International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

Mobile Commerce Application Development and Implementation

Ramkumar Soundarapandian.
Senior Manager - Capgemini America Inc,
333 W Wacker Dr #300, Chicago, IL 60606
United States of America.
ramkumarcg@gmail.com

ABSTRACT

The relationship with technology has totally changed because of mobile applications, which give solid and versatile apparatuses to improve communication, diversion, and efficiency. In this study report, the assessment takes a gander at the best practices from top to base for creating and carrying out mobile apps. This study plans to reveal insight into the generally acknowledged techniques presently being used and investigate the difficulties related with creating mobile applications, which vary from creating customary venture applications. Accordingly, an internet-based overview from the mobile imaginative workspace was finished. The survey questions enveloped the whole lifecycle of fostering a mobile application, from prerequisites for social events to posting a completed item for public deal. Through the investigation of genuine issues experienced and the investigation of best practices that can be really applied to overview, assess, and support the appropriateness of the association, this study adds to how we might interpret the mobile application development process. These outcomes could likewise be seen as an anticipated field of examination delineating the broadness of the field. This' article will probably give specialists and accomplices associated with mobile app development with helpful guidance by consolidating pieces of data from insightful examination with industry best practices. Eventually, our examination progresses the comprehension of the subject and gives shrewd data that will direct further exploration and headways in the plan and utilization of mobile applications.

Keywords: Mobile app development, Best practice, Implementation, Agile methodology, Development Practice

1. INTRODUCTION

Mobile applications have turned into an essential piece of our day to day routines in the quickly developing universe of technology, upsetting the manners by which we convey, team up, and lead business. The interest for imaginative and talented mobile applications has soar because of the wonderful expansion in cell utilization around the world. To guarantee ideal execution, user responsibility, and generally speaking achievement, creating and carrying out an effective mobile app includes cautious preparation, basic execution, and adherence to best practices (Azad-Khaneghah, 2021).

The most common way of making a mobile app includes many strides, from arranging and ideation to programming, testing, sending, and propelling help. Associations and architects the same are consistently looking for strategies to upgrade the type, usefulness, and user experience of their mobile applications in the ongoing cutthroat market. Understanding and carrying out the best practices that have been recognized through broad industry experience and examination is fundamental to accomplishing this.

Guaranteeing consistency across various stages and gadgets is a significant part of creating mobile apps. To really contact a more extensive crowd, specialists ought to take on a responsive plan approach and utilize cross-stage development frameworks, given the variety of working systems, screen sizes, and objectives. Using apparatuses like Answer Neighborhood, Shiver, or Xamarin, planners might smooth out the development cycle and keep up with consistency in the user experience all through all stages (Balapour, 2020).

The user experience (UX) plan assumes a basic part in how well a mobile application performs. An incredibly all around arranged programming encourages user devotion and upkeep while additionally further developing straightforwardness. All through the arrangement cycle, designers ought to focus on user research, prototyping, and comfort testing to make a consistent and stylishly satisfying place of commitment. Through the fuse of user criticism and an emphasis on plan components, engineers can further develop the app's user connection point and utility to all the more likely take care of the developing requirements and inclinations of their main interest group.

One more essential thought in the production of mobile apps is security, especially considering the developing dangers related with cyberattacks and information breaks. To get

delicate user information and guard against possible weaknesses, designers ought to incorporate solid wellbeing measures including data encryption, secure approval, and secure association correspondence standards. Customary security assessments and updates are additionally fundamental to alleviate arising chances and guarantee the app's proceeded with authenticity and constancy (Duvaud, 2021).

Furthermore, giving a predictable and responsive user experience relies upon further developing execution. Code progression, part reservations, and nonconcurrent dealing with are a portion of the strategies that planners could use to lessen stacking times, diminish asset utilization, and further develop by and large app execution. Regardless of the gadget or hierarchical arrangement, creators can alleviate execution bottlenecks and give reliably great user experiences by improving both the frontend and backend parts of the application.

No one has had the option to become accustomed to the universal idea of mobile gadgets and the reliance on them for correspondence. Individuals presently depend altogether on mobile communication as their essential method for correspondence on the grounds that to its huge development in fame and peculiarity throughout the last numerous years. As the interest for reliable mobile communication has grown, a wonderful and mind-boggling structure is expected to sift through the difficult substance of such correspondence. Mobile correspondence can lay out multimodal, or blended media, communication joins by which discourse and data are sent. It isn't simply restricted to setting up voice networks with distant clients or gadgets. The scope of mobile applications being utilized has maybe expanded to move laid out correspondence standards because of the developing premise of the mobile correspondence system.

1.1. Objectives of the Study

- To compare the difficulties and procedures of developing mobile apps to those of developing traditional corporate apps.
- To look into the entire mobile app development lifecycle by conducting an online survey among those involved in mobile research and development.

2. LITERATURE REVIEW

Fahey and Hino (2020) Analyze the mind-boggling connection between the Covid scourge, mechanized assurance, and the limitations put on data driven general prosperity intercessions by social standards (Fahey, 2020). The creators analyze how the seriousness of the plague has prompted expanded observing and information assortment endeavours by globally working state-run organizations and wellbeing experts. That's what they contend albeit these information driven methodologies might have the option to stop the disease from spreading, they likewise raise serious moral worries about private security privileges. The review underscores that it means a lot to find some kind of harmony between saving individual freedoms and propelling general wellbeing goals. It additionally accentuates the requirement for clear regulatory systems and powerful safety efforts while sending state of the art innovations for pandemic reaction.

Ho and Chung (2020) Analyze the relationship that exists between client esteem, client responsibility, and repurchase point with regards to mobile application settings (Ho, 2020). Using goodies of data from promoting composing and client relationship management, the journalists inspect the secret components hidden recurrent buy conduct among mobile app users. Their discoveries propose that more elevated levels of client responsibility essentially affect both client worth and repurchase aim, underscoring the basic job that customized experiences and natural features play in encouraging long haul client connections. The assessment accentuates that it is so essential to make significant responsibility approaches to increment lifetime client worth and client reliability in the intense mobile app market.

Inan et al. (2020) Analyze the way that digitalization has changed clinical starter information (Inan, 2020). The exploration features how modern developments can smooth out a few parts of clinical assessment, for example, data gathering, part enrolment, and far off perception. Investigators can at long last speed up the revelation and assessment of novel clinical intercessions by expanding the proficiency, availability, and cost-adequacy of clinical fundamental examinations through the utilization of complex stages and hardware. To completely appreciate the capability of modernized headways in clinical consideration research, the creators feature the significance of managerial frameworks, data security assurances, and accomplice coordinated effort. They likewise examine significant difficulties and furnish open doors related with digitizing clinical fundamental information.

Janani (2021) gives goodies of data on a few sorts of mobile application development methods (Janani, 2021). It orchestrates numerous strategies for creating mobile apps, like nearby, hybrid, and progressive web applications (PWAs). The article talks about the exceptional parts, benefits, and disadvantages of every technique, furnishing specialists and entrepreneurs with vital direction in choosing the best development strategy given their one of a kind requirements and goals. The blog entry adds to further

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

developing information and knowledge of mobile app development strategies in the business neighbourhood framing the distinctions among nearby and cross-breed app development and exhibiting arising designs like PWAs.

Karar et al. (2021) give an original mobile application that utilizes profound learning computations conveyed in a circulated processing climate to recognize cultivating irritations (Karar, 2021). The appraisal tends to the difficulties looked by farmers in distinguishing and overseeing aggravation infiltrations. Using profound learning and disseminated registering capacities, the researchers foster a user-accommodating mobile application that precisely perceives a few kinds of rustic irritations in view of pictures caught by farmers in the field. By further developing bug observing and control endeavours, the application raises horticultural yields and increments cultivating effectiveness. The review accentuates the capability of mechanical progressions to give farmers significant and appropriate information for executive gatherings, stressing the job of development in tending to monetary requirements in cultivating.

3. RESEARCH METHODOLOGY

To assemble important information on different arising strategies utilized in the development of mobile applications, an investigation survey was led. The review's discoveries filled in as a springboard for distinguishing the exact necessities for new and progressive vital systems in the space of mobile programming. A huge scope web review was planned in view of the effectively comprehensible text connected with mobile app development, as well as an assessment of a few past web concentrates on directed by different industry affiliations. Mobile associations, partners in mobile development, mobile experts, researchers, and pertinent accomplices were the principal advocates of the outline.

Members were welcome to partake in the outline on a deliberate premise by going to different social occasions for mobile app development. Prior to being dispersed to the members, the review plan was assessed and approved by a little gathering of nearby specialists. By zeroing in on every response freely and afterward examining all responses on the whole, the information was dismantled both equitably and quantitatively. Respectable specialists in the field of mobile development assessed the legitimacy of the audit and discoveries. During the hour of data gathering, in excess of 100 reactions were gotten. The outcomes that are relevant to the issues, difficulties, and best practices of mobile programming development processes are introduced in this article.

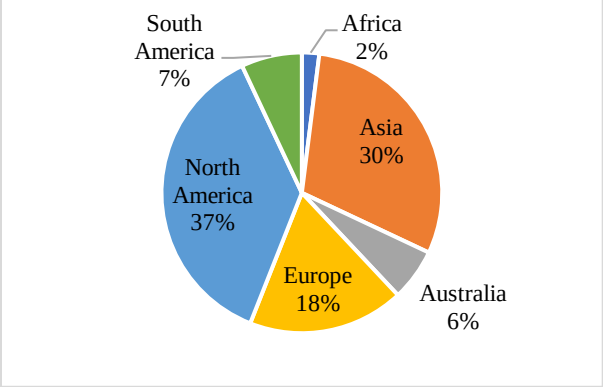


Figure 1: Location of the Organization.

The all-out information in regards to the section attributes and members' experience in the field of mobile application development is introduced in Figures 1 through 5 underneath. The numbers beneath demonstrate that 70% of respondents have genuine encounter creating mobile apps and come from the mobile business. These members are from various bodies of land; the biggest gathering (37%) is from North America, and 24% of the affiliation's size is comprised of individuals who are between the ages of 5 and 25.

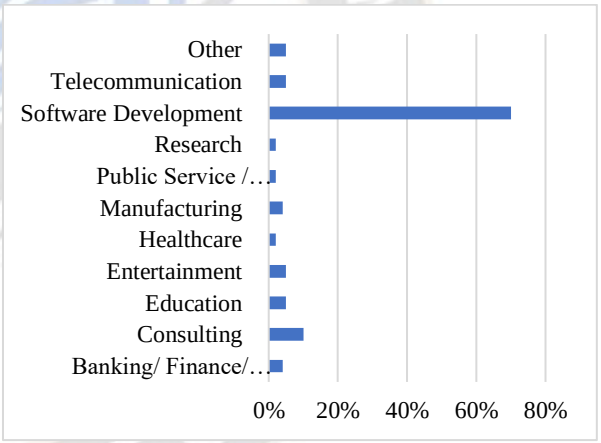


Figure 2: Type of Organization

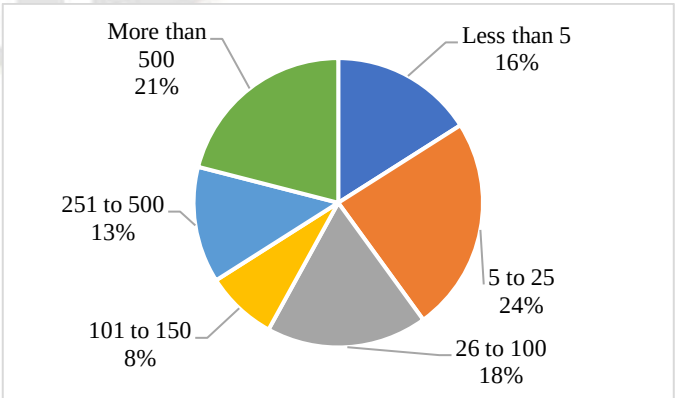


Figure 3: Size of Organization.

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

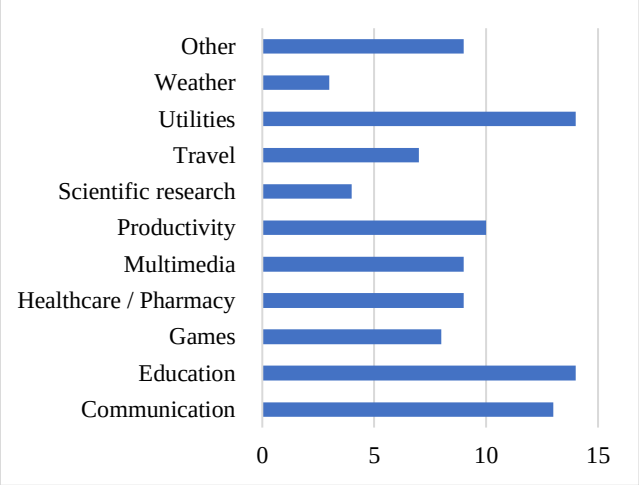


Figure 4: Types of Mobile Apps Developed.

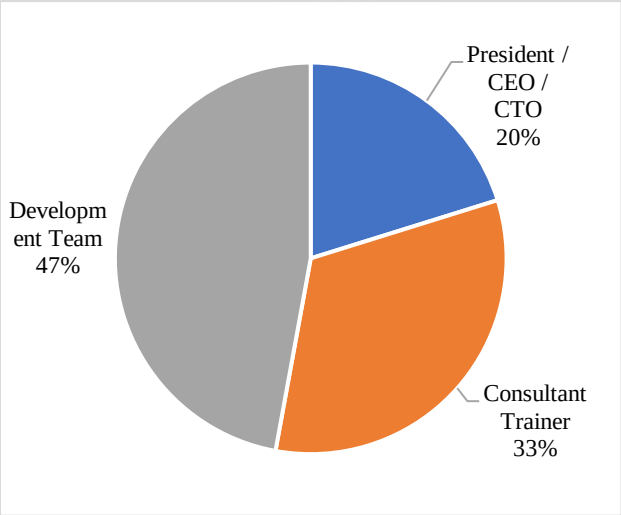


Figure 5: Respondent's Position Inside the Organization.

The gathering with the most serious reaction was the development team (47%) rather than consultants/trainers (33%) and upper management (20%) who had somewhat more experience in creating mobile programming.
The designer members' essential subject matters are in mobile development classes connected with communication (13%), utilities (14%), and education (13%).

4. FINDINGS

The reasons given by the members for beginning to foster mobile applications are displayed in Figure 6 beneath. A fourth of the members revealed that their inspiration for creating mobile applications originates from the improvement of the organization.

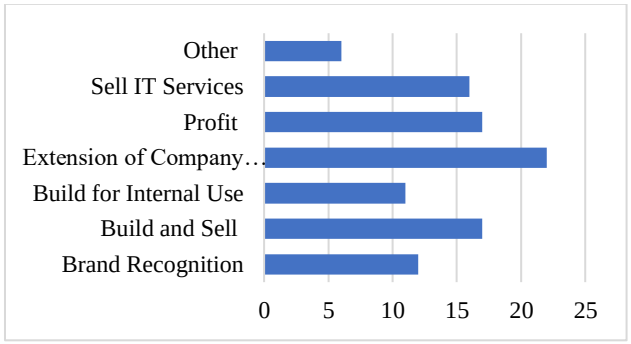


Figure 6: the driving force behind developing mobile applications.

Figure 7 outlines that 34% of exploration members showed that huge partnerships are the essential ones who commission their apps.

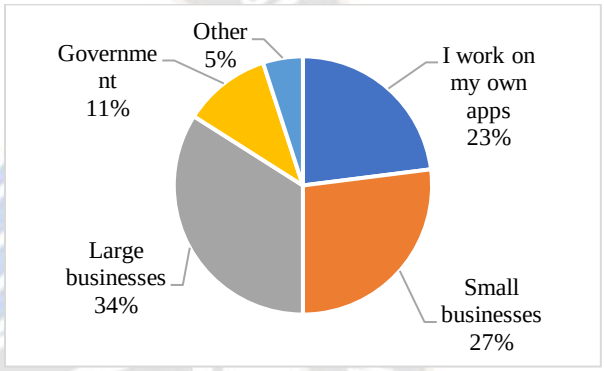


Figure 7: Who orders the application?

Figures 8 through 13 underneath appear to show that 41% of members were allotted to medium-sized development teams, which comprise of five to fifteen people. As per 57% of mobile designers, fostering a mobile app ordinarily requires six to eighteen weeks. As to, 74% of members test mobile apps for multi week preceding creation release, and 45% of members expressed that their mobile app development release repeat is commonly on a month-to-month premise.

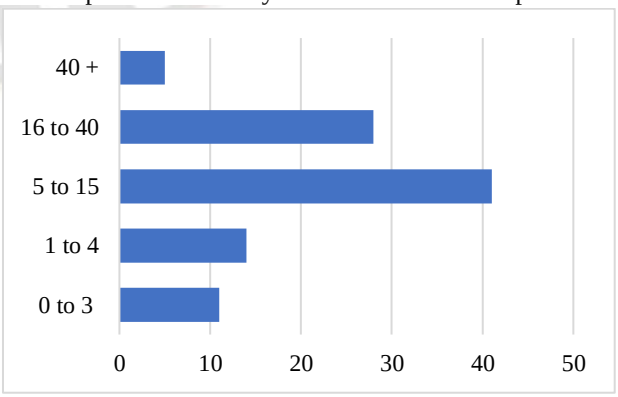


Figure 8: Size of the team.

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

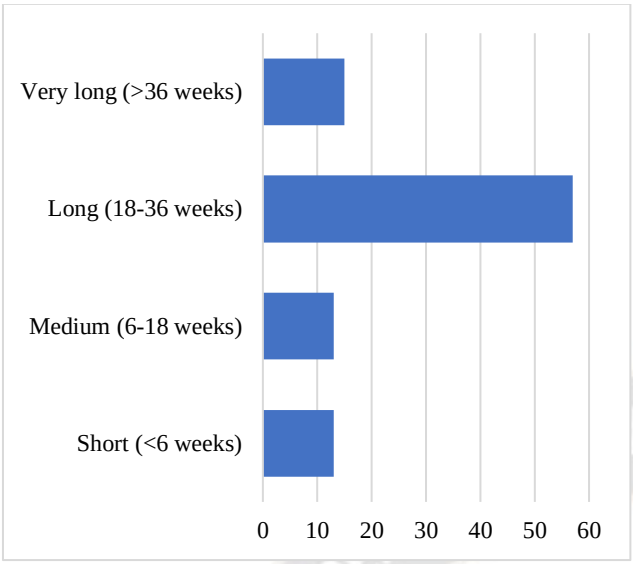


Figure 9: Duration of the development process.

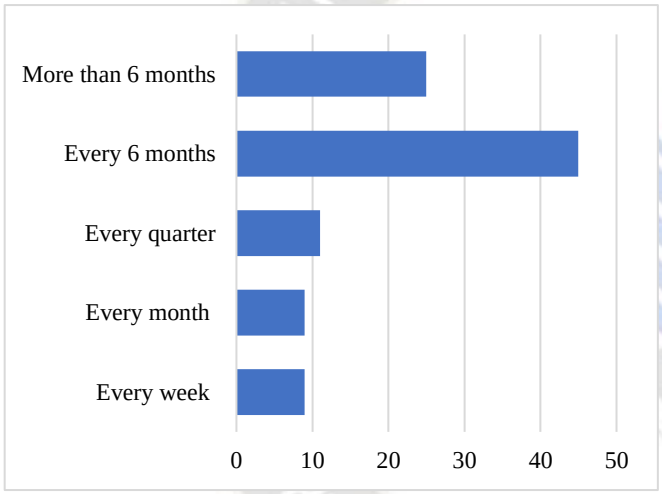


Figure 10: Frequency of production release.

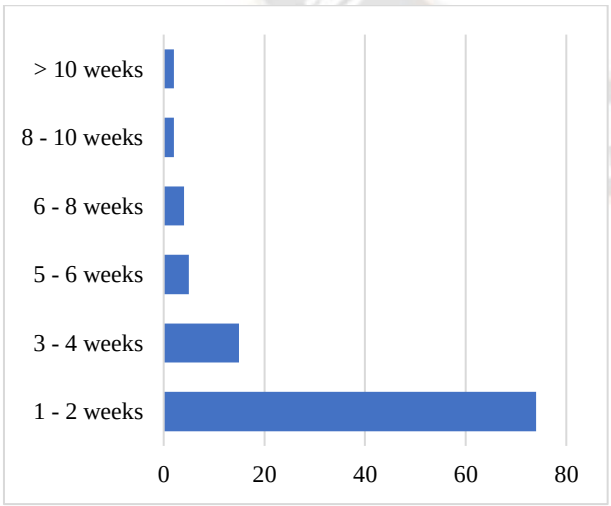


Figure 11: Duration of Test.

In view of the estimations beneath, apparently designs are more excited about utilizing Java (23%), Objective C/HTML5 (15%), and JavaScript (14%), while creating mobile apps. A critical number of specialists from different open stages are showing interest in Android (35%), iOS Apple (32%), and Windows Mobile (12%).

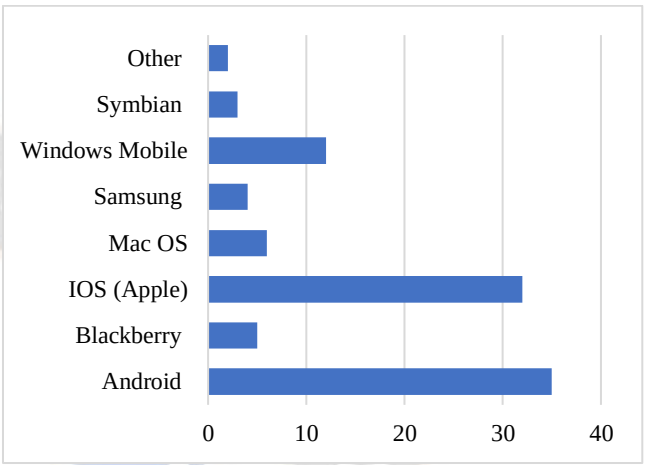


Figure 12: Development platform.

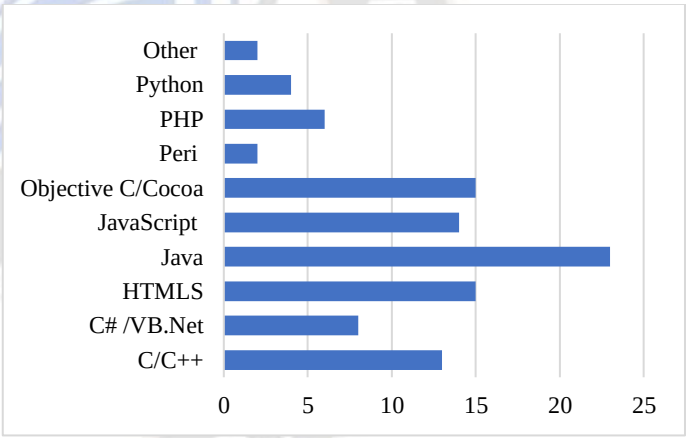


Figure 13: Developmental languages.

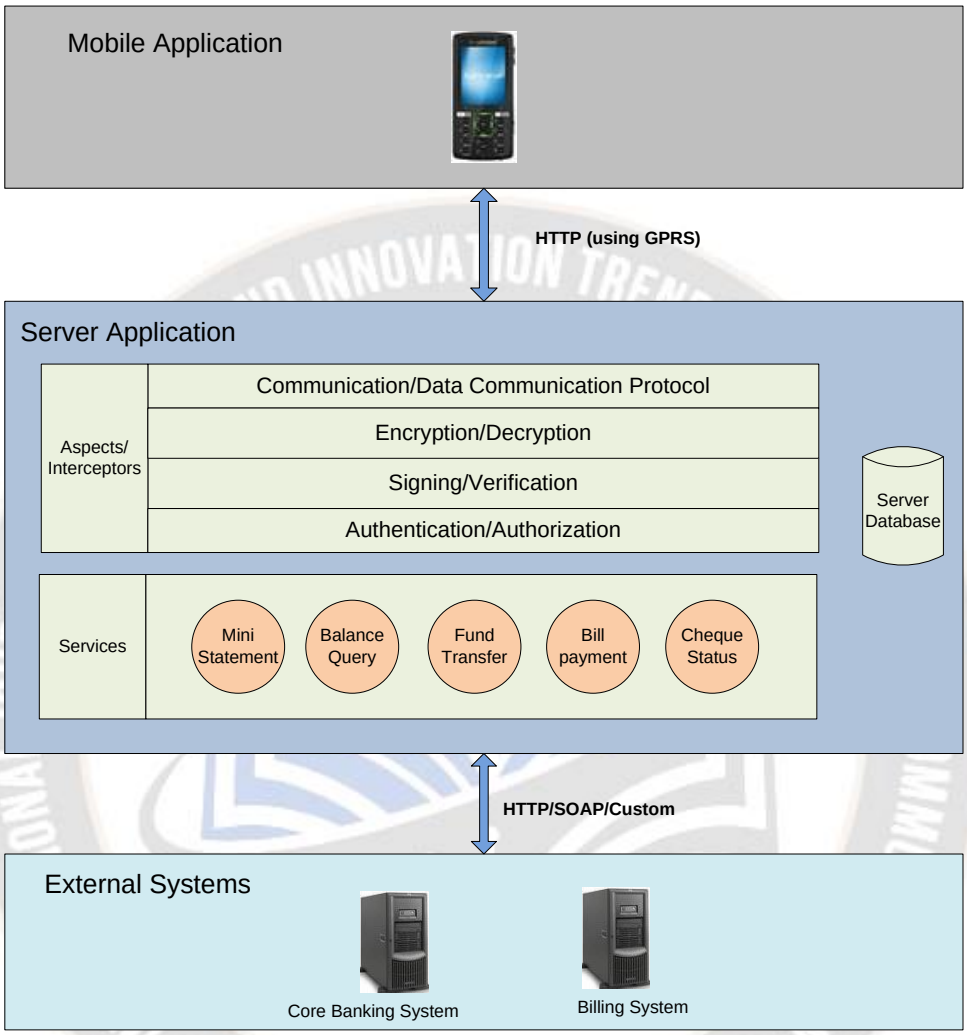
This part takes a gander at an adaptable approach to creating mobile applications, from origination to the end. Not exclusively will the commitment assist users with explaining their requirements and thoughts for impending deliveries, yet it will likewise assist with smoothing out the mobile programming lifecycle.

Following the investigation and analyzation of the exploration reactions, the mobile PC programming cycle can be additionally isolated into the accompanying four significant stages. Mobile specialists have likewise supported these stages as a proven cycle for creating precise and fruitful mobile applications from origination to the end.

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

Mobile Application Architecture

Architecture diagram



User Interface: Thick Client vs. Thin Client

A good user experience is one of the critical success factors for mobile applications.

Most GPRS-enabled mobile devices have built-in browsers, allowing them to function as thin clients for mobile applications.

Advantages of Thin Clients:

- **No Deployment Hassles**: No need for application installation on the device, making version control easy since the application runs from the server without a local copy.
- **Enhanced Security**: With no local application or data stored on the device, the risk of security breaches is significantly reduced.
- **Resource Efficiency**: The application uses the server's processing power, with the mobile device mainly responsible for displaying content, reducing the load on the device.
- Although the thin client approach offers a streamlined deployment strategy, it is not a widely adopted option for mobile applications.

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 10 Issue: 5
Article Received: *25 February 2022* ***Revised:*** *12 March 2022* ***Accepted:*** *30 April 2022*

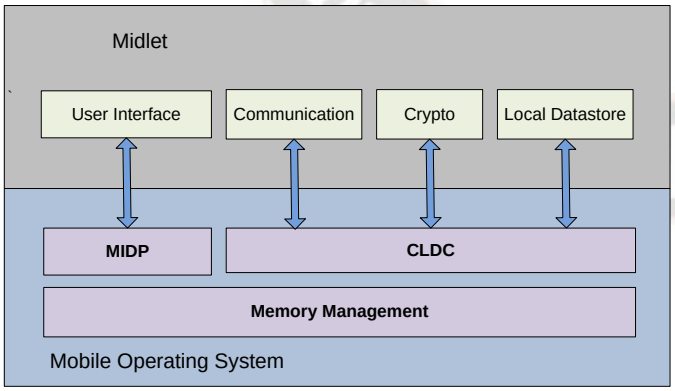
Drawbacks of Thin Clients

1. **Browser Compatibility**: Mobile browsers are still evolving, with significant differences between high-end and basic browsers across devices. As a result, mobile applications cannot fully leverage advanced browser features, leading to a subpar user experience compared to desktop browsers.
2. **Constant Connectivity Required**: Thin clients rely on a persistent connection, which may not always be feasible. Since each request needs to be sent to the server, this can slow down response times, negatively impacting the user experience.
3. **Limited Access to Device Resources**: Mobile browsers operate within their own sandbox, restricting access to device-specific resources like permanent storage. This limitation affects application processing capabilities and the overall user experience.

Due to these limitations, most commercially available mobile services cannot operate efficiently within the restrictions of a thin client. As a result, the industry trend leans toward thick client applications, which provide superior user experience and better access to device hardware resources.

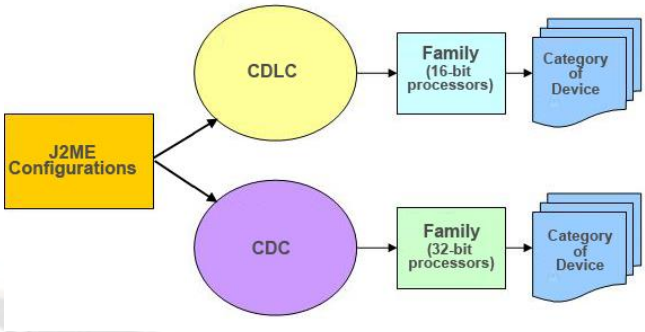
MIDlet

A MIDlet is an application designed for the Java ME environment, utilizing the Mobile Information Device Profile (MIDP) within the Connected Limited Device Configuration (CLDC).

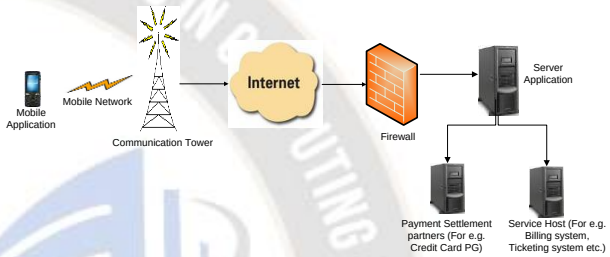


Midlet provides platform-independent development with a "compile once, run anywhere" capability. Similar to an Applet for desktop environments, a Midlet is designed for mobile devices. It operates on any mobile device that supports the MIDP (Mobile Information Device Profile) standard.

Configurations: CDLC vs CDC



Deployment framework



Mobile application connects to server application via Telco infrastructure.

Server application deployed behind firewall, further connects to payment settlement and service host systems. The server application can be deployed on single CPU or a multiple CPU cluster based on scalability data.

5. DISCUSSION

The way that reactions were just gotten from the people who could be explored presents obstructions, perceived dangers, and difficulties for the survey (Langarizadeh, 2021). It is a gamble to get reactions from individuals who have clear inclinations for the locale since requests lead to decisions instead of to realities. The outcomes could be affected by the networks' inclinations, recommending that the outline test probably won't consider this ongoing reality and that the end may be founded more on judgment than on truth (Michaela, 2020).

Long preparation and development cycles will make apps obsolete and superfluous in light of the fact that mobile telephones are growing so rapidly, yet numerous conventional PC programming procedures might be applied in the mobile application market (Parker, 2020). Enormous scope, mind boggling programming development projects have created some distance from a thorough procedural approach and toward an agile one over the long haul. Also, to offer features iteratively for mobile development projects, designers should take on agile methods of reasoning, which

might require them to reproduce the PC programming society inside the organization (Raelovich, 2020). To expand their nimbleness and have the option to answer all the more rapidly to shifts on the lookout, associations need look past the development cycle. To conquer time and viability limitations, teams should be changed across the entire programming life cycle utilizing astounding cooperative devices.

Agile methods have forever been proposed as the most sensible and versatile approach to resolve the issues and difficulties being scrutinized while creating programming items for mobile gadgets (Sarker, 2021). In 2003, the topic of whether Agile development procedures are appropriate for making mobile applications was first raised. Ultimately, mobile programming saw and showed the mapping of agile home ground topics with different development characters. The mapping exhibited why little teams, short development cycles, quickly evolving necessities, persistent compromise, and a predictable conveyance method make agile strategies ideal for completing development exercises in the mobile field (Terhorst, 2020).

Studies have been led on the implementation of the agile development system, which is viewed as a particular counterpart for the production of mobile applications (Valdellon, 2020). This exhibits the requirement for programming development strategies that are custom fitted to meet the necessities for mobile applications. Past exploration has demonstrated that one of the most inconceivable strategies to be left with while creating mobile writing computer programs is agile frameworks (Vasu, 2020).

6. CONCLUSION

This center dives profoundly into the best practices for creating and executing mobile apps, offering significant experiences into crucial approaches for effective management in the current, particular advanced scene (Wang, 2020). This examination investigates the significance of a user-driven plan, agile development methodologies, strong testing frameworks, and predictable coordination of arising developments like increased reality (AR) and recreated knowledge (reproduced insight) by inspecting different cycles, designs, and progressions alongside experiences from industry examples and user suspicions (Weichbroth, 2020). Our survey has given a superior, more goal comprehension of the genuine difficulties looked by mobile application designers today, in light of verifiable records (Yücel, 2021). The discoveries of this examination will prompt a more huge comprehension of the issues and difficulties related with mobile programming development (Zohud, 2021). When thought about during the beginning phases of development, it is guessed that these best practices and multilateral assessment will actually want to successfully direct the recognized worries and upgrade the introduction of mobile apps.

REFERENCES

1. Azad-Khaneghah, P., Neubauer, N., Miguel Cruz, A., & Liu, L. (2021). Mobile health app usability and quality rating scales: a systematic review. Disability and Rehabilitation: Assistive Technology, 16(7), 712-721.
2. Balapour, A., Nikkhah, H. R., & Sabherwal, R. (2020). Mobile application security: Role of perceived privacy as the predictor of security perceptions. International Journal of Information Management, 52, 102063.
3. Duvaud, S., Gabella, C., Lisacek, F., Stockinger, H., Ioannidis, V., & Durinx, C. (2021). Expasy, the Swiss Bioinformatics Resource Portal, as designed by its users. Nucleic Acids Research, 49(W1), W216-W227.
4. Fahey, R. A., & Hino, A. (2020). COVID-19, digital privacy, and the social limits on data-focused public health responses. International Journal of Information Management, 55, 102181.
5. Ho, M. H. W., & Chung, H. F. (2020). Customer engagement, customer equity and repurchase intention in mobile apps. Journal of business research, 121, 13-21.
6. Inan, O. T., Tenaerts, P., Prindiville, S. A., Reynolds, H. R., Dizon, D. S., Cooper-Arnold, K., ... & Califf, R. M. (2020). Digitizing clinical trials. NPJ digital medicine, 3(1), 101.
7. Janani. (2021, February 11). Different Types of Mobile Application Development- Every Business Owner Must Know! Retrieved May 11, 2021, from https://www.zuantechnologies.com/blog/differe nt-types-mobile-application-developmenteverybusiness-owner-must-know/
8. Karar, M. E., Alsunaydi, F., Albusaymi, S., & Alotaibi, S. (2021). A new mobile application of agricultural pests recognition using deep learning in cloud computing system. Alexandria Engineering Journal, 60(5), 4423-4432.
9. Langarizadeh, M., Sadeghi, M., As'habi, A., Rahmati, P., & Sheikhtaheri, A. (2021). Mobile apps for weight management in children and adolescents; an updated systematic review. Patient Education and Counseling, 104(9), 2181-2188.
10. Michaela, H., & Lestara, P. G. P. (2020). Evaluating The Implementation Of Bca Mobile Banking Using Hot-Fit Model. Russian Journal of Agricultural and Socio-Economic Sciences, 101(5), 160-168.
11. Parker, M. J., Fraser, C., Abeler-Dörner, L., & Bonsall, D. (2020). Ethics of instantaneous contact tracing using mobile phone apps in the control of the COVID-19 pandemic. Journal of Medical Ethics, 46(7), 427-431.

12. Raelovich, S. A., Mikhlievich, Y. R., Norbutaevich, K. F., Mamasolievich, J. D., Karimberdievich, A. F., & Suyunbaevich, K. U. (2020). Some didactic opportunities of application of mobile technologies for improvement in the educational process. Journal of Critical Reviews, 7(11), 348-352.
13. Sarker, I. H., Hoque, M. M., Uddin, M. K., & Alsanoosy, T. (2021). Mobile data science and intelligent apps: concepts, AI-based modeling and research directions. Mobile Networks and Applications, 26(1), 285-303.
14. Terhorst, Y., Philippi, P., Sander, L. B., Schultchen, D., Paganini, S., Bardus, M., ... & Messner, E. M. (2020). Validation of the mobile application rating scale (MARS). Plos one, 15(11), e0241480.
15. Valdellon, L. (2020, November 2). What Are the Different Types of Mobile Apps? And How Do You Choose? Retrieved May 11, 2021, from https://clevertap.com/blog/types-of-mobileapps/
16. Vasu, B., & Geetha, A. V. (2020). Monitoring social distancing by Smart Phone App in the effect of COVID-19. Global Journal of Computer Science and Technology, 20(C2), 43-51.
17. Wang, Y., Min, J., Khuri, J., Xue, H., Xie, B., Kaminsky, L. A., & Cheskin, L. J. (2020). Effectiveness of mobile health interventions on diabetes and obesity treatment and management: systematic review of systematic reviews. JMIR mHealth and uHealth, 8(4), e15400.
18. Weichbroth, P. (2020). Usability of mobile applications: a systematic literature study. Ieee Access, 8, 55563-55577.
19. Yücel, M. A., Lühmann, A. V., Scholkmann, F., Gervain, J., Dan, I., Ayaz, H., ... & Wolf, M. (2021). Best practices for fNIRS publications. Neurophotonics, 8(1), 012101.
20. Zohud, T., & Zein, S. (2021). Cross-Platform Mobile App Development in Industry: A Multiple Case-Study. International Journal of Computing, 46–54. https://doi.org/10.47839/ijc.20.1.2091