Operating System Upgrade Recommendations Report

DATE: March 16, 2021

TO: Nicholas Dunne, Office Manager

FROM: Amanuel Demeke, IT Security Manager
IT Department

SUBJECT: Outdated Operating Systems

41/50 of our company computers at our Dallas office are still running on the Windows 7 operating system. This has brought up vulnerabilities in security for the entire company. The danger of these vulnerabilities is that they are unknown and could be found anywhere within Windows 7. Microsoft stopped offering free security updates as of January 2020 (when support ended). Without support from Microsoft, Windows 7 is an unsafe operating system[1]. We should be aiming to get all our computers running on up-to-date operating systems by the end of 2021.

As for alternative solutions, in their article "*Microsoft ends Windows 7 support: What should you do?*" Sam Shead states that Microsoft will be offering security updates for Windows 7 until 2023, at a cost of $25 - $200 per computer and with an increase in price each year. This solution was dismissed early in the analysis of this problem as the financial costs would be too large and we would only have two years' worth of support from Microsoft.

In this document I will be explaining the appropriate route of action to solve this problem. I will also explain alternative options and why I decided not to recommend them. My recommended solution is to upgrade our Windows 7 computers to 8 GBs of DDR4 ram, back up important computer data to physical drives and upgrade our operating systems to Windows 10.

Technical Knowledge Requirements

Here is a list of technical terms and their definitions, that will be used in the document:

- CPU: Central Processing Unit, where all computer processes are made.
- Memory: Primary storage (RAM), directly connected to CPU, stores data that computer is actively using.
- RAM: Random Access Memory.
- DDR4: Double Data Rate 4. Classification of current standard of memory speeds and technologies.
- Operating System (OS): The software that allows users to interact with computers.
- Terabyte/Gigabyte (TB/GB): Size of data or storage. One terabyte is 1000 gigabytes which is 1 000 000 megabytes.

There are three checkpoints in this upgrade that bring up alternative paths and options.

---

[1] This information is provided directly from Microsoft's website.

Alternative Options Along Path to Upgrading

1. Hardware

When upgrading computer software, it is important to consider hardware upgrades to support newer software and applications. I do not believe that our computers need CPU upgrades, seeing as though our computers have Intel Core i5-7600K (2017) processors that were released and installed well after the release of Windows 10. However, our memory has not been upgraded in 8 years and all our computers are running 4GBs of DDR3 RAM. I would like to recommend upgrading to 8GBs of DDR4 RAM to support the new operating systems and to help our computers be better equipped for new applications. Hughs (2019) states, "want a fast system, then 8GB of RAM is the minimum you should consider to avoid frustration" (paras. 13). He states this when specifically comparing memory quantities on machines that run Windows 10.

2. Data Backups

When upgrading the operating systems of our computers, we need to back up data. This is a safety practise to ensure that if local data is corrupted it can be saved. There are two relevant ways to back up data: cloud service backups and local physical backups. Cloud service backups were dismissed in our solution because of the wasted value in subscription services. Buying local drives to host in an on-site data bay would have more value to the Dallas office because back ups could be done at any point in time for a fixed cost. The data bay I would like to recommend is the Synology 4 Bay Nas DiskStation that sells for $513 on Amazon with a Seagate IronWolf 4TB NAS Internal Hard Drive HDD selling for $125 on Amazon. This leads to a total of $638 for data back up resources. This route of data protection is also superior because it allows for easy expansion of drives whenever more space is required. In their article, "*Cloud Based Backup vs Physical On-Site Backup*" Zadro (2019) backs up my claims and also states that "recovery time is usually much quicker (for local drive) than with a cloud-based model" (paras. 12). This is another important reason why I recommend physical drives.

3. Operating System Selection

There are only two feasible options to choose from in terms of operating system: Windows and Linux. Mac OS has been excluded from this report because it cannot be implemented without purchasing entirely new computers. Linux is a free, open-source operating system that provides large amounts of customization. With this freedom comes needed attention to detail because every computer needs to be setup correctly, uniformly, and securely. Jones (2019) states that "Replacing the computers of hundreds of employees is likely to cause chaos, particularly if they're not familiar with Linux" (paras. 12). We do not have hundreds of employees at this location, but the sentiment still stands that our employees will have difficulties adapting to a completely new operating system. It is also important to note that part of this adaptation would involve migrating from popular applications such as Excel and Word as these cannot run directly on Linux (alternatives are available). The implementation of Linux would require more research from the IT department. Windows 10 provides a user interface that is very familiar to what our employees have been using. Files from older Microsoft applications can easily be transferred, and Microsoft will be providing free security updates for the foreseeable future. I have decided to recommend Windows 10 as the new operating system.

Summary Chart of Improvement Options[2]

Hardware	Pros	Cons	Price
4 GB DDR3 RAM	• No purchase necessary. • No physical implementation.	• Windows 10 will not run smoothly. • Applications will not run smoothly. • Not future proof for new applications or operating systems.	$0.00
8 GB DDR4 RAM	• Excellent performance in Windows 10. • Applications will run faster. • More future proof as newer applications will benefit/require 8GBs of memory.	• Will require purchase. • Will require physical installation.	$54.99/ea
Data Back Ups			
Cloud Service (Amazon Web Services)	• No physical implementation. • Easier to implement across multiple computers.	• Ineffective cost due to monthly service. • Data is in hands of third party. • Ineffective use of service with amount of data required to back up (less than 4 TBs).	$0.05 per GB-Month
Physical Backup	• No third-party control of data. • Drives can be used again in future back ups • Internal control of safety and security.	• One time purchase will cost more than one-time monthly subscription. • Must be implemented physically. • Requires knowledge on how to use and keep safe.	$638
Operating System			
Linux	• Free to use. • Open-source, with many user customization options. • Free updates. • Free to use applications available.	• Employees will have to get accustomed to new OS and new applications. • Harder to implement security updates. • Requires more IT infrastructure to run correctly on all machines.	$0.00
Windows 10	• User interface similar to Windows 7. • Microsoft provides updates for free. • Updates are quick and easy to install.	• Large cost to purchase.	$85.00/ea

Pricing Chart for Recommended Solution

Checkpoint	Hardware	Data Back Ups	Operating System	Total
Price	$2 255	$638	$3 485	$6 378

Secondary Conclusions

All the alternative options just previously summarized are still valid methods in creating a solution for this problem. Not upgrading memory allows us to save $2 255 whilst still being able to run Windows 10 (notably less smoothly). Using a cloud backup service still allows us to keep data safe whilst transitioning to a new OS for a similar one-time subscription price (if securing ~20GBs per computer). Switching to Linux allows for the company to cut costs by using open-source Linux applications. If limited funding is provided to the IT department, then I recommend using a cloud backup service (such as AWS), purchasing Windows 10 and omitting the memory upgrade. I feel as though backups and Windows 10 are essential purchases to this upgrade.

[2] All prices provided by Amazon or Amazon Web Services (AWS) as of March 28, 2021.

Final Conclusion

In closing, our operating systems at the Dallas office need to be upgraded to an up-to-date operating system. The security risks with using Windows 7 are high and can cost tremendous financial losses in the event of a systems breach. The final recommendation provided is expandable, employee friendly, does not cut any corners and allows for the office to operate securely.

Final Recommendation

I would like to recommend that we upgrade primary memory on our computers to 8GBs DDR4 RAM, we use the Synology 4 Bay Nas DiskStation for the local back up system and we upgrade dated operating systems to Windows 10. I would like the IT department to be funded with $6 378 to implement this upgrade. Thank you for your consideration.

Sources Referenced

Windows 7 End of Support Info - Microsoft. Microsoft. (n.d.). https://www.microsoft.com/en-ca/windows/windows-7-end-of-life-support-information.

Shead, S. (2020, January 13). *Microsoft ends Windows 7 support: What should you do?* BBC News. https://www.bbc.co.uk/news/technology-51090407?fbclid=IwAR1AQjcq5eH1Qcp81teDXuIX6a-ebLZXydimpQ3DN_H7rvZQDd_ExEpzKwg.

Hughs, A. K. (2019, July 5). *How much RAM does your Windows 10 PC need? (2019 edition)*. https://www.zdnet.com/article/how-much-ram-does-your-windows-10-pc-need-2019-edition/.

Zadro, D. (2019, March 21). *Cloud Based Backup vs Physical On-Site Backup – Which is the Right Choice for Your Business?* Business 2 Community. https://www.business2community.com/cloud-computing/cloud-based-backup-vs-physical-on-site-backup-which-is-the-right-choice-for-your-business-02182327.

Jones, C. (2019, February 12). *Windows vs Linux: Performance and User-Friendliness*. ITPro. https://www.itpro.co.uk/operating-systems/24841/windows-vs-linux-whats-the-best-operating-system/page/0/2.