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Progressive Web App (PWA) - One Stop Solution for All Application Development Across All Platforms

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ABSTRACT

Previously specific features were found in native apps or natively developed apps. There were several various and distinct platforms for development of those features. This was known as cross platform approach; today we have a new approach which is known as progressive web application which can be implemented through a set of latest technologies. This application can then be used on all or almost all platforms. In this research paper we suggest that progressive web applications will suffice the need for native applications. First, we introduce the topic then we will scrutinize the performance and compare the recent specifications provided by each of the technologies for web application development across platforms.

Keywords : Progressive Web Apps, Cross-platform, Mobile Web

I. INTRODUCTION

Source code for the native [1] applications as the name suggests is specific for a particular application therefore it is known as non-reusable code; reusability of code is desired not only in a particular application but also across platforms; this functionality is not served by native applications. This results in separate projects and separate environment for developers working on similar or even sometimes same applications.

Earlier companies had to employee specialised human resources for native application development required for each platform. Solution to this problem has been made possible by progressive web application [2] for cross or inter- platform development; development time as well as time to deploy an application to market is also reduced. Therefore progressive web applications provide for low budget, low human resources etc.

Search applications can be developed by using open sources or paid sources. Popular frameworks include phonegap, react native.

Progressive web applications not only allow cross platform development across websites but also provide with features such as background synchronisation, offline support, home screen installation for mobile platforms.

Progressive web applications hence unify internet experience on mobile as well as other devices, such devices may include laptops, tablets and other devices with varying pixel scope. Web applications can now be distributed without web app

marketplaces, they can work without internet connectivity, receive and send push notifications, etc.

II. DISCUSSION

2.1 Feature comparison

Difference between progressive web apps, hybrid apps [3] and native apps has been shown here along with other information.

Table 1 provides features available in progressive, native and hybrid web applications along with other information

TABLE 1

FEATURE	PWA	HYBRID	NATIVE
Testable before	✓	X	X
Capability offline	✓	✓	✓
Installable	✓	✓	✓
Online marketplace availability	✓	✓	✓
Cross-platform availability	limited	✓	X

2.2 Technologies and concepts

Following Technologies and frameworks can be applied for the development of progressive web applications.

2.2.1 Service workers

The ServiceWorker [4] is responsible for most of the core features associated with progressive web apps. A PWA cannot properly work in browsers without Service Worker support. The worker is registered on a user's first page visit. It consists of a JavaScript file embodying lifecycle hooks for business logic and cache control. It can be used to handle tasks such as background synchronisation , caching mechanisms for data and application shell, as well as interception of network requests.

2.2.2 Application shell

The application shell is defined by the Google Web Fundamentals group as "the minimal HTML, CSS, and JavaScript powering a user interface." Osmani and Gaunt (2017). They list three criteria for the shell: fast loading time, cached, and displaying dynamic content. Data is pulled from external APIs.

2.2.3 Web App manifest

The purpose of the manifest file is to expose certain modifiable settings to app developers. These settings include such as logo image path, app name, splash screen and more.In short, the manifest can be used to modify behaviour and style of PWA applications.

2.2.4 Security through https

For security reasons, HTTPS is required for a Service Worker to register in the browser and accordingly act on events. The reason for enforced security is described by Gaunt (2016), as using the "service worker you can hijack connections, fabricate, and filter responses".

2.2.5 Web experiences and mobile app unification

Progressive web apps work on the term 'best of both' which means that they allow a user- experience of a Marketplace web application via a web browser and also provide with an option for adding to home screen.This feature allows that users are not forced to install an application to experience a particular feature but they can do so on their choice.

2.2.6 Comparison of various measures

TABLE 2

CRITERIA	PWA	HYBRID
Time for launch	230 ms	860 ms
Installation size	104 KB	4.53 MB
Rendering time from app-icon to toolbar	3152 ms	9242.1ms

III.CONCLUSION

Progressive web application, [5] hybrid web application, native web application and other such technologies should be included at academic levels at various Institutions and Universities.

Computer science industry and information technology industry is investing a lot in these technologies so as to learn their advancements and further enhancements. This field of technology still requires a lot of research and has a lot of scope and advantages yet to be explored. This paper may raise its requirement and importance at academic level.

Google web fundamentals group is among one of the drivers behind advocacy of progressive web applications. They are also the leading publications in this technology. Hardware has not been improved for advanced for enhanced for this type of Technology at the maximum level, there are still improvements required which are only available for native applications. among web browsers Google Chrome supports maximum progressive web applications. Apple's Web Browser Safari is yet to support the application programming interface for PWA's.

IV.FUTURE SCOPE

The databases developed for various platforms can now be accessed from a single platform for across platforms via this technology, therefore it provides a database of vast knowledge which contains vast amount of research on a particular topic. This can provide immense help and knowledge to us and the next generation easily. Various security measures will have to be taken into account and more secure and more enhanced encrypted protocols will be required for such a platform to be developed which works smoothly across all devices. Most important security is required for the 'add-to-home-screen' option so that user data is not compromised in any manner. Social and economic aspects such as the cost for the platform which can then be shared across various organisations and communities worldwide need to be taken into account. Marketplaces and online web store can then share various resources required for the development processes which include human resources and all the necessary costs required for development of progressive web applications as well as for the deployment.

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