responsiveness, as there are built for a particular operating system.

**User experience:** There provide a seamless user experience and can utilize device features like camera, GPS and notifications.

**Disadvantages of Native Apps**

**Cost:** Developing a native app for both IOS and Android requires separate codebases and development teams, making it more expensive and time-consuming.

**Maintenance:** Updates and maintenance need to be done separately for each platform, increasing effort and cost.

**Installation:** Users must download and install the app from an app store, which can be a barrier for some.

**2. PROGRESSIVE WEB APPS (PWAs)**

PWAs are applications that functions like native apps but are access via a web browser. There can be installed on the device screen without going through the app store. There are build using standard web technologies (HTML, CSS, JavaScript).

**Advantages of PWAs**

**Cross-platform:** PWAs work on any device with a web browser, eliminating the need for several versions.

**Low development cost:** PWAs are cheaper and faster to develop than native apps because there's a single codebase for all platforms.

**No App Store Needed:** Users don’t need to download an app from an app store; they can simply visit the website, and it can be added to their home screen.

**Offline Access:** they can work offline or in low network conditions, thanks to service networks.

**Automatic Updates:** PWAs can be updated automatically, so users always have the latest version without needing to download updates manually.

**Disadvantages of PWAs**

**Limited Device Access:** PWAs have limited access to device features compared to native apps. For example, full access to sensors, Bluetooth, and other native APIs may not be possible.

**Performance:** While PWAs can perform well, they may not offer the same speed and responsiveness as a native app, especially for complex or resource-heavy applications.

**Browser Compatibility:** Some older browsers may not support the full range of PWA capabilities, though this is improving over time.

**3. HYBRID APPS**

Hybrid apps combine both elements of native and progressive web app. There are build using web technologies and are wrapped in a native shell, allowing them to be distributed through app store.

**Advantages:**

**Cross-Platform:** Like PWAs, hybrid apps can run on multiple platforms with a single codebase.

**Cost and Time Efficiency:** Hybrid apps are cheaper and faster to develop than native apps because they share code across platforms.

**Access to Device Features:** Hybrid apps can access many native features (e.g., camera, GPS) via plugins or APIs, though they may not have the same level of access as a fully native app.

**Disadvantages:**

**Performance Issues:** Hybrid apps typically do not perform as well as native apps, especially for complex or resource-intensive tasks. They may suffer from slower animations or reduced responsiveness.

**User Experience:** The user experience can sometimes feel less "native" than with fully native apps. There may be inconsistencies in performance and design across platforms.

**Dependence on Frameworks:** The app's performance and features can be limited by the capabilities of the hybrid framework used (e.g., Cordova, Ionic).