Microsoft Windows: The evolution of a revolutionary product

Lykourgos G. Zacharogeorgas*

* City University WA

Abstract

The present study explores the history of Microsoft Windows (M.W) by identifying its origins and describing the advantages and disadvantages of its versions, searching the reasons for the replacement of each new edition and indicating the trends for the future development of this revolutionary operating system. The main purpose of the study is to help us understand the forces that shaped the development of M.W., improve our knowledge about the workings of the modern systems and appreciate their basic elements, realizing that software is never finished and never perfect, like people.

1. Introduction

The importance and role of the operating system: A computer can perform useful tasks for us, when it is driven by programs (software) which specify the tasks to be done. Both software and hardware constitute a total usable system. Software is classified into 'system software' and 'application software'. The first group consists of programs that carry out the processing required for user's application, while the second facilitates the running of applications. The most important part of system software is the *operating system.* According to Stallings (1998: 60) operating systems are among the most complicated pieces of software. "This reflects the challenge of trying to meet the difficult and in some cases competing objectives of convenience, efficiency, and ability to evolve". As Colin (1997: 1) explains, "the role of the operating system is to complement the hardware by providing a layer of services which manage the resources of the hardware and permit the users to drive the system. With no software, the bare machine on its own is virtually useless". The most popular operating system today is "Microsoft Windows". According to Kavoura, 90% of microcomputers use Microsoft Windows, while the 10% use the Windows of Macintosh of Apple (2000: 19).

Microsoft windows is a graphical environment for DOS-based systems created by Microsoft Corporation that offers the advantages of a visual interconnection of

ISSN: 1790-0328

the user, full with menu, icons, dialog boxes, an office like screen and the possibilities to run MS-DOS implications.

1.1. Statement and significance of the problem: This is a research paper that explores the history of Microsoft Windows (M.W) and describes it as an evolutionary product. Studying the evolutionary records of windows is not only for historians. As Microsoft Corporation (2001) supports, when we know what Windows is made of and how it was developed, we have a better chance to understand why our computer does what it does and we can make better decisions about how we can solve particular problems. Thus, an examination of the evolutionary process of M. Windows will improve our understanding about the workings of the modern systems and will help us appreciate their basic elements. Identifying the origins of M. Windows and presenting its main improvements and disadvantages will also help us to understand that many modern techniques are of a much greater age than we believe.

1.2. Purpose of the study: The main purpose of this study is to explore the historical evolution of Windows and understand the forces that shaped its development. Specifically, the questions investigated and answered are the following:

- What are the origins of M. Windows?
- What is the main improvement or improvements introduced by each version of M.Windows over what has come before?
- What is the main lack in each operating system that led to the development of its replacement?
- What is the target market for the different versions?
- What is new and improved in Windows XP?
- How security problems were faced during the historical evolution of M.Windows?
- What are the future trends for the development of Microsoft Windows?

1.3. Methodology: This research study is a descriptive/bibliographical one that describes the evolution of Microsoft Windows. The data collected have been studied and compared to identify revolutionary trends in the history of M. Windows and to locate important differences and improvements among the various versions, as well as the possible reasons for their development. Tables have been drawn to show how each succeeding version has built on its predecessor's foundation and added new features. More emphasis has been given on the most important versions and improvements. Because some of thee improvements and innovations are very technical, an attempt has been made to describe them in rather general terms.

2. Microsoft Windows: History and description

Windows is not the first product that used the idea of an office as a mean for a graphical environment of work on a screen. The first application of this idea was done by Star of Xerox in the research center of Palo Alto of Xerox (PARC) at the end of 70s. Star was an advanced product for its time, but it was too expensive to

gain wide acceptance by the majority of servers. According to Bradley (1999: 156) however, "The Xerox executives at that time did not see the potential, so it was left to Apple to commercialize the system, which has since been taken up by Microsoft. Xerox did not receive a penny for this development. The rest is history!".

In the beginning of 1983, Apple Computer Company presented Lisa the first microcomputer that incorporated an allegory of office, while in the beginning of the next year (1984) Apple gave to circulation Mackintosh, a version of Lisa that was of a smaller scale.

2.1. Origin of Windows and MS-DOS system

Microsoft (founded by Bill Gates and Paul Allen) began to work on Windows in the beginning of 1983. At that time, Windows was designed as an application system to extend the capability of the underlying MS-DOS system. Since then, several versions of window-based interfaces have been developed as a partner to MS-DOS. At this point the origin and role of MS-DOS will be briefly discussed since Windows have actually been "layered" on MS-DOS. In 1979 Seattle Computer Products, a small company that manufactured memory boards, wrote an operating software in order to test some of the Intel's products. The company named this system 86-DOS. IBM bought 86-DOS and decided to develop it into a commercial product with the help of Microsoft, which at that time was developing a version of BASIC, being the standard microcomputer language of that time for the PC. In August 1981, IBM PC was announced with version 1.0 of MS-DOS, named by IBS as DOS. This system improved disk file performance because it had a larger disc sector size (512 compared to 128 bytes of the other systems of its time) and a memory based file allocation table. In 1983 version 2.0 of MS-DOS was brought to the market to meet the needs of the new IBM computer (PC/XT) which had a built in hard disk of 10 megabyte. At the beginning of the same year, Microsoft start working on Windows. In an impressive interview that took place in November 10, 1983, Microsoft announced its new product and promised to circulate it in May 1984.

2.2. The development and improvement of Windows: The development of Windows proved to be a more difficult and ambitious task than what his creators imagined and it took more than two years to be completed. In June 1985 Microsoft finished the task and seven months later, in November 18, 1985, the first Windows 1.0 was given to the market. This early Windows system offered a graphical user interface (GUI), a rationalization of memory and I/O operations. The main contribution of MS-DOS to this product was the file management system. In the current versions of Window systems which will be discussed later, the functions offered by MS-DOS have been taken over by Windows. MS-DOS applications programs however, can also be executed in these environments. This is an important fact because a big number of application systems today are dependent on MS-DOS.

The next two years after Windows was circulated, Microsoft continued to improve its new product. Specifically, the first three months of 1986 the company released a European version of Windows (1.02) and later the same year presented the American version 1.03. in the United States. This version was done to correct some bugs of the program and to support more communication parts. In April 3

1987, the day that IBM presented the series PS/2, Microsoft presented the Windows 1.04. This version supported the new type of screen of PS/2 -called VGA- and the mouse of IBM. In the meantime, Microsoft was working on Windows 2. Contrary to versions 1.xx which were absolute products of Microsoft, version 2 of Windows was developed by both Microsoft and IBM. Version 2 was designed to give a functionally visual sensation of the presentation manager where is based the new graphic environment that accompanies OS/2, the new multiprocessing system of Microsoft and IBM. To succeed this goal, several modifications had to be done concerning the interconnection of the user. Specifically, version 1 of Windows used a foursome as a mean to divide the screen in windows (each window placed next to the other). Version 2 however, uses overlapping windows. In addition, a few terms were changed to achieve an agreement with the presentation manager of OS/2. For example, the instructions *Zoom* and *Icon* of version 1 are now called *Maximize* and *Minimize.* Also, more peripheral devices are now supported in version 2 and graphics have been improved to make the environment faster (e.g. in designing). Two special types of Windows have been circulated for the better performance and development of microcomputers 80286 and 80386 of Intel. These are: Windows/286 and Windows/386 which seem to be functionally similar with version 2 of Windows, but inside, they actually operate the advantages of the faster microcomputers of Intel.

Windows 3.0 (1990): This is an important version of Microsoft Windows released in 1990 that became popular very soon. It offers advanced graphics with 16 colors, full support of the more powerful Intel 386 processor and a variety of useful features including: (a) Program Manager, File Manager and Print Manager, (b) a completely rewritten application development environment and (c) an improved set of Windows icons. The popularity of Windows 3.0 increased with the release of "SDK" a new Windows software development kit which helped software developers to focus more on writing applications and less on writing device drivers.

Thus, as we understand, with each succeeding Windows version, the company tries to improve or to cover up as many pieces of MS-DOS and earlier versions as it is possible. For example, the Millennium edition is made up of many components, (hundreds of them) many of these being about 20 years old. (This we can see at the copyright dates at the bottom of the screen when we start up our computer). Bott (2001: 10) of Microsoft Company explains the evolution of Windows from 1983 to 2000 with the following words:

"Imagine an old house that has been remodeled extensively. A few pieces of the foundation are intact, but you are added on new rooms through the years and reinforced the concrete in a few places. You've torn out and replaced half the plumbing, but other pieces seem to be working well enough, so you're left them alone. You're knocked out walls, added on a second story, and replaced the doors and windows. And, of course, you're painted, patched and redecorated countless times. That's windows".

The hardware architecture, the file system and the network plumbing of Windows have built up in layers for more than twenty years. Meanwhile, the user

interface has been through a more transformation. Table 1 summarizes how each version of M. W. has built on its predecessor's.

Table 1: Historical evolution of M.Windows

Date of release	**Type of Microsoft Window Systems**
November, 1983	First announcement of Microsoft Windows (M. Windows)
November, 1985	Circulation of Microsoft Windows 1.0
December, 1987	Release of Microsoft Windows 2.0
December, 1987	Introduction of Microsoft Windows/286 or Windows 286
June, 1988	Introduction of Microsoft Windows/386 or Windows 386
May, 1990	Circulation of M.W. 3.0 full version (Highly successful and popular).
October, 1991	Microsoft Windows 3.0 or Windows 3.0a (with multimedia).
April, 1992	Microsoft Windows 3.1 (one million copies sold the first 2 months).
October, 1992	Microsoft Windows for Workgroups 3.1
July, 1993	Microsoft Windows NT 3.1 (A revolutionary product for Microsoft).
February, 1994	Microsoft Windows for Workgroups 3.11
September, 1994	M.Windows NT 3.5 (Two models: NT Server and NT Workstation).
June, 1995	Microsoft Windows NT 3.51
August, 1995	Microsoft Windows 95 released (one million copies sold in 4 days).
August, 1996	Microsoft Windows NT 4.0 (rather difficult to master and administer).
November, 1996, November, 1997	Microsoft Windows CE 1.0 and M.W CE. 2.0
June, 1998	Microsoft Windows 98 (makes internet connection easier).
May, 1999	Microsoft Windows 98 SE (second edition)
1999	Microsoft Windows CE 3.0
February, 2000	Microsoft Windows 2000 (a multitasking system)
June, 2000	Microsoft Windows ME (Millennium)
October, 2001	Microsoft Windows XP (provides innovative experiences to P.C. users)
March, 2003	Microsoft Windows Server 2003 (released in 4 editions. Integrates fully dot Net).

3. Major revolutionary trends and improvements within the past decade

As it was discussed previously, the original Windows ware layered on top of MS-DOS, which offered support for the disk system. Differences, changes and improvements between the first versions were also discussed. What are however,

the revolutionary trends that marked the development of each new version from 1993 until today? (see also *Appendix A*: Table 2).

3.1. Windows NT: Based on the American bibliography concerning the history of Microsoft, I believe that Windows NT was created because Microsoft decided to succeed in the networking market. It is true that Microsoft had released its first network operating system named MS-NET in 1985, but at that time it was a small company and could not enter the market "aggressively". In October 1988, however, Microsoft hired David Cutler, a charismatic operating system specialist who had worked for Digital Equipment Corporation. Microsoft called this project "New Technology" operating system project, although, "there is some debate about how this name was really chosen" (Sjouwerman and Tittel, 2000: 5). Finally, in the summer of 1993, Windows NT 3.1 was released, the first Windows operating system to be independent of DOS. According to Sjouwerman and Tittel (2000) Microsoft decided to name this new product as version 3.1 because Windows 3.1 desktop was in the market at that time and feared that users might see Windows NT as an inferior product if it had a 1.0 version number. Next year however, (1994) Microsoft introduced a new version of the Windows NT, named Windows NT 3.5. This new version required less memory it had built-in provision for networking and it was separated into Server and Workstation versions. Windows NT provides 32-bit memory addressing, support for threads, full memory protection etc. that makes the system more secure against program failure or sabotage. As Silbershatz informs us, Windows NT4.0 received a c-2 security classification from the US government "which signifies a moderate level of protection from defective software and malicious attacks" (2003: 791). Ecklund however states that "a major weakness of Windows NT was that it was terribly difficult to master and use to administer networks" (2005: 9).

According to Norton (1997: 17), the original version of Windows NT entered the market with a big price tag. "Undaunted by originally slow NT sales and still waiting to give users an alternative, Microsoft developed Windows 95".

3.2. Windows 95 and 98: Windows 95 was released in August 1995 and sold more than one million copies within the first four days. According to Bott (2001), Windows 95 is the most important piece of computer software in history. The basics of the Inter (mouse pointer, desktop, revisable windows and icons) have borrowed elements from the Apple Macintosh OS. Also, the right click menus are out of IBM's OS/2, but the Start bottom and the taskbar are real innovations. Most of the important subsystems of this version are 32 bit instead of 16 bit, and that makes the reliability and performance of Windows much better and improved. Another positive feature of this version is the "Plug and Play" which constitutes an integral part of the operating system. For example, when we connect a mouse with our communication port (com)
the operating system automatically finds the model of the specific device (the mouse) and asks for drivers that either can be found in the operating system or in the installation cd-rom of the specific device.

Microsoft marketed Windows 98 for small businesses and home computer users. Released in June 1998, this upgrade is a retail version of Windows that supports for the first time the FAT 32 file system and makes an Internet connection

much easier. This is a main advantage offered by Windows 98 over Windows 95. As Norton (1997: 19) explains, "Windows 98 require 70MB more hard drive space than Windows 95, but in the long run, you actually get more free hard drive space because FAT32 is a more efficient file system than its 16-bit predecessor". Another upgrade in Windows 98 is the improvement of system stability. (System files are checked and replaced automatically). Memory management has been also improved. Windows 98 however have what Norton calls 'a security hole'. "How would you feel if someone read reports about your finances, all because of a hole in Windows?. Security is a very big business issue that Windows 95/98 is not equipped to handle" (2000: 21).

3.3. Windows 2000: Although Windows 2000 started out as the next version of Windows NT "differs from Windows NT 4.0 more than it is similar to it" (Silbershatz, 2003: 6). As Ecklund (2005: 8) states many people saw Windows 2000 as a continued refinement of Windows NT but "the changes that were made resulted to significant improvements". Released in February 2000 and designed for heavy duty Internet and intranet office use, Windows 2000 is more stable and secure that its predecessors. Designed to be a multitasking operating system capable of running many tasks efficiently, it was intended for corporate desktops that connect to a variety of sources, rather, than a small business or a home machine with two sources. It is also reliable, which means that it can handle error conditions and can resist defects and attacks. It has a native file system (NTFS system) capable of recovering automatically from different file system errors when a system crash. It is also made for international use, providing support for different places via the API, the national language support. (API provides routines to format time, money and dates according to different locales) (Silberschatz, Galvin and Gagne 2003: 746). The last new features in Windows 2000 are: Active Directory (a central database) and Microsoft Management Console (MMC) which improves the management of user accounts, client machines and networks and makes easier the jobs of network administrators.

Herbert Schildt (2000: 2) finds Windows 2000 to be a revolutionary step in Microsoft's professional 32-bit Windows platform, more powerful and flexible than its predecessors. "It represents a major rewrite and redesign effort. … In short, Windows 2000 is the OS design to take Windows into the 21st century".

There are four versions of Windows 2000. The professional for desktop use and three Server versions: Server, Advanced, and Datacenter. "These versions differ in the amount of memory and number of processors they support" (Silberschatz, Galvin & Gagne, 2000: 744).

3.4. Windows XP: Windows XP was released in October 25, 2001 as an update of Windows 2000 desktop operating system and also as a replacement of Windows 95/98. The "XP" stands for 'experience' and symbolizes the innovative experiences (music, movies, messaging, photos etc) that Windows offer to personal computer users.

Specifically, the key goals of this system are: reliability, security, ease–of–use, high performance, portability and international support. Windows XP updates and improves the graphical user interface, the automatic repair of problems in the operating system itself and in applications, the networking and device experience

(e.g. instant messaging, digital photography/video etc), as well as the reliability and the security. "Microsoft used extensive manual and automatic code review to identify over 63,000 lines in the source files that might contain issues not detected by testing, and set about reviewing each area to verify that the code was indeed correct" (Silberschatz, Galvin and Gagne, 2003: 791).

3.5. Microsoft Windows Server 2003: Microsoft released different editions of Windows Server 2003 to satisfy the demands that business put on their networks: The *Standard edition* is designed for small to medium sized networks (for small business and department-level business units). The *Enterprise edition* is 'highly scalable' (can easily adapt to increased demands) and is designed for networks that have grown or plan to grow beyond the capacity of the Standard edition. The *Datacenter edition* satisfies the needs of business that cannot do a moment without their network. The *Web edition* is designed solely for hosting web sites and serving up web pages for business that need to take control of their own web hosting needs. According to Ecklund (2005: 14) the retail price is 60% less than the price of Standard edition. The main benefits and improvements of Windows Server 2003 are the following: It is faster (twice as fast as Windows NT), more reliable, (server does not crash and network is never down), easier to manage, more secure against internal and external threads. Also, it is more closely integrated with the Internet. In fact, Windows Server 2003 is the first operating system that integrates fully Microsoft's new **.**NET (pronounced dot Net) initiative. The **.**NET is "a set of Microsoft technologies for connecting information, people, systems and devices which are not necessarily part of the same network or geographically close to each other" (Ecklund, 2005: 31).

4. Conclusions

As we have seen, the development of Microsoft Windows has been marked by the technological advances and the demands and needs of the users. As Norton (2000: 18) states, software is never finished and never perfect, like people. "Complex software such as an operating system is 'released'; after that, patches, updates, new features, bug fixes and other modifications are made available to the public, relatively frequently". However, "there is nothing like putting an operation system on the hands of the consumer to really find the rough spots" (Ecklund, 2005: 10). Thus, as we have seen, Microsoft released different editions of Windows at more or less the same time to improve the system and to meet different needs. This practice has continued with the release of Windows Server 2003. To summarize, we can say that over the last two decades Microsoft Windows have developed from a single 'one-size-fits-all' desktop operating system into a family of operating systems and mobile technologies. Today, Windows help people everywhere to achieve their potential at work, home, and just about anyplace.

The evolution (for some people the '***re****volution*') of Microsoft Windows will not stop. As you read this study the world is waiting for further news about the release of a new software development platform codenamed Whitehorse that Microsoft promises to make writing Windows applications easier and faster!

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