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ANDROID – Future OS for Personal Computers

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Abstract: After so many efforts for customization and user acceptance still computer operating system layouts are not as simple as we have today for mobile devices (Smartphone and tablets) and some where we find them complicated as compare to that of our handheld devices. Google achieved success through the launch of android as an operating system for mobile phones and tablets. Some organizations are working hard to get a stable version of android for personal desktop computers and the most recent success towards this goal was achieved under project named as Android X86 from Chih-Wei Huang and Yi Sun who started this project during 2009, the aim was to port Google's mobile android to x86 platform [1]. We can say that future of personal computers can be looked as Android based personal computers. Through this paper we are trying to focus on different features that an android based personal computer can provide to its users in modern computing era computing.

Keywords: Android; Google; Operating system; Personal computers

I. INTRODUCTION

Android is a well-known operating system for Smartphone and handheld devices we find it simple and user friendly. Android was developed by Android Inc. it was founded in Palo Alto, California in October 2003 by Andy Rubin, Rich Miner, Nick Sears, and Chris White. The early intentions of the company were to develop an advanced operating system for digital cameras, and this was the basis of its pitch to investors in April 2004 [2]. The company then decided that the market for cameras was not large enough for its goals, and by five months later it had diverted its efforts and was pitching Android as a handset operating system that would rival Symbian and Microsoft Windows Mobile. Rubin had difficulty attracting investors early on, and Android was facing eviction from its office space. In July 2005, Google acquired Android Inc. for \$50 million [3]. Google after acquiring android has achieved maximum market share for mobile operating system in use today. All existing mobile operating systems are struggling to compete with android, let it be iOS, Windows, Symbian or Black berry all are facing tough competition for survival. Android is an open source and free to use operating system it provides an open opportunity to everyone for customization and updates, because of these features android is emerging as first choice for every Smartphone maker and this is what is helping them to keep price of their products low and the end user is benefited in every aspect. After getting all success in the field of handheld devices Google is looking forward for its next goal that is "Android based personal computers". Chih-Wei Huang and Yi Sun through there project names as "Android X86" is working hard to get a stable version of android for personal computers. Google has achieved primarily success in this domain and now we are having android based operating system that make use of Linux kernel available to run on our personal computers and we find them more users friendly and light weighted and they are available free of cost.

II. COMPARING MAJOR OPERATING SYSTEM

When it comes to desktop operating systems no doubt today Microsoft's windows hold the major share in market and all other operating system are nowhere in competition with Microsoft today. The stats provide a major outlook of market share that windows hold till 2017. From the stats below it is clear that Microsoft is leading desktop operating system with ease today and no one stands against it today [4].

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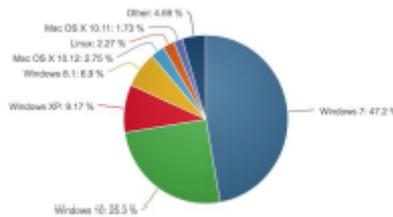


Figure 1: Microsoft share in operating system market 2017.

The same scenario was with operating system till 2008, Symbian was dominating all other mobile operating systems till 2008 but after that it observes a great downfall because of the emergence of Android operating system (Mobile) and today when it comes to mobile operating system market that stats are different we don't find Symbian even in competition infact we find Android dominating all other operating systems and stats prove the theory in favour of Android operating system for mobile as Android holds more than 85% share in mobile operating system market all over the world. Starting with zero in 2005 in total span of 10-12 years android has taken over the mobile operating system market because of its features that not only make it user friendly and light but also fast and stable. We can say that Android holds same position in terms of mobile operating system as Microsoft holds for desktop operating system [5].

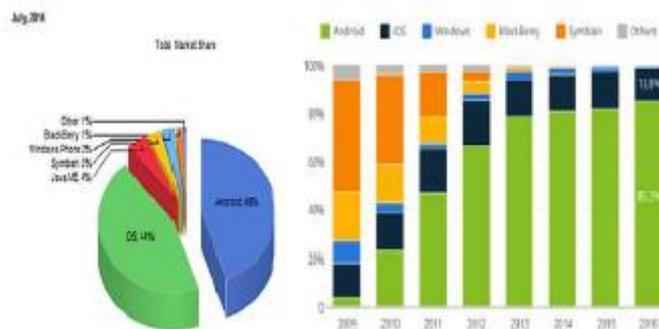


Figure 2: Android versus other operating from 2014 to 2016.

III. FEATURES OF ANDROID OPERATING SYSTEM

Android prove to be a very powerful and stable operating system, through its interface, architecture, support to hardware, availability of large number of applications and the above of all it is open source and free available. We can define main features of Android as under:

3.1 Interface

Android provides a very user friendly interface that can easily be understood and even those can use it that doesn't have any knowledge about technical aspects of operating system. The GUI base interface is much easy to use and provides excellent control and information to users. When it comes to mobile phones it make use of touch screen to take inputs and in case of Android (Desktop Version) it can be either touch screen or mouse based depending upon the availability of hardware but the working scenario going to be same as we have with mobile phone. So, even a person who is not having prior knowledge of desktop can also use android on desktop as it works the same way it works on Smartphone and tablets.



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3.2 Applications

The application that we use with Android Smartphone can be used with Android desktop version and in the same way as we use them on our Android mobile phone. Google app store is available with Android desktop version to download and update applications. The application that we call “Apps” these days follow the same methods of application and development as in case of Smartphone that is ‘.APK’ files are used with android. With availability of large number of applications Android on desktop will prove to be more feature rich than any other operating system available for desktops today. Google is taking forward the same concept to rule desktop market too.

3.3 Memory Management

The Android Runtime (ART) and Dalvik virtual machine use paging and memory mapping to manage memory. This means that any memory an app modifies—whether by allocating new objects or touching memory-mapped pages—remains resident in RAM and cannot be paged out. The only way to release memory from an app is to release object references that the app holds, making the memory available to the garbage collector. That is with one exception: any files mapped in without modification, such as code, can be paged out of RAM if the system wants to use that memory elsewhere. Sharing memory is also possible with android systems and they also provide a better way to keep track of applications using RAM and we can even free RAM when required. This provides an edge to Android Operating System over existing desktop operating systems and this feature make Android fast and stable too. Android also provides features like Memory restriction that is we can even restrict an application to use memory beyond a certain limit. When users switch between apps, Android keeps apps that are not foreground—that is, not visible to the user or running a foreground service like music playback—in a least-recently used (LRU) cache. For example, when a user first launches an app, a process is created for it; but when the user leaves the app, that process does not quit. The system keeps the process cached. If the user later returns to the app, the system reuses the process, thereby making the app faster. These features are also not available with current desktop operating systems. Altogether we can say that Android X-86 may prove to be a better desktop operating when it comes to memory management [6].

3.4 Android Architecture

Android is architected in the form of a software stack comprising applications, an operating system, run-time environment, middleware, services and libraries. This architecture can, perhaps, best be represented visually as outlined in Figures 1 and 2. Each layer of the stack, and the corresponding elements within each layer, are tightly integrated and carefully tuned to provide the optimal application development and execution environment for mobile devices [7].

3.4.1 The different layers of android stack are:

- The Linux Kernel
- Dalvik Virtual Machine
- Android Runtime – Core
- Libraries
- Java Interoperability
- Libraries
- Android Libraries
- C/C++ Libraries
- Application Framework
- Applications

Android is implemented in the form of a software stack architecture consisting of a Linux kernel, a runtime environment and corresponding libraries, an application framework and a set of applications. Applications are predominantly written in Java and run within individual instances of the Dalvik virtual machine. The key goals of the Android architecture are performance and efficiency, both in application execution and in the implementation of reuse in application design. The architecture of Android is quite simple and easy to understand it provides developers an ease to work on it and they can easily built applications that can enhance the workability of this operating system.



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3.5 Security

Android was developed with openness in mind-set and is also open to the use of third part application and cloud-based applications. Performance of Android operating system also depends on the hardware we use for it. It works on LINUX Kernel and at operating system level security is provide by its kernel. The five key security factors that were thought initially for Android operating system were:

- Security at operating system level through the Linux kernel.
- Mandatory application sandbox.
- Secure inter-process communication.
- Application scanning.
- Application defined and user-granted permissions.

Different views exist on security available in Android operating system but a lot has to come-up in this field and numbers of professionals are working for it too. Google has also provided some security features through various options available but it is still under development and soon more features will be added to it.

IV. CURRENT DEVELOPMENTS

Android for desktop (or Personal Computers) is among the most crucial on-going projects for the developing future operating system. Some industry people like Chih-Wei Huang and Yi Sun. Chih-Wei Huang and Yi Sun are not only developing android for desktop (android X-86) as their in-house project but also taking help of individual professionals and other developers to help them in developing and enhancing Android X-86 and it is because of these serious efforts we are trying our hands on Android based operating system like Remix OS, honeycomb x-86 etc. and we find them quite good as desktop operating systems in there early stage. Google with pool of its engineers is also developing Android as a never before desktop operating system and is continuously enhancing its working and making it stable and more suitable for desktop with each and every upgrade. The future is no far when we will get personal computers running Android operating system.

V. CONCLUSION

From the above discussion and facts we conclude that Android as in form such like Android X-86 may prove to be a better option for future desktop operating systems, with enhance stability and light weight in terms of memory requirements and availability of numerous applications Android will not only make our work easy but will also help in spreading computer knowledge by boosting number of personal computer users because of its user friendly interface and cost factors. It will motivate muse of personal computers in future and we will see personal computers developed running Android light in weight and high in performance.

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