Journal of Computer Science and Technology Studies
ISSN: 2709-104X
DOI: 10.32996/jcsts
Journal Homepage: www.al-kindipublisher.com/index.php/jcsts

JCSTS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Linux vs. Windows: A Comparison of Two Widely Used Platforms

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| ABSTRACT
Current studies in OS is usually between linux and windows these days. Both Windows and Linux are widely used PC operating systems (OS). Windows is an eye-catching operating system, but it is not as safe as Linux. With growing worries about OS security, Linux has become well-known among OS users for its security and efficiency. This paper manages two of the principal common types of operating systems (Linux, Windows) with the significance of the operating system in any device and, moreover, to direct the study over Linux and Windows. We've compared various characteristics concerning Windows and Linux that are utilized in various researches and directed a survey for this reason. The results of the survey related to Windows and Linux are analyzed. The findings indicate that Linux is more preferred when concerned with security, whereas Windows is preferred when user-friendliness is concerned.

| KEYWORDS
Operating System, OS, Windows, *Personal Computer,* Linux, Open Source, Proprietary, User Interface, UI, GUI, Security, PC, Graphical User Interface

| ARTICLE DOI: 10.32996/jcsts.2022.4.1.4

1. Introduction

The operating system in a device can be thought of as a link between the needs of end-users and the capabilities of the PC hardware. OS is both a software and system software that not only resolves difficulties between the client and the PC hardware but also includes a few capabilities within the system such as managing PC memory, files, and the protection of other system software. In this way, for all the activity of these capacities, we have numerous OS out of that Windows and Linux are two operating systems that are ceaselessly going after the control of the PC market. Every OS have shown huge development inside the OS purchaser market. Microsoft sent off its underlying OS in 1985. Almost about time, Linux came on the internet.

Windows was released in November 1985 as a graphic or figure-based operating system shell for MSDOS (Microsoft Disk Operating System). Windows is an operating system that prioritizes the PC's growing demands and the client's graphical user interface. Linux is a well-known open-source operating system that runs on the Linux kernel. KernelCare, dpkg, and GNOME programming were used to produce Linux, which was introduced in September 1991. Windows is the most well-known operating system on the market. Clients benefit from Windows in a variety of ways. Because of its simple user interface, Windows is straightforward to comprehend. However, these days, clients are increasingly switching from Windows to LINUX. In recent years, the Linux industry has dominated the IT sector. Because Windows is not more secure than Linux and does not provide hardware adaptability for use, it is becoming increasingly untrustworthy day by day.

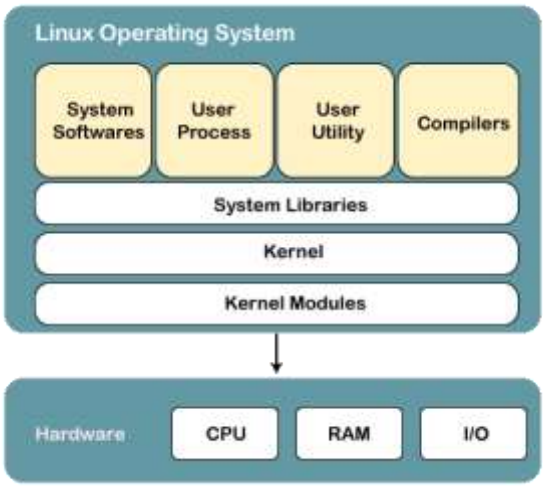

Fig. 1. The architecture of the Linux Operating System

Since 1993, both Windows and Linux have attempted to gain control of the operating system buyer market. Both operating systems have their own set of benefits and drawbacks. Our research aims to determine the main differences between Windows and Linux and how these differences might affect the expected utilization of end clients. There are several key areas from which we would want to analyze Linux and Windows. These areas include cost, security, configurability, and user-friendliness, which we'll be discussing in detail and the others will be discussed briefly and asked and analyzed in our survey. We'll conjointly inspect explicit instances where each of these two OS will be the best fit for explicit errands. Our interest group is any PC client that needs to utilize and execute an excellent system and improve and use its greatest execution.

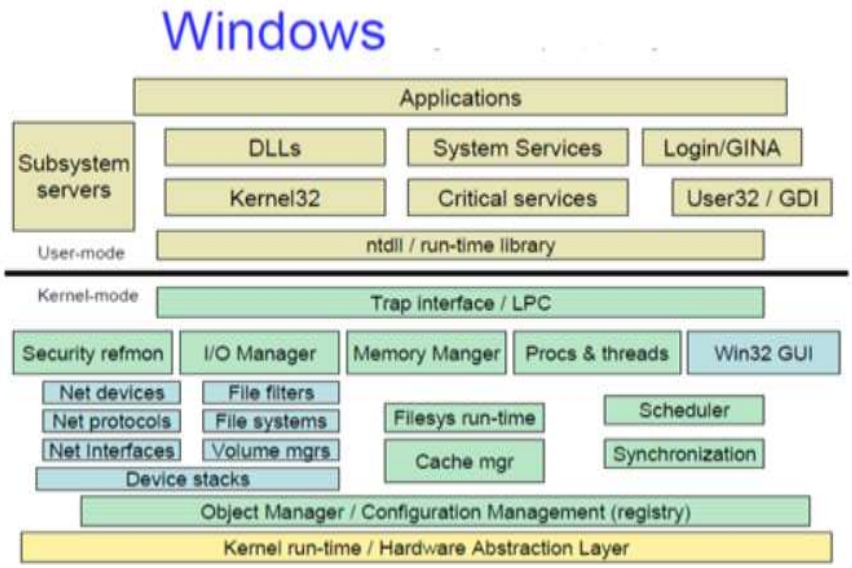

Fig. 2. The architecture of the Windows Operating System

The rest of this paper is as follows: in Section II, a literature review and a short depiction of all the relative technologies until now is given. The methodology used to understand our examination is presented in section III. The benchmark results are introduced in section IV. Finally, a few closing comments and future work are given in Section V.

2. Literature Review

2.1 Classification of Past and Present Operating Systems:

This section has compiled various famous past and current Windows and Linux Operating System facilities beginning with Windows followed by Linux.

1) *Windows:*

a) *Windows 3.x:*

Li R (2012), Yang N (2012) and Ma S (2012) state in their research that The Microsoft 3.0 and 3.1 versions of Windows come with a number of features, such as VDD ("Virtual Device Drivers"), which helps divide arbitrary devices among many DOS applications. This adaptation application may run in either bound or secured mode, allowing it to access a maximum of (MB) megabytes of memory and participate in the virtual memory of software. The address space remains constant during execution, and the partitioned memory provides layers of protection. The user interface in Windows 3.0 has also been improved. We can see that Windows 3 is GUI-based and more beneficial for customers, like providing multitasking capabilities.

b) *Windows 9.x:*

In August 1995, Windows 95 was delivered. Windows 95 is as yet based on MS-DOS; it is delivered with availability for neighbourhood 4-bytes (32-bits) applications, join and furthermore use hardware, preplanned coordinating, information names empowering till 255 char just as offers higher strength over its past variants. Windows 95 features a brand-new user interface, as well as a brand-new start menu, taskbar, and Windows Explorer.

c) *Windows NT:*

NT was released with a focus on security, multi-user capability, and POSIX compatibility and was built on an expandable kernel with preplanned scheduling and support for multiprocessor design. Li R (2012), Yang N (2012) and Ma S (2012) state in their research that Windows NT's bit is completely different from prior Windows variations, and it's also a crossover bit that both Windows and IBM used. The Mach microkernel is the foundation of the Windows NT crossover bit.

d) *Windows XP:*

Windows XP totally accompanies a new UI which brings a new choice of Start menu and Windows Explorer, smoothly running media just as the organization focuses, and furthermore, XP arrived with various settings which can offer security with software program that is utilized with the past variants of windows, just as an online guide. Windows XP was exceptionally effective as even after the launch of its other follower variants; individuals found it simple to utilize.

e) *Windows Vista:*

Vista highlights brand-new capacities, like a new covering and UI to outstanding specialized adjustments, with a solid focus on safety features. It accompanies different versions, and furthermore, to make the system very defensive, a more rigid, permit understanding was there with Windows Vista.

f) *Windows 7:*

Windows 7 was released with a progressive approach to the Windows series, resulting in stated characteristics such as application security and hardware security that is far superior to Windows Vista. Multi-contact support, a newly created shell, an updated taskbar, and HomeGroup, which is a home system administration tool, were all included in Windows 7.

g) *Windows 8 / 8.1:*

Windows 8 was released with a completely new and different approach to UI by making changes at the start screen, which includes large artistic tiles that are more useful for contact correspondences and take into account the current reliability redesigned data, as well as a moderately new set of applications that are designed with interaction, i.e. touch-based gadgets in mind. Cloud-focused features and other online systems like Microsoft OneDrive are included in Windows 8 and 8.1. It has also been upgraded to Windows RT for use on ARM-based devices.

h) *Windows 10:*

Windows 10 introduces a new start menu and the option to run the Windows Store app in Windows, regardless of the overall screen size. Windows 10 comes with a plethora of excellent features, such as numerous desktop options that allow us to move a handful of our Tabs to an advanced work area and put them to the side. In the same way that Siri is equivalent to Google, Currently, we have Cortana as a remote assistant in Windows 10 and a tablet PC in Windows 10 that supports a variety of customized out-of-the-box qualities.

Table 1 below summarises the specific features of different versions of windows.

Table I. Versions of Microsoft Windows with Specific Features

Windows OS Version	Release Date	Specific Features
Windows 3.x	1992	Introduced multitasking. Supported 256 colors which brought a more modern, colorful look to the interface
Windows 9.x	1995	Introduced start button, taskbar, windows explorer, start menu, web browser, plug and play feature—introduced 32-bit processor.
Windows NT	1999-2000	Designed to act as servers in networks
Windows XP	2001	Introduced 64 bit processor. Improved windows appearance with themes and offered a stable version.
Windows Vista	2006	Updated the look and feel of Windows
Windows 7	2009	Improved boot time, New features like aero peek, pinning programs to the taskbar, handwritten recognition etc.
Windows 8 / 8.1	2012	Faster than previous versions of windows. The start button was removed in Windows 8 but was introduced again in 8.1 and served as a common platform for mobile and computer. It takes better advantage of multi-core processing, SSDs, touch screens and other input methods.
Windows 10	2015	Multiple desktops, Cortana voice assistant, Central notification center for app notifications and quick actions.

2) Linux:

a) Ubuntu:

Ubuntu is usually the distro of choice for brand-new individuals. It tends to focus on functionality and simpleness for the user that wants the system to "simply function". Launches come every 6 months and also are available on a live CD. Equipment assistance is typically quite good, except for wireless.

b) Linux Mint:

Based upon Ubuntu. Concentrate on the convenience of use and accessibility of proprietary software programs such as codecs as well as a flash plug-in. Uses Cinnamon desktop, which appears like a Windows user interface.

c) Debian:

Debian is a completely cost-free, non-commercial circulation of Linux. It holds to the initial idea of the 'Open Resource' software program. Debian focuses on stable releases that function without issues on all platforms and, therefore, will certainly not be the first to integrate the current bells and whistles.

d) Fedora:

Fedora acts as Red Hat's "testing room" for Red Hat Enterprise Linux. Thus, new innovations are deployed swiftly, though the atmosphere will, for that reason, be much less steady. It permits full-disk file encryption through a straightforward checkbox throughout the mounting process.

e) CentOS / Redhat:

Red Hat Linux is a modern Linux dissemination implied for web servers just as workstations. It depends on open-source Fedora, yet it is made to be a steady stage with enduring help. Red Hat utilizes brand name guidelines to stop its authority. Red Hat Enterprise Linux software from being rearranged. Notwithstanding, the center software program is free, just as open-source. CentOS is a local community-based project which utilizes the Red Hat Linux code disposes of all Red Hat's trademarks, just as makes it promptly accessible for nothing use and course. It's an absolutely free variant of Red Hat EL, so it's great assuming you want a steady framework that will surely be supported for quite a while.

f) openSUSE:

It is a distro for newbies that additionally wish to utilize Linux in a professional atmosphere.

g) ArchLinux:

Arch Linux is a very customizable, non-commercial distribution for i686 and x86_64 computer systems. All the required bundles can be installed on purpose to minimize pointless bundles using disk room. This distro would not be good for novices since all arrangements are done with editing and enhancing the setup data. This distro takes even more setup time than a few of the distros.

h) Kali Linux:

It is basically a Debian-derived Linux circulation that was originally designed for digital forensics and infiltration screening. The Offensive Safety and Security dept. Keeps and funds it.

2.2 Related Work

D'Elia (2011) and Paciello (2011) offered an examination over execution and investigations of execution overestimations of data of applications in both operating systems Windows as well as Linux.

Casadesus-Masanell (2003) and P. Ghemawat (2003) researched a vibrant setup of competition between Windows as well as Linux.

Economides (2006) and E. Katsamakas (2006) evaluate the tactical constraints in b/w an open-source and a proprietary innovation platform just as their rivals. Giri (2017), Nandgaonkar (2017) and Gosavi (2017) offered migration towards online OS for Windows from Linux and vice versa.

3. Methodology

Our methodology is that we will be comparing both these OS on the basis of four key areas stated below.

1. Cost
2. Security
3. Configurability
4. User Friendliness

We will compare and discuss all these areas in detail. For this comparison, we will first be performing a survey. For this purpose, our survey methodology is that we made a simple questionnaire. First of all, we requested respondents to indicate how Linux looks at Microsoft Windows as an operating system. (Our questionnaire didn’t ask about any specific Linux distro or variant of Windows because different people used different OS distributions or versions, so it would've been difficult to gather responses specific to a single OS.

We consider eight major attributes and had asked our respondents to answer based on these below:

- Ease of installation
- Ease of management/ administration
- Security
- Reliability

- Flexibility
- Scalability
- Availability of skilled support staff
- Total cost of ownership (TCO)

For the assessment of both OS, respondents were approached to demonstrate which OS is better keeping in mind about every one of the eight attributes, as follows:

- Linux much better
- Linux somewhat better
- Linux and Windows are about the same
- Windows somewhat better
- Windows much better
- No opinion
- Other: _____

In our investigation, we have not considered the reactions for "no opinion" and averaged all the other responses afterwards. Then, we requested that respondent's show which of the accompanying best portrays their essential involvement with both OS:

- User
- IT manager
- System administrator
- Engineer / programmer
- None
- Other: _____

The second question thus allowed us to open the survey to all willing participants and categorize responses in our analysis according to the respondents' experience.

Let us discuss in detail now our key four areas:

1. Cost:

   Windows 10 Licenses is priced at $139 for Home $199.99 for Pro. Pro version is usually best suited for businesses, large enterprises, or businesses. Businesses that need a more powerful and faster OS mostly buy Windows 10 Pro for Workstations License, which usually costs $309. While this option may be affordable for small businesses with limited technical support, it would become quite expensive for many large businesses and corporations.

   Linux, then again, is totally free. It is authorized under the GNU General Public License, which takes into account the free circulation of the Linux source code. Anybody can change the code to suit their particular requirements as long as the code is never sold at a cost. It is likewise essential to note that many organizations give subscription-based backing to Linux at an ostensible charge. Red Hat, of the many organizations that give Linux support, offers Red Hat Enterprise Linux with an essential help membership for $349, which incorporates Web support, 2 workday reaction, and limitless episodes. The secret expense in Linux lies in its backing and upkeep.

   Windows likewise underlines that Windows Server diminishes the Total Cost of Ownership (TOC). Anyway, once a Linux server is appropriately introduced and custom-fitted to your requirements, it is fundamentally more expense productive to keep up with over the long haul.

2. Security:

   Because Windows is built on the Windows component, it is vulnerable to various security threats. Song (2006), Stinson (2006), Lee (2006) and Albee (2006) state in their research that in the last quarter of 2006, 11,000 malware applications for Windows were discovered. Botnets have also become a threat to Windows. Botnets are a collection of infected computers controlled by vengeful individuals, and they're commonly used to launch large-scale denial-of-service attacks. Song X

(2006), Stinson (2006), Lee (2006) and Albee (2006) again state in their research that Microsoft argues that Windows is designed to be secure. The closed-source strategy used by Windows only allows Microsoft's software engineers to repair flaws. Microsoft continues to claim that closed source provides a faster and more viable response to security vulnerabilities or defects. In any case, major changes and updates are only released once a month after extensive programming and testing. It is common for bugs and security problems to go unpatched for an extended period. There are numerous flaws in Microsoft's design that render it defenceless in the face of security threats. Many people mistakenly believe that Windows is the primary source of security vulnerabilities and malware simply because it controls the largest share of the overall market. With Windows' multiple hidden security flaws, it's easy to see why it's frequently compromised as technology advances.

The security model for Linux traces its roots back straightforwardly to UNIX, which was the first to perform various tasks and stage a convenient PC working framework. UNIX, from the start, isolated manager honours from those of the typical client, something that Windows didn't carry out until they understood that individuals would really be involving their working framework for more than one client. The UNIX working framework likewise used the principal encryption strategies to be utilized on PCs and fostered a framework that permitted PCs to speak with each. Since the main PCs networks connected these enormous PCs together, it was important to guarantee security across the organization and guarantee that information parcels got to their expected objections. The Linux working framework has acquired all of its safety efforts and plan from UNIX and has even as a rule added to it. The UNIX working framework splits control between typical clients and one superuser, known as root. All clients, naturally when they login onto the framework, start as ordinary clients and afterwards can turn into the superuser assuming they know the right secret phrase. This keeps an amateur client from accidentally making a system-wide change that could carry the framework to a crushing stop. It likewise shields an ordinary client from rolling out any damaging improvements to the framework that could endanger the utilization by different clients on the framework. In the UNIX framework, each record and interaction has a place with a particular client and a particular gathering. Each document has explicit consents for the proprietor, gathering, and others that incorporate read, compose and execute access. The root client can execute any document with execute consent and read, compose, and adjust any record on the file system. This model guarantees that main the right individuals approach records and orders.

Because major framework alterations must be refined as superusers, it is incredibly impossible for someone without sufficient honours to annihilate a framework. While an aggressor can still exploit a bit of security flaw, with many people contributing to the code, a security flaw can be fixed in a matter of hours. However, repairing a security hole in Windows may take some time.

3. Configurability:

Windows frameworks are restricted by the need to have a real face to appropriately keep up with and arrange the OS. Rather than having the option to effectively add new security elements and components, Windows solid plan makes it hard to effectively add another security module to the current framework without doing a significant framework upgrade. All the security includes that accompany the arrival of a specific Windows programming discharge are the main elements that will be accessible to the framework chairman. In terms of client validation, Windows is utilized to constrain clients and customers to demonstrate their character to the framework. While Linux based verification takes into account validation from Windows-based customers, Windows then again will just verify Windows-based customers.

Linux is designed to be tailored to the client's specific requirements. Because Linux is an open-source program, anyone can download it, modify it, and then recompile it to meet their own needs. Likewise, since Linux isn't restricted by the dependence on a graphical point of interaction, the clients can ordinarily exceptionally tweak projects to do precisely what they need them to do and to assume that they need more control, they can even dig into shell prearranging to robotize and further alter explicit errands. Because of Linux's particular plan, it doesn't dependably need to depend on explicit exclusive programming to achieve errands. Linux machines can be changed to meet the particular requirements of every single client. While it may require some investment to arrange and alter Linux to your necessities, the practically unlimited quantities of ways you can tailor Linux incredibly dwarf how much time taken.

4. User-Friendliness:

No other operating system comes close to Windows in terms of Ease of use. What more could you ask for than a simple "point and snap" environment with a great GUI? While Windows isn't as safe as Linux right out of the box, it is far easier to set up and install. It is possible to set up, install, and design Windows in a few hours. The majority of Windows' utility may be discovered through simple "point and snap experimentation," and the Windows help system does an excellent job of answering the most insignificant questions that a novice director could have. In Windows, every possible adjustable option is directly at your fingertips. While Windows is really simple to use, it also implies that most people with regular PCs will install Windows, which means they will be less secure, less up to date, and provide fewer administrations than Linux. On

the other hand, Windows can be the best option if you require an operating system that you won't have to hire a PC professional to manage or buy a book to learn Linux.

On the other hand, Linux may appear to be a little more intimidating to the typical PC user and occasionally even PC chairman. While many Linux distributions now include a graphical user interface (GUI), such as Gnome or KDE, others do not and rely only on message-based commands. This puts the client in a position where he must learn how to investigate and construct a Linux machine entirely using text-based commands. Linux includes an implicit handbook known as the man pages that allows users to see all of the unique features that each programme or order offers. This manual covers a wide range of commands, including shell commands and even commands for new programming languages such as C. It's also possible that most Linux newbies will require extensive documentation and experience before they can properly explore on a Linux machine. This knowledge can be found in online Linux client networks, websites, and publications. To someone who is very informed about Linux, Linux might be considered extremely simple to comprehend in many respects. It has also been widely reported that Linux is generally safer, better maintained, and provides more support than Windows because understanding the Linux operating system requires someone with above-average PC abilities.

Table 2 shows a brief comparison and description of Windows 10 and Linux Ubuntu in these key areas based on the above factors.

Table II. Brief Comparison of Windows and Linux

OS	Availability (Source Code)	User Modification	Usability (User-Friendliness)	Security	Cost
Windows	Proprietary (Not freely Available)	User cannot modify in OS independently	Window provides Ease of use and a nice GUI	Improved security than the previous version but still not that secure.	The cost of software and OS is high as it is proprietary.
Linux Ubuntu	Open Source (Freely Available)	Users can easily Modify the OS as source code freely available	Widely used by programmers and gained much attention in a few years.	Very Secure and safe to use.	Everything is community-based and freely or less costly available.

4. Results and Discussion

One method for assessing the after-results of this study is to view the short examination between the two OS as displayed in Table 2.

Another way is to look at the number of traits where every system was evaluated better than the next, as displayed in Table 3 and Table 4. According to this viewpoint, Linux is the champ, leading the pack in five out of eight classes. (By and large) that Linux is "to some degree better" than Windows as far as security, unwavering quality, adaptability, versatility, and all-out cost of possession. (By and large) is "fairly better" as far as simplicity of starting establishment, simplicity of on-going organization, and "much better" as far as accessibility of gifted care staff.

Table III. Windows Vs. Linux Survey Demographics

	Linux Users	Windows Users	Other Users	Total
User	10	20	10	50
IT Manager	0	0	0	0
System Admin	0	0	0	0
Engineer / Programmer	40	10	10	60
Other	0	0	0	0
Total	50	30	20	100

As demonstrated before, there are contrasts in intensity between how System Admins and IT Chiefs see each operating system in any case.

These distinctions give the detailed reactions for system admins with experience on both operating systems versus IT chiefs with obligations regarding both operating systems versus all survey respondents. The investigation on the general benefits of each operating system and gives rules to picking between Linux and Windows depending on these eight attributes.

Almost 54.5% of users are windows based, and the other is Linux or MacOS based in our survey.

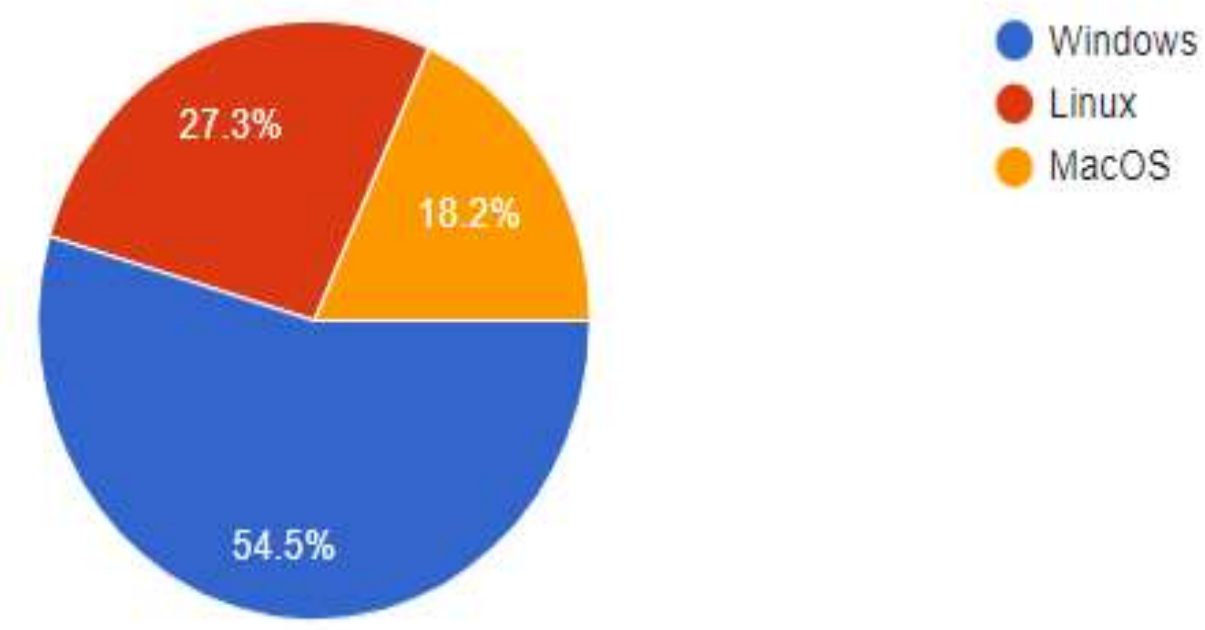

Fig. 3. Different OS Users in Survey

In terms of simplicity of installation, the majority of respondents (45.5%) preferred Windows.

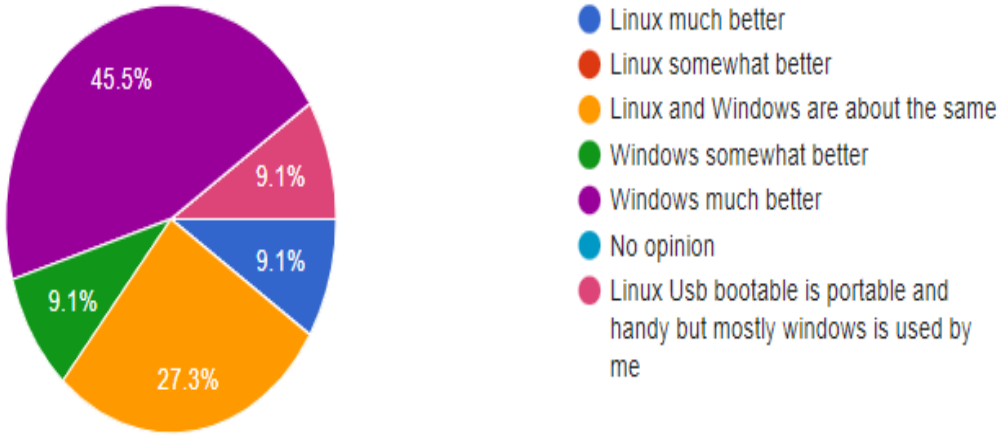

Fig. 4. Ease of Installation Graph

The majority of the respondents, i.e. 27.3%, opted for either no opinion or that both windows and OS are about the same in terms of Ease of administration.

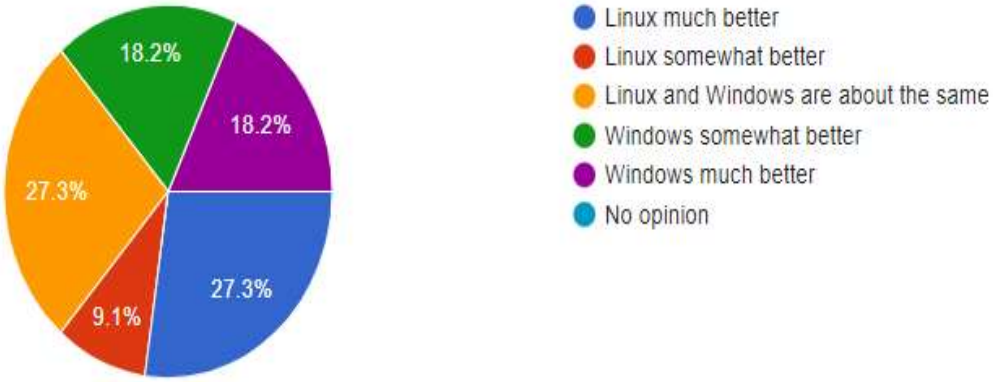

Fig. 5. Ease of Administration Graph

In terms of skilled staff availability, most respondents (63.6 percent) preferred Windows.

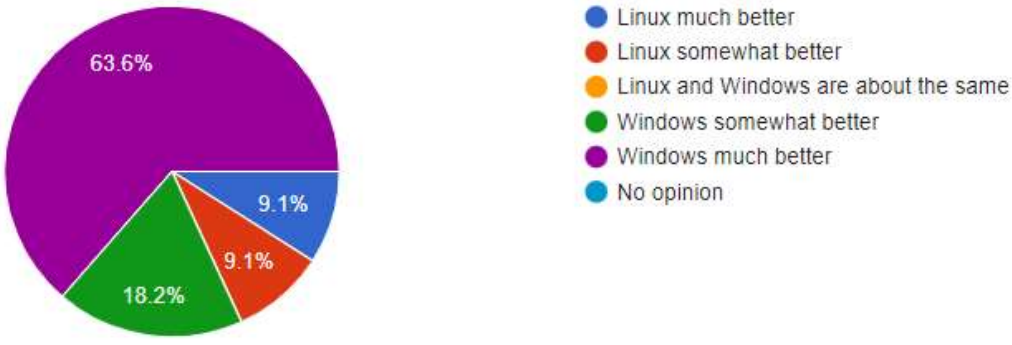

Fig. 6. Availability of Skilled Staff Graph

The majority of the respondents', i.e. 54.5%, opted that Linux is much better in terms of Scalability.

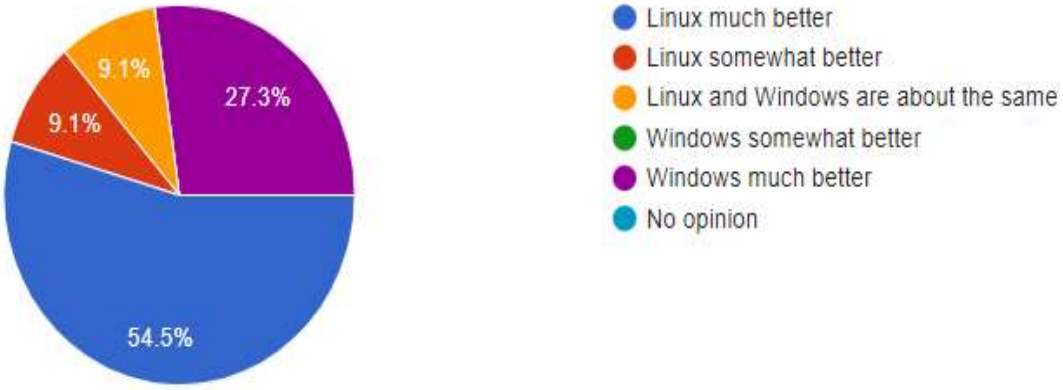

Fig. 7. Scalibility Graph

The majority of the respondents, i.e. 54.5%, opted for Linux much better in terms of reliability.

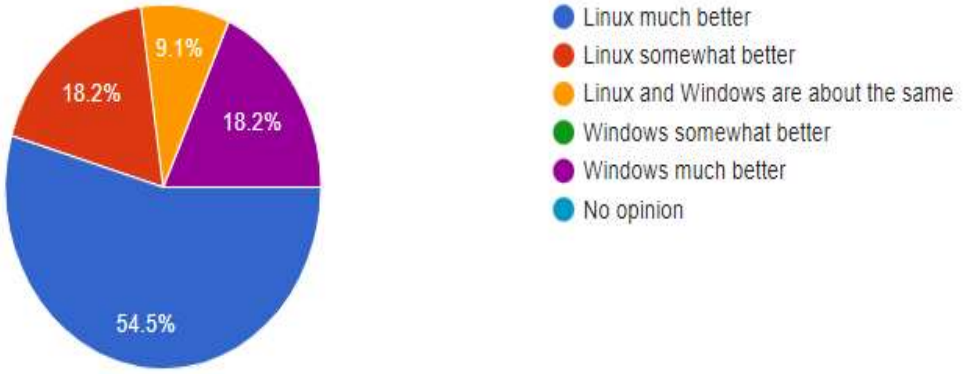

Fig. 8. Reliability Graph

The majority of the respondents, i.e. 90.9%, opted for Linux much better in terms of security.

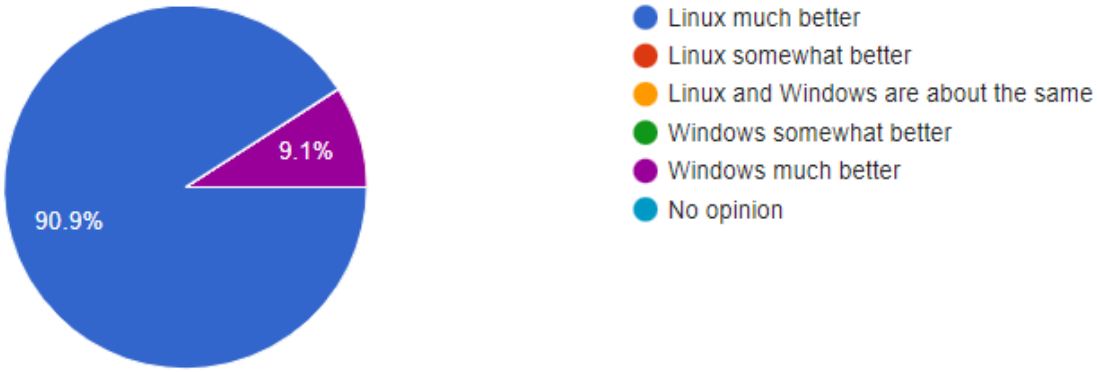

Fig. 9. Security Graph

The majority of the respondents, i.e. 63.6%, opted for Linux much better in terms of Total Cost of ownership.

Fig. 10. TOC Graph

The majority of the respondents, i.e. 81.8%, opted for Windows much better in terms of User Friendliness.

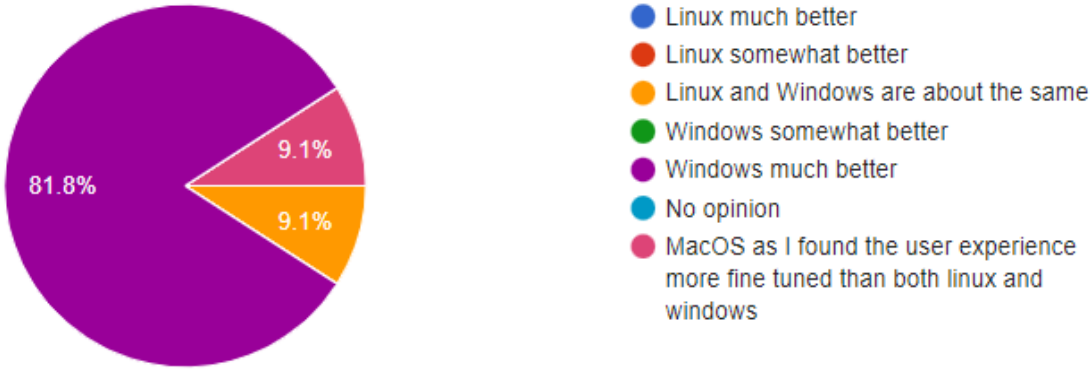

Fig. 11. User Friendliness Graph

The majority of the respondents, i.e. 45.5%, opted for Linux much better in terms of Flexibility.

Fig. 12. Flexibility Graph

The majority of the respondents, i.e. 54.5% in our survey, were Engineers or Programmers.

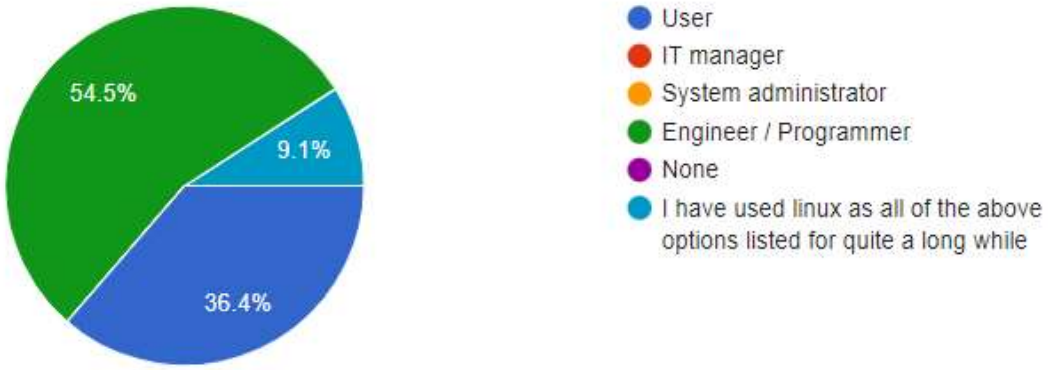

Fig. 13. User Role Graph

No single operating system 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.

TABLE IV. Attributes Summary Linux Vs. Windows

	Linux	Windows	Same
Ease of Installation		Somewhat better	
Ease of Administration			About the Same
Availability of skilled staff		Much Better	
Scalability	Much Better		
Flexibility	Much Better		
Reliability	Much Better		
Security	Much Better		
Total cost of ownership (TCO)	Somewhat Better		
User Friendliness		Much Better	

While assessing Windows versus Linux as an operating system, our survey gives knowledge on the general benefits of each operating system. IT admins and managers can utilize this knowledge to settle on informed choices on the operating system that best meets their organisations' specific requirements and needs.

5. Conclusion

Linux and Windows will continue to compete in the operating system market. Following a comparison of the essential aspects of both operating systems that are generally critical to the operation of a respectable system, Linux should be your choice if you are looking for a secure, cost-effective, stable system that allows for the most configurability. Windows leads the way in terms of user-friendliness, and it's ideal for a system that's simple to manage and won't perform crucial activities. In general, Linux provides more functionality and a more secure environment, both of which are critical for a successful system.

References

[1] Cabrera, J. (2009) Windows vs Linux: A Comparative Study.

[2] Chaudhary, V, Kuldeep K, and Mikanshu R. (2008). OPERATING SYSTEM SELECTION USING AHP ON THE BASIS OF SECURITY, PERFORMANCE AND COST. *International Journal of Computing and Business Research (IJCBR) ISSN (Online):* 2229-6166

[3] Kong, M., Li, J., & Fengming, W. (2010). Study on the educational model of Linux majors in colleges. 2010 International Conference on Artificial Intelligence and Education (ICAIE). 5(2).

[4] Song, X., Stinson, M., Lee, R., & Albee, P. (2006). An approach to analyzing the Windows and Linux security models. 5th IEEE/ACIS International Conference on Computer and Information Science and 1st IEEE/ACIS International Workshop on Component-Based Software Engineering, Software Architecture and Reuse (ICIS- COMSAR'06).

[5] Severini, H., Neeman, H., Franklin, C., Alexander, J., & Sumanth, J. (2008). Implementing Linux-enabled Condor in windows computer labs. 2008 IEEE Nuclear Science Symposium Conference Record

[6] Li, R., Yang, N., & Ma, S. (2012). An Approach of Windows Memory Management Simulation on Linux. 2012 Third World Congress on Software Engineering.

[7] Li, R., Yang, N., & Ma, S. (2012). An Approach of Windows Synchronization Mechanism Simulation on Linux. 2012 13th International Conference on Parallel and Distributed Computing, Applications and Technologies.

[8] D'Elia, M., & Paciello, V. (2011). Performance evaluation of LabView on Linux Ubuntu and Window XP operating systems. Paper presented at the 2011 19thTelecommunications Forum (TELFOR) Proceedings of Papers.

[9] Casadesus-Masanell, R. and P. Ghemawat, (2003). Dynamic Mixed Duopoly: A Model Motivated by Linux vs Windows. Harvard Business School Working Paper 04-012.

[10] Economides, N. and E. Katsamakas, (2006). Two-sided competition of proprietary vs open-source technology platforms. Management Science, forthcoming.

[11] Giri, N., Nandgaonkar, V., & Gosavi, R. (2017). The virtual operating system for Windows to Linux migration. Paper presented at the 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS).

[12] Zhou, Y., & Yan, J. (2012). Experimental evaluation of TCP implementations on Linux/Windows platforms. 2012 21st International Conference on Computer Communications and Networks (ICCCN).

[13] Keir T. (2005) Beginning Ubuntu Linux[M]. New York, USA: Springer-Verlag New York Inc, (2005).

[14] Pangaria, M, Shrivastava V and Soni P. (2012). Compromising Windows 8 Metasploit's exploit, Technology, 7(2). 119-123.

[15] Edwards, K (2005). An economic perspective on software licenses: Open source, maintainers and user-developers, *Telematics and Informatics, 22*(1), 111-133

[16] Jesum M. (2009). Macro-level software evolution: A case study of a large software compilation, *Empirical Software Engineering, 14*(3), 262-285