COMPARATIVE STUDY OF VARIOUS CELLULAR PHONE OS IN CURRENT WORLD

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Abstract: Many people have adequate knowledge about different mobile phones and their companies but a very few of them know something about operating systems. It is very important to know about different mobile OS used by a number of companies so that we can actually know that what is behind our smartphone's smooth and colourful touchscreen. The main purpose of this study is to discuss the different comparative studies on mobile operating system. Now a day's different mobile phone companies are competing in the market each having its own hardware and software. Each company mobile phone has its own interface and they are looking to provide new features to their customers. Each company use different operating system like Apple using iOS, Samsung using Android and Nokia using Symbian. In this study we will discuss about the various mobile technologies along with the different mobile operating systems available in the market and the difference between them.

Index-Terms: Android, Symbian, iOS, Mobile Operating System.

I. INTRODUCTION

"Mobile Phone" or "Cell Phone" or simply "Cell" has become the most used and the most wanted device among any other electronic devices available so far. Also, mobile phone technology is growing day by day and the growth is still continuing drastically making mobile phone a one stop device for almost all necessities. Mobile phones were initially released in to the market that could make calls and send SMS only. But never too late, new models were released in to the market with additional new features packed in them. The new features included are Camera, Video Recorder, Internet, Live TV, Audio Player, Games, GPS, Wi-Fi and more. These features have helped the businessmen in particular who can be connected even on the move. Mobile phones have become one of the basic necessities of life apart from food, clothes and shelter. The affordable cost of this device has helped people across the globe to own at least one mobile phone of his own. This device also helps one to keep in close touch with his relatives and friends whenever necessary. This ultimately proves that the mobile phone has been included as a basic necessary tool of this generation. Here a comparative study between various cellular phone os in current world has been made from the latest available sources.

A cellular phone operating system (OS) is a set of programs that manage phone hardware resources and provide common services for application software. The operating system is the most important type of system software in a computer System. A user cannot run an application program on the cell phone without an operating system, unless the application program is self-booting.
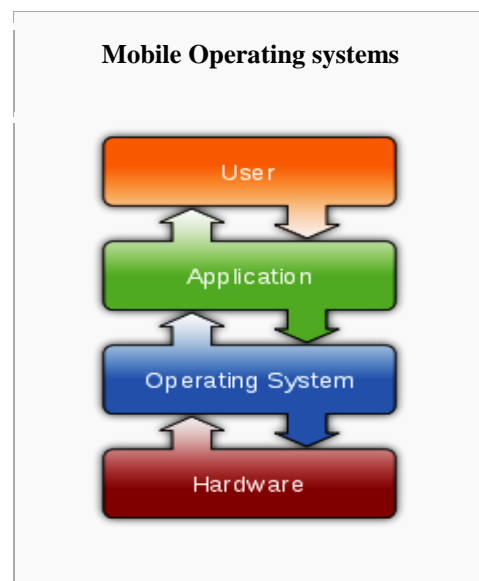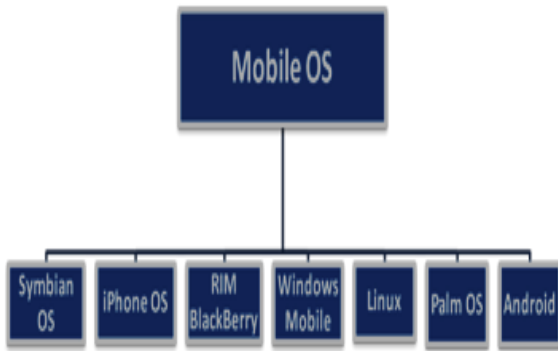

Figure 1: Mobile Operating systems

Figure 2: Different types of OS's

The description of popularly used OS in various phone are:

II. SYMBIAN OS

Symbian OS is officially the property of Nokia. It means that any other company will have to take permission from Nokia before using this operating system. Nokia has remained a giant in low-end mobile market, so after Java Symbian was the most used in the mobile phones till a couple of years ago. Still Symbian is widely used in low-end phones but the demand rate has ben continuously decreasing. By upgrading Symbian mobile OS, Nokia has made it capable to run smartphones efficiently. Symbian ANNA and BELLE are the two latest updates which are currently used in Nokia's smartphones. Overall, the Symbian OS is excellently designed and is very user-friendly. Unfortunately, Symbian OS graph is going downwards nowadays due to the immense popularity of Android and iOS. Some of the phones currently running on Symbian OS are Nokia C6-01, Nokia 603, Nokia 700, Nokia 808 Pure View, Nokia E6 (ANNA) and Nokia 701 (BELLE). Symbian is a popular choice among nokia dual sim mobile phones as well.

III. OPERATING SYSTEM VERSIONS

As for today, Symbian OS is in its ninth version. The first version was 5, and back then it could have been called ER5, "EPOC Release 5" (EPOC was the operating system's name before Symbian). 5th version was used, for example, in Psion Series 5mx handheld computers.

The first Symbian based phone, which was open to third party applications, was Nokia 9210. Ericsson R380, which was launched before Nokia 9210, had Symbian OS, but the phone's software was limited to the one which was preinstalled into it. R380 had so-called "closed operating system."

In the upcoming Symbian OS v9.4 all applications should launch up to 75% faster. Symbian has also announced that its future OS versions support quad core processor; it takes less power when only one processor is running, but when needed, extra performance can be brought from three other processors.

A. USER INTERFACES

There are five user interfaces made to run on top of Symbian, and amongst Symbian beginners these mess up heads pretty easily. The links below give a lot of information about each user interface, and in the bottom of that page there is a list of devices which use the user interface. I'm only going to tell about four user interfaces, because the fifth, MOAP, which is maintained by the Japanese operator NTT DoCoMo, is a platform designed for Japan market.

- **Series 60 (S60):** Series 60 is Nokia's smart phones' most common user interface, but it's also used by other mobile phone manufacturers as well.

- **Series 80 (S80):** Series 80 is the user interface used by Nokia's communicators. Yet Nokia E90 doesn't use S80, but S60.

- **Series 90 (S90):** Series 90 is the user interface of Nokia's touchscreen phones 7710 and 7700.

- **UIQ:** UIQ is a touch screen user interface of e.g. some of Sony Ericsson's and Motorola's phone models.

B. ANDROID OS

September 20th 2008 was the date when Google released the first Android OS by the name of 'Astro'. After some time next upgraded versions 'Bender' and 'Cupcake' were also released. Google then adopted the trend of naming android versions after any dessert or a sweet in alphabetical order. The other releases are Donut, Éclair, Froyo, Gingerbread, Honeycomb, Ice Cream Sandwich and Jelly Bean. Jelly Bean is so far the latest android version from google. Since the platform is not closed like IOS, there are too many great android apps built by developers. Just after stepping into the smart phone and tablets market Android gained immense popularity due to its beautiful appearance and efficient working. Many new features were introduced which played a significant role in Android's success. Google Play is an official app market which contains millions of different apps for android devices. Samsung, HTC, Motorola and many other top manufacturers are

using Android in their devices. Currently Android is one of the top operating systems and is considered a serious threat for iPhone.
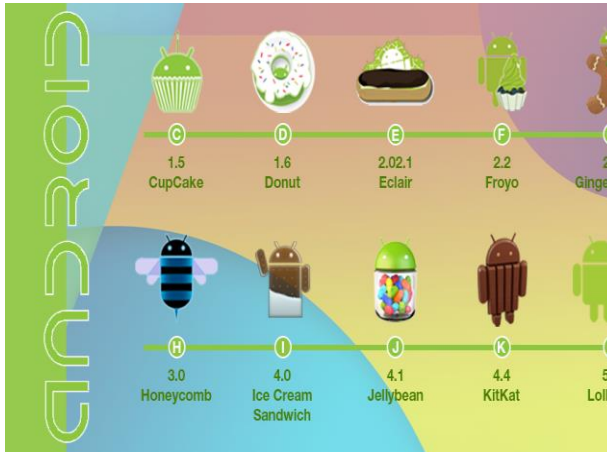

Figure 3: All versions of Android OS

Cupcake: Android 1.5
Donut: Android 1.6
Eclair: Android 2.0, Android 2.1
Froyo: (short for "frozen yogurt") Android 2.2
Gingerbread: Android 2.3
Honeycomb: Android 3.0, Android 3.1, Android 3.2
Ice Cream Sandwich: Android 4.0
Jelly Bean: Android 4.1, Android 4.2, Android 4.3
KitKat: Android 4.4
Lolipop: Android 5.0, Android 5.1

C. WINDOWS OS

We all are familiar with Windows OS because it is used in computers all over the world. Windows OS has been also been used in mobile phones but normal mobile phone users find it a bit difficult to operate it but at the same time it was very popular among people who were used to it.

This was the case until Nokia and Microsoft joined hands to work together. The latest Windows release by Microsoft is known as Windows 7 which has gained immense popularity among all kind of users. With its colourful and user friendly interface it has given Windows OS a new life and is currently in demand all over the world. Another reason behind its success is that this latest OS is used in very powerful devices made by Nokia. The computer like look has totally vanished from the windows phones with the release of Windows 7. Samsung and HTC also released some Windows based

phones but they could not much place in the market. Nokia Lumia series is completely windows based. Some of the latest Windows Phones are Nokia Lumia 800, Nokia Lumia 900, Samsung Focus and HTC Titan 2.

- **User interface**

Windows Phone features a user interface based on Microsoft's "Metro" design language, and was inspired by the user interface in the Zune HD. The home screen, called the "Start screen", is made up of "Live Tiles", which have been the inspiration for the Windows 8 live tiles. Tiles are links to applications, features, functions and individual items (such as contacts, web pages, applications or media items). Users can add, rearrange, or remove tiles. Tiles are dynamic and update in real time for example, the tile for an email account would display the number of unread messages or a tile could display a live update of the weather. Since Windows Phone 8, live tiles can also be resized to either a small, medium, or large appearance.

- **Windows Phone 7**

The most anticipated development in the smartphone market in recent times has been the launch of the new version of the mobile OS from Microsoft. Called 'Windows Phone 7?, its beautifully designed, and radically new interface has impressed one and all with its focus and simplicity of use. It represents a fresh start for Microsoft in this domain, and the initial reviews indicate that they are right on target.

- **Windows Phone 8**

On October 29, 2012, Microsoft released Windows Phone 8, a new generation of the operating system. Windows Phone 8 replaces its previously Windows CE-based architecture with one based on the Windows NT kernel with many components shared with Windows 8, allowing applications to be ported between the two platforms.

- **Windows Phone 8.1**

Windows Phone 8.1 was announced on April 2, 2014, after being released in preview form to developers on April 10, 2014. New features added include a notification center, Internet Explorer 11 with tab syncing among Windows 8.1 devices and WP devices, separate volume controls, and the option to skin and add a third column of live tiles to the Start Screen. Starting with this release, Microsoft has also dropped the requirement that all Windows Phone OEMs include a camera button and physical buttons for back, Start, and Search.

Windows Phone 8.1 also adds "Cortana", a voice assistant much like Siri and Google Now. Cortana replaces the previous Bing search feature, and was released as a beta in the United States in the first half of 2014, before expanding to other countries in late 2014 and early 2015.

- **Windows Phone 10**

Windows 10 (mobile) was announced on January 21, 2015, as a mobile operating system for smartphones and tablets with screens smaller than 8 inches running on ARM architecture. Its primary focus is unification with its PC counterpart in software and services; in accordance with this unification strategy, Microsoft began to phase out the Windows Phone brand from public usage in favor of using the "Windows 10" brand across all device classes (for instance, the Microsoft Store refers to smartphones that can be upgraded to the OS as being "Windows 10 ready") rather than using the name "Windows Phone 10.

D. BlackBerry OS

Blackberry OS is the property of RIM (Research In Motion) and was first released in 1999. RIM has developed this operating system for its Blackberry line of smartphones. Blackberry is much different from other operating systems. The interface style as well as the smart phone design is also different having a trackball for moving on the menu and a qwerty keyboard. Like Apple, Blackberry OS is a close source OS and is not available for any other manufacturer. Currently the latest release of this operating system is Blackberry OS 7.1 which was introduced in May 2011 and is used in Blackberry Bold 9930. It is a very reliable OS and is immune to almost all the viruses. Some of the smartphones operating on Blackberry OS are Blackberry Bold, Blackberry Curve, Blackberry Torch and Blackberry 8520.

- **User interface**

On 1 May 2012, Thorsten Heins, CEO of BlackBerry officially unveiled the BlackBerry 10 platform. The features shown off at the BlackBerry included a unique platform wide flow interface, a new intelligent keyboard, as well as a camera app which allows the user to time-adjust the whole photo and also time-adjust individual faces one at a time to optimize picture quality. The user interface also includes the ability to run 8 "Active Frames". BlackBerry Passport can run 16 apps as "Active Frames". Unlike iPhone, BlackBerry multitasks in real time. Active Frames are applications that are currently running within the operating system, but minimized. These applications can either be running or paused while in "Active Frames" to help with battery longevity. Some are capable of showing a feed of live information on the home screen. The operating system also features the 'Hub', a message center accessible from anywhere in the OS where all notifications including emails, social networking notifications, text messages, and other notifications are displayed and are actionable.

E. iPhone OS (iOS)

The iPhone was that one revolutionary device that changed the way we looks at phones. Forever never had the simple phone been transformed into something so brilliant, and so beautiful. iOS was introduced in 29th June 2007 when the first iPhone was developed. Since then iOS has been under gone many upgrades and currently the latest one is the iOS 6. Apple has still not allowed any other manufacturer to lay hands on its operating system. Unlike Android, Apple has more concentrated on the performance rather than appearance. This is the reason that the basic appearance of iOS is almost the same as it was in 2007. Overall it is very user-friendly and is one of the best operating systems in the world. So far iOS has been used in iPhone, iPhone 2G, iPhone 3G, iPhone 4, 4S, iPhone 5, 5S, 5C, not to mention their tablet pcs branded as iPad 3, iPad 2 and iPad.

- **User Interface: 9/10**

Apple is the expert at designing beautiful and intuitive interfaces, and they hit the jackpot again with the iPhoneOS. Successive versions have improved usability even further. Really you have to use the iPhone to grasp the beauty of the software.

- **Application Availability: 4.5/5**

With the highest number of apps amongst any app store, Apple is the clear leader and offers an astounding choice of apps to iPhone users (see chart). There is an app literally for everything!

News, reference, sports, weather, shopping, tv, movies, games, notes, organizers, social networking – virtually every possible category is loaded with hundreds of apps.

F. BADA OS

Like others Samsung also owns an operating system which is known as BADA. It is designed for mid range and high end smartphones. Bada is a quiet user friendly and efficient operating system, much like Android but unfortunately Samsung did not use Bada on a large scale for unknown reasons. The latest version Bada 2.0.5 was released on March 15th 2012. There are only 3 phones which are operating on Bada. These three smartphones are Samsung Wave, Samsung Wave 2 and Samsung Wave 3. I believe that Bada would have achieved much greater success if Samsung had promoted it properly.

G. Palm OS (Garnet OS)

Palm OS was developed by Palm Inc in 1996 eespecially for PDAs (Personal Digital Assistance). Palm OS was basically designed to work on touchscreen GUI. Some Years later it was upgraded and was able to support smartphones. Unfortunately it could not make a mark on the market and currently is not being used in any of the latest top devices. It has been 5 and half years since we saw the latest update of palm OS in 2007. Palm OS was used by many companies including Lenovo, Legend Group, Janam, Kyocera and IBM.

IV. CONCLUSION

With the completion of this paper, we can conclude that every operating system has been developed by keeping in mind the targeted customers. Every Operating System provides competitive and unique features for their customers. However, iOS came out to be ever enhancing operating system with a great evolution chart over the years. On other hand, Android, being an open source operating system enjoys addition of new ideas every day by various Android lovers. Whereas, Symbian lacked the continuous updations as compared to other systems thus creating a large loophole for Symbian to match the latest advancements The discussion above concludes that android is more preferred than symbian and windows but it is more susceptible to security threats and viruses due to the permission of anonymous applications submission. However, as user point of view the android OS is mostly preferred OS than the other two OS. While talking about graphical user interface it is superb in IOS and android is also in the same race.

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