Survey on Xamarin Cross Platform Implementation And Framework

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Abstract- *Xamarin is a modern integrated development environment used to develop applications on iOS, Android and Windows mobiles. Xamarin cross platform look like 100% native on any device, with which a user can use efficiently and can also understand the code. It uses c# language to write the code. It consists of two major products: Xamarin iOS, xamarin android. Now we discuss about xamarin android. The main use of xamarin is that the code can be reused or it can be shared across all platforms. Xamarin depends on coupling between backend code and UI. With the cross platform technology, you can write the code once, and can be reused on other platforms. The main subject is that we focus on framework and android applications and the use of xamarin in mobiles for the developers who are using Xamarin platform.*

Keywords- *Xamarin, cross platform implementation, Xamarin studio, Xamarin Android, iOS.*

I. INTRODUCTION

For the last few years the use of mobiles has been increasing tremendously. We can see many mobile development applications with many features and creative applications. But developing applications on every platform is a time consuming process and cost effective. So, with the help of xamarin we can develop the applications with low cost and money. There may be ambiguity that with the help of cross platform implementations sometimes it gets difficult where it can meet the naïve performance and features of every platform etc.

Coming to xamarin framework it is used to built a cross platform mobile applications by using c# language and there are different types of cross platform tools for building mobile applications for example web-based frameworks, in web based frame work phone gap is probably one of the well known framework. Secondly Titanium which is a JavaScript based development platform. It is fully native.

Coming to android application, Xamarin has two products mono touch and mono for android which are cross platform implementations of the common language infrastructure. Are built on top of mono, an open source

version of the .NET framework based on the published .NET ECMA standards. To run the android applications you need to install Xamarin.Android.
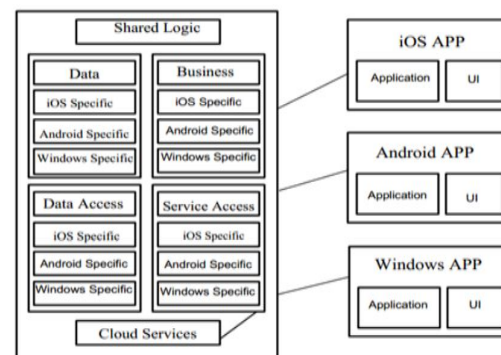
II. XAMARIN ARCHITECTURE

FIG : Xamarin Architecture

User interface: The screen, presentation code and controls are included in the user interface. The user interface build in xamarin will be similar to that of native applications.

App layer: It combines the user interface with the business layer, it has specific features of platform.

Business layer: It focuses on the logic and object classes of business

Data access layer: It is the abstraction layer between data layer and business logic.

Service access layer: REST, WCF and JSON are the complex web services from which service access layer is accessed. Networking behavior is encapsulated by the service access layer, application and user interface layer consumes simple API which is provided by service access layer.

Data layer: It focuses on database binding such as SQLite database.

III. XAMARIN FRAMEWORK

With the use of c# language, xamarin framework is used for developing cross platform mobile application. Other frameworks such as HTML and JAVA Script are mainly used to develop apps such as websites using JS libraries for mobile apps. C# is a single language that is offered by xamarin and it runs on three platforms iOS, Android and windows. Let us discuss few points on xamarin iOS and xamarin android

Xamarin .iOS:

Compilation of c# source code is done by using Xamarin.iOS. Native iOS applications can be build with the help of xamarin.ios.by using the UI controls such that they can be used in building objective-c and x-code. We can make native mobile applications which are similar to that of swift or objective-c by using c#. The specific features of iOS platform are allowed to access by the framework itself. Compilation of source code into intermediate language is done by xamarin.ios compiler which is known as ECMACIL. Again this CIL code is converted into native machine code which is compiled again so that it runs on iOS device. This process is done by SDK tool "Mtouch".

- The deploying of application bundle can be done by either the actual iOS device or iOS simulator like ipad or iphone which is returned by "Mtouch".
- Applications of iOS can be developed inside visual studio which provides many benefits as follows:
- Cross platform projects are created for iOS, Android , and windows applications.
- ReSharper and team foundation server are the visual studio tools which help to build applications faster for all cross platform projects including iOS.

Xamarin.Android:

Xamarin android builds c# developer leverage that builds native android applications by using .Net base class library and are similar to two types of IDE's: they are xamarin and visual studio. Xamarin also provides xamarin studio which is similar type of IDE that is used to create applications. Compilation of c# code is done by converting it into intermediate language by using MonoVM+JIT package. Application runs with the interaction of java native ty pes through Java Native Invoke (JNI).
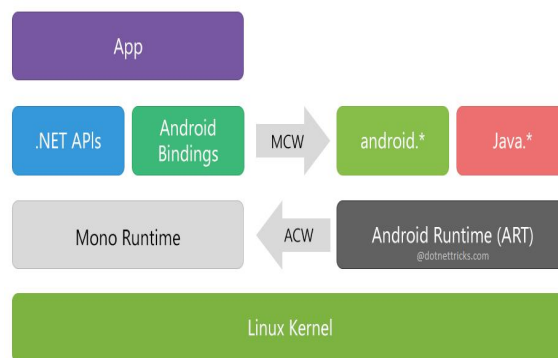

FIG : XAMARIN.ANDROID ARCHITECTURE

Applications in Xamarin.android run with the mono execution environment .the execution runs on the top of Linux kernel. Execution environment of mono runtime and the android runtime runs side by side. It exposes various types of API's to the user code. To access the facilities of Linux Operating system, we can use System.Net, .Net based class libraries and system.

Xamrin.Windows:

Compilation of c# code is done by converting it into intermediate language so that it can be executed by the built in runtime. Xamarin tools are not required for this compiled code. It is simple and easy to reuse the iOS code and android code by designing applications of windows under the guidance of xamarin. It has .Net native option that behaves same as that of Xamrin.iOS' AOT compilation.

Xamarin studio:

Xamarin studio is a technology of cross platform developed by xamarin in San Francisco that is available on both Mac operating system and windows. It is grown out from the mono project in 2011 which allows c# developers to create native apps for OSX, Android, iOS and windows store, windows phone and windows10 universal apps. The developed applications are distributed in both private and public app stores.

IV. ADVANTAGES AND DISADVANTAGES OF XAMARIN CROSS PLATFORM DEVELOPMENT

Advantages:

- Developing is the biggest advantage of this language.
- Xamarin.Forms which are released in xamarin 3.0 helps in sharing of codes.
- Compilations of codes are platform specific, so it can achieve high performance, use native hardware acceleration, device features and native UI components.

- The performance of the app is faster than many other cross-platform IDEs. It also supports full hardware features like camera, accelerometers, GPS and accelerometers.
- Xamarin coding can be done in Visual Studio and Xamarin Studio. Cross platform becomes even more simple and facile, because of its test cloud, which makes the task truly effortless.

Disadvantages:

- Xamarin studio is the development tool if we use Mac or don't have Visual Studio, it's still far away of Xcode or Android Studio. It is improving during the time of course, and is usable but it lacks the features of its native counterparts, continuous crashes and mysterious file disappearances are routine, no need to mention the fear of what will crash now after each system update.

The Learning curve the developers should know C# and .NET and the frameworks of the native framework and the Xamarin framework.

- The cost of Xamarin development tool is not a open source and they are not cheap.

V. CONCLUSION

Developers want their apps to be available on all the major platforms, the emergence of cross-platform technology gives them advantage. It is important because some of the cross-platform technologies are too complex and difficult for developers. For e.g. Titanium is a great framework but very complex for building mobile applications. Similarly, few technologies doesn't give you native features and performance. Xamarin cross-platform provides us to develop native apps with all the features for specific platform and since it requires developers to know only one language i.e. C# that makes life easy for developers.

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