RESEARCH PAPER ON OPERATING SYSTEM

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OPERATING SYSTEM

An operating system (OS) is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is an essential component of the system software in a computer system. Application programs usually require an operating system to function.

Time-sharing operating systems schedule tasks for efficient use of the system and may also include accounting software for cost allocation of processor time, mass storage, printing, and other resources.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between programs and the computer hardware,[1][2] although the application code is usually executed directly by the hardware and will frequently make a system call to an OS function or be interrupted by it. Operating systems can be found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers.

Types of Operating Systems

Within the broad family of operating systems, there are generally four types, categorized based on the types of computers they control and the sort of applications they support. The categories are:

• **Real-time operating system** (RTOS) - Real-time operating systems are used to control machinery, scientific instruments and industrial systems. An RTOS typically has very little user-interface capability, and no end-user utilities, since the system will be a "sealed box" when delivered for use. A very important part of an RTOS is managing the resources of the computer so that a particular operation executes in precisely the same amount of time, every time it occurs. In a complex machine, having a part move more quickly just because system resources are available may be just as catastrophic as having it not move at all because the system is busy.

Single-user, single task - As the name implies, this operating system is designed to manage the computer so that one user can effectively do one thing at a time. The Palm OS for Palm handheld computers is a good example of a modern single-user, single-task operating system.

Single-user, multi-tasking - This is the type of operating system most people use on their desktop and laptop computers today. Microsoft's Windows and Apple's MacOS platforms are both examples of operating systems that will let a single user have several programs in operation at the same time. For example, it's entirely possible for a Windows user to be writing a note in a word processor while downloading a file from the Internet while printing the text of an e-mail message.

Multi-user - A multi-user operating system allows many different users to take advantage of the computer's resources simultaneously. The operating system must make sure that the requirements of the various users are balanced, and that each of the programs they are using has sufficient and separate resources so that a problem with one user doesn't

affect the entire community of users. UNIX, VMS and mainframe operating systems, such as *MVS*, are examples of multi-user operating systems.

It's important to differentiate between multi-user operating systems and single-user operating systems that support networking. Windows 2000 and Novell Netware can each support hundreds or thousands of networked users, but the operating systems themselves aren't true multi-user operating systems. The **system administrator** is the only "user" for Windows 2000 or Netware. The network support and all of the remote user logins the network enables are, in the overall plan of the operating system, a program being run by the administrative user.

Functions of an operating system

Booting the computer

The process of starting or restarting the computer is known as booting. A cold boot is when you turn on a computer that has been turned off completely. A warm boot is the process of using the operating system to restart the computer.

Performs basic computer tasks

The operating system performs basic computer tasks, such as managing the various peripheral devices such as the mouse, keyboard and printers. For example, most operating systems now are plug and play which means a device such as a printer will automatically be detected and configured without any user intervention.

Provides a user interface

A user interacts with software through the user interface. The two main types of user interfaces are: command line and a graphical user interface (GUI). With a command line interface, the user interacts with the operating system by typing commands to perform specific tasks. An example of a command line interface is DOS (disk operating system). With a graphical user interface, the user interacts with the operating system by using a mouse to access windows, icons, and menus. *An example of a graphical user interface is Windows Vista or Windows 7.*

Handles system resources

The operating system also handles system resources such as the computer's memory and sharing of the central processing unit (CPU) time by various applications or peripheral devices. Programs and input methods are constantly competing for the attention of the CPU and demand memory, storage and input/output bandwidth. The operating system ensures that each application gets the necessary resources it needs in order to maximize the functionality of the overall system.

Provides file management

The operating system also handles the organization and tracking of files and directories (folders) saved or retrieved from a computer disk. The file management system allows the user to perform such tasks as creating files and directories, renaming files, coping and moving files, and deleting files. The operating system keeps track of where files are located on the hard drive through the type of file system. The type two main types of file system are File Allocation table (FAT) or **New Technology File system (NTFS).**

Types of file system

➲ *File Allocation table (FAT)*

➲ *New Technology file system (NTFS)*

File Allocation table (FAT) uses the file allocation table which records, which clusters are used and unused and where files are located within the clusters.

NTFS is a file system introduced by Microsoft and it has a number of advantages over the previous file system, named FAT32 (File Allocation Table).

"One major advantage of NTFS is that it includes *features to improve reliability. For example, the new technology file system includes fault tolerance, which automatically repairs hard drive errors without displaying error messages. It also keeps detailed transaction logs, which tracks hard drive errors. This can help prevent hard disk failures and makes it possible to recover files if the hard drive does fail. "*
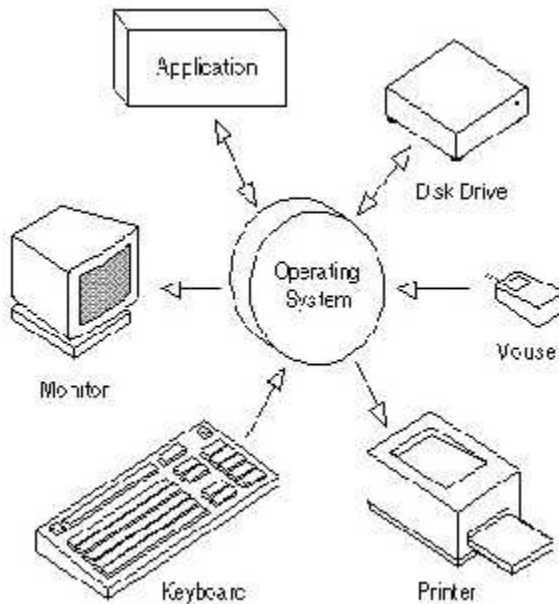
Problem Statement

Do you think that in today's era Linux as an operating system has taken a lead in IT Industry elaborate and compare with windows operating system.

Linux

Linux is a UNIX-based operating system. Its original creator was a Finnish student name **Linus Torvalds**, although being 'open source' it has change a great deal since its original conception. It belongs to nobody, and is free to download and use. Any changes to it are open for all to adopt, and as a result it has developed into a very powerful OS that is rapidly gaining in popularity worldwide, particularly among those seeking an alternative to Windows.

LINUX History

The History of Linux began in 1991 with the commencement of a personal project by a Finnish student, Linus Torvalds, to create a new free operating system kernel.

Since then, the resulting Linux kernel has been marked by constant growth throughout its history. Since the initial release of its source code in 1991, it has grown from a small number of C files under a license prohibiting commercial distribution to its state in 2009 of over 370 megabytes of source under the GNU General Public License.

TIME LINE	
YEAR	**EVENTS**
1957	Bell Labs found they needed an operating system for their computer center that at the time was running various batch jobs. The BESYS operating system was created at Bell Labs to deal with these needs.
1971	First edition of Unix released 11/03/1971. The first edition of the "Unix PROGRAMMER'S MANUAL [by] K. Thompson [and] D. M. Ritchie." It includes over 60 commands like: b (compile B program); boot (reboot system); cat (concatenate files); chdir (change working directory);

	chmod (change access mode);
1972	Second edition of Unix released December 06, 1972.
1973	Ritchie rewrote B and called the new language C.
1973	Third edition of Unix released February 1973
1973	Forth edition of Unix released November 1973
1974	Fifth edition of Unix released June 1974
1991	Sun unveils Solaris 2 operating environment, specially tuned for symmetric multiprocessing.
1991	Linux is introduced by Linus Torvalds, a student in Finland.
1994	Red Hat Linux is introduced.
1994	Caldera, Inc was founded in 1994 by Ransom Love and Bryan Sparks.
1994	NetBSD 1.0 released 10/26/1994
1995	FreeBSD 2.0 released 01/xx/1995
2001	Linus Torvalds releases version 2.4 of the Linux Kernel source code on January 4th.
2001	Microsoft files a trademark suit against Lindows.com in December.
2004	Lindows changes it's name to Linspire April 14, 2004.
2004	The first release of Ubuntu is released October 20, 2004.

Advantages and Benefits of Linux

Affordable

If you're basing your decision on price, then Linux is right for you. There is no comparing Windows to Linux when it comes to money; we all know that Windows is expensive, while Linux can be obtained free, a huge cost saving in anyone's book. All you have to do is go to the webpage and click where it says click here and you have Linux ready to go.

Security

Another known fact about Linux is their security is much stronger than other operating systems; you don't need home security systems for your computer when you use the Linux system, and you can browse the net without any serious concerns.

Versatility

The biggest plus for me when it comes to Linux is the ability for me to change what I want and how I want it especially on my desktop, the versatility is easy and amazing and I'm not forced to go with the design given to me. It's similar to when you are shopping around for remodeling estimates, but you know exactly what you want and don't need someone deciding for you.

Fast and Efficient

Another interesting fact about Linux is how fast and effective it is, it's the ideal solution for an older computer which struggles with other operating systems, it is much faster is start up to browsing. It's like the hcg drops you buy when trying to lose weight, super-fast and super effective, you can think of it as the anti wrinkle cream for older computers to get them running smoothly again.

Freedom

Most Linux distros are free..... users do not need to pay for a copy, but this is only one aspect of freedom enjoyed by Linux users! In addition, Linux distros can be freely downloaded and legally installed on as many computers as you want and freely (and legally) given to other people. Because most distros are open source, you have access to the source code and can customize Linux to be whatever you want it to be; you can even create your own distro if you like!

Linux is easy to install

In many instances, it is actually easier to install Linux to your computer than Windows. Click here to learn more about how to download and install Linux to your computer [1].

Linux is very stable

Linux systems rarely crash, and when they do, the whole system normally does not go down. The "blue screen of death" familiar to Windows users is not a worry for Linux users

Disadvantages

Many Windows programs will not run in Linux.

iTunes, Microsoft Office, Internet Explorer and many other Windows programs will not run natively in Linux. The good news is that there are decent ways around most of these problems. For example, music libraries can be managed with an iPod using programs such as Amarok, Banshee, or Rhythmbox in Linux. Mozilla Firefox and Google Chrome are outstanding Internet browsers which can be used in the place of Internet Explorer. It is also possible to run iTunes in Linux using Wine, VirtualBox, or Parallels, though it is difficult to have good results. LibreOffice and Open Office are excellent office suites which can be used in the place of Microsoft Office, but while overall compatibility in both suites is good with Microsoft Office formats, it is not perfect. Click here to learn more about Linux equivalents to software commonly used in Windows .

There is a smaller selection of peripheral hardware drivers for Linux.

There is a smaller selection of peripheral hardware drivers (for printers, scanners, and other devices) in Linux as compared to Windows, though many new Linux hardware drivers are constantly being added. Closely related to this issue is the fact that not all Linux distros work with all sets of computer hardware, so a person may need to try more than one distro to find one which works well with his/her computer. When it comes to printers, some manufacturers offer better Linux support than others; for example, HP offers excellent printer support for Linux. Click here to learn more about Linux hardware compatibility.

There is a learning curve for people who are new to Linux.

Despite this, most Linux distros, especially the major ones, are very intuitive and user-friendly. Also, the desktop environments in Linux are in many ways similar to Windows in their appearance. One thing which should be emphasized is that there is also a learning curve for Windows XP users who switch to Windows 7 or Windows 8.

Microsoft Windows

Microsoft Windows is a series of graphical interface operating systems developed, marketed, and sold by Microsoft.

Microsoft introduced an operating environment named Windows on November 20, 1985 as a graphical operating system shell for MS-DOS in response to the growing interest in graphical user interfaces (GUI). Microsoft Windows came to dominate the world's personal computer market with over 90% market share, overtaking Mac OS, which had been introduced in 1984.

A history of Windows

- **1975–1981: Microsoft boots up**

It's the 1970s. At work, we rely on typewriters. If we need to copy a document, we likely use a mimeograph or carbon paper. Few have heard of microcomputers, but two young computer enthusiasts, Bill Gates and Paul Allen, see that personal computing is a path to the future.

In 1975, Gates and Allen form a partnership called Microsoft. Like most start-

ups, Microsoft begins small, but has a huge vision—a computer on every desktop and in every home. During the next years, Microsoft begins to change the ways we work.

1982–1985: Introducing Windows 1.0

Microsoft works on the first version of a new operating system. Interface Manager is the code name and is considered as the final name, but Windows prevails because it best describes the boxes or computing "windows" that are fundamental to the new system. Windows is announced in 1983, but it takes a while to develop. Skeptics call it "vaporware."

1987–1992: Windows 2.0–2.11—More windows, more speed

On December 9, 1987 Microsoft releases Windows 2.0 with desktop icons and expanded memory. With improved graphics support, you can now overlap windows, control the screen layout, and use keyboard shortcuts to speed up your work. Some software developers write their first Windows–based programs for this release.

1990–1994: Windows 3.0–Windows NT—Getting the graphics

On May 22, 1990, Microsoft announces Windows 3.0, followed shortly by Windows 3.1 in 1992. Taken together, they sell 10 million copies in their first 2 years, making this the most widely used Windows operating system yet. The scale of this success causes Microsoft to revise earlier plans. Virtual Memory improves visual graphics. In 1990 Windows starts to look like the versions to come.

Windows now has significantly better performance, advanced graphics with 16 colors, and improved icons. A new wave of 386 PCs helps drive the popularity of Windows 3.0. With full support for the Intel 386 processor, programs run noticeably faster. Program Manager, File Manager, and Print Manager arrive in Windows 3.0.

Windows NT

When Windows NT releases on July 27, 1993, Microsoft meets an important milestone: the completion of a project begun in the late 1980s to build an advanced new operating system from scratch. "Windows NT represents nothing less than a fundamental change in the way that companies can address their business computing requirements," Bill Gates says at its release.

Unlike Windows 3.1, however, Windows NT 3.1 is a 32-bit operating system, which makes it a strategic business platform that supports high-end engineering and scientific programs.

1995–2001: Windows 95—the PC comes of age (and don't forget the Internet)

On August 24, 1995, Microsoft releases Windows 95, selling a record-setting 7 million copies in the first five weeks. It's the most publicized launch Microsoft has ever taken on. Television commercials feature the Rolling Stones singing "Start Me Up" over images of the new Start button. The press release simply begins: "It's here."

1998..2000: Windows 98, Windows 2000, Windows Me

Released on June 25, 1998, Windows 98 is the first version of Windows designed specifically for consumers. PCs are common at work and home, and Internet cafes where you can get online are popping up. Windows 98 is described as an operating system that "Works Better, Plays Better."

With Windows 98, you can find information more easily on your PC as well as the Internet. Other improvements include the ability to open and close programs more quickly, and support for reading DVD discs and universal serial bus (USB) devices. Another first appearance is the Quick Launch bar, which lets you run programs without having to browse the Start menu or look for them on the desktop.

2001–2005: Windows XP—Stable, usable, and fast

On October 25, 2001, Windows XP is released with a redesigned look and feel that's centered on usability

and a unified Help and Support services center. It's available in 25 languages. From the mid-1970s until the release of Windows XP, about 1 billion PCs have been shipped worldwide.

2006–2008: Windows Vista—Smart on security

Windows Vista is released in 2006 with the strongest security system yet. User Account Control helps prevent potentially harmful software from making changes to your computer. In Windows Vista Ultimate, BitLocker Drive Encryption provides better data protection for your computer, as laptop sales and security needs increase. Windows Vista also features

enhancements toWindows Media Player as more and more people come to see their PCs as central locations for digital media. Here you can watch television, view and send photographs, and edit videos.

2009: Windows 7

Windows 7 was built for the wireless world that arose in the late 2000s. By the time it was released, laptops were outselling desktops, and it had become common to connect to public wireless hotspots in coffee shops and private networks in the home.

Windows 7 included new ways to work with windows—like Snap, Peek, and Shake—which both improved functionality and made the interface more fun to use. It also marked the debut of Windows Touch, which let touchscreen users browse the web, flip through photos, and open files and folders.

2012: Windows 8

Windows 8 is Windows reimagined from the chipset to the user experience. It functions as both a tablet for entertainment and a full-featured PC for getting things done. It introduces a totally new interface that works smoothly for both touch and mouse and keyboard. Windows 8 also includes enhancements of the familiar Windows desktop, with a new taskbar and streamlined file management.

Topic	Linux	Windows
What is it?	Linux is an example of Open Source software development and Free Operating System (OS)	Windows is the family of operating system (OS) from Microsoft, which is the most famous OS in the world
Cost:	Linux can be freely distributed, downloaded freely, distributed through magazines, Books etc. There are priced versions for Linux also, but	For desktop or home use, Windows can be expensive. A single copy can cost around $50 to $ 450 depending on the version of Windows.

	they are normally cheaper than Windows.	
Manufacturer:	Linux kernel is developed by the community. Linus Torvalds oversees things.	Microsoft created the Windows operating system, but allows other computer manufactures to distribute their own computers with Windows pre-installed.
Usage:	Linux can be installed on a wide variety of computer hardware, ranging from mobile phones, tablet computers and video game consoles, to mainframes and supercomputers.	On PC's servers and some phones
Processors:	Dozens of different kinds.	Intel and AMD, but WinCE runs on some additional processors. (see: WinCE)
Development and Distribution:	Linux is developed by Open Source development i.e. through sharing and collaboration of code and features through forums etc and it is distributed by various vendors.	Windows is developed and distributed by Microsoft.

Architectures:	Originally developed for Intel's x86 hardware, ports available for over two dozen CPU types including ARM	x86,x64 and ARM (Windows RT)
GUI:	Linux typically provides two GUIs, KDE and Gnome. But Linux GUI is optional.	The Windows GUI is an integral component of the OS and it is mainly influenced by Apple Macintosh OS and Xerox.
File system support:	Ext2, Ext3, Ext4, Jfs, ReiserFS, Xfs, Btrfs, FAT, FAT32, NTFS	FAT, FAT32, NTFS, exFAT
Text mode interface:	BASH (Bourne Again SHell) is the Linux default shell. It can support multiple command interpreters.	Windows uses a command shell and each version of Windows has a single command interpreter with dos-like commands, recently there is the addition of the optional PowerShell that uses more Unix-like commands.
Hardware	Although hardware manufacturers have made great advancements in supporting Linux	Because of the amount of Microsoft Windows users and the broader driver support,

	it still will not support most hardware devices. However, for the hardware devices that have driver support they will usually work in all versions of Linux.	Windows has a much larger support for hardware devices and almost all hardware manufacturers will support their products in Microsoft Windows.
Open Source	Many of the Linux variants and many Linux programs are open source and enable users to customize or modify the code however they wish to.	Microsoft Windows is not open source and the majority of Windows programs are not open source.
Reliability	The majority of Linux variants and versions are notoriously reliable and can often run for months and years without needing to be rebooted.	Although Microsoft Windows has made great improvements in reliability over the last few versions of Windows, it still cannot match the reliability of Linux.

Advantages of using Linux over Windows

Cost

The most obvious advantage of using Linux is the fact that it is free to obtain, while Microsoft products are available for a hefty and sometimes recurring fee.

Security

In line with the costs, the security aspect of Linux is much stronger than that of Windows. Why should you have to spend extra money for virus protection software? The Linux operating system has been around since the early nineties and has managed to stay secure in the realm of widespread viruses, spyware and adware for all these years.

Choice (Freedom)

The power of choice is a great Linux advantage. With Linux, you have the power to control just about every aspect of the operating system. Two major features you have control of are your desktops look and feel by way of numerous Window Managers, and the kernel.

Software

There are so many software choices when it comes to doing any specific task. You could search for a text editor on Freshmeat and yield hundreds, if not thousands of results. Hardware - Linux is perfect for those old computers with barely any processing power or memory you have sitting in your garage or basement collecting dust. Install Linux and use it as a firewall, a file server, or a backup server.

Flexibility

You don't have to deal with anti-piracy schemes and additional "hoop jumping".

Conclusion

There is no single operating system that is the right choice for every organization and every application. Many organizations find that the best approach is to run multiple operating systems. Linux and Windows are only two choices--there are many others. That said, for organizations that are deciding between Windows and Linux, what is the best way to decide?

When evaluating Windows versus Linux as a server operating system, our survey provides insights on the relative advantages of each operating system for *following eight criteria*. IT managers can use these

insights to make informed decisions on the operating system that best meets the particular needs and priorities of their organizations.

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