

Microsoft Windows Vista vs. Ubuntu Linux: An Analysis of Competing Computer Operating Systems

For
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Dear Ms. Stetz-Waters,

Enclosed in this report is a comparative analysis of two major computer operating systems, Windows Vista and Ubuntu Linux. This has been a very interesting line of research and I have enjoyed the process.

My conclusion regarding this issue is inconclusive as far as one system being superior to the other outright. Rather, I have found that it is more helpful to make this decision on a case by case basis depending on a variety of criteria tailored specifically to each individual computing objective and setting; be it for business, education, or home use. However, I believe this report is a helpful starting point for identifying just what those criteria may be, and gaining a basic understanding of general differences and similarities between Vista and Ubuntu.

My biggest challenge was identifying the most important areas of comparison given the general focus of this report. It was also difficult to locate accurate and up to date numerical data in some of these areas as this is a complicated and rapidly changing field of study.

Nevertheless, I believe this report is quite informative and manages to grasp important and relevant topics of comparison and I think that you will agree.

Sincerely,

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Abstract

Every computer is run on a user interface called an operating system or OS. Two of the foremost OSs to emerge recently are Windows Vista and Ubuntu Linux. There is a lively ongoing debate in the computer community over which is the superior operating system in today's computer industry. The debates range from technical to political. Some important factors in the technical side of these debates are retail price, system requirements, security issues, hardware support, software capabilities, customization, and ease of use. This report examines the differences and similarities of these two OSs regarding these factors. Comparative analysis shows inconclusive results regarding OS superiority. It is recommended that OS choices are made on a case by case basis dependant on specific usage criteria.

Important Terms

Open source software is software which is not encoded. In other words, its inner workings are not hidden from the general public. It is written in human-readable language (as opposed to machine-readable) and is, therefore, available to be viewed and analyzed by any person who opens its files in a regular text editing program. Open source software is usually accompanied by minimal intellectual property restrictions, if any at all, to promote community based innovation and advancement to the software. Recently, there has been a movement in the software development community to move away from encoded software to open source. The belief is that open source programming promotes software innovation, whereas encoded source is believed, in some circles, to hinder development. The Linux operating systems are based on open source software.

Proprietary software is the intellectual property of the company or programmer who creates it and is protected under copyright laws. It is generally encoded and only machine-readable, that is, the source or program code can only be decoded by special software used by its owners. Encoded software is often difficult to reverse engineer, and thus, it is not easily stolen and reused by other competing developers. Many software developers choose to encode their software in order to ensure that a return can be made on their expensive investment in developing new software. Many advocates of proprietary software make the point that this kind of market security is essential to the advancement of innovative computer technology because the best programmers can be pooled with vast corporate resources to produce high quality software for any variety of specialized computer applications. The Windows operating systems are based on proprietary software.

Introduction

As computer technology is rapidly advancing and becoming ever more complex, and as computers are becoming more prevalent in and essential to business, education, and home life, many computer users are becoming aware of the different computer operating systems (OSs) that are available, and are beginning to explore their options in this area. This report focuses on two OSs: Windows Vista and Ubuntu Linux. While most users are familiar with some version of Windows, many are relatively or completely unaware of the emergence of Linux as a legitimate competitor to Windows and other OSs. Both Windows and Linux have been advancing at such a quick pace in recent years that an investigation into the capabilities of each OS is pertinent to these three categories of computer users.

The intent of this report is to compare these two operating systems and determine whether one may have a great number of advantages over the other in the three general usage areas of business, education, and home use.

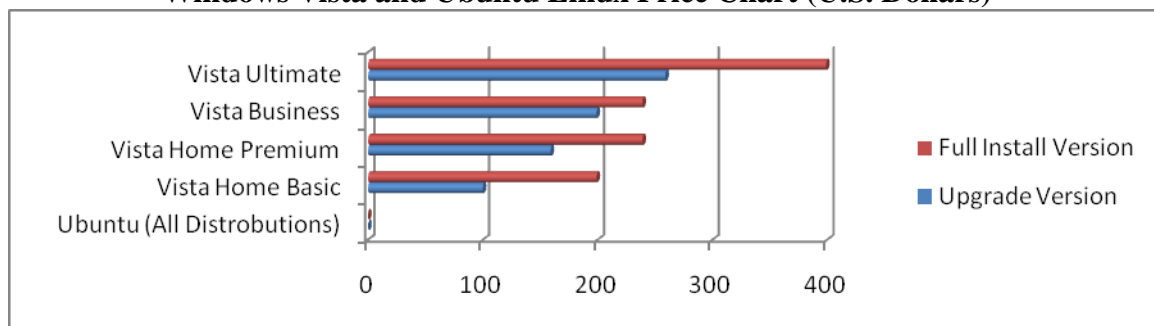
While debates within the computer community are lively, it seems as though a conclusive ruling on this matter may be impossible, as both systems have very similar general capabilities (such as email, web browsing, imaging, office tools, and multimedia) but have differing advantages and disadvantages based upon many factors. One OS may be preferable to the other depending on issues relating to hardware, intended use, budget, varying levels of computer experience, and even the user's personal politics.

Important Findings and Data

Prices

While Windows Vista distributions are currently priced between \$99 for an upgrade version of Vista Basic and \$399 for a full install of Vista Ultimate (Castle), Ubuntu distributions can be downloaded legally at for free or can be obtained on a CD for free through their website (ubuntu.com). This is one of the major advantages Linux has over windows. In addition, Windows is usually only liscenced to be installed on one computer per purchase, while Ubuntu can, under most circumstances, be installed legally on as many machines as needed free of charge. This is beneficial to home users, but even more so to schools or businesses, where the cost of setting up large Windows networks can be very substantial.

Windows Vista and Ubuntu Linux Price Chart (U.S. Dollars)*



*(Castle. "What are the Windows Vista Prices?")

System Requirements

The minimum hardware requirements for an OS can be a major factor in deciding which system to install. Both Vista and Ubuntu have several different versions to choose from, many of which have differing requirements. Minimum requirements can be deceiving however and it is best to check for “recommended requirements” instead to get a better idea of what hardware a decently fast setup will require. Below is a chart comparing the recommended requirements of versions of Vista and Ubuntu.

Recommended Systems Requirements for Windows Vista and Ubuntu Linux PCs*

Operating System	CPU	RAM	Hard Drive Space	Other Requirements
Vista Home Basic	1 GHz 32-bit (x86) or 64-bit (x64) processor	512 MB	20 GB	- DVD-ROM Drive - Audio Output - Internet access
Vista Home Premim, Vista Business, Vista Ultimate	1 GHz 32-bit (x86) or 64-bit (x64) processor	1 GB	40 GB	- DVD-ROM Drive - Audio Output - Internet access
Ubuntu, Gobuntu	500 MHz 32-bit (x86) or 64-bit (x64) processor	256 MB	4 GB	- CD-ROM Drive - Internet access
Kubuntu	500 MHz 32-bit (x86) or 64-bit (x64) processor	256 MB	3 GB	- CD-ROM Drive - Internet access
Edubuntu	500 MHz 32-bit (x86) or 64-bit (x64) processor	256 MB	2.5 GB	- CD-ROM Drive - Internet access
Xubuntu	500 MHz 32-bit (x86) or 64-bit (x64) processor	192 MB	1.5 GB	- CD-ROM Drive - Internet access

*(Microsoft.com, Ubuntu.com)

Ubuntu’s major requirements (RAM, Hard Drive, and CPU Speed) are substantially lower than those of Windows Vista. In fact, all the Ubuntu requirements are at least half of those of Vista. Most new computers already meet Vista requirements, except for RAM, which can be cheaply upgraded. However, many older computers will not require any sort of upgrade to run Ubuntu. This can mean vast savings in business and educational settings where a large number of computers are already deployed.

The same is not true regarding schools and businesses who wish to upgrade to Vista. In November 2007, Michael Cherry, an analyst at Directions on Microsoft, warned, “It appears that many organizations view Vista as fine for new hardware, but not for upgrades to existing hardware. I am recommending that businesses wait for Vista until they do a hardware refresh and then get it preinstalled.” (eWeek 11/17/07)

Viruses and Security

Windows users with internet access are well aware that viruses and spyware pose a frequent problem. Anti-virus and anti-spyware software are available (usually subject to purchase and subscription fees), but malicious software is developed at such a high rate, that these programs can never be fully up to date. Linux systems, on the other hand, have the reputation of being incredibly resistant to these threats due to certain security features built into the basic parts of the system. Specific user privileges must be enabled to alter any important system files and these privileges are locked by a root password known only to the system administrator. In Ubuntu Linux, a special system login is required to even access some of these privileges providing several lines of defense against an attack. Linux also has very frequent system updates (usually every few days) compared to Windows (about once a week or less), adding another advantage to the platform. While theoretically it is certainly not impossible that a virus could be written to attack a Linux computer successfully, I was not able to find a confirmed case of this actually happening. An attacker would most likely need physical access to the computer or be able to trick the user into providing their root password in order to hack into the system. It is possible, however, for Linux machines to become infected with viruses through email that could then be passed on to Windows users, although the Linux machine itself would not be harmed. (wikipedia)

Despite advances in security in both Vista and Ubuntu, the greatest security threat comes in the form of social engineering. That is, users are tricked into installing malware onto their machines or giving up personal information online. As always, this problem is not especially OS specific. The best solution lies in a user's own judgment.

Hardware Support

Because Windows currently holds the vast majority of the OS market worldwide, most hardware manufacturers specifically design their products specifically for use with Windows. For this reason alone, Vista has the upper hand when it comes to supporting a broad selection of video cards, motherboards, modems, printers, cameras, and other hardware. Vista does have some trouble in this area, though, due to major changes in the way this version of Windows deals with hardware. Many hardware issues can be solved by installing Vista drivers provided by the hardware manufacturer, but some can not.

Linux in general has had tremendous hardware support issues from the start, and although Ubuntu has made great progress in recent months, the fact remains that many hardware vendors are wary to invest in providing Linux support for their products. This is not true for all companies, some have been readily doing so for years and more appear to be taking interest in the Linux market all the time. For example, both Compaq and IBM are now manufacturing computers specifically with Ubuntu preinstalled and Wal-Mart has begun selling an inexpensive computer with its own version of Ubuntu called gOS. (eetimes.com). This progressing interest should lead to better hardware compatibility in the near future, but for right now, some devices can take weeks for even an experienced computer user to get working.

Software

Support for existing software is a major issue for Vista as this excerpt from the November 12, 2007 eWeek describes: “‘We are holding out against Vista as long as possible as it will require new hardware, and a lot of the software that we use is not compatible with it at this time.’ said Schumacher, whose company has 250 employee machines.” (eWeek) Vista is having backwards compatibility problems due to a new software infrastructure within the OS. This is causing problems from those who need to use certain existing software to maintain continuity in their computing techniques.

On the other hand, Ubuntu users can encounter much the same problem. Most of the software in common use by businesses is designed for Windows exclusively and therefore, will not run in a Linux environment. There are workarounds for this issue, for example a user can install a program called Wine which can be used as “a compatibility layer for running Windows programs [in Ubuntu]” (winehq.org). Many Windows programs can be made to run on Linux systems this way, although often some kind of functionality is lost. Another workaround is to run a Windows program on a virtual machine (a virtual version of Windows on a Linux computer) through software such as VMware.

Although software compatibility between the two OSs can be problematic, it should be noted that there is software available for each OS that can perform the same basic tasks. Below are some examples of equivalent software between the Vista and Ubuntu platforms.

Windows/Linux Software Equivalences*

Computing Task	Windows Vista	Ubuntu Linux
Email	MS Outlook	Mozilla Thunderbird
Instant Messaging	AIM, Windows Messenger, ICQ	Pidgin (incorporates Windows IM networks into one program)
Office Suite	MS Office 2007	OpenOffice.org
Digital Imaging	Adobe PhotoShop	The gIMP
Web Browsing	Firefox, Netscape, IExplorer	Firefox, Netscape, Opera
File Sharing	LimeWire	FrostWire
Video	Windows Media Player	VLC, MPlayer
Music	Winamp, iTunes	XMMS, RhythmBox

*(http://wiki.linuxquestions.org/wiki/Linux_software_equivalent_to_Windows_software)

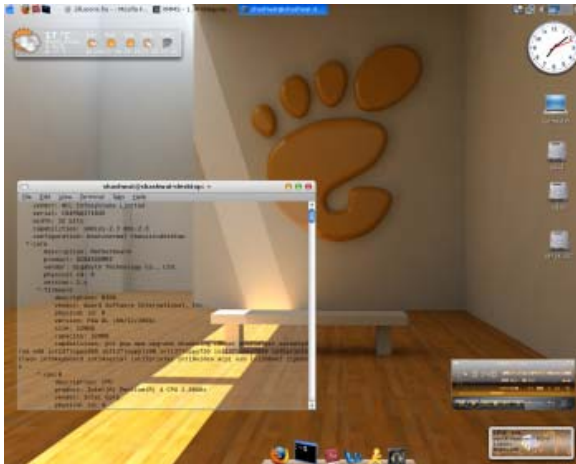
This is only a small sample of software equivalencies available to users of Vista or Ubuntu. A more complete listing can be found at the BeetleSpace Windows/Linux Software Table of Equivalents (http://www.nawaz.org/wiki/index.php?title=Table_of_Equivalents).

Ubuntu has an added advantage in this area because most of its software is free and can be downloaded instantly from the internet through its “Add/Remove Programs” function. This means a user can try out many different programs for a specific task until finding a favorite without spending any money. This could be a costly process for a Vista user if they were to try several different office or digital imaging suites, although there certainly are many free programs for Windows as well, including most Linux programs.

Customization

Both Ubuntu Linux and Windows Vista boast impressive capabilities for customization. With a fast processor, lots of RAM, and a supported video card, unprecedented visual customization is possible on either OS. Generally speaking, the more impressive set-ups will involve more expensive hardware, but this applies fairly evenly across both platforms. Vista and Ubuntu also have some unique 3d desktop abilities although, once again, these may require more advanced hardware than the average user is willing to pay for at this point. Below are some screenshots of customized desktops from each platform.

Ubuntu



(from Tux Enclave)

Vista



(from Paul's Computer Service)

While the general customization abilities of Vista and Ubuntu are quite similar, Ubuntu may have a slight advantage as fewer additional programs are required to accomplish a complex customized desktop as are in Vista. (Norton) Once again, this really depends on the preferences of the individual user. These advanced visualizations are not in any way necessary for performing basic tasks.

Ease of Use

As most computer users have grown accustomed to systems running Windows 98 or Windows XP, ease of use in Vista or Ubuntu relies heavily on users' desire to try something new. Both these OS's are different enough from 98 and XP that they require a user to, in some ways, relearn how they use their computer. Vista has had many complaints in this area and Ubuntu would probably receive the same criticism if its users expected the same kind of similarity to their familiar Windows systems as many Vista users do. This sort of discomfort with change has actually been a major hindrance to both Ubuntu and Vista. Many computer users may, on some level, feel that they have invested enough in learning to use XP and do not have the desire to repeat the process with either of these newer systems.

For those users who have either overcome this discomfort, or have been enticed by the challenge, there have been reports of great satisfaction with these two systems. The majority of these users seem to, in general, belong to a more computer literate demographic than the general populace.

Conclusion

Interpretation of Findings

In researching the differences and similarities between Ubuntu Linux and Windows Vista, two topics of interest stood out above the rest. Those are the topics of retail price and recommended system requirements. One reason is that these two areas are the most objective and easiest to quantify with hard data. The other reason is that Ubuntu Linux seems to be superior in these areas. Ubuntu is completely free and requires very minimal hardware in comparison with Vista. While these facts do not necessarily make Ubuntu a better operating system, they are definitely worth consideration by anyone looking into installing one of these systems.

In the area of security Ubuntu seems to have a slight advantage, but because this is an area of the computer industry which changes on a daily basis, the slight perceived advantage may not actually be as important as the judgment of an actual computer user who uses online resources.

Ubuntu and Vista also seemed to be more similar than they are different regarding the subjects of hardware, software, customization, and ease of use. Again, any real advantage of one system over the next seems to hinge on the intent and preference of the individual user and is not necessarily inherent in the actual OS.

In light of the findings of this research, it is apparent that any answer to the question of superiority between these two systems is inconclusive. It may not be possible to determine which is a better OS in any sort of objective way and is certainly not possible from such a general focus. Ubuntu or Vista may outperform one another on specific, individual tasks or processes, but neither does overall.

Recommendation

My recommendation to any business, school, or individual computer user trying to decide which of these OSs (if either of them) is the best choice for their computers is to identify the specific tasks and purposes that will be important for their computers and do some research into the feasibility of upgrading to either system, keeping in mind the financial differences between the two. It may also be that more time is needed to watch the developments of these and other operating systems to see which one is most on track with these specific usage intentions.

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