**CASE STUDY**

**Comparison of different operating system like windows, Linux, Mac OS**

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| **The basis of Comparison** | **Windows** | **MAC** | **Linux** |
| Basic difference and history | Windows was first released in 1985. It was supposed to be a graphical user interface on top of MS-DOS. All features of MS-DOS were later integrated with Windows 95 release. It was a huge success in and led to the Windows transition. | This operating system from Apple stands older than Windows. It was first released in 1984. It began as a graphical user interface right from its inception. In 2005 the design and structure of MAC OS were changed to Intel x86 based architecture. | It was initially developed at Finnish University. It was released in 1991 and designed for GNU developers. GNU developers later integrated it into Linux. It is open to consumers, and everyone can use it as per their specifications. |
| File structure | Windows follows a directory structure to store the different kinds of files of the user. It has logical drives and cabinet drawers. It also has folders. Some common folders like documents, pictures, music, videos, and downloads. All these files can be stored in these folders, and also new folders can be created. It also has files which can be a spread sheet or an application program. It can have extensions as .txt, .jpg etc.  In addition to this, Windows also provides a recycle bin where all deleted files can be stored. Recycle bin can be configured to increase its size. | The file structure of MAC is commonly known as MAC OS X. If you go to dig into your MAC’s hard disk through the finder, you will see many directories. The root directory of MAC may encounter when they visit their own MAC book. You can explore the file system and directory structure by going to directories like /Application, /Developer, /sbin, /tmp, etc. | Linux has a completely different file structure form Windows and MAC. It was developed with a different code base. It stores data in the form of a tree. There is a single file tree, and all your drives are mounted over this tree. |
| Registry | Windows registry is a master database that is used to store all settings on your computer. It is responsible for storing all user information with its passwords, and device relate information. The registry also has an editor which allows you to view all keys and values or even drivers if necessary. | MAC stores all application settings in a series of .plist files, which have the various preferences folder in MAC. This .plist file contains all properties in either plain text or binary format. These are stored at:  /Library/Preferences folder | Linux also does not have a specific registry of its own. All application setting is stored on a program basis under the different users in the same hierarchy format of the files being stored. There is no centralized database for storing these details, and so periodic cleaning is also not required. |
| Interchangeable Interfaces | Windows interface was not interchangeable until Windows 8. Windows XP had some improvements but not par. Start menu, taskbar, system tray, and Windows Explorer. | MAC has a facility to bridge virtual network interfaces. This can be done by going to system preferences and managing the interfaces. | Linux is easy to switch interfaces. You can switch the environment without having to carry all installations. There are utilities like GNOME and KDE which help in catering to these needs. They help in focusing on different aspects. |
| Command terminal | A terminal or command prompt is a black box ideally used to execute commands. It is also called the Windows Command Processor. It is used to execute commands and different batch files. It can also be used for administrative functions and troubleshoot and solve all windows issues. | MAC provides a console as a terminal application. It has a console, command line, prompt and terminal. A Command-line is used to type your commands. Prompt will provide you with some information and also enable you to run commands. A terminal is an actual interface that will provide the modern graphical user interface as well.  You can find the terminal at Applications -> Utilities. | Linux also provides a terminal. You can find terminal at: Applications -> System or Applications -> Utilities. In addition to this, there is also a shell prompt. The most common shell used in bash. It defines how the terminal will behave and look when it is run. |

* 1. Windows Operating System:

Windows is an operating system designed by Microsoft to be used on a standard x86 Intel and AMD processors. It provides an interface, known as a graphical user interface(GUI) which eliminates the need to memorize commands for the command line by using a mouse to navigate through menus, dialog boxes, buttons, tabs, and icons. The operating system was named windows since the programs are displayed in the shape of a square. This Windows operating system has been designed for both a novice user just using at home as well as for professionals who are into development.

Features:

* It is designed to run on any standard x86 Intel and AMD hence most of the hardware vendors make drivers for windows like Dell, HP, etc
* It supports enhanced performance by utilizing multi-core processors.
* It comes preloaded with many productivity tools which helps to complete all types of everyday tasks on your computer.
* Windows has a very large user base so there is a much larger selection of available software programs, utilities.
* Hardware is automatically detected eliminating need of manually installing any device drivers.

Drawbacks:

* Windows can be expensive since the OS is paid license and majority of its applications are paid products.
* Windows has high computer resource requirement like it should have high ram capacity, a lot of hard drive space and good graphics card.
* Windows slows and hangs up if the user loads up many programs at the same time.
* Windows includes network sharing that can be useful if user has a network with many PCs.
* Windows is vulnerable to virus attacks since it has a huge user base and users have to update OS to keep up to date with security patches.
  1. LINUX Operating System:

The Linux OS is an open-source operating system project that is a freely distributed, cross-platform operating system developed based on UNIX. This operating system is developed by Linus Torvalds. The name Linux comes from the Linux kernel. It is basically the system software on a computer that allows apps and users to perform some specific tasks on the computer. The development of Linux operating system pioneered the open-source development and became the symbol of software collaboration.

Features:

* Linux is free can be downloaded from the Internet or redistribute it under GNU licenses and has the best community support.
* Linux OS is easily portable which means it can be installed on various types of devices like mobile, tablet computers.
* It is a multi-user, multitasking operating system.
* BASH is the Linux interpreter program which can be used to execute commands.
* Linux provides multiple levels of file structures i.e. hierarchical structure in which all the files required by the system and those that are created by the user are arranged.
* Linux provides user security using authentication features and also threat detection and solution is very fast because Linux is mainly community driven.

Drawbacks:

* There’s no standard edition of Linux hence confusing for users and also becoming familiar with the Linux may be a problem for new users.
* More difficult to find applications to support user needs since Linux does not dominate the market.
* Since some applications are developed specifically for Windows and Mac, those might not be compatible with linux and sometimes users might not have much of a choice to choose between different applications like in Windows or Mac since most apps are developed for operating systems that have a huge user base.
* Some hardware may not be incompatible with Linux since it has patchier support for drivers which may result in malfunction.
* There are plenty of forums to resolve Linux issues, but it may not always match the user’s own level of technical understanding.
  1. iOS:  
     iOS which is short for iPhone OS is a mobile operating system created and developed by Apple Inc. exclusively for its hardware like A12 Bionic chip that presently powers many of its mobile devices, including the iPhone, iPad, and iPod. The iOS user interface is based upon using multi-touch gestures such as swipe, tap, pinch, and reverse pinch. The purpose of these finger actions is to provide the user with fast responsive inputs given from multiple fingers to the multi-touch capacitive screen display.

Features:

* It is written in C, C++, Objective-C and Swift and is based on the Macintosh OS X.
* Has excellent and intuitive user interface and very fluid response.
* Performance of iOS is unbeatable.
* iOS comes with a lot of default apps, including an email client, web browser, media player and the phone app.
* Availability of higher quality apps which can be downloaded from the Appstore.
* Apple has provided its own iOS software development kit (SDK) for the developers to create applications for Apple mobile devices.
* iOS is much safer than other mobile operating systems and has fewer security breaches as well.
* Provides regular updates and security patches.

Drawbacks:

* The OS is closed source instead of open source hence beta testing taking a lot of time since its only available to limited developers
* The OS is closed source instead of open source hence beta testing taking a lot of time since its only available to limited developers.
* Lack of customization compared to other operating systems.
* Doesn’t allow third party installations.
* Having intense graphics and animations consumes more power and causes battery drains.
* iOS is resource intensive operating system due to which older devices struggle to run it.