

Computer Architecture and Operating Systems

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Investigate Computer Systems

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Introduction

I have recently started a new job role in a computer department, I have been asked by my new line manager to source and justify an Operating System which will be installed on new computers in an office. I will be offering two solutions to my line manager, one of which will be an open source Operating System, and deciding which one to install. I will research and find two Operating Systems, to offer, identifying their individual advantages and disadvantages. I will also be discussing the costs, including the total cost of ownership. I will then make a final recommendation as to which one I would select.

Research

I will first research Operating Systems in general, narrowing down the different options until I have just to contrast and compare. I'm starting by searching for the best open source operating systems, as I feel this would be the hardest for finding information from reliable sources. An open-source OS is a software with a source code which anyone can access, inspect, edit and enhance.



The first open-source OS I came across was LibreOffice, which was described as “a real open-source alternative to Microsoft Office”. - TechRadar.pro. LibreOffice is a community-driven software development, being a project for

a non-profit organization. One of their aims being able to provide access to productivity tools at no cost. “LibreOffice is Free and Open Source Software. Development is open to new talent and new ideas, and our software is tested and used daily by a large and devoted user community.” - LibreOffice.

The second open-source OS I found was Linux Zorin OS 15.3, an open-source alternative to Windows and macOS. Zorin OS is designed to be easy and user-friendly meaning nothing new will need to be learnt in order to use it. It is also “designed to make your computer faster, more powerful, secure and privacy-respecting” - Zorin OS. You can even change the appearance of your desktop to resemble the Operating System environment you are most familiar with. “When speed is of the essence, Zorin OS really shines” - PC World.



I then moved on to researching for Operating Systems that aren't open source. The first one I came across was Windows 10 Pro, this was one of the top recommended OS for businesses and offices. It is familiar to a lot of people and is a lot easier to set up compared to other operating systems. Windows 10 also offers different operating systems depending on your needs, for example “Windows 10 Enterprise E3 is designed for larger businesses and offers privacy and security across all devices. Windows 10 Enterprise E5 is the newest OS and is designed for companies that need advanced threat protection.” - Colocation America.



The next operating system I looked at was Mac OS, it is well known as the easiest to use OS. Mac OS's applications are most effective and focused upon creating content, and whether the content is written or visual the process is frequently hassle-free and user-friendly. “And the emphasis on user interface is unparalleled. This OS is much more stable than any Windows system.” - business.org. There is also a huge selection of free open source software that is made available on Mac OS.

macOS

After considering the benefits and drawbacks of both open-source OS, I have chosen Zorin OS 15.3. And the closed source OS I have chosen is Windows 10 Pro. I will now compare and contrast each OS until I come to a conclusion as to which is better suited.

Open Source Operating System - Zorin OS 15.3



Built on an Ubuntu and Linux foundation, Zorin OS was created in 2008. It was created in order to bring advanced technology to everyone, free of charge. Zorin believes in creating a product which is open so that people can feel in control of their technology. Zorin OS is free and is completely funded by the community.

As Zorin OS is designed in particular for newcomers to Linux the interface is based on Windows and similar programs to those found on Microsoft, as this would make it easier for Windows users to adapt to using the Linux interface. In September this year, the latest version of Zorin was released, the interface looks clean and simple, and will be easily understood. “By maintaining a clear focus on simplicity, we’ve been able to create a powerful computing experience that countless people love to use everyday.” - Zorin OS.

Zorin OS also gives the user a choice of different desktop looks, you are able to change your desktop to what you as the user enjoy to use, or feel comfortable in using. To me, the latest version of Zorin looks similar to Mac OS. "Because of OS X option in the Zorin OS premium editions, Apple fans and Mac Loves can also have a way to feel at home." - Eukhost. So Zorin can almost mimic the experience Windows and Mac users are used to.

Zorin OS is an Ubuntu-based Linux operating system which means there are constant updates provided for the user. Also free or very cheap software that can be used as an equivalent to the Microsoft Office package, for example, this would be useful in an office environment as users would have access to software similar to Microsoft Word or Excel. It also comes with an Office-compatible software suite, powerful photo editing software and fully featured apps already installed.

Another advantage that comes with this operating system is that it is able to run on computers as old as 15 years, it does not slow down with updates. This means you can extend the life cycle of the hardware, and "breathe new life into old PCs." - Zorin OS.

Zorin is reliable, using Linux's advanced safety features it is protected against, and resistant to viruses, but with software updates, their security will only get better. "Zorin OS runs on the same Open Source software that powers the U.S. Department of defense, NASA, and more." - Zorin OS. Zorin also claims to respect your privacy, "so advertisers and governments can't spy on your activity." - Zorin OS. They do not collect any personal data, being an Open Source OS anyone can view the source code and ensure it is secure. Zorin also comes with a firewall to help protect the user's network against intrusion.

While Zorin OS has a graphical user interface, the Unix underpinnings can be arcane, with multiple 'non-obvious' solutions to singular problems, that can make it difficult for novices or casual users to problem solve. Another issue with having an open-source operating system is that all of the technical support will have to be in-house, meaning that when you get the OS you are not receiving any technical support so all issues will need to be resolved by the user.

The majority of computer users are Windows users, meaning that it will take time to adjust to a new operating system. Although Zorin is designed to be the OS you "already know how to use." - Zorin OS, and can resemble Windows or Mac operating systems, it still won't be the 'real thing' and some may need a familiarisation or training course, this would then contribute to the total cost of ownership.

The total cost of ownership can only be an estimate. As the cost of technical support services and training/familiarization courses would have to be created and run in-house, therefore the true cost would only become apparent after a few years of running the operating system. Zorin will work perfectly well with open source Unix or Linux servers, mail and web servers, so there will be less additional cost. The actual cost of downloading and installing Zorin OS is zero, as it is free.

Closed Source Operating System - Windows 10 Pro



Windows was created in 1985 by Microsoft, an operating system that has lasted 35 years, and survived the test of time. Founded by Bill Gates, Microsoft designed Windows to compete with Mac OS. The original Windows was introduced as a graphical user interface (GUI) shell for MS-DOS, in response to growing interest. Since then, Windows has become a strong competitor in the world of operating systems. The most recent version, Windows 10, was released in 2015 and has recently overtaken Windows 7 as the most common operating system.

As of April 2020, Windows is the most common operating system in the world on desktop computers. Most new personal computers arrive with a preloaded operating system, and most of these are Windows OS's. Windows also emerged early, so it was embraced by businesses, which then meant it filtered into homes as people were used to using it at work. This has helped Windows to accumulate loyal customers, and now the majority of people use and/or have knowledge of Windows.

Compatibility is also a good advantage when it comes to Windows. It is compatible with most software programs, its most useful software for an office environment would be the Office suite. But it's the greatest compatibility is in supporting older file formats, which allow businesses to access their archive of documents indefinitely. And retain access to older software in new Windows versions. "The world of Windows is filled with shareware and freeware. These are free to download and they can be used to do a multitude of applications with personal computers." - IntervalZero.

Windows 10 is well integrated, meaning the Office suite works together and the user will be able to create work across applications including Excel, PowerPoint, Word and others. The skill level needed to use the Office suite effectively is basic, and the knowledge and understanding of the suite has become a basic requirement for many jobs and careers. The Office suite is also able to help you to communicate with colleagues more efficiently. "Whether you're using Outlook for email, or taking advantage of the co-authoring features in Word and PowerPoint, you're literally on the same page as your co-workers." - Charter College.

As Windows 10 is a closed source operating system it is difficult for users to get a clear understanding of what is going on. As Microsoft are the only ones who can view Windows' source code, and no log files are generated, if an issue occurs the user needs to repair the issue through using a trial and error process. "At best this is time-consuming, while at worst it can make a program impossible to work with" - RJ Systems.

Security and antivirus protection are also disadvantages when it comes to Windows. The disadvantage of Windows being the most common operating system is that it is the largest target for viruses and malware. "Nearly all computer viruses target Windows computers and regularly wreak newsworthy havoc." - RJ Systems. This vulnerability is mainly due to Microsoft's lack of focus on good security practices early on. Requiring them to back engineer them in subsequent Windows releases. Weakness to viruses is a given on Windows. Due to its past susceptibilities, it is the most attacked platform, which exposes further vulnerabilities, necessitating the need for constantly updated anti-virus software.

Keeping a Windows machine up to date within a business environment, avoiding the risks of virus and malware, requires additional device management software. To ensure that all the computers comply with company processes and policies. "It's a sad state of affairs that Microsoft's Windows 10 updates have become so unreliable and potentially dangerous that they may pose an equal or greater risk to being able to use your computer every day." - Forbes.

The total cost of ownership again can only be estimated as there are no specifics as to the number of computers that are in the office. Starting with working out the total cost of ownership for 1 seat, we can then multiply this by the number of seats that are in the office, when we have this information. The cost to download Windows 10 Pro is £219.99, and minimal support would be included. The cost of full technical support from Microsoft is also unknowable as again we do not know how many seats will be in the office, or what services will be needed. And without knowing which services will be needed you cannot know which back end will be required. Microsoft codes their servers to work better with their own products, so that will incur additional costs.

Conclusion

After thoroughly researching and analysing both the open source Zorin OS, and the closed source operating system Windows 10 pro. I have come to the conclusion that Zorin OS would be the better suited operating system for the office. As Zorin OS is open source software it is free, and the ethos and community spirit behind Zorin,

only attracts me to this operating system more. Zorin was designed to be user-friendly and easy to use. The user can choose the style and look of the interface, meaning if you are more used to Mac OS you are able to simulate the aesthetics in the interface, and the same with Windows.

Most of the software the user will need is free or cheap to install, this includes an office suite which is similar to that of Microsoft's Office Suite. You are also able to pick and choose what software you want and make it tailormade to the user's needs. From this you could then develop and provide your own training courses and packages, being specific on how the user should use the operating system.

Zorin is reliable, having been built on Linux's advanced safety features, which are the same open-source software as those used in the U.S. Department of defense and NASA. You will also have reduced antivirus costs as you will not have to pay for licenses for antivirus software. It is also a less common operating system than Windows, therefore it is less likely to be attacked than Windows.

Zorin does not collect personal data as providing privacy is a strong principle behind the software. You are also able to run updates on computers as old as 15yo, meaning the lifespan of the hardware will be increased.

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