A Comparative Study of Operating Systems: Case of Windows, UNIX, Linux, Mac, Android and iOS

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ABSTRACT

Varieties of operating systems (OS) have emerged over the years having different features and functionalities. Understanding the functionalities of each OS guides users' decisions about the OS to install on their computers. In view of this, the comparative analysis of different OS is needed to provide details on the similarities and difference in recent types of OS vis-à-vis their strengths and weaknesses. This paper focus on the comparative analysis of Windows, Unix, Linux, Mac, Android and iOS operating systems based on the OS features and their strengths and weaknesses. A qualitative analysis of six different operating systems and result showed that Windows 10 had 0.04 malware file present while Windows 7 machine was 0.08. Higher percentage of mobile malware target Androids than iOS. Windows 10, Linux, UNIX and Mac OS are more secured and reliable. Windows and Android are more popular, user-friendly, easy to use and allow more application program than Mac OS. Linux and Android are free while Windows is moderately costly and Mac OS is very costly. Except for Mac and iOS others allow compatibility. Windows 10 and Mac OS integrated firewall. Windows and Android tend to be the most widely used especially the newest versions. It is because they are affordable, secure, reliable, compatible and user friendly. This study helps to provide some guides to both end-users and developers guiding them in taking decisions about operating systems that are most suitable for them.

General Terms
Operating System

Keywords
Operating System, Windows, Linux, Mac, UNIX, Android, iOS, Comparative Analysis

1. INTRODUCTION

Operating System (OS) is software that manages and controls the main computer hardware, the hardware peripherals and software resources, so also the users. It also offers the platform and support for application programs and acts as an interface between the computer user, programmers inclusive, and the computer hardware [1]. Applications software like word processors, spreadsheets, databases, and other dedicated applications that businesses need, run on a given OS platform.

Operating systems provide standard services for processes implementation such as storage, deadlock, scheduling and other processes. It also provides a programming environment that enables a user to write and execute programs in a much convenient and efficient way. Every computer system including desktops, laptops, tablets, supercomputers, hand-

held and even video game consoles use some type of operating system. There are numerous types of operating systems in today's ICT world. Mac Operating System designed and owned by Apple Inc., Windows by Microsoft Inc., Linux by Community, likewise Android by Google Inc. and others.

Varieties of Operating Systems have emerged over the years having different features and functionalities. Understanding the functionalities of each OS guides users' decisions about the OS to install on their computers. In view of this the comparative analysis of different OS becomes inevitable. Thus the need arises for a comparative analysis that will give an overview of the similarities and difference in different types of OS with the view to presenting and mapping the features of the OS with various user services.

This paper presents a comparative study of six (i.e. Windows, Linux, Mac, UNIX, Android and iOS) operating systems based on the OS features and their strengths and weaknesses.

The paper is structured as follows: Section 2 presents the review of related works while Section 3 presents the comparative analysis of Windows, UNIX, Linux, Mac, Android and iOS. Section 4 presents merits and demerits of Windows, UNIX, Linux, Mac, Android, and iOS. Deductions are presented in Section 5 and Conclusion is presented in Section 6.

2. REVIEW OF RELATED WORKS

Several research works had been carried out on operating systems used on desktop computer systems and mobile devices. Summary of the existing works is presented in this section.

Lin and Ye in [2] investigated the smartphone OSs market in a uniform ecosystem framework. They compared major companies like Nokia, RIM, Apple and Microsoft. The result showed that the companies used smartphone OS as a business unit and as opportunity for new business. Similarly in [3], the authors compared various operating systems (OSes) for developing WSN applications such as TinyOS, Contiki, and LiteOS. Several issues were considered amongst which are: memory requirement, process management and scheduling, kernel model, reliability etc. Moreover, features such as Networking Support, Real-Time Guarantee, Language Support, Multi-Threading Support, File System, Platform Support, and Simulator for comparison of these OSes were discussed. Strengths and weaknesses of the operating systems were equally identified. The significance of this work is that, the OS developers will know what had been done on existing OSes, and the OS users will know the various features of

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examples end of chapter reviews and interactive exercises novice users are transformed into confident UNIX Linux users who can employ utilities master files manage and query data create scripts access a network or the Internet and navigate popular user interfaces and software The updated 4th edition incorporates coverage of the latest versions of UNIX and Linux including new versions of Red Hat Fedora SUSE and Ubuntu Linux A new chapter has also been added to cover basic networking utilities and several other chapters have been expanded to include additional information on the KDE and GNOME desktops as well as coverage of the popular OpenOffice org office suite With a strong focus on universal UNIX and Linux commands that are transferable to all versions of Linux this book is a must have for anyone seeking to develop their knowledge of these systems Important Notice Media content referenced within the product description or the product text may not be available in the ebook version **A+, Network+, Security+ Exams in a Nutshell** Pawan K. Bhardwaj,2007-03-27 If you re preparing for the new CompTIA 2006 certification in A or the current Network and Security certifications you ll find this book invaluable It provides all the information you need to get ready for these exams including the four new A exams the required Essentials exam and three elective exams that pertain to your area of specialization As with other O Reilly Nutshell books for certification exams A Network and Security in a Nutshell follows a proven style and approach It reviews all of the topics needed to master each exam in a remarkably concise format with required knowledge boiled down to the core Instead of plowing through 500 to 700 pages to prepare for each exam this book covers each one in approximately 150 pages And because the objectives for the three elective A exams are redundant and the book covers them in one section The exams covered include A Essentials Required for A 2006 certification EXAM 220 602 For the A IT Technician specialization EXAM 220 603 For the A Remote Support Technician specialization EXAM 220 604 For the A IT Depot specialization EXAM N10 003 For Network Certification EXAM SYO 101 For Security Certification Each exam is covered in three parts Exam Overview Study Guide and Prep and Practice Plenty of detailed tables and screen shots are included along with study notes and practice questions Once you have completed the exams successfully you will find this all in one book to be a valuable reference to core administration and security skills **Linux for Beginners** Ethem Mining,2020-10-03 Are you looking for a complete guide which enables you to use Linux and manage shell Linux like a pro Are you struggling to navigate among all the Linux distributions out there and finding hard to define the best one for your needs Do you want to evaluate your learning level step by step Linux is without doubt the most powerful operating system in the world Yes you may think Windows and macOS are powerful operating systems owing to the fact that they control much of the PC market but I have some stats that will change your perspective As of 2020 100% of the world s supercomputers run on Linux 23 of the top 25 websites in the world run on Linux 96 3% of the world s top 1 million servers run on Linux 90% of the world s cloud infrastructure operates on Linux All the best cloud hosts run on Linux I believe you now appreciate just how Linux is not really given as much credit for running the world behind the scenes and have even greater motivation to

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