COMPARISON OF LINUX AND WINDOWS

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ABSTRACT

In the computer world these days, various operating systems are used to perform computer operations. Most likely we used Linux and Windows. Most of the people have used Windows OS because of its GUI, but it is not safe to run because any virus can easily affect Windows. On the other hand, Linux is a more secure and efficient operating system in the mass market without impacting data. Linux is a command line environment. Windows OS is used for small scale environment while Linux is useful for large organizations, institutions because it is free. Linux includes thousands of applications such as games, office tools, publishing, graphics, math education, science, music and art, and more. In this article, we basically study the advantages and disadvantages of Linux systems with respect to security, choice, software, price, hardware, understanding, compatibility and use of alternative programs.

Keywords: Operating System, Linux, Windows, Benchmarking, UNIX, Kernel.

I.   INTRODUCTION

An operating system is software that manages and controls the main computer hardware. It also offers and supports an application program. It allows the user to write and run the program in a very convenient way [1]. Since 1993, both Windows and Linux have attempted to gain control of the operating system buyer market. Both operating systems have their advantages and disadvantages [2]. Windows is the most popular operating system in India due to its user-friendly GUI (Graphical User Interface). However, to use Windows, we have to pay a large amount of money. Windows is a licensed operating system and its source code is also inaccessible. Windows does not require any additional programming knowledge due to the simple and straightforward GUI (Graphical User Interface).

Linux is a free and open source operating system based on the UNIX standard. Linux provides both programming and user interface compatibility. Linux also includes many independently developed features without proprietary code. The performance of the Linux operating system is enhanced by the Linux kernel. The LINUX KERNAL allows most drivers to dynamically load and unload simultaneously.

II.   LINUX VS WINDOWS

Windows operating system was launched in 1985. And as a robust and comprehensive kind of software, it has almost 90% market share over other operating systems [3]. Windows has the following features:

• Multiple operating environments

• Symmetrical multiprocessing

• Client server

• Integrated catching,

• Virtual memory, primitive scheduling, portability, extensibility

Linux is a free Unix-like operating system for computing devices. Linux is free and has various distributions such as Ubuntu, CentOS and Debian. Linux can be executed, downloaded, modified and also redistributed at no cost. Linux includes a very robust packet filtering firewall. Linux can only run binary files, which keeps all data encrypted, thus maintaining privacy and security. Linux is mostly used in Android and mobile phones. Linux has the following features:

• Multiple user option

• Multitasking and portability

• Security and Live CD/USB

• Graphical user interface

• Open source application support and file system

A comparison between Windows and Linux is as follows:

Parameters	Linux	Windows
Open Source	Linux is Open Source and is free to use.	Windows is not open source and is not free to use.
Case sensitivity	Linux file system is case sensitive.	Windows file system is case insensitive.
kernel type	Linux uses monolithic kernel.	Windows uses micro kernel.
Efficiency	Linux is more efficient in operations as compared to Windows.	Windows is less efficient in operations.
Kernel	Uses Monolithic Kernel which consumes more running space.	Uses Micro Kernel which takes less space but lowers the system running efficiency
Path Separator	Linux uses forward slash as path separator between directories.	Windows uses backward slash as a path separator.
Security	Linux is highly secure as compared to Windows.	Windows provides less security as compared to Linux.
User Account	1. Regular 2. Root 3. Service Account	1. Administrator 2. Standard 3. child 4. Guest

Linux has replaced Windows, which costs over hundreds of dollars. This makes free Linux distributions very attractive [4].

III.   WORKING OF LINUX

For Linux operation:

1. Install VirtualBox or VMware to run a Linux virtual machine

2. Use a live bootable CD/DVD [as a last resort only]

On a Chromebook:

1. Use a Linux application Best option: Use a native installation with one operating system

2. Use a Chromebook

On Windows or Mac:

1. Use a live bootable USB

2. Use Putty on Windows or Terminal App on iPad to connect to the cloud server (as cheap as Rs 203.50 per month)

3. Install Windows 10 Ubuntu Subsystem

4. Install Linux as a guest VM on Windows 10 Pro Hyper-V

The kernel is the program at the heart of the Linux operating system that takes care of basic things like hardware communication with software. The basic subsystems of the Linux kernel are as follows:

1. Process scheduler

2. Memory Management Unit (MMU)

3. Virtual File System (VFS)

4. Network drive

5. Interprocess communication unit
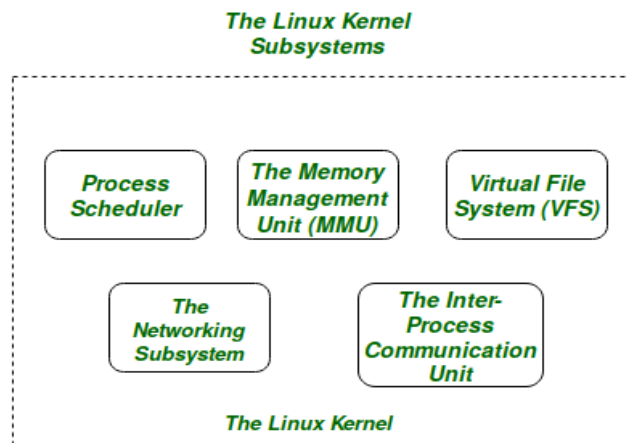
Fig 1: Basic Linux kernel subsystems

1. Process scheduler: This kernel subsystem is responsible for fair distribution of CPU time among all processes running on the system at the same time.

2. Memory Management Units: This kernel sub-unit is responsible for the proper allocation of memory resources among the various processes running in the system. The MMU does more than just provide separate virtual address spaces for each of the processes.

3. Virtual file system: This subsystem provides a unified interface to access stored data across different file systems and physical storage media.

4. Network Drive: This subsystem is part of the kernel space and one of the most important subsystems. This allows Linux systems to connect to other systems over a network. There are a number of possible hardware devices that are supported and a number of network protocols that can be used. The network subsystem abstracts both of these implementation details so that user processes and other kernel subsystems can access the network without necessarily knowing what physical devices or protocol are being used.

5. Interprocess communication unit: Processes communicate with each other and with the kernel to coordinate their activities. Linux supports a number of inter-process communication (IPC) mechanisms. Signals and pipes are two of them, but Linux also supports System V IPC mechanisms named after the Unix release in which they first appeared.

The Linux command is a tool of the Linux operating system. All basic and advanced tasks can be done by executing commands. Commands are executed on a Linux terminal. The The Linux command is a tool of the Linux operating system. All basic and advanced tasks can be done by executing commands. Commands are executed on a Linux terminal. Terminal is a command line interface for interacting with the system, which is similar to the command line in Windows OS. Commands in Linux are case sensitive.

Linux provides a powerful command line interface compared to other operating systems such as Windows. The Linux terminal is a user-friendly terminal as it provides various support options. To open a Linux terminal, press the "CTRL + ALT + T" keys simultaneously and execute the command by pressing the "ENTER" key.

Basic Linux commands:

♣ ls- List information about file(s)	♣ pwd- Print Working Directory
♣ chmod- Make a file executable	♣ mkdir- makes folders
♣ Vi- Text Editor	♣ Wq- save the data (programms)
♣ Gcc- Gnu Cross Complier	♣ ./a.out - Run
♣ df- view file system disk space usage	♣ du- view the space used by files and folders
♣ passwd- changes your login password	♣ rm- delete files and folders, short for remove
♣ file- determine file type	♣ clear- clear terminal screen
♣ cmp- compare two files	♣ comm- compare two sorted files line by line
♣ Free- display memory usage	♣ logname- print current login name
♣ cp- copy one or more files to another location	♣ cut- divide a file into several parts
♣ logout- exit a login shell	♣ lprint- print a file
♣ more- display output one screen at a time	♣ mv- move or rename files or directories
♣ printf- format and print data	♣ screen- terminal window manager
♣ shutdown- shutdown or restart linux	♣ usermod- modify user account
♣ users- list users currently logged in	♣ who- print all usernames currently logged in

IV. CONCLUSION

We conducted this study to compare two operating systems like Windows and Linux. This article reveals the idea of a better, more useful operating system with regards to price, security, selection, software, hardware, understanding, compatibility and alternative program usage. Apart from comparing the basic aspects of linux and windows data generally essential to running a decent system, linux should be your choice if you're looking for a secure one.

V. REFERENCES

[1]   Umaima Khan, "Comparative study of Linux and Windows", International Journal of Academic Research in Business, Arts & Science (IJARBAS) - Volume: 2, Issue: 2, Year: 2020, Page 53-70.

[2]   Muhammad Talha Awan, Kashaf Khan, "Linux Vs. Windows: A Comparison of Two Widely Used Platforms", Journal of Computer Science and Technology Studies - JCSTS 4(1): 41-54, 2022.

[3]   Akinlolu Solomon Adekotujo, Adedokun Ademola, Adedoyin Odumabo, Olukayode Aiyeniko, "A Comparative Study of Operating Systems, The Case of Windows, UNIX, Linux, Mac, Android and iOS" International Journal of Computer Applications (0975 – 8887) – Volume 176 – No .39, July 2020.

[4]   Matthew R. Yaswinski, Md Minhaz Chowdhury, Mike Jochen Matthew R. Yaswinski, Md Minhaz Chowdhury, Mike Jochen, "Linux Security: A Survey", IEEE International Conference on Electronic Information Technology, 2019.

[5]   Joachim Puls, Michael Wegner, "Liux Operating System", 2022.

[6]   Marko Boras, Josiph Balen, Kresimir Vdovjak, "Performance Evaluation of Linux Operating Systems", International Conference on Smart Systems and Technologies (SST), October 2020.

[7]   Vimal Kumar V., "The Debian Linux Operating System for All Purposes" – 2019.