

A PERSONALISABLE SUPER-APP SOLUTION TO SUPPORT MULTIPLE APPLICATIONS.

1st Amith Lal

Computer Science and Engineering
St. Joseph's College of Engineering and Technology
Palai, Kerala
amithlal1010@gmail.com

3rd Aravind Manoj

Computer Science and Engineering
St. Joseph's College of Engineering and Technology
Palai, Kerala
aravindmanoj51@gmail.com

2nd Ann Susan George

Computer Science and Engineering
St. Joseph's College of Engineering and Technology
Palai, Kerala
anngeorgesusan@gmail.com

4th Davis Emmanuel

Computer Science and Engineering
St. Joseph's College of Engineering and Technology
Palai, Kerala
davisemmanuel15@gmail.com

5th Smitha Jacob

Computer Science and Engineering
St. Joseph's College of Engineering and Technology
Palai, Kerala
smitha.jacob@sjcetpalai.ac.in

Abstract—Mobile Applications are widely used in our daily life for entertainment, business, education etc. To develop and maintain a custom mobile application might be an expensive effort that many users like small scale business users cannot afford to do. Currently, there is a great need for a platform for independent app development that doesn't involve any coding. Even though there are technology solutions including low-code and no-code platforms available to foster custom app development, scaling and maintaining such apps might be still strenuous. The need for an independent app development platform arises from the fact that the existing app stores and marketplaces are often dominated by a few large companies, which can make it difficult for smaller developers to effectively compete and gain visibility for their apps. An independent platform would provide a level playing field for all developers, regardless of their size or resources, and give them the opportunity to showcase their work and reach a wider audience. In addition, an independent platform could also offer a more flexible and customizable environment for app development, allowing developers to experiment with new ideas and features without being bound by the limitations and restrictions of existing app stores the proposed solution provides a super-app that supports multiple mini-apps that enables users to have a low-cost, high performance, scalable and maintainable solution. Mini-apps are custom developed app modules that can be installed into the super-app.

Keywords—Super App, In-App, Deep Link, Mini App

I. INTRODUCTION

Users like small scale business users may require custom mobile applications to manage their businesses and/or to provide services to their customers. Development and maintenance of a mobile app solution might be challenging and expensive. A super app is a type of mobile application that offers a wide range of services and functions, typically

including messaging, social networking, e-commerce, payment processing, and more. The idea behind a super app is to provide users with a single, all-in-one platform that can meet most of their daily needs and eliminate the need to download and use multiple separate apps. Some examples of popular super apps include WeChat in China and Gojek in Indonesia.

One of the main reasons for the need for a super app is the growing number of mobile apps available today. With millions of apps available on app stores, it can be overwhelming for users to sift through them all and find the specific app they need for a particular task. This can lead to app overload, where users become overwhelmed by the sheer number of apps they have installed on their phones and have difficulty managing them all.

A super app can help alleviate this problem by providing users with a single platform that offers access to a wide range of services and functions. This can help users save time and effort, as they no longer have to search for and download multiple separate apps for different tasks. In addition, a super app can provide a more convenient and user-friendly experience for users. By offering a range of services within a single app, users can easily access the services they need without having to switch between multiple apps. This can improve the overall user experience and make it easier for users to get the information and services they need. Our proposed system satisfies the demand for an independent cross-platform super-app that enables service providers to develop and publish their solution as mini-apps, and common users to install and use their preferred mini-apps.

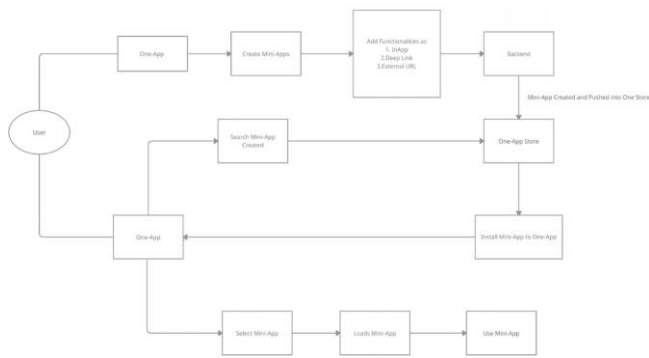


Fig. 1: Architecture Diagram

II. BACKGROUND

With the growth of the mobile application market, users are faced with the challenge of navigating through multiple apps to access different services. This results in information overload and a decline in user satisfaction. The concept of a super-app was introduced to address these challenges by providing a unified interface for users to access multiple apps, reducing information overload and enhancing the user experience.

III. PROBLEM STATEMENT

Mobile devices are more popular among users across a variety of industries because they are more convenient, affordable, and low-maintenance. App overload is a term used to describe the phenomenon of having too many mobile apps installed on a device, which can lead to difficulty managing them all and can negatively impact the user experience. App overload can lead to several problems, including:

- Difficulty finding the app you need: With a large number of apps installed on your device, it can be difficult to find the specific app you need for a particular task. This can lead to frustration and wasted time.
- Difficulty managing and organizing apps: With a large number of apps installed on your device, it can be difficult to organize and manage them all. This can lead to a cluttered and disorganized home screen, which can make it difficult to find and access the apps you need.
- Difficulty updating and maintaining apps: With a large number of apps installed on your device, it can be difficult to keep track of updates and maintain them all. This can lead to apps becoming outdated and potentially insecure.
- Performance issues: Having a large number of apps installed on your device can impact the overall performance of your device, leading to slower loading times and potential crashes.

The issue is solved by integrating many apps into a single system. Integrating mini apps into a super app involves adding smaller, standalone apps within the main super app platform. This allows users to access a range of services and functions within a single app, without having to download and manage multiple separate apps. While mobile apps are more rapid,

secure, and effective than web apps, they are also more expensive to design and maintain.

IV. RELATED WORKS

Revolut is a financial services company that offers a range of services, including a mobile app that allows users to manage their money and make payments [1]. The app also offers a range of additional features and services, such as budgeting tools, investment options, and cryptocurrency trading. Revolut could be considered a super app, as it offers a wide range of services and functions within a single platform. This allows users to access a variety of financial services and tools within the app, without having to download and manage multiple separate apps. In addition, Revolut offers a user-friendly interface and a convenient experience for users, allowing them to easily manage their money and make payments. This makes it a good example of a super app that provides a range of services and functions within a single platform.

Paytm is an Indian digital wallet and e-commerce company that offers a range of services, including a mobile app that allows users to make payments and transfer money [2]. The app also offers a range of additional features and services, such as online shopping, bill payments, and investment options. Through the Paytm Super App, customers may even pay their credit card bills and tuition. Consumers may easily complete their daily purchases without the need for numerous apps thanks to the industry's top success rates and the availability of so many payment services on a single platform. One of the few tech platforms, the Paytm Super App, provides a full spectrum of financial services, from loan distribution to credit cards and insurance, on its platform.

MyJio is a mobile app offered by Jio, a telecommunications company in India [3]. The app allows Jio users to manage their accounts and access a range of services, including making payments, checking data usage, and redeeming Jio offers and rewards. MyJio offers a range of features and services within a single app, allowing Jio users to easily access and manage their accounts. This can provide a more convenient and user-friendly experience for Jio users, as they no longer have to download and manage multiple separate apps for different tasks. In addition, MyJio offers a range of additional services and features, such as JioMusic and JioCinema, which allow users to access music and videos within the app. This makes MyJio a good example of a super app that offers a range of services and functions within a single platform. MyJio has transformed into something of a super app from a companion tool for managing your mobile or broadband connection. The fundamentals still apply, including keeping track of all of your accounts for your prepaid or postpaid plans.

Users of PhonePe can send and receive money, reload data, DTH, mobile, and utility cards, pay for goods and services, buy insurance, mutual funds, gold, and silver, and invest in liquid and tax-saving funds [4]. Through its Switch platform, PhonePe also enables customers to reserve their Ola rides, pay for Redbus tickets, and reserve flights and lodging on Goibibo.

CashKaro is an Indian cashback and coupons website and app [5]. The platform allows users to earn cashback on their online purchases at over 1,500 Indian e-commerce websites. In addition, the platform offers a range of coupons and deals for users to save money on their purchases. CashKaro could potentially be considered a super app, as it offers a range of services and functions within a single platform. In addition to its core cashback and coupons services, the platform also offers a range of other features and services, such as price comparison and product reviews.

Adrian Bridgwater [6] mentions a micro app is a consumer-focused mobile application that provides extremely targeted functionality (e.g. a weather forecast app). The commonality factor here has always been that micro apps (in either sphere) provide highly focused, task-based functionality that let users get in, interact, and get out with maximum efficiency. Micro apps differ from micro services in that they often consist of UI-level constructs that access other application resources. However, the term "micro app" is not specifically linked to the idea of micro services; rather, micro services are a broader software architecture strategy by which entire applications are composed of independent services that interact through standard APIs. Micro app development can benefit from an application infrastructure composed of micro services.

Stefania Cuccurullo proposed the system [7], a MicroApps Development on Mobile Phones is a paper written by Stefania Cuccurullo and published in 2011. The proposed system discusses the concept of microapps, which are small, standalone apps that offer specific services or functions. The paper examines the possible advantages of utilizing microapps on mobile devices, such as enhanced user convenience and an improved user experience.

A Hybrid Mobile Application for an e-Commerce Store, as mentioned in [8], has the advantages of utilizing a hybrid app for an e-commerce store, including enhanced performance and user experience, are covered in the paper. The constraints and difficulties of creating a hybrid app are also discussed in the paper, including compatibility issues and the requirement for specialist programming abilities. The article offers a thorough explanation of the creation of a hybrid mobile app for an online retailer. It is a useful technique for people who are interested in the creation and application of hybrid apps for e-commerce.

Kirankumar S. Momaya [9], discusses the concept of super apps and presents a case study of a super app from India. The research explores the advantages and difficulties of creating a super app and highlights the crucial elements that determine a super app's success. In addition, the paper provides a case study of an Indian super app, showing its salient functions.

The article offers a thorough examination of the idea of super applications, as well as some of its possible advantages and drawbacks. It is an effective way for individuals who are interested in the development and utilization of super applications as well as the elements that contribute to their success.

As per Marc Steinberg [10], LINE as Super App: Platformization in East Asia is a paper written by Marc Steinberg

and published in 2020. The paper discusses the concept of super apps and presents a case study of LINE, a Japanese messaging app that has expanded to offer a range of additional services. The article addresses the critical elements that lead to a super app's success as well as the advantages and difficulties of creating one. The essay also includes a case study on LINE, detailing its salient functions and offerings and looking at how successful it has been as a super app.

The ETLab e-campus management app [11] is a technology designed to manage academic institutions. Studies suggest that the application can streamline the enrollment process, optimize academic scheduling, efficiently manage faculty, and track student performance. The application has been found to be effective in improving the efficiency of these tasks and providing real-time information to enhance decision-making. Further research is needed to explore the potential of the ETLab e-campus management app in other areas of academic management. Overall, the ETLab e-campus management app is a useful tool for academic institutions.

The idea of super applications, as well as their possible benefits and disadvantages are thoroughly examined in this research. It is a helpful tool for anybody interested in the creation, usage, and variables that influence the success of super applications.

V. PROPOSED SYSTEM

The proposed system, referred to as the "One-App", aims to provide a platform that enables users to customize their mini-apps with specific features and behaviors. The users can select and pay only for the features that they require, making it a cost-effective solution for businesses. The platform would also provide a user-friendly interface that makes it easy for even non-technical users to create their own mini-applications. The users would be able to connect various existing applications and services to create customized mini-apps that meet their specific needs. They would also be able to customize the behavior of each feature within their mini-apps, including deep linking, in-app behavior, and redirecting to the default web browser. Additionally, the proposed system would include a public store where users can publish their mini-apps and receive feedback and ratings from other users. It is a platform that enables users to create their own mini-applications using simple links and existing applications. Mini-Apps are user-created applications to which users may add functionality as needed. Mini-apps can be built for private use or shared with the public.

The process of building a mini-app within the Super App would be straightforward and user-friendly, allowing even those without technical expertise to create their own applications. Users would be able to connect various existing applications and services, such as social media platforms, productivity tools, and more, to create a customized mini-app that meets their specific needs.

For those who wish to share their mini-apps with others, the Super App would also include a store where users can deploy their creations publicly. The store would allow users

to showcase their mini-apps to a wider audience and receive feedback and ratings from other users. In addition to its user-friendly interface and store, the Super App would also provide security measures to ensure the privacy and security of users' data. The platform would have robust authentication and authorization protocols in place to ensure that sensitive information always remains secure.

Additionally, the mini-apps created within the Super App would be fully customizable, allowing users to edit and modify them as per their requirements. This flexibility would give users complete control over the functionality and appearance of their mini-apps, ensuring that they meet their unique needs and preferences. One of the key features of the Super App would be the ability to set different behaviors for each component of the mini-app. The mini-apps within the Super App could exhibit different behaviors such as Deep linking, In-app, and Redirected to the default web browser.

- Deep linking allows users to access specific content within an app by clicking on a link. This can be a convenient way to direct users to specific pages or functions within the app. However, it may not be possible to use deep linking if the user doesn't have the app installed on their device.
- In-app behavior would allow users to access the mini-app within the Super App, providing a seamless and integrated experience for the user without leaving the Super-App platform.
- Redirected to the default web browser behavior, would limit the mini-app to run within the user's default web browser, providing users with greater flexibility and accessibility.

MODULE DESCRIPTION

A. Authentication Module

An authentication module for a super app would be a software component that is designed to handle the authentication process for the app. This module would typically include functions for verifying user identities and granting or denying access to the app based on the authentication results.

- Support for multiple authentication methods, such as username/password, two-factor authentication.
- Reset Password: User can change his/her password using email at any given time.
- SSO: It can help super apps to provide a seamless and convenient login experience for users, allowing them to access multiple services within the app using a single set of credentials. By implementing SSO, users can log in to the super app once and then access all of the app's services without having to log in again.

B. Adding Mini-Apps Module

- Through the One-App store, users may add additional Mini-Apps as needed.
- Any user of One-App is free to add these apps if necessary.

C. Editing Mini-Apps Module

- Mini-Apps can be edited by the user at any time.
- The user can edit features and behavior from the Mini- Apps.
- Mini-Apps can be edited only by the app owner.

D. Creating Mini-Apps Module

- There are several considerations to keep in mind when deciding which option to use for creating mini-app functionality:
 - In-App: Loading a webpage within the app can provide a seamless user experience, as users don't have to leave the app to access the content.
 - Deep Link: Deep linking allows users to access specific content within an app by clicking on a link. This can be a convenient way to direct users to specific pages or functions within the app. However, it may not be possible to use deep linking if the user doesn't have the app installed on their device.
 - External Link URL: Redirecting users to a webpage on their browser can be a simple and flexible option, as it allows users to access the content using any device that has a browser.
- Once the mini app is ready for distribution, it will be available to the super app store.

E. Using a Mini-App Module

A One-App is a type of mobile application that provides a wide range of services within a single platform. These services are typically provided by smaller apps, known as mini-apps, that are built specifically for the One-App and can be accessed within it.

- To use a mini-app from the One-App home, the user can first choose the necessary app from the available options. This can typically be done by browsing the One-App home screen and selecting the desired app.
- Once the app is selected, it will be loaded from the available mini-apps within the One-App platform. This process may involve adding the Mini-App if it is not already available on the user's device.
- The user can access and utilize the app's services as needed after it has loaded. Users may now access and use the services provided by several applications more easily and effectively without having to download and maintain each app separately.

F. Store for Listing Mini-Apps Module

A One-App store is a store that list all the Mini-Apps available. This allows users to access and use multiple apps, or mini-apps, within a single app, rather than having to download and install each app individually.

- Through the One-App store, users can add additional mini-apps as needed by browsing the available options and selecting the ones that they

want to use.

- This can typically be done by navigating to the One-App store within the app, searching for the desired mini-app, and tapping on it to download and install it.
- Once the mini-app is installed, the user can access it within the One-App platform and use its services as needed. This allows for a more convenient and efficient way for users to access and use the services offered by multiple apps, without having to download and manage each app individually.

G. Admin Module

An admin module for a super app would typically provide tools and functionality for managing various aspects of the app and its services.

- User management: This could include tools for creating and managing user accounts, setting permissions and roles, and tracking user activity.
- Service management: The admin module may include tools for managing the various services and functions that the app offers.
- Mini app installation: The admin module should allow users to select and install mini apps from the super app store.
- Mini app management: The admin module should provide tools for managing the mini apps that are installed on the One-App, including the ability to view and delete installed Mini-Apps.
- Security: The admin module should include measures to ensure the security and integrity of the installed mini apps, such as checking for and preventing unauthorized access or tampering.
- Updates: The admin module should allow users to easily update the installed mini apps to the latest version when updates are released.

VI. RESULTS

One-App Home Page

Figure 1 represents the home page of One-App, where users can access their mini-apps or add a mini-app to the One-App store.

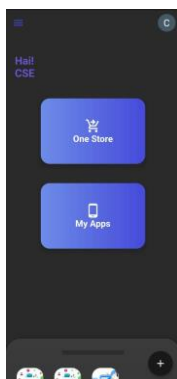


Fig. 2: One-App Home Page

One-Store

Figure 2 represents the One-App Store, where users can access and add the required mini-app to the One-App Home page.

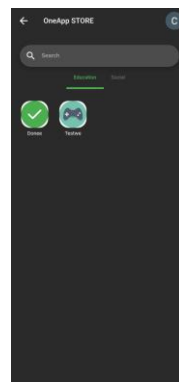


Fig. 3: One-Store

Mini-App

Figure 3 represents the Mini-App created or added by the user from the One-App store.

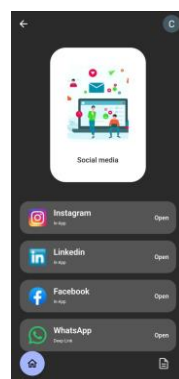


Fig. 4: Mini-App

One-App Admin page

Figure 4 represents the One-App Admin Dashboard, where the admin can manage the special apps and the mini-apps created by the user.

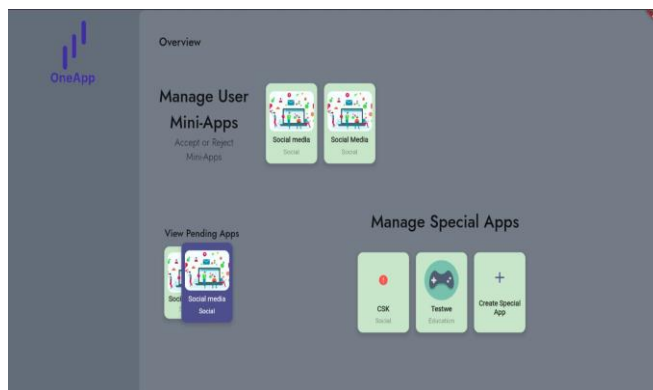


Fig. 5: One-App Admin page

Admin Approval page

Figure 5 represents the One-App Admin approval page, where the admin can either accept or reject the Mini-App created by the user.

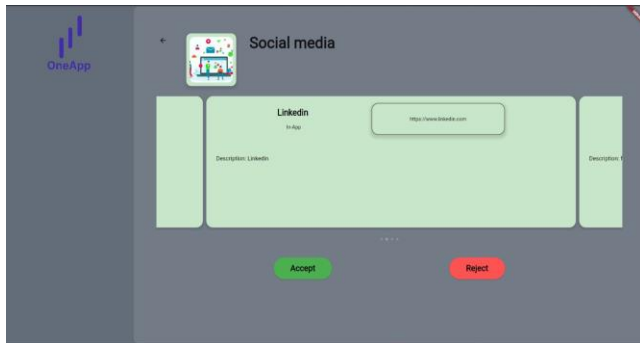


Fig. 6: Admin Approval page

CONCLUSION

A scalable and personalisable Super-App solution using mobile technologies can provide a convenient and efficient way for users to access a variety of applications and services from a single platform. This type of solution can be particularly useful in markets where there is a need for a diverse range of services and where users may have limited access to or may be hesitant to download multiple standalone apps. By combining multiple applications into a single platform, users can access a wide range of services and features with just one app, which can be convenient and time-saving. The Super-App solution can also be customized to suit the individual needs of each user, which can enhance their experience and make it more tailored to their preferences.

The use of mobile technologies in the development of a Super-App solution can also facilitate the personalisation of the user experience, as the platform can collect data on the user's preferences and activities to tailor the content and features available to them. Overall, a scalable and personalizable Super-App solution using mobile technologies has the potential to be a powerful tool for both users and businesses, as it can provide a wide range of services and features in a convenient and customizable platform.

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