CASE STUDY BASED SOFTWARE ENGINEERING FOR MOBILE APPLICATION DEVELOPMENT

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ABSTRACT

Mobile applications become more complex, moving beyond inexpensive recreational applications to more business critical uses, it will be essential to apply software engineering processes to assure the development of secure, high-quality mobile applications. This paper highlights important software engineering issues related to the development of applications that run on mobile devices and it also discusses the case study of IOS and Android app of mobile applications development.

Keywords: *Mobile devices, application development, software engineering*

I. INTRODUCTION

The case study is aimed to demonstrate a variety of software areas, modules and studied of persons, actions, choices, stages, projects, strategies and organizations are considered holistically by one or more approaches [5]. Software engineering (SE) is the application of a methodical, well-organized, countable method to the strategy, development, procedure, and maintenance of software, and the revision of these methods; that is, the application of engineering to software. [7] SE is a process of generating or modifying information systems, and the models and approaches that people use to develop these systems. [8]

Mobile application development for smart phones has been increasing in last years as mobile phones have become an essential part of our contemporary life. Mobile application development is the set of processes and procedures involved in writing software for small, wireless computing devices. [6]. Like Web application development, mobile application development has its roots in more traditional software development. One critical difference, however, is that mobile apps are often written specifically to take advantage of the unique features a particular mobile device offers.

In this paper we present a case study of Mobile application development. Two applications are developed, one based on native technologies, the other related frameworks. We provide implementation details and compare the different solutions in terms of location support, compliance with required features, and cross-platform functionality of IOS and Android App.

II. MOBILE APPLICATION DEVELOPMENT

Software engineering for mobile application development has become, as mobile application development become more complex, also Business-to Business and Business-to-Employee applications are increasing more and more when it compared with Business-to-Customers applications. Thus, mobile application project now needs its own effort rather than being part of a web or desktop project, which means that software engineering for mobile applications development demands a separate team to develop the mobile application. [6] Mobile applications development is similar to software engineering for other embedded applications. However, mobile applications present some additional requirements that are less commonly found with traditional software applications.

A key goal of the development practices for mobile applications included the following points:

1) most of the applications were relatively small, averaging several thousand lines of source code, with one or two developers responsible for conceiving, designing, and implementing the application;

2) there was a sharp divide between native applications, those that run entirely on the mobile device, and web applications, which have a small device-based client with execution occurring on a remote server;
3) developers adhered quite well to recommended sets of best practices but rarely used any formal development processes, and
4) developers did very little organized tracking of their development efforts and gathered few metrics. [4]

There are two main approaches to mobile application development [9] [10], either the application is built using a native programming language, or the application is based on web technology. Some general properties of native vs. web are often emphasized. Native apps are created for specific devices. Such apps can make use of the hardware capabilities of the targeted device, and adheres to the device-specific design conventions. The native app is typically downloaded from a digital marketplace, managed by the provider of the operative system, e.g. Apple's AppStore or Google's Google Play. The web app on the other hand is basically a web site, optimized for mobile web browser access in terms of e.g. screen size, cellular network speed and mobile navigation controls. [11]

Any organization tries to build a native app for its business and request to cover all mobile platforms, this will cause cost crisis for the organization, especially if its business need complex application. For example, if they try to cover the main three platforms (Android, iPhone and Windows Phone) they need three different environments and tools for that purpose, because each platform needs different language, complier, and different experiences to develop the application. [6] The native application is stable, secure, and more capable for accessing mobile resources than cross-platforms this makes it the choice for most game, social, and communications applications developers. [6]

III. USER-CENTRIC MOBILE APPLICATION DEVELOPMENT PROCESS

The mobile apps have become an essential part of the human life. Almost everything is done with the help of an application now. It has changed the definition of everyday activity of human life. And hence the demand for mobile apps in all the businesses has also increased by many folds. It has become a must-have element for any business to prosper and reach its potential customers. Our app development process includes 7 stages:

1.Initial requirements, research and analysis

Connect with us and tell us about your mobile app idea. Discuss with us all the requirements of your mobile app. Based on the details you provide; we will carry out an extensive research of the similar apps in that niche to learn how your competitors work.

2.Wireframing

Based on the analysis, we will create a wireframe for your app to give you a rough idea of the look and feel of your application. It will let you know how your final product will look like.

3.Rolling out functional and UI Design

Once you give a nod for the wireframe, we will start with the actual designing process. We will make sure that your app includes all the necessary elements and looks as attractive and engaging as possible.

4.Development

Once the design is ready, we will start the development process. Our app developers will build all the functionality as per the requirements given by you.

5.Testing, Evaluating and Optimizing

We perform testing at every step of the development. This will ensure that all the individual modules are working perfectly. Once the application is built, we again test the entire application to make sure that there are no bugs in the application.

6.Launch

After completing a thorough testing process, it is time for making your application live and making it available for the users.

7.Support and Updates

Not just the development, we provide app maintenance services too. We will fix any bugs in your application and will provide updates both in terms of designing and developing even after the deployment of the application. Our developers are available all times to provide you the necessary support. [16]

IV. CASE STUDY OF iOS AND ANDROID APP

Mobile application development for smart phones has been increased in latest years with widespread of smart phones especially Android OS from many phone manufacturers and iOS on iPhone, iPad and iPod devices from Apple. [6] Mobile devices have special hardware sensors, limited power consumption issues, and need to consider special security issues, thus, mobile applications development requires special effort and strategy for the development life cycle. Many developers and application publishers currently use cross-platforms for their advantages especially those related to cost and maintenance.

An operating system is the heart of the smartphone, since it determines features, performances, security, and availability of applications [13]. iOS and Android has distinctive difference in their strategy and policy, such as operating system licensing, application development and registration, and application store profit sharing. Android differentiated itself from iOS well. In addition, Android utilized value network. It has been known that platform depends on value network, while classical industries depend on value chain, and that value does not flow into one direction, but crosses through various networks of participants. For network carriers who had lost value added service revenue to App Store, it was good news and they started adopt more Android products on their product portfolio. [13]

iOS catalyzed a transition of traditional mobile industry into value network industry Once mobile internet was only connectable through mobile operators' portals, but iOS collapsed the boundary between the mobile device and mobile internet. Also, iOS created an ecosystem, which was originally under operation for iPod products, where application developers and customers voluntarily transact with each other and bring in more value to platform. Therefore, in platform strategy aspect, Apple successfully implemented tipping strategy. This strategy brought Apple huge first mover advantage in terms of locking in users inside iOS ecosystem. Even after the market share was surpassed by Android, still 54.5% of mobile internet connection is through iOS devices, while Android is 34.6% and Java ME is 4.3%10. [14]

iOS architecture is written in Objective-C language and comprised of four layers, Cocoa touch, Media, Core service, and Core OS. System interfaces are provided by framework, which contains libraries and resources such as header and image. To develop applications for iOS, developers need integrated development environment (IDE) called Xcode, which runs on Mac OS X platform, and software development kit (SKD), that provides APIs in the form of libraries. iOS applications are written in Objective-C as well. iOS SDK was first released in February 2008. To publish and upload applications on the devices, developers need to pay $99.00 per year. [12]

Android is open-source software for a wide range of mobile devices and a corresponding open-source project led by Google. It was first announced in 2007 with the introduction of the Open Handset Alliance, a consortium of hardware, software, and operator companies. The first product, HTC Dream was launched in October 2008. Android started from entirely different business model, originating from dominant position in PC based web search service. With its free and open policy Android captured attention of OEMs who were weak at smartphone operating system technology. [14] Android architecture is built on a modified Linux kernel (Butler 2011). System components are written in Java, C, C++, and XML. Applications are run on JAVA virtual machine. Android consists of number of layers as Linux Kernel, Android Runtime, Libraries, Application framework, and Applications. [15]

Android applications are mostly developed on Eclipse IDE. In that android applications are developed with JAVA, Java development kit (JDK) is required, along with Android SDK. To facilitate the Android application development on Eclipse, Android development tools (ADT) is required for streamlined export of *.apk file. Developers pay $25.00 for application registration and distribution on the Google Play application store. [12]

IV. CONCLUSION

Nowadays, mobile applications become more complex, moving beyond inexpensive entertaining applications to more business critical uses, thus, it becomes essential to apply software engineering process to assure the development of secure, high-quality mobile applications. [6] While the large number of mobile applications creates it appear that software development processes for them are well understood, there remain a large number of complex issues where further work is needed. In addition, there is a mobile angle to almost every aspect of software engineering research, where the characteristics of mobile applications and their operating environments present a new or different set of research issues.

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