A REVIEW ON COMMONLY USED OPERATING SYSTEMS

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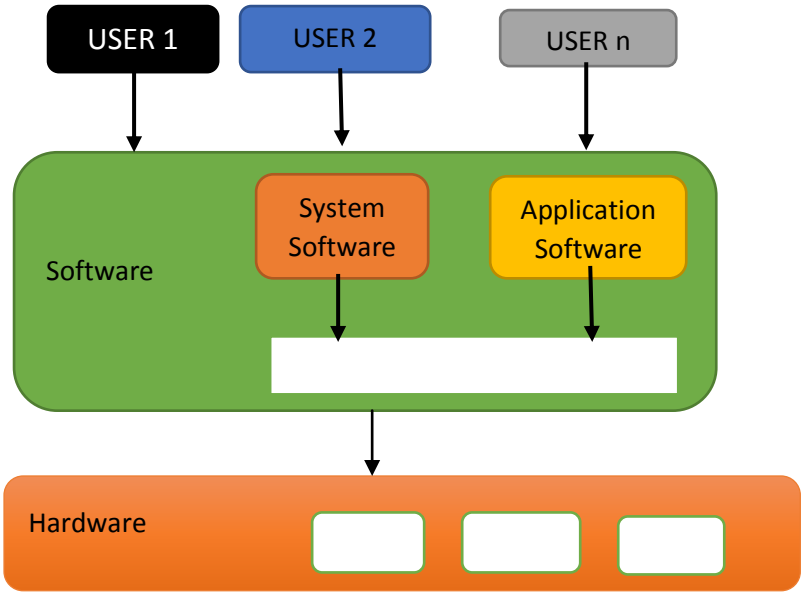
ABSTRACT

This paper provides information about the different types of operating systems available for user to use. Operating System is a software that works as an interface between the user and the computer hardware. Its primary object is to make computer system convenient to use and utilize hardware in an efficient manner. Different operating systems have different advantages as well as disadvantages. In this paper, we compare and review some operating systems. Here are few types of OS which are commonly used these days – Windows, Linux, Mac OS.

Keyword:- *OS, Windows ,Mac OS X, Linux*.

1.Introduction

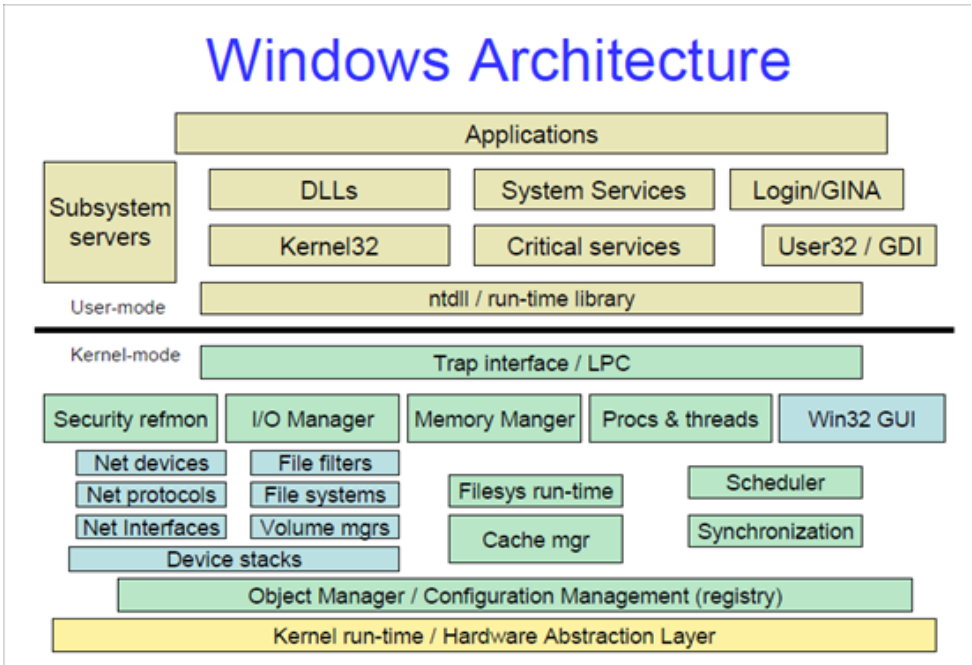
Operating System (OS) is a program that acts as an interface between the user and the computer hardware and controls the execution of the program. It is a system software, that manages computer hardware resources and provides services for computer programs. It is an important component of the system software. It performs all the basic tasks like memory management, file management, process management and controlling peripheral devices such as keyboard, disk drives, etc.



Windows

It is generally used OS. It is easy to use. It is generally used for personal computing, small scale offices. It was introduce as a graphical operating system shell for MS-DOS in response to the growing interest in graphical user interfaces (GUIs). It's kernel type is hybrid.

Windows architecture:-



Linux

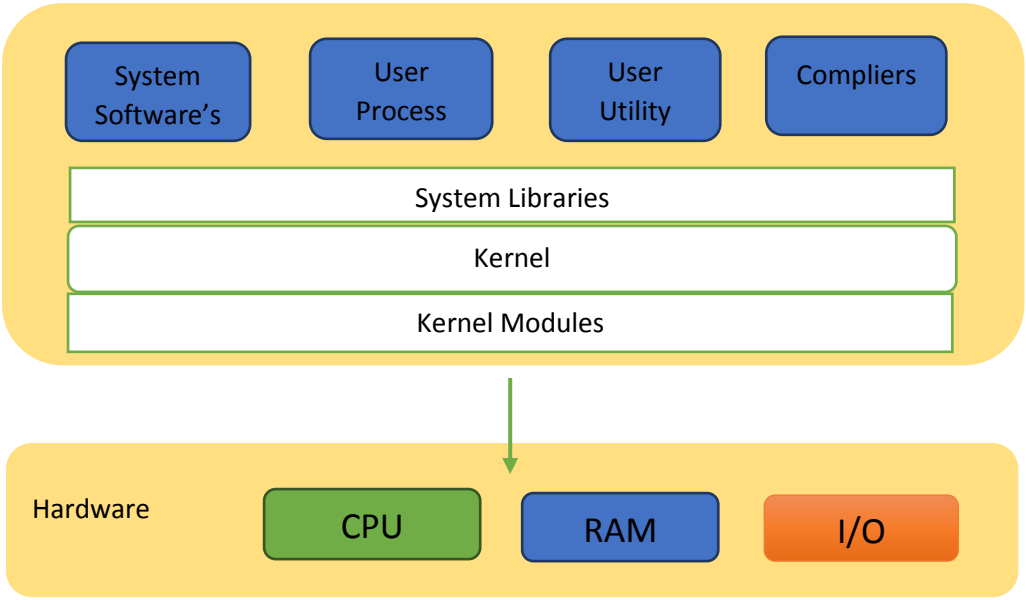
It is one of the popular version of UNIX Operating System. It is an open source as its source code are freely available. It is secured than windows. Linux was designed considering UNIX compatibility.

Components of Linux System

Linux OS has three components:-

- Kernel - It is the core of Linux. It is responsible for all major activities of an operating system. It consists of different modules and it interacts directly with the underlying hardware.
- System Library – These are special functions or programs which accesses Kernel's feature. These libraries implement most of the functionalities of the OS and do not require kernel module's code access rights.
- System Utility - System Utility programs are responsible to do specialized, individual level task.

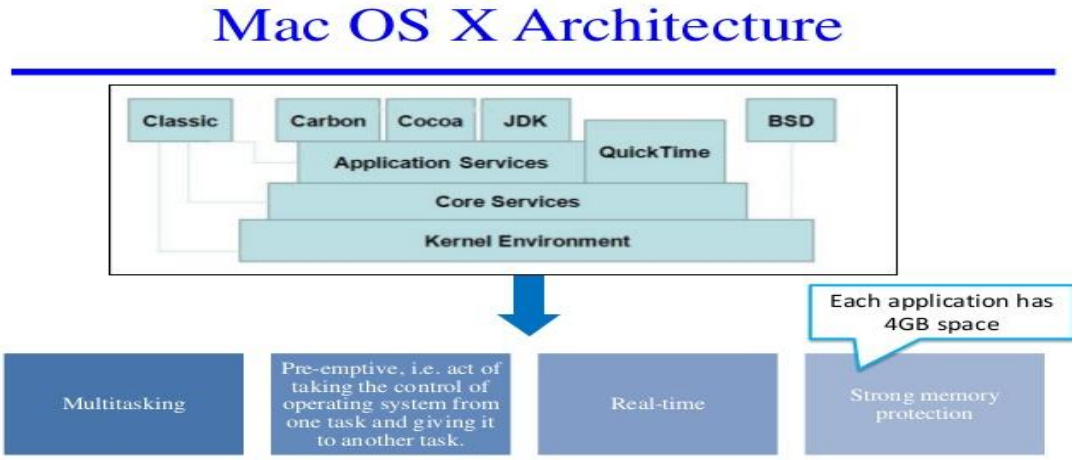
Linux Architecture



Mac OS:-

Mac OS is an open UNIX based foundation with the richness and usability of the Mac interface, bringing UNIX technology and 64-bit power to the mass market. MacOS makes use of BSD codebase and the XNU kernel, and its core set of components is based upon Apple's open source Darwin operating system. It takes up a special role in the world of desktop systems. Mac OS was named by the company Apple as " Mac System Software" in the beginning, a specially designed operating for 68k Motorola processors. The classic desktop is designed as a single user operating system and almost completely hides the full path to files and directories. The graphic representation is reduced to the essence. Overall the interface is very easy to use and does not need the right mouse button for user interface. Mac OS does not include a command line interface.

Mac OS architecture:-



I. Comparison

Ubuntu is an open source and more secured compared to Windows and Mac OS. There are thousands of viruses, worms and trojans targeting windows users. Users who have poor knowledge of viruses become their victims and some have their information compromised as not all kinds of viruses can be detected by antivirus.

Ubuntu is the most popular Linux distro till today. It comes with pre-installed software that a user would use. This is one major advantage with all Linux distros unlike Windows which just comes with the recycle bin and other basics like calculator, word pad and Windows Player.

O.S	Variant	Advantages	Disadvantages
Windows	1.0 (DOS Based)	• It offers limited multitasking of existing MS-DOS programs and concentrates on creating an interaction Paradigm. • It is often regarded as a Front end to the MS-DOS OS. • It can call functions of MS-DOS. • It have original device driver for video cards, mouse, keyboards, printers and serial communications, and applications were supposed to only invoke APIs built upon these drivers.	• It lacked storage. • Unable to run multiple operations at once. • Lack of memory management. • All windows are tilled.
	XP	• It provide better performance over its DOS-based predecessors. • Streamlined multimedia and networking features. • Fast user switching. • Native support for ZIP files. • DirectX 8.1 upgradeable to DirectX 9.0c. • Improved imaging features, improved image handling and thumbnail caching in Explorer. • A number of kernel enhancements and power management improvements.	• Less RAM. • Cannot solve problem automatically. • Absence of User Account Control. • It has compromised security. • Performance cannot be increased without increasing hardware requirements.
	Vista	• Compared to Windows XP, its highly secure. • Enhanced performance and reliability with graphical user interface. • Performance can be increased without increasing hardware requirement. • Each processor has one or more threads. • Enhanced memory management. • Direct X10 was launched for windows Vista	• It consumes a lot more resources than windows XP. • It require high memory. • It is not compatible with too many system. • It only supports DirectX 10 graphics card. • Due to reduced size of buttons like min, max and close, it cause difficulty for those with sight problems. •

	7	• It has lot of new features that are not in other versions. • It was introduced for touch screen interaction. • It is faster than its predecessors. • It supports Virtual Hard Disk with the support of enhanced performance of multi core processor. • It is much easier and safe from hackers than other versions. • It support advance touch and handwriting recognition. • It helps you make best use of graphic cards.	• It require at least 1 GB of RAM. • It is not easily not upgradable from XP. • It is expensive than the previous Microsoft OS. • Only high end computers can install Windows 7. • Can only be used in highly configures system.
	8,8.1	• It is optimized for touch devices as it uses the 'Metro' interface which is improved for touch screen devices. • It supports the low-power ARM architecture. It has advanced security features such as antivirus capabilities and supports secure boot. • It has short boot time. Windows 8 boot time takes less than 8 seconds which is much shorter than its earlier version. • It is upgradable from windows 7. • I was introduced with app platform called "Windows Store". • Windows 8 also supports Near Field Communications (NFC) printing. A technology which can aid in financial transactions digitally.	• The most important issue is Privacy. If the users are not alert during installing Windows 8, they might end up granting location access to many of the Windows 8 apps. • The main disadvantage of Windows 8 is overlapping of Metro and Aero User Interface. Switching between Metro applications and desktop applications is not user-friendly and creates confusion for users and developers. • There is no way to turn the home screen tiles into icons. • Most of the applications, which were designed to work with Windows 7, are not working in Windows 8. • System tray is gone and determining where programs have gone when minimized is difficult.

	10	• It is free for Windows 7 and Windows 8 users. • It has simple setup and migration experience. • Familiar user experience • It is a perfect mixture of classic and modern. • Finally return of customizable Start menu. • It has improved setup and recovery tools (rollback), backup. • It has stable, robust modern entertainment and productivity apps. • Customizable Universal (modern) apps – ability float on desktop, resize, snap. • It has Cortana digital assistant . • Task View for managing applications • Snap Assist for managing on screen windows more effectively. • Action Centre for centralizing and managing app and system notifications • Clean, powerful modern web browser – Microsoft Edge. • Logicaluser interface with less distractions.	• Two step process for performing a clean install and activation compliance check and 32 to 64 bit migrations. • Action Centre limited options for notifications – can't respond a tweet on the fly. • Mandatory Automatic Updates gives users less control over managing updates they might not want or can potential cause damage. • Microsoft Edge lacking Thumbnail Previews when multiple tabs are open • No extension model in Edge, some sites will still need to depend on Internet Explorer. • Some functions have been moved around that will require familiarization. • Number of Control Panel items have not been modernized. • Network Flyout does not support setting connection as a Metered Connection.
Linux	Debian	• It a open source Operating System and a old one. • APT is good enough, and Debian has one of the biggest software repositories. • It is one of the easiest distros to update/upgrade. • It can be boot live.	• It's rather conservative and lags behind in features. New software update need to go a lengthy way to get to Stable repository. • It's not very user-friendly. • Ubuntu has PPA's, Debian doesn't.
	Kali	• It comes with many in-built applications. • It is used to analysis vulnerability. • It is less vulnerable to malware and a stable OS. • It give you the best security for data. • It helps in Sniffing, Cloning Web Pages, Penetration of Wifi and lots other thing related to hacking and cracking. • User can boot it live.	• Many users are not familiar with Kali Linux. • Does not support windows application. • The installation is not as easy as windows.
	Slackware	• It is most stable and fastest version of Linux. • Highly secure.	• It uses old versions of most packages.

		• It doesn't depend on a package manager, so it enjoys much more neutrality than any other distribution does. • It is probably the most GPL compliant. • It is a live OS	
	Red Hat	• It is the open source OS. • It is fast to boot, agile. • Several hardware vendors already support the OS. • It reduce support and maintenance efforts. • It inherit the stability. • It simplify management tasks. • It minimize points of failure and security vulnerabilities. • RedHat Enterprise Linux clone called Scientific Linux is being used to perform all the computing at CERN laboratories.	• Decreased productivity due to breaking habits.
	Fedora	• No bundleware, bloatware. • Drivers are usually cleaner than proprietary operating systems. • It provide ideal learning environment.	• Hardware manufactures don't see Linux as a market share worth considering and eventually some hardware doesn't run on Linux.
	Mint	• It provide a "complete out of box experience". • In Linux Mint users can customize and tweak the desktop they use. • It doesn't track users – no personal info. Is collected, shared or used to customize individual users search results. • It's appearance have original artwork and even more new themes. • It is a application power house. • It has a unique Update Manager. • It takes a number of additional steps towards safety and reliability. • it's a real eye-opener to be able to make your operating system your own.	• Commercial Software vendors do not generally write their software for Linux use. • New users have no idea how to install software. • Some configuration changes have to be done as the Root User and access to the Root account is done indirectly through the use of Sudo command.
Mac OS	Cheetah	• It was a next generation software. • It introduce a brand new code base completely separate from Mac OS 9. • It also introduce a completely new system of memory management. • "Dock" a new way of organizing applications. • The terminal was a feature that allow access to	• The system can only use TCP/IP, not apple talk to connect to servers sharing the Apple Filing Protocol. • It cannot use SMB to connect to Windows or Samba servers. • As a server, the system can share files using only the Apple Filing

		Mac OS underpinnings, namely the Unix core. • Memory protection so that if an application corrupts its memory, the memory of other application will not be corrupted. • New Darwin Unix like core was introduced.	Protocol. • It was riddled with fatal bugs that caused kernel panics, especially in complex hardware setups. • Missing features such as DVD playback, as well as CD burning.
	Jaguar	• Introduced with support in QuickTime, Address Book and Inkwell for handwriting recognition. • It include Apple Zeroconf implementation, which allows devices to discover each other and display available services to the user.	• No Google search in Sherlock. • Security issues.
	Snow Leopard	• It is very inexpensive compared to most operating system upgrades. • It modestly improved performance compared to "Leopard" on Intel-based Macs. • It saves an Apple-estimated 7 GB of hard drive (or SSD) space compared to "Leopard" OS. • It continues to support PowerPC applications via “Rosetta” framework. • It support Native Microsoft Exchange. • It has improved Voice Over for visually impaired.	• It does not support PowerPC Macs. • Intel based Macs capable of booting 64-bit apparently blocked in EFI. • There are some existing MacOS X software and peripherals that are not compatible. • It does not support MacOS 9/ Classic software.
	Mountain Lion	• It was introduce with iCloud integration. • It contain syncing features that give same experience on all your devices. • Brought new features for sharing and social connectivity. • With new sharing system ,making it easier to share links, photos, videos and other files. • It allow you to dictate text. • A faster version of “Safari” with unified Smart Search Field. • It is a much more stable environment than windows. • It is a lot more convenience.	• Can’t use dictation offline. • Gatekeeper (A mac program) doesn’t allow you to download unsafe program. • Mac OS is twice expensive than Windows OS. • No customization option. • Mac comes with limited gaming option.
	Sierra	• It comes with fix over 60 securities issues. • Safari 10 IS released with 21 Patches for vulnerabilities. • It is more secure than others versions of Mac OS X.	• It come with view rough edges. • It was not as smooth as previous version of Mac OS. • Due to security it has blocked some application.

		• Sierra was introduced with Siri which integrates many things. • It unlocks automatically with Apple Watch. • It allow interaction b/w Mac and iOS devices. • It has optimized the storage.	• Bad compatibility with a series of application.
	High Sierra	• Its newly enforced security on EFI automatically. • It uses 35% less disk space than Sierra. • New file system introduced "Apple File System(APFS)". • APFS is a 64 – bit file system that supports native encryption and faster metadata operation. • It finally support VR. • It compress video files 40% more than the previous generation H.264 standard. • Faster video Streaming.	• It's the latest Mac OS X.
Ubuntu		• It is relatively secure compared to Windows and OS X. • It is open source. • It supports windows application. • It is most popular Linux distro till today. • It comes with all software pre-installed ever required.	• It have compatibility issues with hardware. • Poor choice for gamming. • Does not support Mp3 files. • Poor availability of software.

3.Conclusion

Windows beats Linux and Ubuntu in market share because of its excellent hardware support, availability of software's. Windows is generally used by personal desktop and laptops users. It's best platform for gaming (PC level). Linux is mostly used for Web Serving, Networking, Database management, Scientific Computing and of course it can be used on a daily basis at home and in the office. Mac lets you get a lot more done in less time without any aggravation. A Mac is the right tool for photography just as a remote control does a better job of tuning your TV than a 10 foot wooden pole. When people speak of computer problems they are referring to Windows OS problems, not computer problems. Mac users hear about these things, but rarely if ever have to deal with them. Except gaming Mac is better than windows. Mac is complete virus free and apple comes with Mac OS only. Linux is an open source OS, there are lesser amount of virus in Linux compared to windows. Apple devices are too much expensive than windows. Many software are not compatible with Mac OS, user can feel limited as compare to Windows. On the other hand user can program software for Linux as they want. Mac is too much reliable and smooth, but windows get struck, Linux is not a complete OS user can modify it according to their usage. Mac is a complete GUI system. No Operating System is really better, the choice is up to user. If user is a gamer, then windows is good. Programmers might prefer Linux for programming and graphics producers will probably prefer Mac. The best thing to do is probably to try each OS.

4.**Acknowledgements**

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