

Analysis of failure of Symbian Operating System in market share

¹Prof. Vinayak D. Shinde, ²Karbhari Nishigandha Nandkumar

¹Assistant Professor, ²ME scholar, Dept. of computer Engg, SLRTCE, Mira Road, Mumbai, India, Maharashtra.
¹vdshinde@gmail.com, ²nishi_karbhari@yahoo.com

Abstract : Mobile phone technology is a commodity now .Today mobile phone is not just a tool to make voice call or text message, but it's a device used for information and entertainment. Smart phones are growing popularity and with these manufacturers are trying to provide rich set of resources in the handset. This in turn increases complexity in the software which has to be manufactured with the mentioned limitation of the devices. Hence, new bugs are emerged with this. We are in a position to explore the question how this evolution of smartphones impacts their reliability.[1] We analyze the cases of failures of Symbian based on bug reports posted by third party developers. The focus is there should be nothing that users can access on their desktop that they can't access on their cell phone.[2] This has led to the competition in the market by the different manufacturers. Symbian is one of the many competitors in a bid to get market share for mobile platform. This paper intends to find the limitations of Symbian operating system with respect to the increasing need form the mobile device which led to the failure of the operating system.

Keywords —Symbian, operating system, mobile OS, Symbian OS.

I. INTRODUCTION

This focus of bridging the space between desktop computers and handheld mobile devices brings in new challenges in the smartphone market. The new age mobile devices have transformed into miniaturized entertainment consoles connected to the global information backbone, the Internet. But, every this comes with a price which can be mentioned in cost of new software and/or cost of memory and/or cost of battery consumption etc. We analyze the "cost" of smartphones from the point of view of failures. How the reliability of a mobile operating system, is impacted when the developers offer a feature-rich and highly configurable system Symbian.

The relation between complexity and reliability in traditional operating systems has been well studied.[3] [4]How this evolution of smartphones, will increase in complexity or impact the reliability is a question. This system introduces question like the resources which can be—operating power, memory provided, battery capacity, and display. Their interface with sensors like camera, GPS etc. this brings in a lot of streams of data also puts additional demands on the mobile OS. After Symbian open sourced now it can be analyzed the dependability of the operating system and check with the customized mobile operating systems.

Many researchers have analyzed with the reasons of popular operating systems like Windows and Linux [5], [6]. But evaluations of comparing and analyzing this for mobile

operating systems are rarely seen. A remarkable exception is the study of Symbian OS-based smart phones [7]. Since Symbian was not open source when it had initially begin i.e. at the time of the analysis, the authors of this study were limited in what the operating system could provide as a result.

II. OVERVIEW OF SYMBIAN

Symbian operating system was designed for mobile phone environment. It provides a framework to handle low memory situations, a power management model, and a rich layer of software implementing industry standards for communications, telephony and data rendering constraints of mobile phones. Symbian Operating System has no constraints on the integration of other peripheral hardware even with these abundant features.

This flexibility in it allows manufacturers to pursue original designs and innovative. This OS is proven on many platforms. The five key points - mass-market, small mobile devices, intermittent wireless connectivity, an open platform for independent software developers and diversity of products.

This makes it different from any desktop, workstation or server operating system. Symbian OS is also different from embedded operating systems. They weren't designed with all the key point. Symbian uses open standards. Symbian OS has a POSIX-compliant interface and a Sun-approved JVM, and the company is actively working with emerging standards, such as J2ME, Bluetooth, MMS, SyncML, IPv6 and WCDMA.

Symbian delivers a global network of third-party competency and training centers. Which are directed at enabling other organizations and developers to take part in the new economy. Small devices come in many shapes/sizes, each addressing distinct target markets that have different requirements.

Symbian was a closed source mobile operating system and computing platform designed for smartphones. It was originally developed by Symbian Ltd. As a descendant of P'sion's EPOC and runs exclusively on ARM processors although an unreleased x86 port existed.

It was open sourced platform by the Symbian Foundation in 2009, as the successors of original Symbian OS. Symbian was used by major phone brands like Samsung, Motorola, Sony Ericson and above all by Nokia. It was briefly the most popular smartphone OS on a worldwide until end of 2010. Symbian OS, was being used by several leading mobile phone manufacturers, account of near about 50% of global smart phone sales, in the mid of 2010 which made it the world's most popular mobile operating system [8]. It was made to be a lightweight operating system designed for mobile devices which will associate libraries of the device, providing user interface, checking frameworks and implementations of tools for the device. [9] Mobile phones' resources are the main constrain, therefore Symbian was created with 3 design principles:

- (i) Real time processing
- (ii) Resource limitation
- (iii) Integrity and security of user data.

These principles, used Symbian a hard real-time, multithreaded microkernel, and have a request-and-callback approach to services. Symbian's system model is segmented into 3 main layers [10]:

OS Layer:

The hardware adaptation layer (HAL) is included that abstracts all higher layers from the actual hardware this includes Kernel physical and logical device drivers in it. It provides interface which is programmable for operating system and hardware with framework, utilities and libraries. Higher level Operating System provides service for data exchange, networks, GUI, multimedia etc.

Middleware Layer:

Provides service to the applications and other higher-level programs these are independent of hardware, applications or UI. Services can include application technology specific like sms and/or multimedia or can be web browsing services, security, device management, IP services and so on.

Application Layer:

This includes applications provided by Symbian; these are multimedia applications, telephony and IP applications etc.

III. CURRENT TRENDS OF SYMBIAN OS IN MARKET

Symbian was being made for low-power battery-based devices i.e. mobile phones and Read Only Memory based system. Here, the programming being done is event-based, and the processor is in a low power mode when applications are not dealing with performance. Similarly, the Symbian approach to threads and processes is driven by reducing memory and power overheads. Readers are referred to [15] for further details on the Symbian architecture. The basic motive to know about Symbian architecture was to understand that this OS was been made only for mobile phones. This maybe made it more acute to focus on market whereas the competitors were more inclined on focusing to make a mini computer which will include everything that a personal device provides.

In end December 2010, Nokia, was once a world leader was losing popularity to the stars like Google Android and Apple iOS. Android phones were selling more than Symbian phones. Google activated round about 300,000 phones every day and Nokia Symbian phones somewhat less to be even compared after 2010. What happened to the old clear smartphone OS Symbian? Which was a leader when it initially began Why Symbian faced fail in the market: article from the developers says that the reasons why others succeeded in generating a phones market have now become wisdom with convention. iPhone clearly stated it was designed to be a computer first, rather than being referred as a phone. Same applied to Android OS.

This can be the major reason what Nokia missed out. Nokia's designed atheory that smartphones were phones first, not computers. Nokia is has been very dependent on Symbian OS, which is definitely not the reason why it failed but negligence to develop an operating system develop it with the user interface over the years is where it lacked. This is how the Symbian started losing in the competition.

The reason for problem could also be its software architecture. The Symbian OS on the initial stage was written to run on even pretty low power CPUs which helped even less processing power than Linux OS or iOS for the similar tasks. To achieve this Symbian had its own way. The planned way was damned hard to learn, where most coders faced all the troubles. This can be also concluded that Symbian was hard to code to the beginners this made the availability of them lower for the manufacturers.

The outcome can be seen in the performance on the device it stated that these are the result of developers doing things in non-optimal way. In real life a lot of production code is been put together by contractors who are short-term and people new to a platform. This makes it difficult to get the real and skilled coders for Symbian.

Many mobile phone manufacturers that used Symbian OS are not using it anymore, the Symbian OS was used by none

after all the hurdles of naïve coders, non-optimal production and Nokia was the only one left to use Symbian till 2010. Nokia is reduced hundreds of people in on Symbian smartphone development. Nokia announced 1,800 job cuts worldwide in October. This led to low manpower to provide better performance since the profits was less to invest on the large manpower for the production.

Nokia the closed Symbian Foundation and took the development to it's own hands. This was the end of the open source Symbian era. This was followed by Symbian Developer web site getting closed. "There's just one problem with Symbian and that is the UI(user interface)," says Jan Ole Suhr, a Berlin, Germany, app developer who has worked on the Symbian platform since 2003

But the fact is its hard is it to develop an application for Symbian OS compared to any other operating system that existed as a competitor in the market. Even Symbian fans cannot deny this fact. It's tough to understand, its messy to code or debug and it's plain hard work for anything to be developed.

Mobile apps were around long before Symbian's competitor Apple introduced the app store. But they had made apps a big motivation for smartphones or to even purchase a smartphone. Consumers purchase smartphones for the application they can download on it but since Symbian lack with the user interface the question is can Symbian provide the market with what the competitors are currently providing? What killed Symbian? Complexity according to Nokia. Nokia was always Symbian's biggest supporter. The company produced millions of phones running the OS, and they have always had close ties. Together they dominated the cell phone market throughout the early 2000s; in fact, Symbian remained the top-selling smartphone OS worldwide until late 2010.

In reports, Symbian's is blamed as it is difficult and unfriendly code structure for the time it takes for a phone using that operating system to be developed. Nokia's representative also complained that a Symbian handset required 22 months of time to be development, comparing it with other competitor with less than a year. In today's environment, saving time in production is a necessity where markets are made and lost in a matter of weeks.

"It took 22 months to get a Symbian phone out of the door," a Nokia spokesperson told. "With Windows Phone, it is less than a year. We spend less time having to tinker with deeplying code and more time on crafting elements of the experience that make a big difference, such as around photography, maps, music and apps in general." This made it obvious that the time on coding should be given to build applications or user interface or development of the system but with Symbian's the major concern was fixing bugs and that continued in making the code complex for the developers.

IV. CONCLUSION

We presented a measurement based failure analysis of Symbian—by studying publicly available bug databases. The key findings can be mentioned as. The bugs in these platforms are permanent mentioning that the code is not mature. The Kernel layer in the platforms is robust in nature. The widespread requirement of Development tools, Web, Multimedia, and Build failures. This suggests there is a necessity for better mobile application development tools. In Symbian the percentage of build errors is high (around 40%). Symbian platforms have established well-defined and well-maintained open mechanisms for reporting and dealing with bugs, without which a study like ours would not have been possible. The need is to fully explore the customizability, reliability and complexity in a mobile operating system. These are the major areas where Symbian lacked. This in turn caused its failure in the market.

REFERENCES

- [1] Maji, Amiya Kumar, et al. "Characterizing failures in mobile oses: A case study with android and symbian." *Software Reliability Engineering (ISSRE)*, 2010 IEEE 21st International Symposium on. IEEE, 2010..
- [2] Gandhewar, Nisarg, and Rahila Sheikh. "Google Android: An emerging software platform for mobile devices." *International Journal on Computer Science and Engineering* 1.1 (2010): 12-17.
- [3] M.Sullivan and R.Chillarege, "Software Defects and their Impact on System Availability - A Study of Field Failures in Operating Systems," In Proc. of 21st International Symposium on Fault-Tolerant Computing (FTCS), P. 2-9, 1991.
- [4] S.Chandra and P.M.Chen. "Whither Generic Recovery from Application Faults? A Fault Study using Open-Source Software," In Proc. of the 30th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2000, P. 97-106, 25-28 June 2000.
- [5] A.Chou, J.Yang, B.Chelf, S.Hallem, and D.Engler. "An Empirical Study of Operating Systems Errors," In Proc. of 18th ACM Symposium on Operating Systems Principles (SOSP), P. 73-88, 2001.
- [6] W.Gu, Z.Kalbarczyk, R.K.Iyer, and Z.Yang. "Characterization of Linux Kernel Behavior under Errors," In Proc. of International Conference on Dependable Systems and Networks (DSN), 2003, P. 459-468, 22-25 June 2003.
- [7] M.Cinque, D.Cotroneo, Z.Kalbarczyk, and R.Iyer. "How do Mobile Phones Fail? A Failure Data Analysis of Symbian OS Smart Phones," In Proc. of International Conference on Dependable Systems and Networks (DSN), 2007, P. 585-594, 25-28 June 2007.
- [8] Gartner Says Worldwide Mobile Phone Sales to End Users Grew 8 Per Cent in Fourth Quarter 2009; Market Remained Flat in 2009. <http://www.gartner.com/it/page.jsp?id=1306513>
- [9] SymbianOS on Wikipedia. http://en.wikipedia.org/wiki/Symbian_OS
- [10] Symbian System Model. http://developer.symbian.org/wiki/index.php/Symbian_System_Model