The Development of Windows Systems and their Security

Christopher Hossele

Old Dominion University

Professor Malik Gladden

December 7th, 2023

Shaped by professionals with the ability to comprehend the most challenging forms of technological science, computer technicians everyday face the dilemmas of building the most operable systems of computers and researching the most efficient ways to achieve this. Over three decades of software engineering allowed Microsoft Windows Operating Systems to conform to the consistently advancing technologies of today to overcome challenges revolving around security vulnerabilities and overall performance.

Operating systems software allows the ability to communicate through the computer and oversees the system's memory and processor. Other components of operating systems consist of the abilities of file management, security management, process management, and storage management (Components). These characteristics of an operating system took years to create and develop and they are common throughout many operating system organizations. There are many distributions of operating systems out there such as Microsoft Windows, who introduces society with the technology of computers and their software systems. Microsoft Windows has introduced many forms of these systems that have shaped and developed into the modern systems that exist now. Some of the most known operating systems that have shaped today's computer technology include but are not limited to Windows 95, Windows 98, Windows XP, Windows Vista, Windows 7, Windows 8, Windows 10, and Windows 11. The evolution of these windows operating systems has gone through over two decades of innovation and invention, giving the world of technology with the latest version Windows 11. These operating systems did not come into existence without prior knowledge and research to learn how the flaws and successful components benefit the creation of newer systems. Many earlier operating systems had a fair share of both flaws and successes with both performance and security. Understanding how earlier versions of windows

operating systems influenced their successors is important when acknowledging the development of windows systems and their security.

Windows 1.0x

In 1985, Microsoft released the first version of a windows operating system, Windows 1.0x. Windows 1.0x harbored four version updates 1.01, 1.02, 1.03, and 1.04. The first release 1.01 consisted of MS-DOS, which is a 16-bit shell that the Windows 1.0x system would run on (Windows 1.0 1.01). It introduced applications such as paint, notepad, and calculator (Greene, Tim 2013). It was rather inexpensive considering the value of today's money, but it did not come with much. Windows 1.0x consisted of compatibility issues that did not mix well with other software which imposed concern for its future adaptability. Microsoft would release updated versions of Windows 1.0x such as 1.02, 1.02, and 1.04 that consisted of minor updated changes that advanced performance and use until 1987. As of 2001 Windows 1.0x is known to be unsupported due to the continuation of newer operating systems (Windows 1.01). With the operating system no longer supported by Microsoft, the chances of security vulnerabilities developing are high since there are no longer updates being processed to the Windows 1.0x operating systems.

Windows 95

The next major operating system lineup was Windows 95. Launched in 1995, it was equipped with a 32-bit system and introduced "plug and play" to the computer field. Windows 95 was more user friendly compared to its predecessor operating systems, being equipped with a start menu and the desktop environment (What Is Windows 95?). The start menu was one of the most significant features from Windows 95, allowing for easier access to inner files and settings.

The plug and play that was introduced to Windows 95 allowed for simpler hardware device installation rather than the former manual way to install devices into the older operating systems, such as Windows 1.0x (What Is Windows 95?). Windows 95 also came with the ability to utilize Windows Explorer as a perk option, introducing the widespread use of the internet and web browsing. Windows 95 also garnered the acknowledgement of security vulnerability patching, bringing the Windows Update feature to update the systems. The updates fixed issues such as bugs and allowed the ability to update to strengthen the security of the systems (What Is Windows 95?). Performance became a major improvement compared to earlier versions of Windows operating system software but still had its fair share of issues. The 32-bit system that Windows 95 ran on stored its passwords within inner files and was easily cracked. Microsoft responded to this issue and released a 128-bit key that allowed for better password storing within the systems files (*What Are the Pros and Cons of Windows 95?)*. Windows 95 also suffered cyberattacks such as the “Ping of Death” attack and the “Back Orifice” trojan. The “Ping of Death” attack was carried out without being presently at the computer itself. Microsoft patched the vulnerability that caused this attack and served as a lesson for Windows to take security issues into consideration. The “Back Orifice” trojan was carried out in 1998 and was also committed without being at the computer itself (Gilmour, Tristan, 2023). The trojan infiltrated computer files and was able to gain access to important data and completely dismantle systems. The “Back Orifice” was far too advanced for the Windows 95 system as it was able to bypass many security features that were supposed to prevent security threats. To dismantle the trojan, Microsoft released updates that would patch the vulnerabilities related to the trojan (Gilmour, Tristan, 2023). Windows 95 was a significant step forward for Microsoft's operating systems and

introduced many factors that are still present in today's operating systems. Like Windows 1.0x, support for the system ended in 2001.

Windows 98

Similar to the layout of Windows 95, Windows 98 was released with two editions that harbored many new features for the field of Windows operating systems. Windows 98 ran on the same 32-bit key system that Windows 95 ran on and utilized up to 512 megabytes of RAM and 4 gigabytes of file sizes. Windows 98 allowed for the use of USB hardware devices, an updated version of Windows Explorer, and the ability to play DVD content such as movies (Documentation).

Windows XP

Windows XP was released in 2001 and came with several different editions including but not limited to Windows XP Professional, Windows XP Home, and Windows Starter Edition. Windows XP came with 64 megabytes of ram, which is far more than its predecessors 98 and 95. Windows XP Professional was developed with a 64-bit system while the other versions were still developed in 32-bit. The 64-bit system requires 256MB of Ram (Fisher, Tim, 2023). Windows XP included new features that Windows 98 and 95 did not have such as the enhancement of the DVD player, Remote Assistant, Windows Explorer 6, and System Restore (Indiana). These new features were both made for security and performance purposes. The System Restore is a security feature introduced on Windows XP that would reset a system back to an earlier version if a flaw were to occur on the current version (Indiana). Windows XP ran for a long time before it was discontinued in 2014 due to Microsoft’s continuation to run updates to the operating system and its high-performance ratings for its time. Some security features were introduced with Windows

XP, such as the ability to utilize guest mode if user authentication fails, file system encryption, and the introduction of the firewall (Informit). These security features helped significantly with keeping the operating systems secure until updates were released. Although security concerns were prominent with Windows XP, as its built-in firewall was not automatically turned on when the system was developed.

Windows Vista

Windows Vista was released to the public in 2007 and also had multiple editions as Windows XP. Some of the editions included Ultimate, Business, and Enterprise. The editions ran on both 32 and 64-bit systems but depended on the edition on which one it would consist of. Compared to Windows XP's 256MB of ram, the Vista system's ram was at 512MB making it a large increase from the previous operating system. Windows Vista also had a stronger graphics card compared to previous versions (Fisher, Tim 2023). Windows Vista had developed lots of issues regarding system performance and security, but the majority of these issues have been patched by Microsoft in newer updates brought to the operating system. Windows Vista was known to be Microsoft's poorest performing operating system based on public opinion regarding flaws (Fisher, Tim 2023).

Windows 7

The new standard 64-bit processor was widespread in computer operating systems. Windows 7 was one of those operating systems that were equipped with the 64-bit processor, giving it a powerful system for its time compared to the 32-bit processor that its predecessor Windows Vista had. Windows 7 had a better improved taskbar as well and was able to detect USB devices quicker (Windows 7). The display settings were also improved with better themes

and features and developed more default applications for the computer. The operating system uses up less memory as well as allowing for swifter performance compared to older systems such as Vista and XP (Windows 7).

The security features with Windows 7 cover a wide range of vulnerability and threat issues that can potentially infect the system. Date Execution Prevention is one of the security features that was developed with Windows 7. DEP prohibits attackers from executing code within data pages and prevents memory attacks (Windows 7 Security). Cryptography improvements were also present with Windows 7, giving more algorithms that can be chosen to hide certain code so authorized users can only understand. Windows 7 also introduced an improved firewall Windows Defender software, which was able to block incoming threats to the software system (Windows 7 Security).

Windows 8

Windows 8 was designed with new security improvements and better user performance. Windows 8's design was newly improved compared to older versions, with live tiles, a better start screen, and better customization for the display features. The new cloud was introduced to Windows 8 as well as Microsoft OneDrive where the systems data and files would be saved into to transfer over to newer systems (Windows 8). Windows Defender was used in Windows 8 as well which acted as a firewall to protect a computer's important data. User Account Control was used with Windows 8 to prevent malware and other lingering threats to a system and will allow for a Windows associate to help resolve the issue before the system can be used again (Windows 8: Security). The action center was also in windows 8 for a user to view a system's inner security component for analyses and gives a diagnostic for the system to make sure that it is good with no issue (Windows 8: Security).

Windows 10

Windows 10 developed a more nostalgic feel to the system, bringing back the traditional smart menu that the older systems had. Windows 10 introduced Microsoft Edge, which was the default browsing system that improved user experience and performance (Windows 10: Windows). Windows 10 was developed with a 64-bit system and gave better performance for a 2GB ram system. Cortana was brought to Windows 10 as well as a virtual assistant to help with tasks and asking about information. The action center was introduced as well and allowed for Wi-Fi connectivity and switching to different modes for the computer (Windows 10: Windows). Windows 10 is in the majority of computers today as it is one of the newest systems brought to Microsoft. The security features of Windows 10 were introduced and were developed stronger considering the advancement of cyberattacks and technology (Windows 10 Security). Some of the security features consisted of Windows Defender, Windows application card, Windows Sandbox, improved access controls, and better system architecture to support better security features (Windows 10 Security).

Microsoft led the way for creating windows operating systems that enhanced user experience and operation. The windows systems over the years were curated through understanding the past flaws and successes of older versions. Operating systems work to protect important information with strong systems and strong security features as well. It took almost 4 decades for Microsoft to continuously change the game with breakthrough technological discoveries that enhanced every new system.

References

1. Greene, Tim. "10 Things You Didn't Know about Windows 1.0: Windows 1.0 Came Out 28 Years Ago this Week Laying the Groundwork for Microsoft's Signature Operating System." Network World (Online) (2013)ProQuest. Web. 6 Dec. 2023
2. “Windows 1.0 1.01.” WinWorld, winworldpc.com/product/windows-10/101. Accessed 6 Dec. 2023.
3. “Components of Operating System.” GeeksforGeeks, GeeksforGeeks, 5 Dec. 2022, www.geeksforgeeks.org/components-of-operating-system/.
4. “What Is Windows 95? The Hardware Requirements You Need To Know.” The Hardware Requirements You Need To Know | Lenovo US, www.lenovo.com/us/en/glossary/windows-95/?orgRef=https%253A%252F%252Fwww.google.com%252F. Accessed 7 Dec. 2023.
5. *What Are the Pros and Cons of Windows 95?*, www.cityu.edu.hk/csc/netcomp/net6/win95.htm. Accessed 7 Dec. 2023.
6. Gilmour, Tristan. “A Brief History of Windows Vulnerabilities: The Evolution of Threats and Security.” Infosecurity Magazine, 3 Apr. 2023, www.infosecurity-magazine.com/blogs/history-of-windows-vulnerabilities/.
7. “Documentation of Operating Systems and Developers.” *Windows 98 Operating System*, www.operating-system.org/betriebssystem/_english/bs-win98.htm. Accessed 7 Dec. 2023.
8. “Informit.” InformIT, www.informit.com/articles/article.aspx?p=22166. Accessed 7 Dec. 2023.

9. "Indiana University." *What Is the History of Microsoft Windows?*, kb.iu.edu/d/abwa#:~:text=Windows%20XP%20Home%20Edition%20was,the%20need%20to%20close%20applications. Accessed 7 Dec. 2023.
10. Fisher, Tim. "A Look Back at the Windows XP Operating System." Lifewire, Lifewire, 9 Jan. 2023, www.lifewire.com/windows-xp-2626354.
11. Fisher, Tim. "Windows Vista: Everything You Need to Know." Lifewire, Lifewire, 9 June 2022, www.lifewire.com/windows-vista-2626311.
12. "Windows 7: Exploring Windows 7." *GCFGlobal.Org*, GCFGlobal Learning, edu.gcfglobal.org/en/windows7/exploring-windows-7/1/#. Accessed 7 Dec. 2023.
13. "Windows 7 Security Features." Infosec, resources.infosecinstitute.com/topics/operating-system-security/windows-7-security-features/. Accessed 7 Dec. 2023.
14. "Windows 8: Windows 8.1 Features." *GCFGlobal.Org*, GCFGlobal Learning, edu.gcfglobal.org/en/windows8/windows-81-features/1/#. Accessed 7 Dec. 2023.
15. "Windows 8: Security and Maintenance." *GCFGlobal.Org*, GCFGlobal Learning, edu.gcfglobal.org/en/windows8/security-and-maintenance/1/#. Accessed 7 Dec. 2023.
16. "Windows 10 Security Features." *Infosec*, resources.infosecinstitute.com/topics/operating-system-security/windows-10-security-features/. Accessed 7 Dec. 2023.
17. "Windows 10: Windows 10 Features." *GCFGlobal.Org*, GCFGlobal Learning, edu.gcfglobal.org/en/windows10/windows-10-features/1/#. Accessed 7 Dec. 2023.