CCS technologies

The Ultimate Guide to Choose The Right Mobile App Tech Stack for Your Business Needs

Abstract

In today's fast-paced digital landscape, mobile apps are essential tools for businesses to stay competitive and meet the evolving needs of their customers. However, developing a mobile app can be a complex and time-consuming process. Choosing the right mobile app tech stack is crucial for accelerating digital transformation and ensuring that your app is efficient, scalable, and performs well.

When choosing a mobile app tech stack for digital acceleration, several factors must be considered. You'll want to select a tech stack that is well-suited for rapid development and deployment, while also being flexible enough to adapt to changing business needs.

A few years ago, the native app was the only reliable and feature-rich option for building a mobile app. However, for accelerating digital transformation and bringing the app to market faster, while ensuring a high-quality user experience businesses are investing heavily in multiple application software that improves customizations. Yet only a few organizations have been able to achieve a high ROI from their application development efforts. Developing an application that enhances user experience and allows organizations to save time, money, and redundant effort requires selecting the right tech stack based on business needs and a certain level of expertise.

In addition, it is important to develop an in-depth understanding of users' tastes and needs such as which operating system are they utilizing. Android or iOS? or both? Today Android and iOS, together account for around 99.22% of the total mobile operating system market share, with Android being used by 3.3 billion users and iOS by 1.8 billion users. The choice of a mobile operating system helps assess the project's needs and develop the app based on customer usage. At the same time, choosing the appropriate technology is essential since different types of apps require different coding techniques such as Native, Hybrid, Cross-platform, and PWA.

It is therefore critical to understand the advantages and disadvantages of developing native, hybrid, cross-platform, and PWA apps. The guide delves into the respective merits and demerits of Native, Hybrid, cross-platform, and PWA apps to help organizations determine the best approach for app development and improve the return on investment.

The advantages and disadvantages of a native app include:

Pros

➡ Native applications can frequently interface with the device's database system, camera, GPS, and other features as the operating systems, SDKs, development tools, and APIs are available for all mobile platforms.

➡ Given they are created in the programming languages specific to the platform they deliver flawless and faster functionality even when there is no network connection.

➡ An added advantage of a native application is zero dependencies on open-source libraries or third-party frameworks

➡ A native app can also easily utilize native UI and UX elements of its specific platform. This means when creating a native application, it is easy to apply best practices for enhancing the UI/UX. However, developers must adhere to platform-specific UI/UX guidelines to build apps that appear to be an integral part of the OS. Interestingly, native SDKs' features can automatically adjust the app's aspect ratio in real-time.

Cons

➡ Native applications are specifically designed for one platform and cannot be run on other platforms.

➡ Creating and maintaining a native application that will work on multiple platforms such as iOS and android require a sizeable investment and expertise to develop a unique set of codes.

Native Application Software:
Faster and Flawless Applications

A native application is a software built for a specific mobile operating system and is written as a programming language specific to that platform. This helps build a smooth user interface and powerful operating system-specific features while enhancing security and minimizing the risk of a data breach. Depending on the model, such applications can be easily installed on smartphones or tablets, enabling users to seamlessly operate offline or online. At the same time, native applications are created in code languages tailored to the specific operating system. Typically, Kotlin is used for android and Swift for iOS.
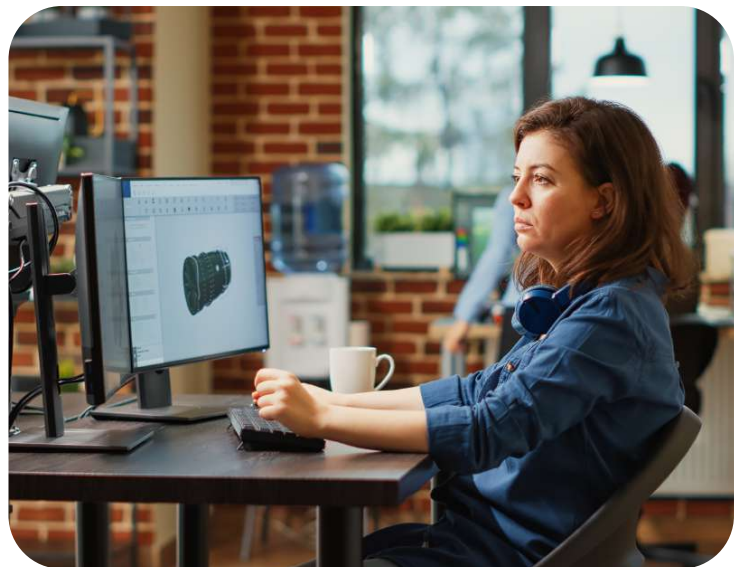
The advantages and disadvantages of hybrid applications include:

Pros

→ A hybrid application development framework helps in faster app creation and market launch

→ As compared to native applications, hybrid applications don't require extensive coding and are easy to maintain given their dependence on web technologies.

→ At the same time, hybrid app development frameworks help reduce development costs as single-version can be used across various platforms

→ This in turn helps create a unified user experience on all platforms.

Cons

→ As hybrid apps only use one piece of code, a few operating system-specific features, such as some Android-specific functionality, may fail to function properly on iOS devices.

→ Hybrid apps generally load in web view. This affects their speed and makes them much slower than native apps.

→ Unlike native apps, hybrid apps don't provide offline support.

Hybrid Application Software for Enabling Faster Development and Cost Efficiency

Hybrid applications work on all mobile devices and enable faster development and cost optimization as they use the same code base. This helps businesses create a single app rather than creating an individual Android and iOS app. The apps are created using web technologies such as Javascript, HTML, and CSS and run inside native apps with embedded browsers, and are not visible in users' browsers.
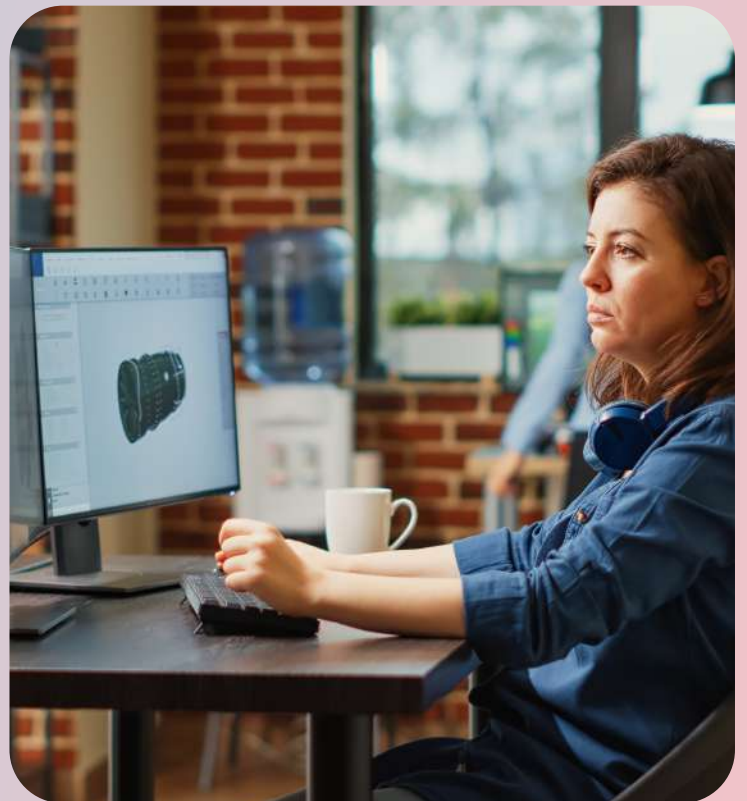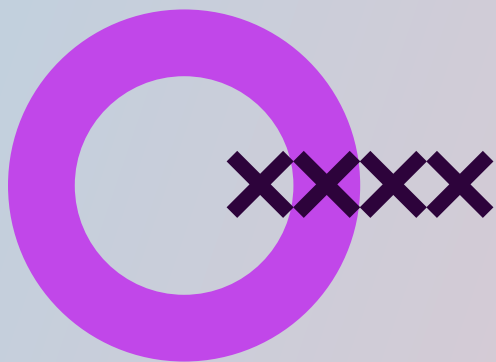
Here are the advantages and disadvantages of cross-platform applications.

Pros

→ In a typical scenario, cross-platform applications are developed as a single project, but they can be used on various devices.

→ They can easily run across many platforms and are simpler to manage as they can be updated and modified once for enabling changes across all the platforms.

→ The app's features and functionality will be the same across all platforms as the same codebase is utilized across all of them. This results in a seamless user experience.

→ Moreover, cross-platform apps can be tested at once for all platforms, speeding up the identification and issue resolution.

Cons

→ Cross-platform apps are designed to work seamlessly across multiple operating systems, allowing for a consistent user experience and greater accessibility. But sometimes they fail to utilize the specific features of each individual platform.

→ Cross-platform applications offer the unique advantage of being compatible with multiple operating systems, allowing for a more versatile and accessible user experience. However, these applications are difficult to optimize for each individual platform, resulting in performance issues.

→ Third-party libraries can be leveraged to add functionality and features to cross-platform apps but it's crucial that they are maintained and kept up to date for ensuring maximum security and performance. Keeping these libraries up to date with the newest versions and security patches ensures optimal performance of the app and can help mitigate any potential issues.

Cross-Platform Applications:
To Boost Adaptability and Accelerate Time to Market
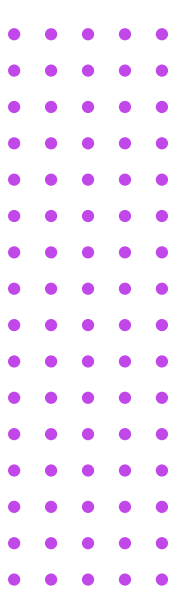
Cross-platform apps are developed using a single codebase and can operate on multiple platforms and operating systems. Writing code once and using it across different platforms reduces development expenses and workload. These apps offer a nearly native user experience, easy implementation, and cost-effective development. Their popularity has soared due to their ability to hit the market faster, lower cost, and adapt to a wide range of platforms and operating systems. React Native and Flutter are the two most widely used technologies for developing cross-platform mobile applications.

The advantages and disadvantages of PWA include:

PWAs are hosted as a web application and do not need to be submitted as a mobile app on the app store with Apple Appstore or Google Playstore. Some find this an advantage, and some find this as a disadvantage. The answer entirely lies in the purpose for which you intend to use the application.

Pros

→ PWA can be adjusted to the various screen sizes, including tablet, mobile, and desktop, as well as any future sizes that might be made accessible.

→ They can be easily shared through URLs. Moreover, users can easily add the application link to their homepage without any complex installations.

→ The navigation and user interaction in PWA are the same as in native apps.

→ In addition, PWA applications are indexed by search engines, enhancing their discovery and usage.
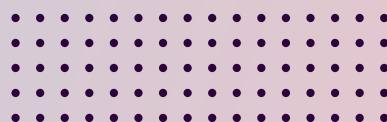
Cons

→ There are limitations in implementing hardware and operating system features, For example, iOS might have performance issues due to a lack of Apple device support.

→ In addition, PWA apps offer limited support for offline features, resulting in increased consumption of battery.

Progressive Web Application (PWA):
Optimize User Experience Across Platforms

Progressive Web Application (PWA) combines the greatest elements of both webpages and mobile applications. They use modern web capabilities to offer users a very similar experience to the native app. PWAs can be easily downloaded and used on mobile devices, and they can make use of hardware functions like the camera and GPS. The user experience can be optimized for each platform without any specific languages or frameworks (usually done in Angular or React).
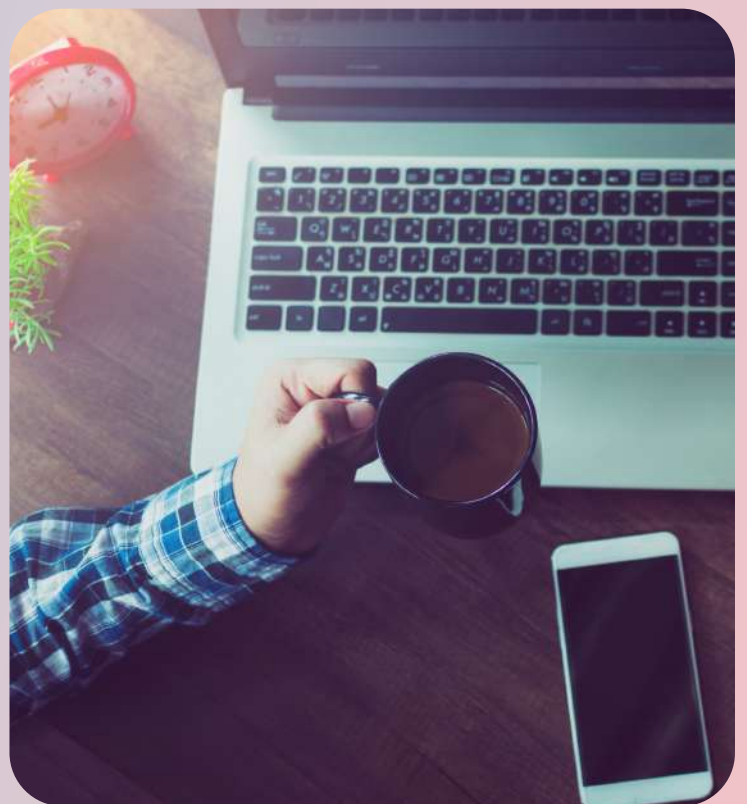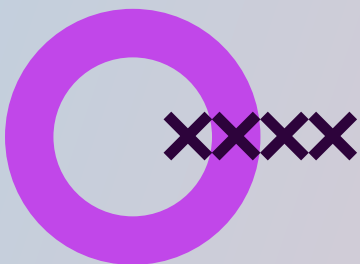
→ Who is the target audience for the app?

→ What mobile devices and platforms should the app be compatible with?

→ What native features of the required mobile devices should the app support?

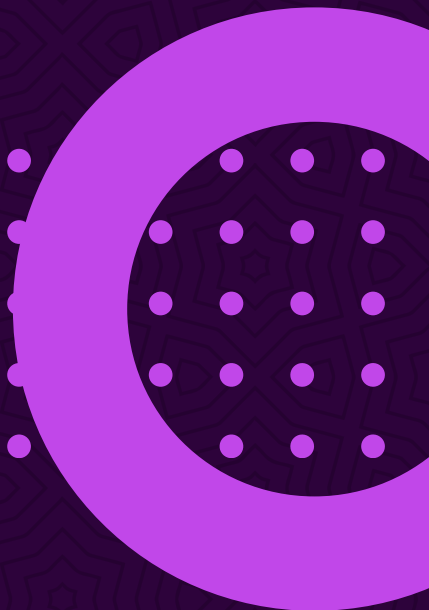→ Does the app need to work offline or in low-connectivity environments?
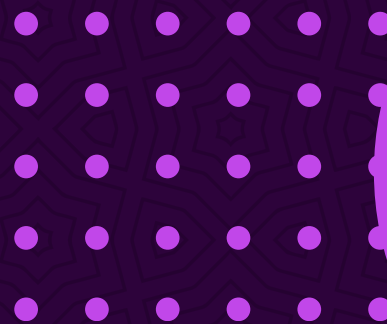
→ Does the app need to be published in the Play Store/App Store

→ Are there any specific technology choices or specifications to be used in the app development?

→ Do you need have any statutory security needs for the app and its data?

→ Is there a budgetary range / guideline and timeline to achieve your business goals for this app?

→ What is the expected users over a period of 1 to 3 years?

→ What are the expected maintenance and support requirements of the app?

→ What is the expected frequency of updates and new features of the app?

Leveraging a Discovery Framework for Mobile Application Development

Businesses need a discovery framework for mobile application development to help create an app that aligns with their business objectives, meets the needs of their target audience, and delivers a positive user experience. Here is a framework developed by our team of experts to help you develop an app that delivers tangible value.

→ What is the business purpose / objectives of the app?

→ What features and functionality do you think are required to achieve those goals?

Building Affordable and High-Performing Applications for Competitive Differentiation


Today more than ever, consumers are using mobile to as a primary device to engage with businesses. In the US alone the number of mobile users is expected to grow by 253.3 million in 2023. Designing an effective and user-friendly mobile application is crucial to keep your consumers coming back. However, designing a secure, high-performing, and affordable is not an easy feat.

It requires choosing the right application software by assessing application requirements based on user behavior and attributes. The CCS team has extensive expertise and experience in implementing multiple types of applications for various businesses. The optimal option will depend on several variables, including the product, the audience, the timeline, the budget, and most importantly, the core business. This will help in capturing the right technical and functional requirements of an application for faster and more successful application development while ensuring cost-effectiveness.
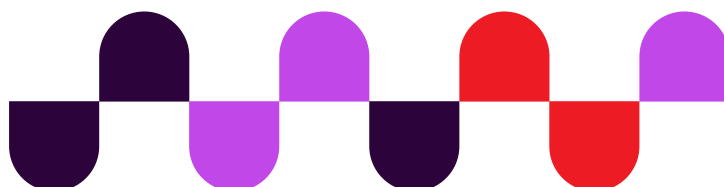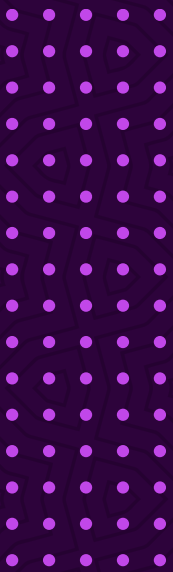
About the Author

Sunil Kartha is the Program Manager at CCS and leads the Mobile App Development team. He brings to the table more than 10 years of experience in customized mobile app development for enterprises.
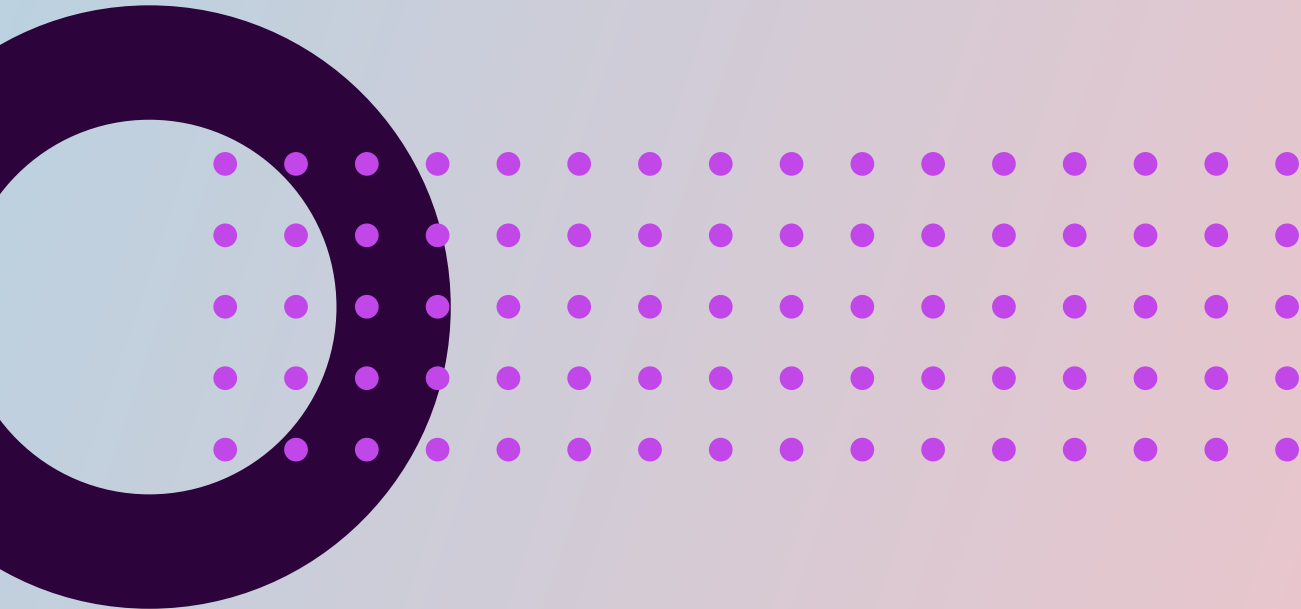
About CCS:

Established in 1980, CCS is a full service IT solutions provider leveraging deep expertise in Application Management, ERP Systems, Infrastructure, and Cloud to deliver digital solutions that help our clients across 5 continents improve their operational efficiency and accelerate growth.