Windows® vs. Linux® in Corporate Environments

INFORMATION FOR IT MANAGERS

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ince the dawn of personal computing, proprietary solutions, such as those developed by Microsoft, ruled Silicon Valley. The key to their phenomenal success could be found in the depth of their source codes and, similar to the way most people would keep a valuable treasure, it was kept under lock and key. Open source solutions became a viable alternative to their proprietary counterparts sparking a movement toward overcoming proprietary standards.

Insisting on being everything Microsoft wasn’t, open source developers claimed to provide innovative solutions with flexibility, scalability, as well as greater functionality and security all at a cost-effective price. Microsoft and other proprietary vendors, of course, dispute this claim insisting that their solutions are superior in every way. In the interest of revenue, and converting opposite-side loyalists, this debate has been raging on for years, with no end in sight. In the light of each side’s claims, the questions still remains—are open source solutions the best choice, or is Microsoft still the reigning king?

This paper will provide readers with an understanding of both open source and proprietary methodologies and help explain why Linux and open source is the driving force behind the future of computing.
In the software world there are basically two roads an IT decision-maker can take. They consist of the familiar road (Proprietary) or the road less traveled (Open Source). As in the Robert Frost poem, the road less traveled could very well make all the difference in your IT environment. The key to understanding both sides is to first recognize how the two methodologies differ. What makes one solution superior to the other? Does one offer a more effective way to conduct business then the other? How can each of these opposing viewpoints benefit you as the consumer? Learning the philosophy and goals of each side is an essential step in determining the best solution for your organization.
Often referred to as “free software”, open source software is free in the sense that it freely allows anyone to change, enhance, and redistribute the program as they see fit. However, it does not necessarily mean free of charge. Although many open source programs are available at no cost, there are countless others that charge an initial fee for the program but freely provide the source code.

The most popular form of open source software is the Linux operating system. Created utilizing parts of the Unix operating system and the GNU project, Linux has achieved mainstream adoption with improved distributions from popular vendors like Red Hat, Novell, IBM, and Guardian Digital.

Driven by the Open Source Initiative (OSI), developers of software allow the code to be freely shared, enhanced, and redistributed. Those that chose to create or re-distribute open source software can use the Open Source trademark if their distribution terms conform to the OSI's Open Source Definition. Among other things this model requires that:

- The software being distributed must be redistributed to anyone else without any restriction;
- The source code must be made available (so that the receiving party will be able to improve or modify it);
- There can be no discrimination against persons, groups, or fields of endeavor;
- The license can require improved versions of the software to carry a different name or version from the original software.

**Open Source** (adj). A method and philosophy for software licensing and distribution designed to encourage use and improvement of software written by a network of volunteers. Through this system, a program’s source code is made available to all interested parties for use, modifications, and improvements. Frequently a product of a collaborative environment, open source software is typically created by a number of developers and made freely available to all who wish to utilize it.
Proprietary Software (adj.) Refers to software that is owned by an individual or a company and is protected from unauthorized use by patents, trademarks and/or copyrights. Such software is often sold or licensed to other individuals or organizations, usually with strict restrictions regarding its use, modification and further distribution.ii

The most prominent vendor of proprietary software is Microsoft. Along with the purchase of Microsoft programs, users receive a license to utilize those programs. Source codes are kept hidden to prohibit user modification and re-distribution. Proprietary vendors contend that the information contained in the source code is Intellectual Property and that it is best utilized and protected by remaining kept from the public. This approach to development has been the standard for many years, and corporate developers like Microsoft are actively fighting to maintain its efficacy.
Given the dominance of Windows and Linux as the most prevalent operating systems available, the debate as to which platform holds superiority thunders on. With Linux strongly becoming the arch nemesis of the “Windows Empire”, mud slinging between the two communities has been consistent and fierce. Windows claims Linux is burdened with security issues, insufficient technical support, inconsistent interfaces, and instability. Linux developers, on the other hand, accuse Windows of being more susceptible to attack, unstable, inflexible, promoting vendor lock-in, and of lesser quality.

As in everything else, the truth is always somewhere in the middle. Both have their advantages and disadvantages when implemented in a corporate environment. Similarly, each operating system has the ability to adeptly perform the functions they claim to do, but most decision-makers desire the most for their money.

How do these rivals stack up in the way of security, functionality, compatibility, innovation, usability & support?

The following section of this paper will explain the perceived advantages and disadvantages of both to help IT decision makers identify the areas that are most important to them in choosing an operating system.
The Advantages of Windows

User-Friendliness
As touched upon earlier, Windows user-friendliness stems from familiarity. Since it is the most popular operating system on the market, users are more familiar with how it operates. Until the recent explosion in Linux adoption, Windows had been the operating system of choice in the majority of worldwide corporations, educational institutions, government sectors, and homes. It is, therefore, it is only natural that a vast majority of users would find it more user-friendly than a foreign system with a unique interface.

Simplified Installation
Program installation on a Windows system is an independent process that takes the user step-by-step through each facet of the install requiring little user input. The installation process does not typically require an advanced knowledge of computers and Windows provides choices of standard or advanced installations. Also, included are recommended choices for those who may be new to Windows and would not have the skills to successfully set it up on their own.

Variety of Software Choices
Considering Windows runs on a vast majority of computers, almost all software is designed to run on it, potentially providing users with more application choices. Moreover, the availability of only one Windows distribution ensures that software written to work with Windows will. Since not all Linux distributions are the same, in some instances software written for Linux does not easily work on all available distributions.

From a proprietary viewpoint, there are many advantages to using the Windows platform. The main advantage of Windows lies within its user-familiarity. Since it was the first mass-marketed operating system on PCs, Windows has become the computing standard. Nearly everyone who learns how to use a computer is taught on a Windows system and therefore, those same people are more inclined to stay loyal to what they know. (It could be argued that if Linux had hit the market first, we may be having conversations regarding switching to the renegade Windows system.) Aside from familiarity, the other proposed advantages of Windows over Linux include user friendliness, simplified installation, and a greater variety of software choices.
The Disadvantages of Windows

Insecurity
Due to the closed source nature of Microsoft, the programs are unable to undergo the rigorous scrutiny and testing Linux systems endure at the hands of the open source community. The limited staff to write and edit the code for vulnerabilities leaves the systems more susceptible to attack and due to its popularity, many more viruses are written to hit Microsoft programs (i.e. Blaster, Nimbda, etc.). These viruses have been known to cause devastating and costly network losses including the destruction or corruption of confidential corporate files. Further utilizing the resources of an entire community, Linux vulnerabilities are quickly and correctly patched. In some cases, Microsoft vulnerabilities are only patched after seeing a problem and many provide only a quick fix and are in need of further attention in the future.

Instability
As the design flaws of Windows are consistently exploited, the stability of the operating system is under constant scrutiny. These flaws are not exclusive to virus and worm exploitation but also to how Windows interacts with other technology. Windows is infamous for not working well with third party vendor products causing slow processing time and system crashes. Additionally, allowing end-users full administrative control of their machine can often times result in the inadvertent corruption of system data providing further instability.

Compatibility
A wide range of software available for Windows PCs often is not fully compatible with certain hardware, causing inconvenience, monetary losses, and system lock-up or software crash.

Customizability
Windows does not provide the ability to customize the program to meet the specific needs of the users or organization. If a particular program does not contain all the functionality, style, compatibility, or security desired, an organization must purchase additional products to fill that void.

It is important to remember that Linux was created as a solution to the unaddressed issues found with Windows. Issues with stability, security, and flexibility provide substantial disadvantages for Windows in a corporate environment.
The advantages of choosing an open source solution like Linux are becoming more apparent every day. As administrators and users are warming up to the idea of utilizing Linux to run servers and desktops. It is quickly being adopted in an ever increasing number of global corporations and government agencies. The reason for this rapid adoption is Linux’s unique ability to provide powerful functionality, security, compatibility, customization at a more cost-effective price than proprietary vendors.

**Availability of the Source Code**
As earlier discussed, open source solutions, like those based on Linux, provide the user with the source code the program was created from. Under the GNU license, Linux and software components are free. Again, free in the sense that users have the right to use, share, modify, and re-distribute that code as long as the altered code also abides by the demands of the GNU license. One of the advantages of this process is the ability for open source developers to rapidly evolve existing software code providing cutting-edge technology much quicker than proprietary vendors. They are able to do this because programmers operating under the GNU license do not need to spend the time writing a program for something that someone else in the community has already created. They are permitted to use the code and improve upon it, promoting programming efficiency and potentially leading to more advanced applications than closed source counterparts at generally a less-expensive cost to the consumer.

**Stability**
Since the basis for Linux was the operating system UNIX, Linux inherits the same stability UNIX established. Designed to run corporate servers, it was essential for UNIX to possess rock-solid stability and Linux users now reap those benefits. Further in the sense of security, fewer viruses and worms are written to attack Linux programs providing unmatched constancy when compared to proprietary vendors.

**Compatibility**
Due to its flexibility and the availability of the source code, Linux systems can be customized to work with any network, running any number of applications, and supported by numerous hardware platforms. Linux systems can run on both Macs and PCs, eliminating common operating system lock-in and providing consumers with viable alternatives to Windows and MacOS.

**Customization**
Similar to the benefits that allow Linux solutions to provide compatibility with the contents of any corporate networks, Linux systems and applications can be customized to fit the individual needs of any corporation. As long as the corporation has experienced Linux programmers on staff or knows where to hire them, nearly any functionality required by an organization can be created off a Linux platform. Unlike proprietary solutions that run on a “what you see is what you get” philosophy, Linux programs allow organizations to request the customization of existing applications to provide a perfect fit. An accomplishment that is seemingly impossible with other solutions.

**Security**
One of the main missions of the open source methodology is to utilize the expertise of thousands of developers in a collaborative network to create secure and powerful solutions for computing. Evolving from the successful collaboration of these programmers is the “Many Eyes” theory regarding security. It is the opinion of the open source community that programs developed in such an environment are subject to much harsher scrutiny due to the “many eyes” analyzing the code. As such, vulnerabilities are identified much earlier, patches are created more quickly, and in many cases are released before users are exposed to any threats.

**Freedom of Choice**
With the ability to modify and improve upon pre-existing code, there are many distributions of Linux available. Most contain similar functionalities but all possess a uniqueness to differentiate themselves from the herd. Although the amount of choice can sometimes be a bit overwhelming, it eliminates vendor-lock-in and provides users with a freedom to choose the right solution for their individual need.
The Disadvantages of Linux

Corporate Stability/Insufficient Support
Software developers realized that to build a market for their product they could not just simply put it on the store shelves. They had to prove the stability of their company, provide professional-grade technical support, and ease the learning curve. They accomplished this by garnering the interest of large investors to back their projects and provide stability to their company. Once they had established stability and began bringing in customers, comprehensive technical support was needed to maintain them. Appropriate documentation was written and technical support teams were created to assist those that required help utilizing the system.

Steep Learning Curve
A steep learning curve was also an obstacle to Linux adoption. Since nearly all users have at one time or another primarily used Windows systems, a switch to a Linux-based operating system represented a dramatic change. With so many distributions of Linux available, there is no universal user interface, therefore each Linux application implemented would require time to learn and become accustom to a new interface. Further, since there are so many distributions of Linux available, there is no common software installation method. Every distribution utilizes different or unique ways to install their software which can potentially lead to a more difficult installation process and results in a dark cloud over Linux’s user friendliness. The most popular Linux vendors, however, have taken steps to minimize this curve by providing users with simplified web-based interfaces (more primitive versions of Linux would need to be administered from the command line) some of which even attempt mirror that of a Windows interface. The learning curve of using Linux has definitely been curtailed as user-friendliness increases; however, Windows is still the most commonly used operating system and arguably the most user-friendly.
As stated before and demonstrated throughout this paper, both open source and proprietary solutions have advantages and disadvantages. The perfect solution is still waiting to be developed so in the meantime it is up to the IT professionals to determine what their organization deem valuable. Do they value price over user-friendliness? Security over variety? Freedom over familiarity? Knowing the answers to these types of questions could make the great Linux vs. Microsoft debate a bit less challenging for the end consumer.

When making this decision it is also important to remember that in a relatively short amount of time, Linux vendors have made incredible strides in developing an operating system that would encompass the values Windows users cherish while at the same time continue to improve upon the ideals open source was invented on. The perceived downfalls of Linux are becoming more obsolete while its benefits continuing to rise. There is no end to the possibilities with Linux and open source software which is predominantly why so many worldwide organizations are making the switch. With Linux establishing itself as a qualified and robust alternative, the years of Microsoft and vendor lock-in domination are quickly coming to a close.
Guardian Digital utilizes the merits of open source architecture to create powerfully functional and secure Internet and network productivity solutions. The open source architecture of Guardian Digital solutions provides users with the most technologically advanced security and productivity features, flexibility, and resiliency not available with closed source counterparts. Using the latest in open source technology, Guardian Digital software can be tailored to fit the individual needs of each organization.

As the market grows and more companies choose to embrace open source, the strength of open source security solutions will increase. With each new user there is another pair of eyes that could help find and eliminate security vulnerabilities, enhance functionality, and further develop the technology of Linux. Enterprises are increasingly becoming aware that the distributed open source development model has a greater potential to protect the security of their online assets than those developed by a single company.

Our server solutions combine the principles of the open source community with the engineering and security expertise exclusive to Guardian Digital, providing users with:

**Increased Quality and Enhanced Security** - Thousands of programmers and users collaborate to create superior code design. With so many people scrutinizing the finished products, vulnerabilities are quickly identified and eradicated.

**Advanced Technology** - Combining the security expertise of Guardian Digital engineers along with the resources of programmers from all over the world, Guardian Digital software encompasses the most advanced security and productivity features available.

**Rapid Evolution** - Release of frequent software updates offers users consistent protection from the newest forms of Internet threats.

**Customization Ability** - The availability of the source code allows organizations to customize particular applications to suite their individual needs.

**Eliminate Vendor Lock-in** - With the flexibility and compatibility of most open source applications, there is no longer a need to be a slave to a single vendor solution.

**Scalability** - The flexibility brought fourth by the open source model allows for rapid growth within a company.
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