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EVOLUTION OF USER INTERFACE IN MICROSOFT WINDOWS OPERATING SYSTEMS

ABSTRACT

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This thesis was about showing the changes the user interface of Windows operating systems has gone through and their importance, starting from Windows 1.0 and finishing on the technical preview of Windows 10. The main objective was to show how much has changed in 30 years of development.

There were many changes and additions, such as Start menu, taskbar, graphical environment and windows. Some of them were kept with slight adjustments between different instalments of the series and while others were discarded, for example Active Desktop and Windows Gadgets.

The years of development have significantly changed Windows. There is seemingly no end to what might be added or changed despite the age of the series. In the future, there might be very different concepts of user interfaces, given that technology is constantly developed and changed based on mankind's needs.

ABSTRACT

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1 INTRODUCTION

This thesis presents how the user interface in Windows operating systems has developed since its first instalment in 1985 to what the users from all over the world recognise. The programs have changed in accordance to available technology through 30 years and it is quite a journey to see how the interface evolved from being new to computer mice to handling touch screens. It is important to understand how the features were added and removed, as Microsoft tries to understand what its customer base wants. As such this thesis goes through all of the changes in user interface between different Windows', so as to show how much has changed and what could possible change in the series in the future.

The largest issue was finding reliable sources for Windows' from 1.0 to 3.0 as well as Windows ME. The former three due to their old age and their user guides having a collector's value, while the latter simply because its shelf life was slightly more than a year, so there were not that many user guides and books written about its user interface in detail. Those issues were the results of the decision to make this thesis based on literary works rather than practical experience.

The thesis will attempt to show the importance of operating systems, the reason why user interface is one of the higher priorities as well as present the changes to user interfaces in Windows operating systems. The writer has used several Windows' personally, but not all of them, from young age and is aware how much the user interfaces in Windows operating systems has helped him in proper usage of his computer throughout the years.

2 OPERATING SYSTEMS AND WINDOWS' POSITION AMONGST THEM

For the purpose of understanding how important the user interface is in an operating system, one must know what defines an operating system, as it is not just another program ran on the computer, as will be shown in this chapter. It is the most important program ran on the computer, as without it, a computer simply cannot be used. Its user interface has a facilitative impact on the user when it is imperative that he actually uses the computer. While Windows is hardly the only option on the market of operating systems, it still took over the market nonetheless.

2.1 Definition of an operating system

Operating systems are programs that work between user's applications and the computer's hardware, acting as an interface between the user and the computer. They are responsible for managing the computer's users, controlling errors, executing programs and controlling input/output devices (Liwei, Yong & Yukun 2011.) As such, the operating system is the most important program on the computer, because without it the user simply cannot use the computer's hardware. One might compare a user trying to use a computer without an operating system to a marionette with its strings cut. Just like the puppeteer will try to control the marionette by its control bar to no avail, the user simply will not be able to achieve anything with a computer without its operating system. The operating system in this metaphor is the strings attached to the marionette.

As such, the operating system is the most important program that runs on the computer, therefore it is important that it is usable by anyone regardless of their knowledge and experience. The development of user interfaces has changed from physical interaction with the computer, through textual interfaces that required extensive knowledge of commands and finishing on the graphic user interface (Computer Hope 2015.) The metamorphosis of user interfaces was induced owing to the fact that with the increase of computer users, the accessibility of operating systems had to be increased as well. Otherwise there would not be as many customers as there are today.
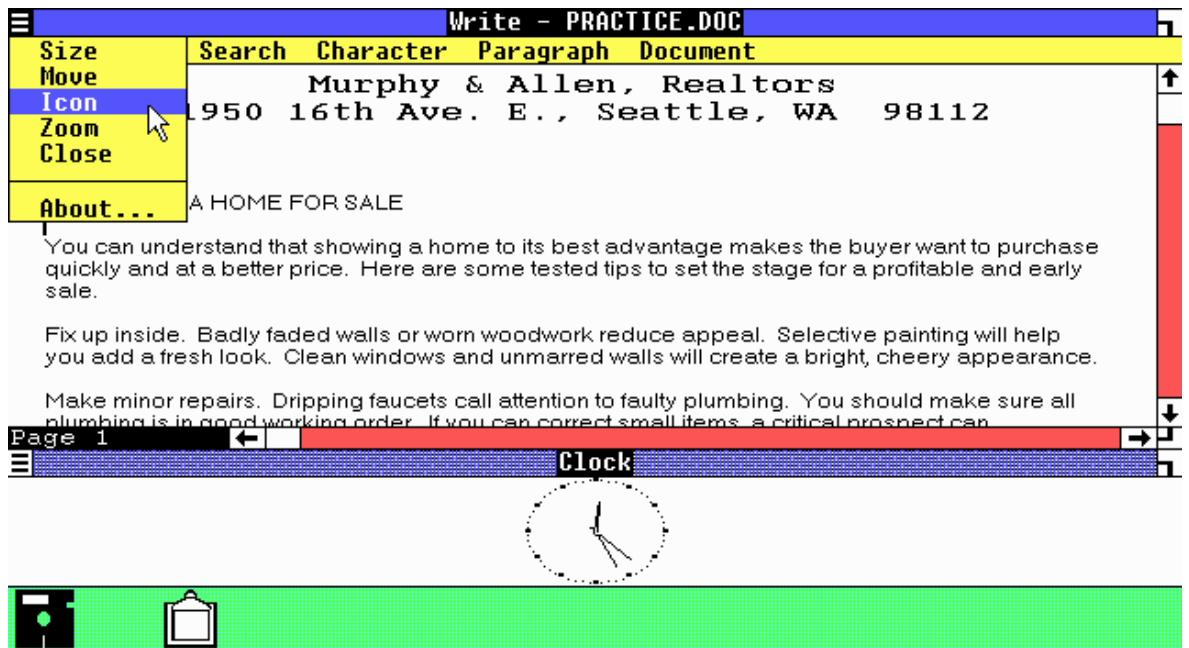
2.2 Windows

Windows is a series of graphical operating systems that are developed, marketed and sold by Microsoft. Windows has been made due to sudden rise of interest in graphical user interface amongst consumers (Bellis 2007). The series started with Windows 1.0 in 1985 and continued with its high points and low points, while developing new features, optimising its performance and becoming more pleasing to the eye with every release. It has risen in popularity to the point where four instalments of the series take the first four spots in terms of market share in desktop operating systems, Windows 7 being number one (NetMarketShare 2015).

3 EVOLUTION OF WINDOWS

This chapter and its subheadings is why this thesis has been written. For the purpose of showing how much has changed in 30 years from 1985 to 2015. While reading this, one must understand that even though a number of the features might seem obvious to the customer base today, there is a possibility that some of them were just not thought of beforehand, whereas other enhancements might have been too much to handle for average computers at that point in time. The reader must keep in mind that Microsoft is selling a product that is ideally used by every computer owner, that means there is little to no point in jumping on technology that is brand new, as that is wasted development time.

3.1 Windows 1.0

Windows 1.0 was more of a graphical shell for MS-DOS than a proper operating system, that allowed accessing folders and files with a computer mouse, as opposed to typing in commands, but it also came with several programs, such as Calendar, Write and Paint (Toasty Technology 2002.) The user interface was slightly unwieldy, as it only allowed tiled windows, i.e. while it was possible to have multiple windows open as well as change their sizes, they could not overlap each other. That is a substantial sign of how aged this operating system is (Toasty Technology 2002.) The user interface of Windows 1.0 is shown in Graph 1, where there are only two windows open and they fill the screen. The icons visible at the bottom of Graph 1 are 'iconized' (old form of minimising) programs, waiting to be resumed to at a later time. In the upper left corner of every open window there is a system box which lists available options for that window.
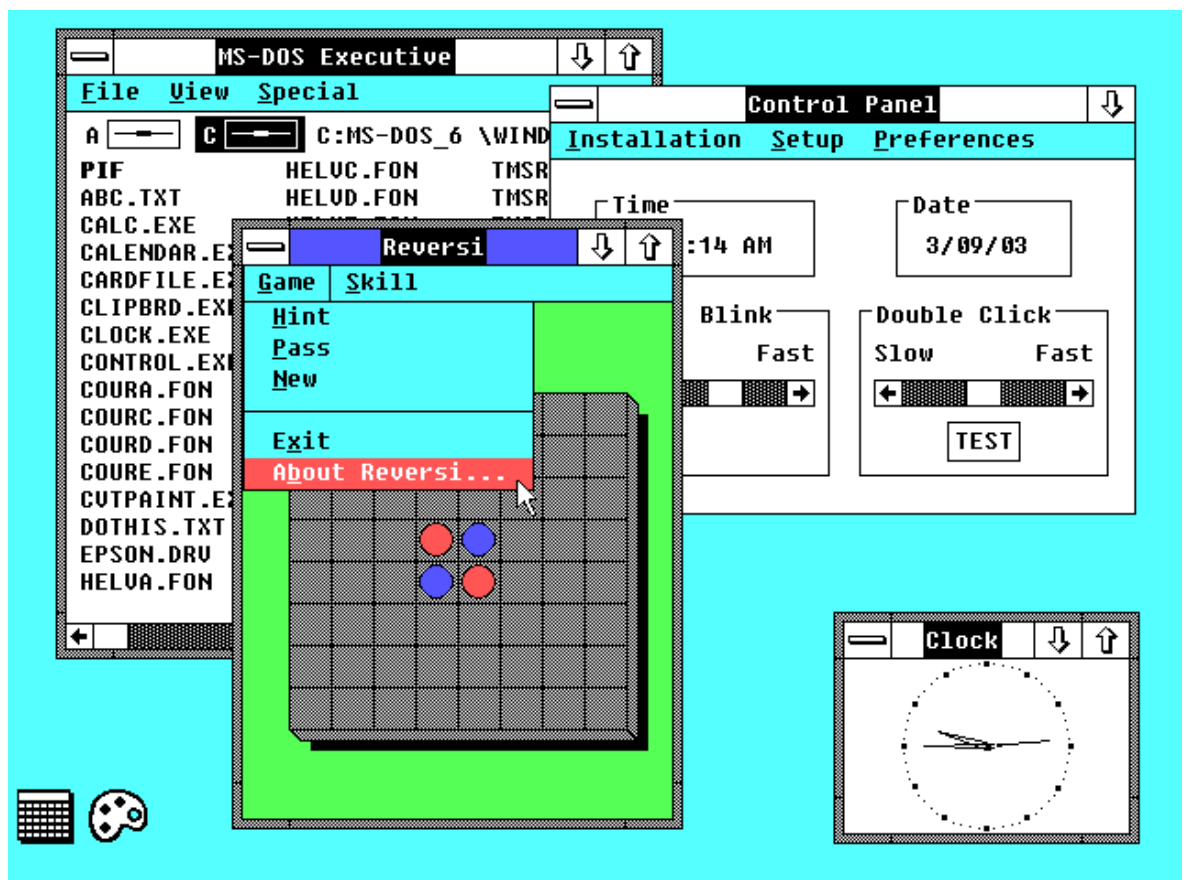
GRAPH 1. User interface of Windows 1.01 (Toasty Technology 2002)

3.2 Windows 2.0

The second instalment in the Windows series had a couple of significant changes, such as the ability to have overlapping windows (Microsoft 2011). Windows 2.0 was also the first Windows to have the Control Panel, a window that lists all of the options available in terms of colour display, printers, and time and date of the computer (Microsoft 1987).

It also featured a slight change in terminology, as this is the first Windows to refer to minimise and maximise functions as such, whereas in Windows 1.0 those were called iconize and zoom respectively (Software Business Partners 2009). Keyboard shortcuts, which are sequences of keystrokes on keyboard allowing quicker command invoking, were added in Windows 2.0 (Beal 2012). Graph 2 shows the aforementioned overlapping windows and Control Panel, as well as a change in icons used for minimising, maximising and the system box, now represented as arrows and a dash, respectively.
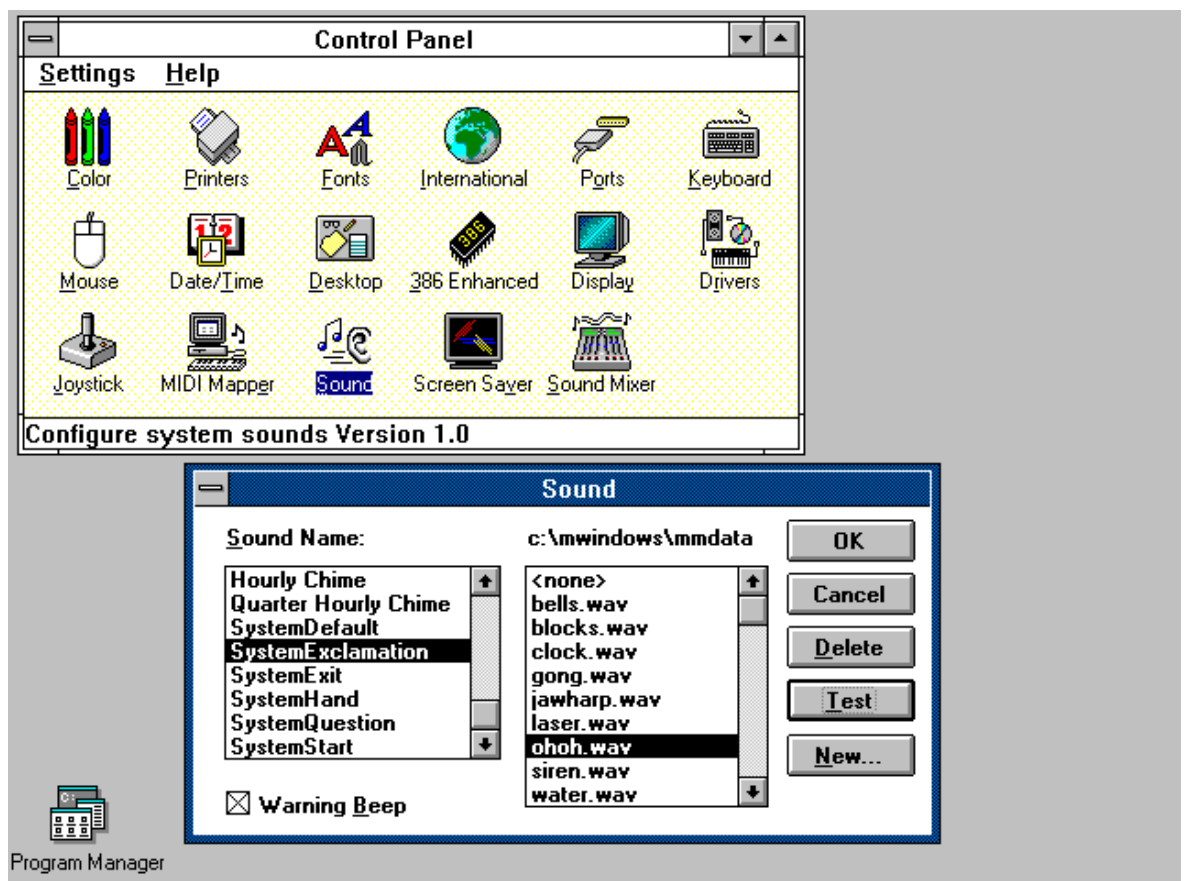

GRAPH 2. User interface of Windows 2.03 (Toasty Technology 2002.)

3.3 Windows 3.0

Windows 3.0 did not bring many changes interface-wise, as the most significant development was in its coding, but it still brought changes with it. The most noticeable change is that Windows 3.0 is fully coloured, as opposed to only colouring menus and windows boxes in Windows 2.0 (Microsoft 2011). Another notable addition was the Control menu, situated in the top left corner of every window. It listed all possible options in terms of positioning and the size of the window, as well as closing the window (Boncler 1991.)

Graph 3 shows the colorization of Windows as well as the increase in options available at the Control Panel. The Control Menu has retained its button from Windows 2.0, but minimise and maximise buttons have been changed from full arrows to simple arrowheads.
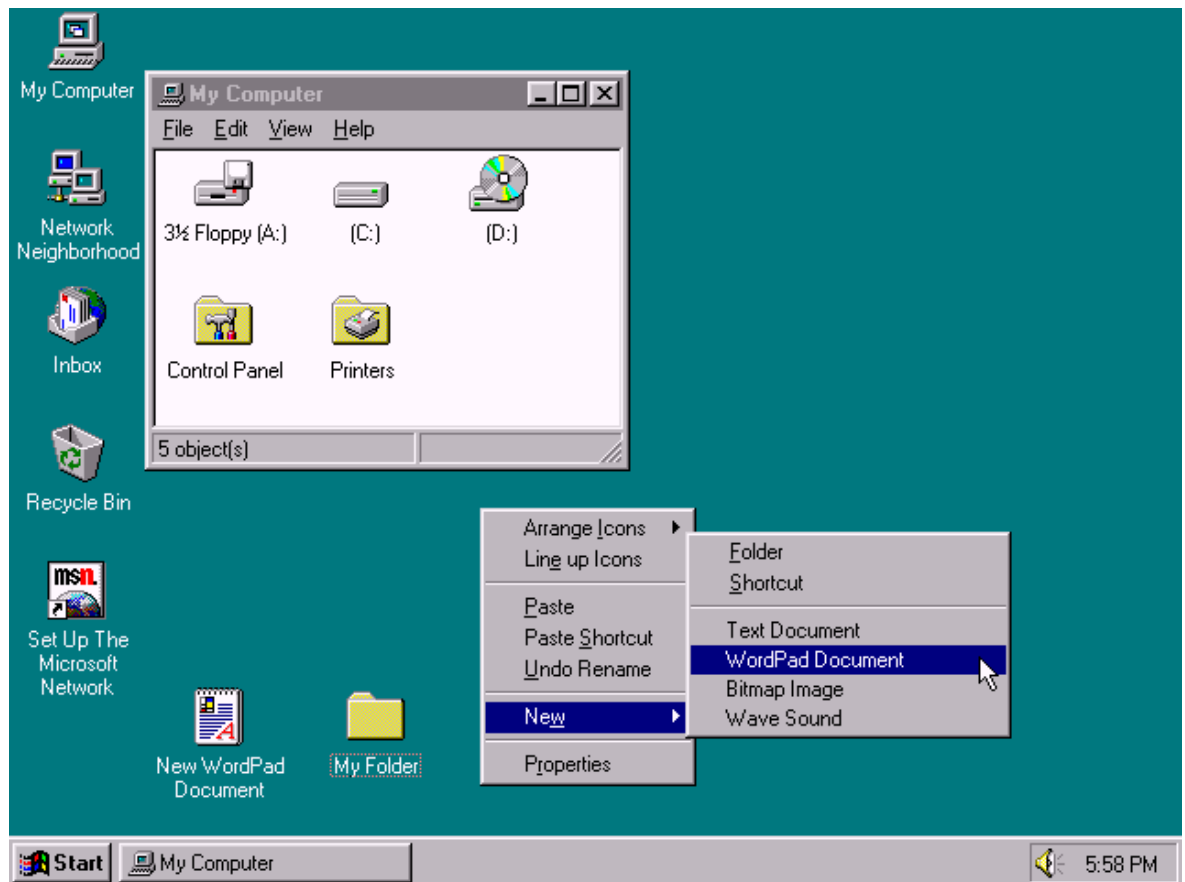
GRAPH 3. User interface of Windows 3.0 (Toasty Technologies 2002)

3.4 Windows 95

Windows 95 was Microsoft's first operating system that had vastly transformed in comparison to the older versions. It included a desktop metaphor, where users could store shortcuts to often accessed programs and documents, similar to using office supplies on one's desk (Microsoft 1995, viii). Another significant feature was the Start menu, which was a simple interface allowing users to access separate sections inside of the menu for quick entry to e.g. software or the control panel (Microsoft 1995, 3). Yet another big addition was the taskbar, which listed all open windows in it, allowing quick switching between windows without the need to move them aside (Microsoft 1995, 4). It also brought upon a small change in terms of the windows themselves the minimise, maximise, and close buttons have been repositioned to the top right corner (Microsoft 2013.)

Graph 4 shows how much the graphical environment has changed in comparison to Windows 3.0. The desktop is seen in Graph 4, with multiple icons that now serve as access points rather than a representation of a minimised program or folder. The Start menu and the taskbar are visible at the bottom of the picture. On the bottom right corner of the graph, one can see the system tray which is where the time is shown as well as icons representing programs that are running in the background for example antivirus. Windows can represent options as an icon in the system tray, the icon of a speaker shown in Graph 4 allows volume control without the need to access the Control Panel. The gray multi-tiered menu is called Context Menu and it is filled with options related to where it is opened by pressing the right mouse button. In this case it was clicked on an empty spot on the desktop, which is why it offers the option of creating a new folder or file, as well as arranging icons and pasting what is currently in storage. The Recycle Bin icon that is visible on Graph 4 leads to a special folder where all deleted files and folders appear and remain there, until it is emptied, which is required to maintain free hard disk capacity. As seen on the My Computer window, which lists all of the drives connected to the computer as well as the Control Panel and Printers folders, the Control Menu button is removed, replaced with a simple close button. The minimise and maximise buttons were shifted slightly to the left and their graphics were changed to an underscore lookalike (meant to represent the

window as seen in the taskbar) and to an empty square. The close button is a cross and it is situated in the upper right corner of every window (Toasty Technologies 2002.)


GRAPH 4. User interface of Windows 95 (Toasty Technologies 2002)

Graph 5 shows an open Start menu, which is a multi-tiered menu that provides access to the most common functions, such as Programs, Find and Shut Down. To navigate through it the user has to click the Start button and then rest his or her mouse cursor over the appropriate folder and wait for Windows to list its contents and this would continue until the user would select the sought for program. The Start menu was slightly modifiable, as in the user could add any file, folder and shortcut to it, one could not remove the most important functions, such as Shut Down, Settings and Control Panel, which was inside the Settings menu (Toasty Technologies 2002.)
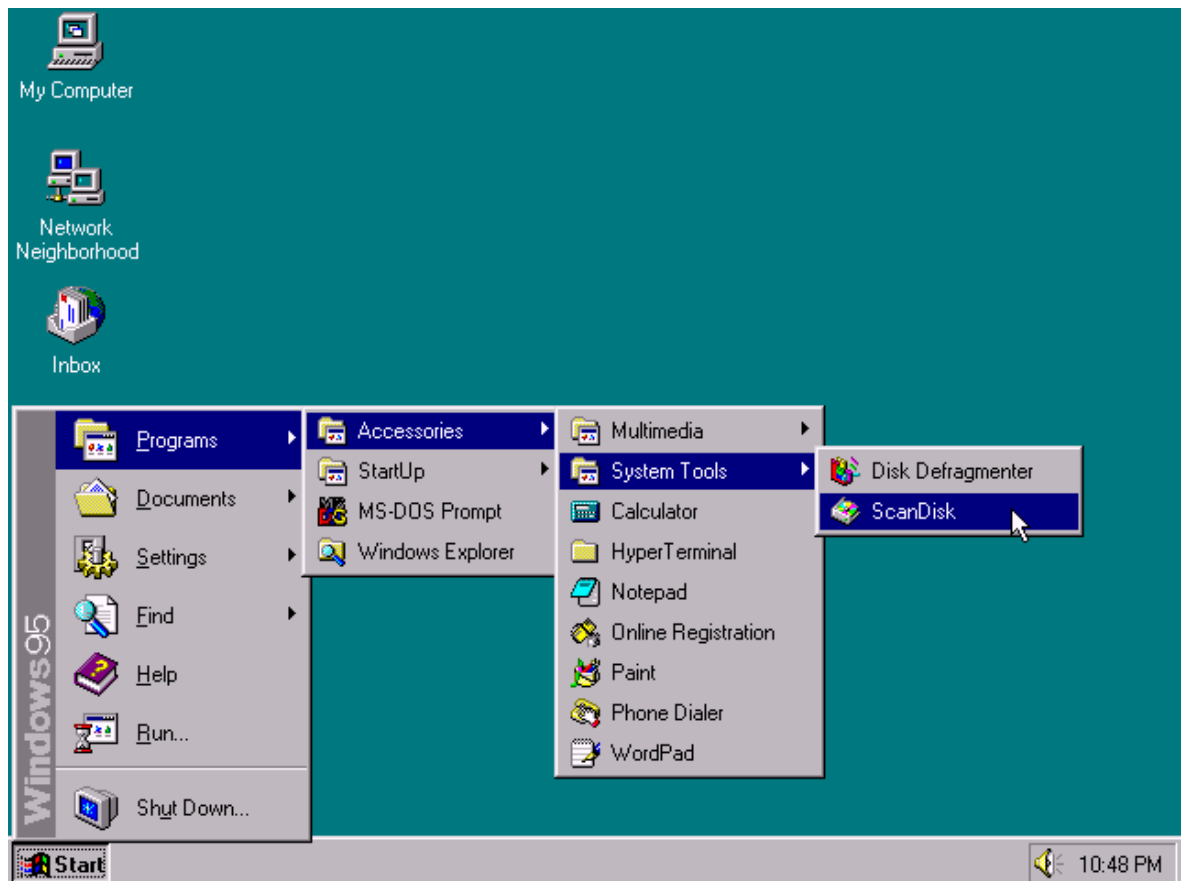
GRAPH 5. The Start menu in Windows 95 (Toasty Technologies 2002)

Graph 6 shows another addition to Windows that remains the series' fundamental feature called 'wizards' which are dialog boxes that would guide the user through some of the more complicated operations. They would have several steps that would ask the user questions, rather than listing all of them at once to the confusion of the user. This has made Windows 95 less alienating to the less experienced users (Toasty Technologies 2002.)
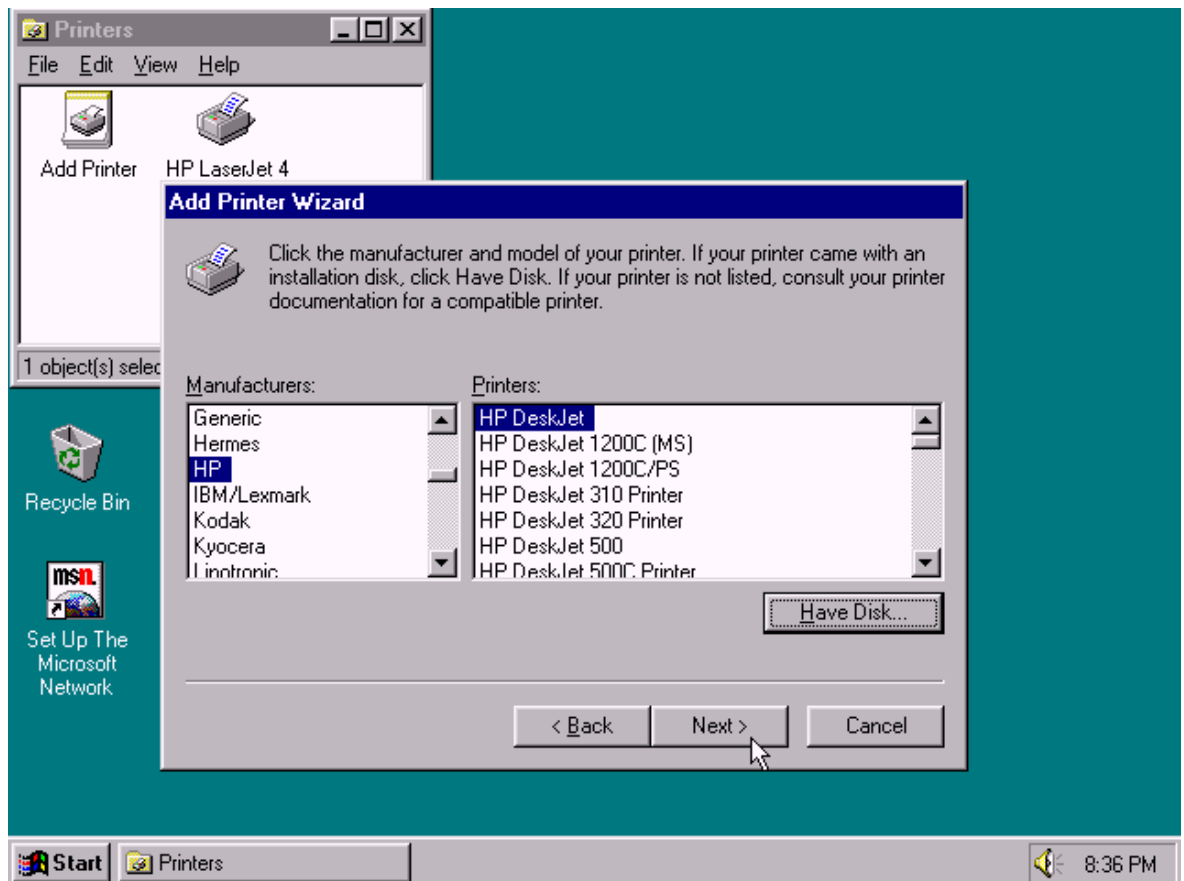
GRAPH 6. Windows 95 'wizard' helps configuring a recently connected printer (Toasty Technologies 2002)
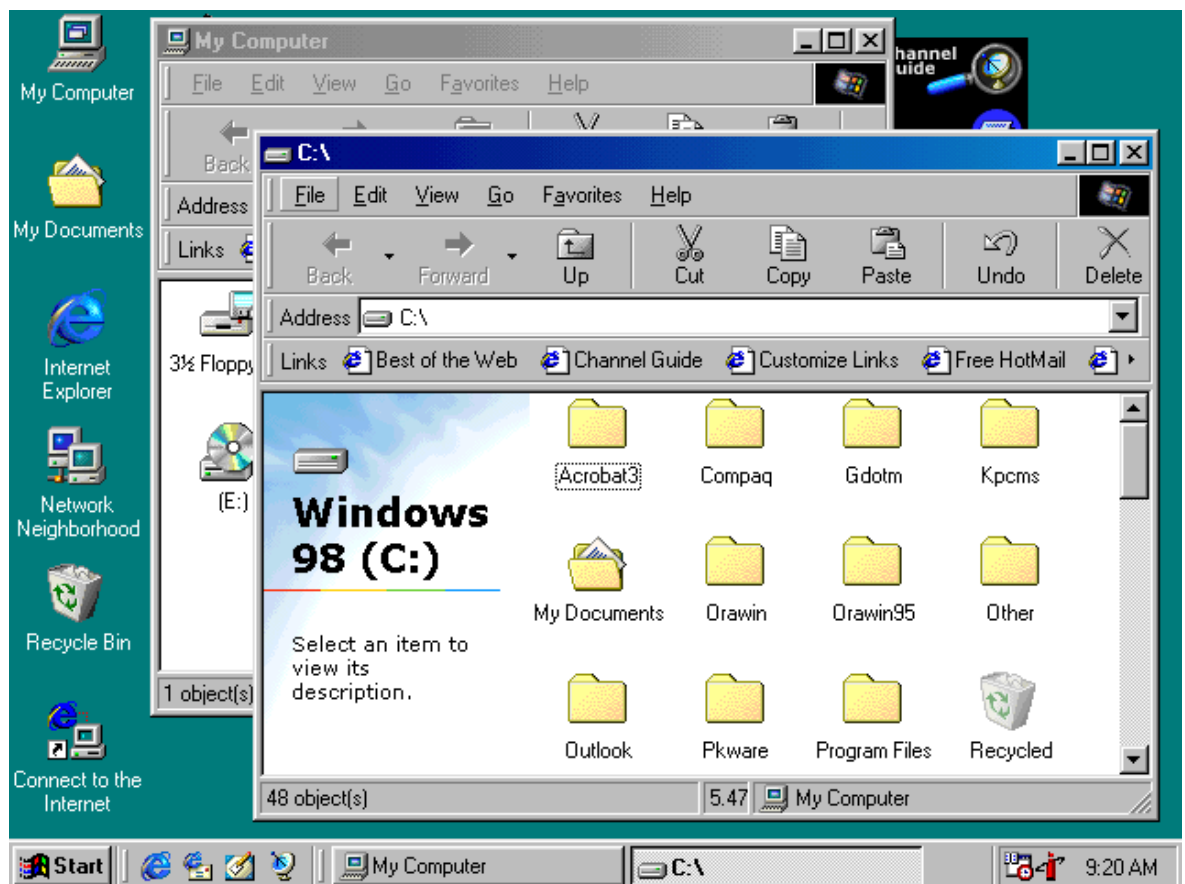
3.5 Windows 98

Windows 98's File Explorer was integrated with Internet Explorer 4, which is how the windows received Back and Forward navigation buttons, single click accessing (with hovering the mouse pointer over a file or folder highlighting it), address bar and web view in folders. While all of these have become standard features in File Explorer, they no longer are connected to Internet Explorer (Microsoft 2015.)

The desktop could become an Active Desktop, which means the background would be a website behaving just like it would in an Internet Explorer window. It had also gained Channels, shortcuts to popular websites, which were listed at a side of the screen (Microsoft 2015.) Both Active Desktop and Channels are visible on Graph 8. Quick Launch toolbar has been added, which could be accessed through the taskbar; it showed

shortcuts of programs and files that were added there, giving another means of access to them in addition to desktop and Start menu (Microsoft 2007b).

Graph 7 shows slightly improved graphics, such as more detailed icons and gradient colours in title bars. It also shows how the Web Style changes the windows, adding the aforementioned Address bar, Links bar that lists website bookmarks, Back and Forward buttons. At the bottom of Graph 7, in between the Start button and the windows listed on the taskbar one can see the Quick Launch toolbar. The Windows icon which is visible in folder windows would animate whenever the computer would work on accessing a folder or file.

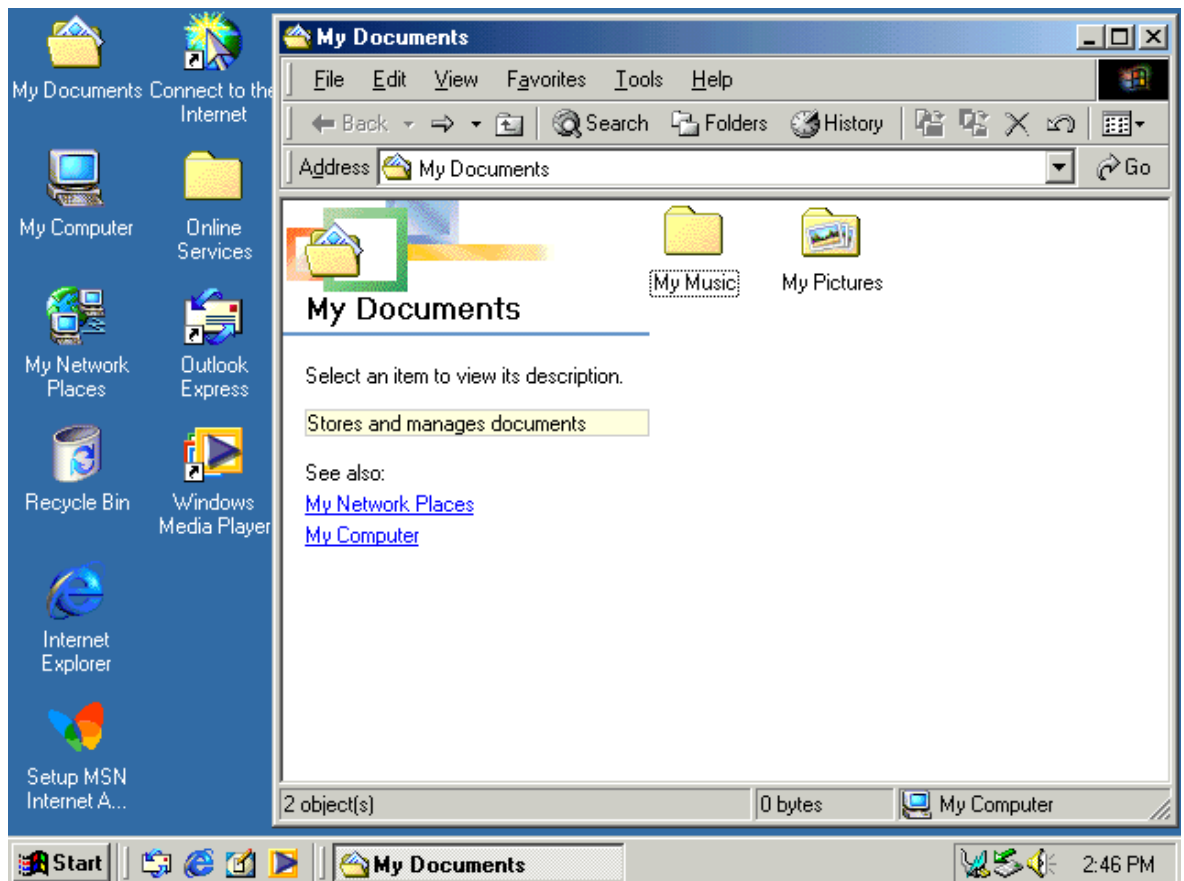GRAPH 7. User interface of Windows 98 (Toasty Technologies 2002.)
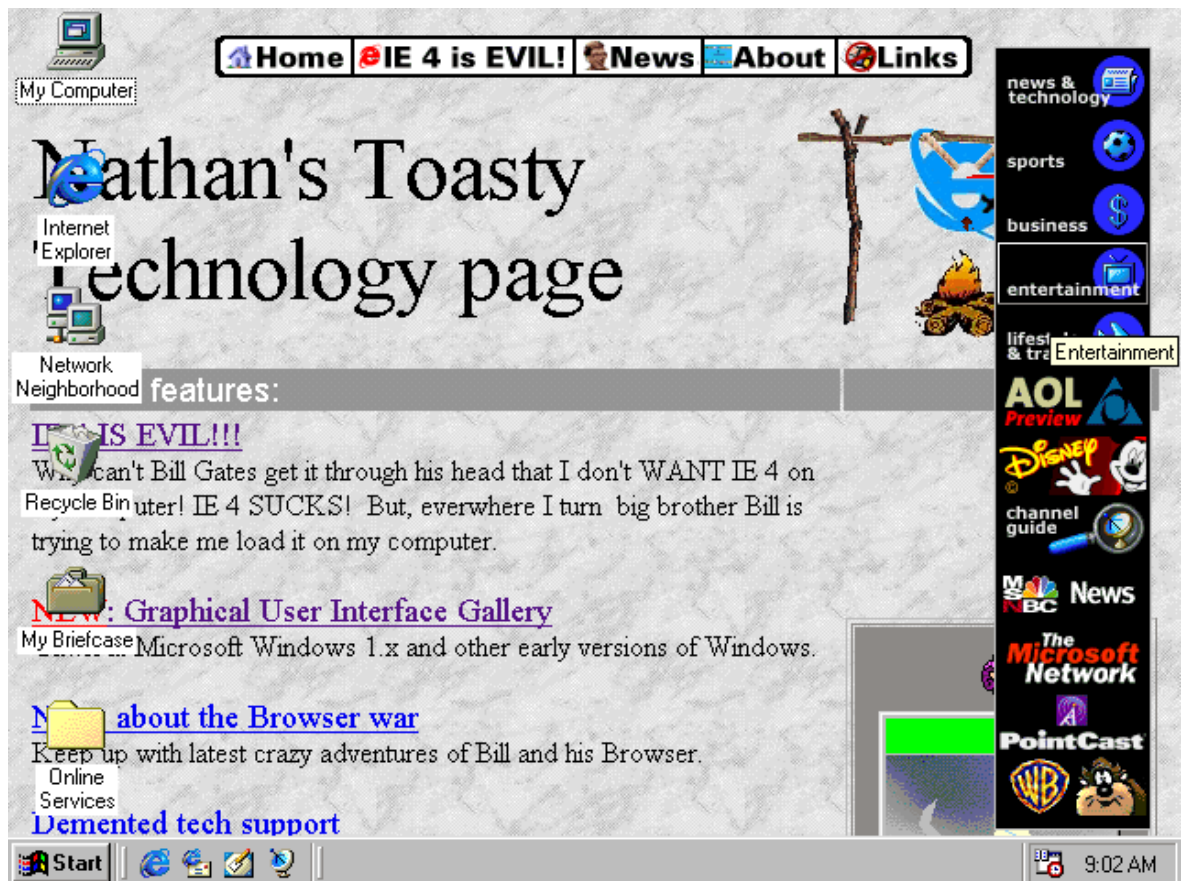
GRAPH 8. Active Desktop and Channels (Toasty Technologies 2002.)
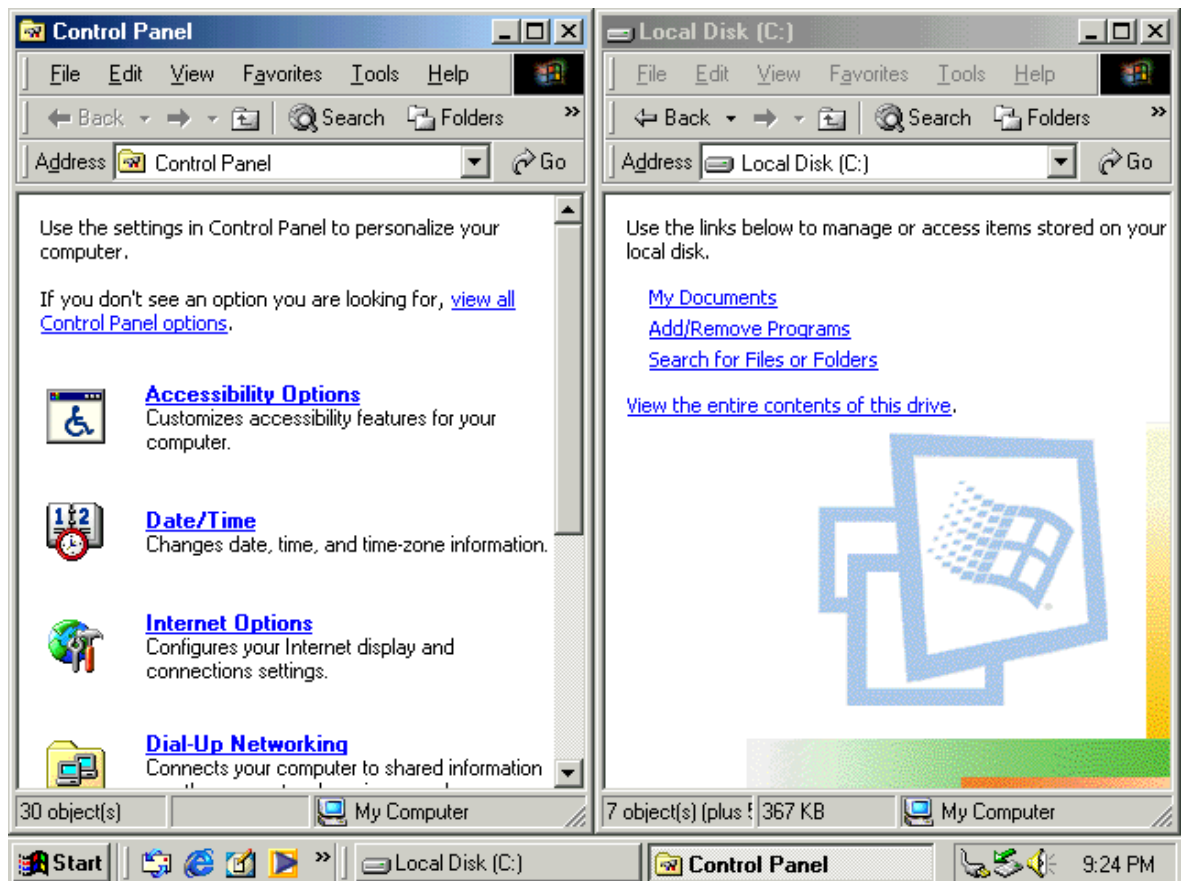
3.6 Windows ME

Windows ME, which is short for Millennium Edition, did not have many changes. The only notable changes are the first appearance of simplified version of the Control Panel window, which lists only those options that might be used by an average computer user. There is still the possibility to access all of the options, which is reserved for expert users (Toasty Technology 2002.)

Graph 9 shows yet more enhancements in graphics and the change of the default colour of the desktop from teal to blue. The windows still have the Address bar, but the Links bar is no longer there by default. The icons for Windows' special folders have become more elaborate as well.

GRAPH 9. User Interface of Windows ME (Toasty Technologies 2002.)

The aforementioned simplified Control Panel can be seen in Graph 10, listing only a couple of options available, but once the user clicks the 'view all Control Panel options' link, all other options be arranged just like they did in earlier instalments of Windows. On the right side of Graph 10 one can see that Windows ME 'warns' the user before showing contents of the C: drive, as it is the system drive and a mistake might mean permanent damage to Windows ME or programs installed on the C: drive.

GRAPH 10. Simplified Control Panel and access restriction in Windows ME (Toasty Technologies 2002.)

3.7 Windows XP

Windows XP featured a whole new appearance, due to increased use of graphical effects, such as drop shadows and allowed the usage of visual styles as well. This allowed the user to change the operating system based on his liking further than any other Windows before (The University of Reading 2008).The Start menu has been changed to include a list that shows programs that have recently been used and programs that the user himself has 'pinned' to it, granting quick access to regularly used programs (The University of Reading 2008).

Windows XP also included the ability for the taskbar to gather all similar tasks, so that five separate instances of Internet Explorer, or any other program, will not cover most of the taskbar. Instead the user receives a list of those instances with their website titles visible for ease of choosing (Microsoft 2006.) As seen in Graph 11, the environment has changed

drastically and the desktop only has the Recycle Bin icon by default, though other 'special' icons, such as My Computer can be added to the desktop by right clicking its icon in the Start menu and clicking 'Show on desktop'. The Start menu that is visible in Graph 11 has changed drastically and one can see it lists recently opened applications, yet a fresh installation of Windows XP will show the same programs as the ones in Graph 11.

The Internet and E-mail icons will change if a different program is set as the default browser/e-mail client. The username of the current user is now showed at the top of the Start menu, along with a personalised icon. The icons in system tray can now show messages in a popup message in the form of a bubble. The desktop has been changed as well to show a wallpaper known as "Bliss".

GRAPH 11. The Start menu of Windows XP (Toasty Technology 2002.)

Graph 12 shows how the windows have been changed, with better looking icons and a different stylisation of the title bar and the minimise, maximise and close buttons. The

pane on the left shows options relevant to the current window, for example the Other Places list shows links to other places once the user goes to My Network Places. The drives are now separated to hard disk drives and mountable devices.
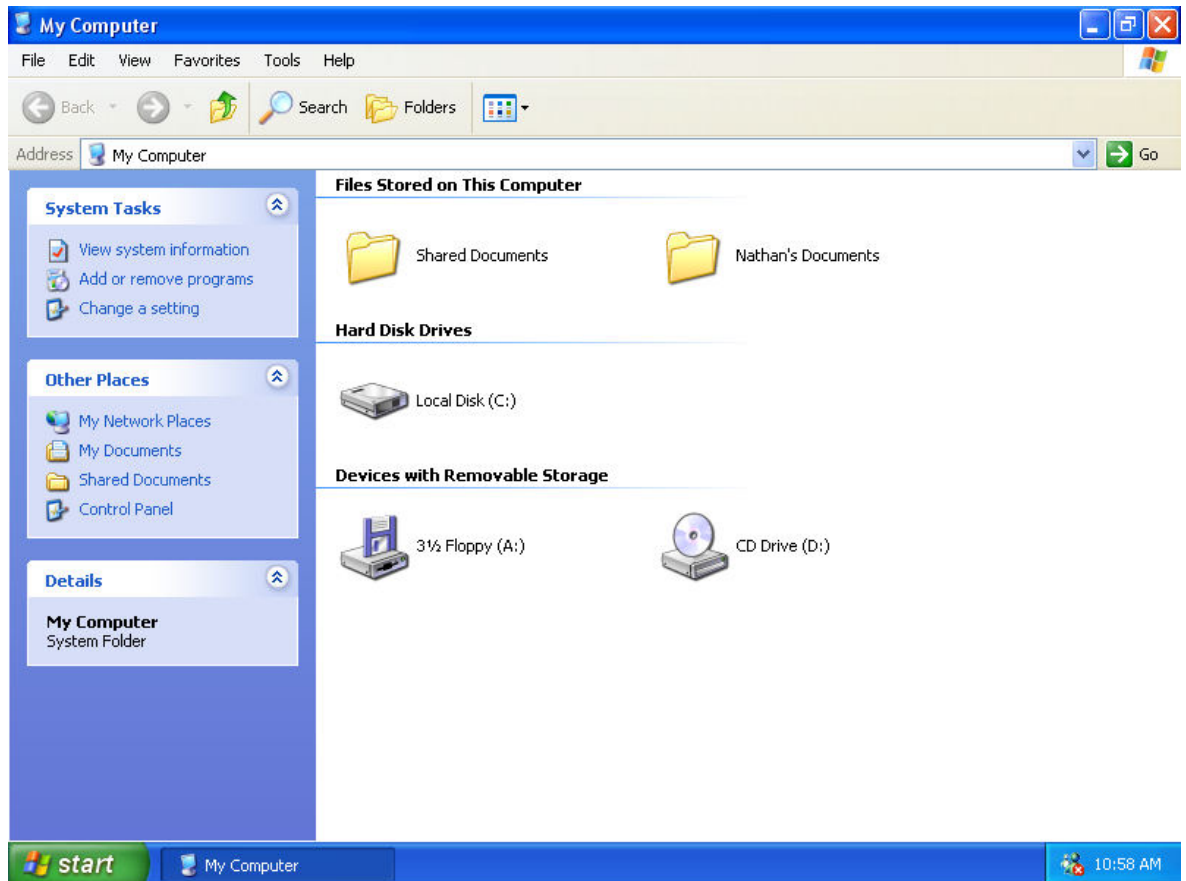

GRAPH 12. The My Computer folder in Windows XP (Toasty Technologies 2002.)

Graph 13 gives another point of view at the drastically changed graphical environment, as well as a different approach to the simplified Control Panel. In Windows ME, the window would show few options whereas the simplified Control Panel in Windows XP divides options into categories. On the left side one can see the 'Switch to Classic View' link, which reverts the look of the Control Panel back to what it looked like in Windows 95.
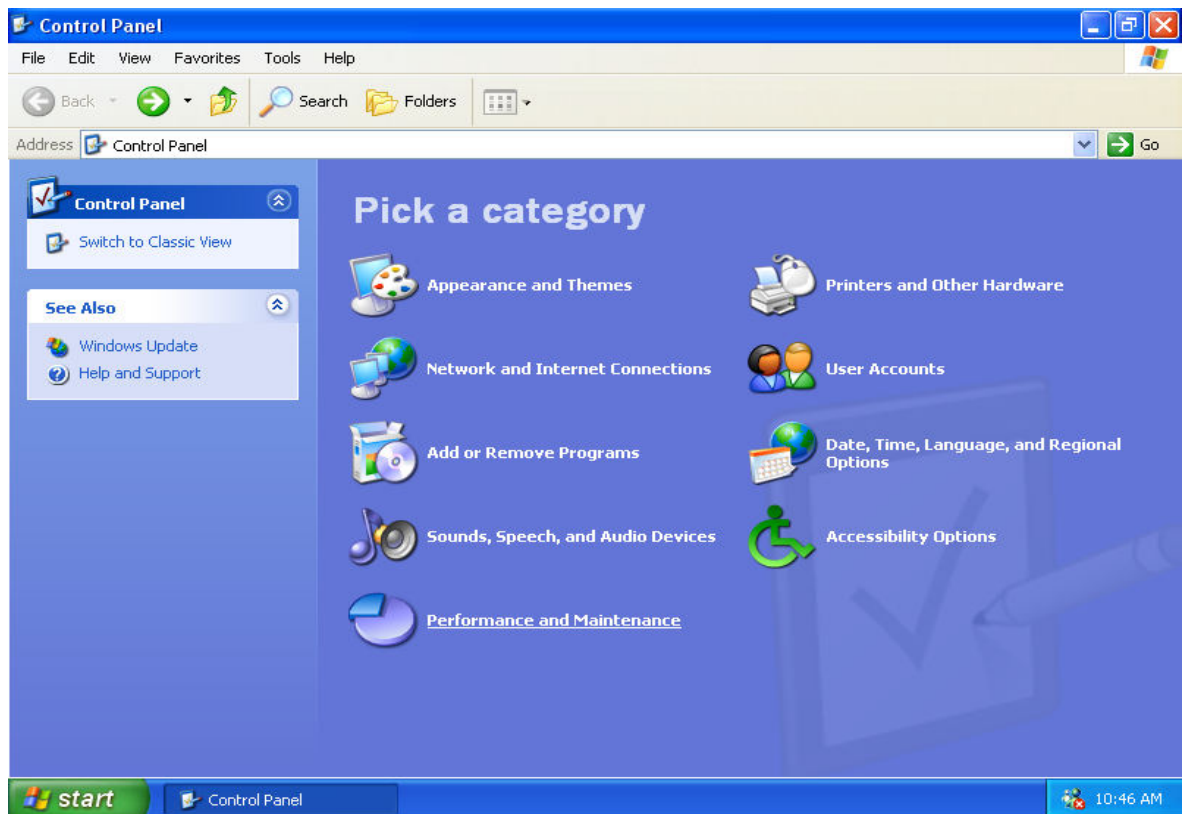
GRAPH 13. Simplified Control Panel as seen in Windows XP (Toasty Technologies 2002)

The user can disable the Web style in Windows XP and switch to the classic theme, resulting in an environment that is similar to the one from Windows 95, as shown in Graph 14. Note the lack of gradients in the windows' title bars. This does not result in losing any functionality and it helps with the performance of the operating system on underperforming computers.
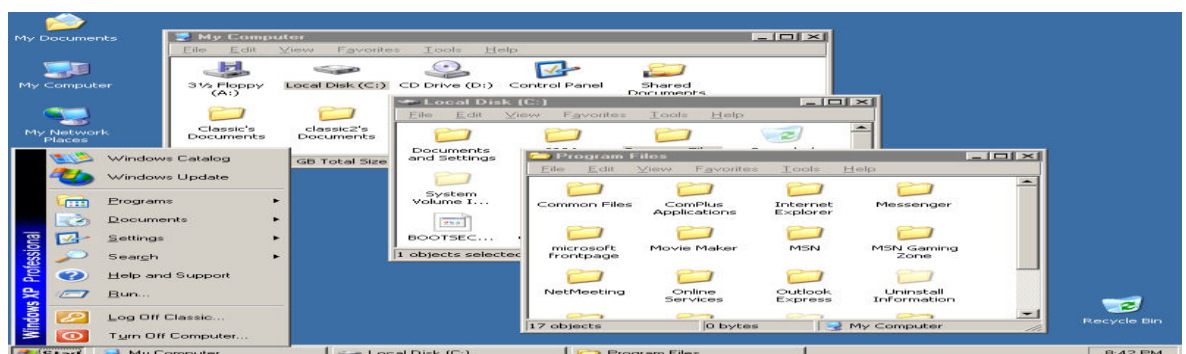
GRAPH 14. User interface in Windows XP with graphical enhancements disabled (Toasty Technologies 2002.)

When the user clicks the Turn Off Computer button in the start menu, he or she will see what is shown in Graph 15. Windows XP fades the colour out of the rest of the operating system making the shutdown window the only thing in colour.
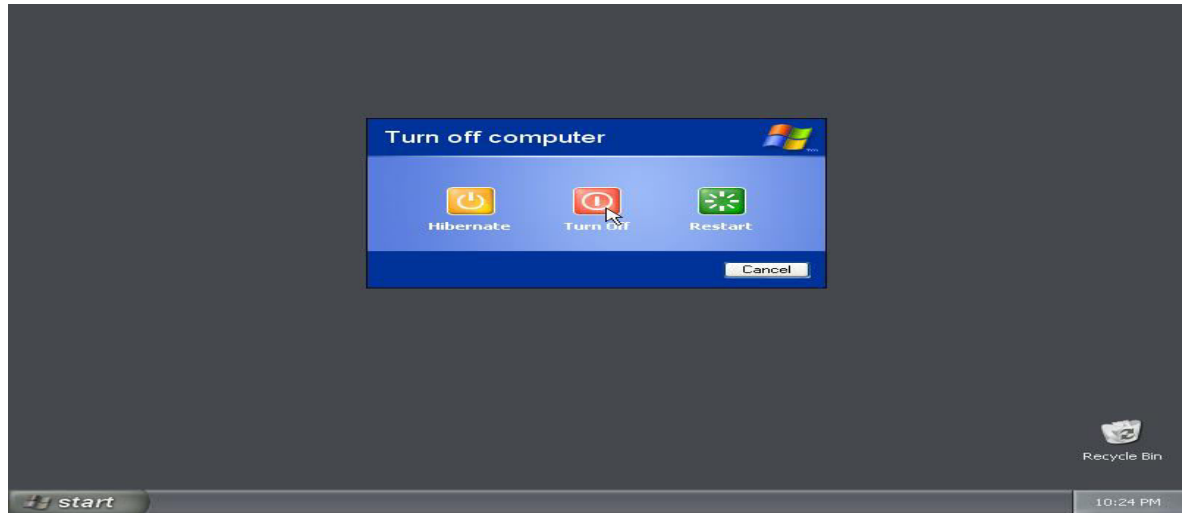
GRAPH 15. The shutdown box in Windows XP (Toasty Technologies 2002.)
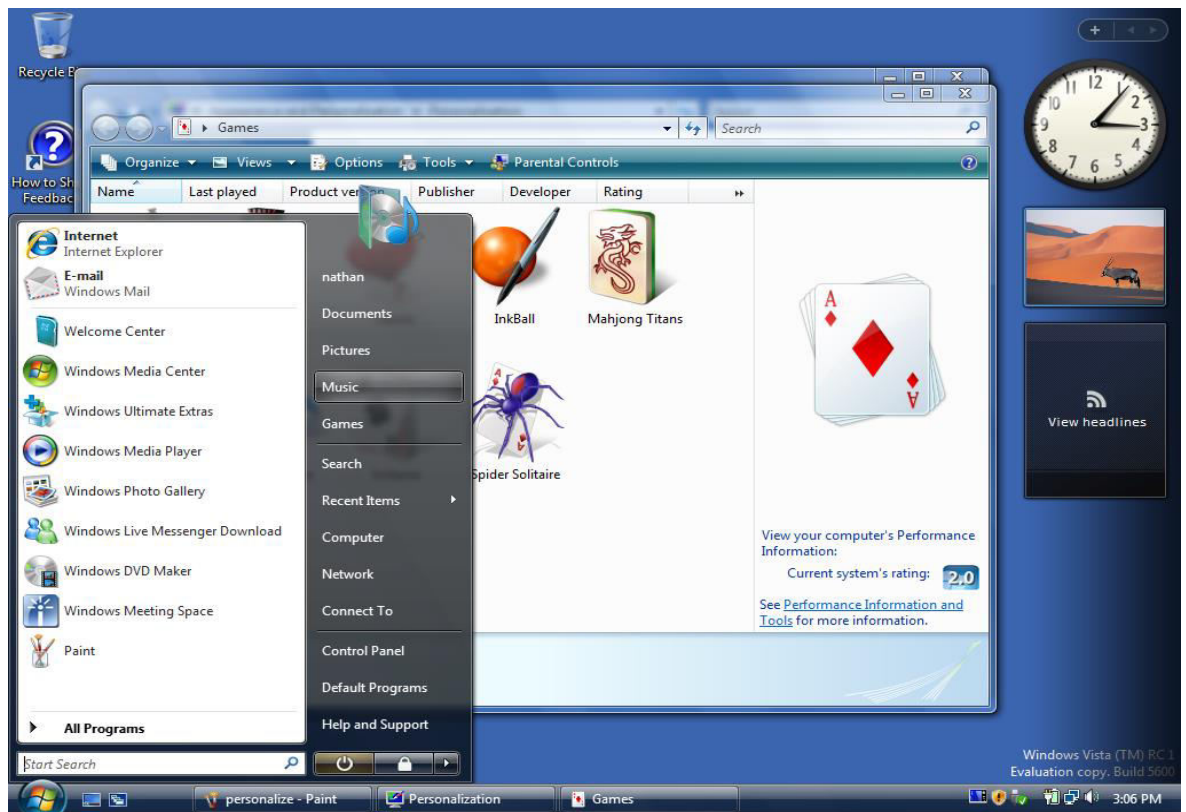
3.8 Windows Vista

Windows Vista has drastically changed as well, introducing and reworking several features. Windows Aero, which stands for Authentic, Energetic, Reflective and Open, was a new user interface and visual style, which was supposed to look cleaner and more fluid thanks to for example glass-like visuals and window animations (Microsoft 2006). In addition to that, the default font has changed to Segoe UI (Livingston 2006).

The style itself can be changed and saved as a theme, changing window colours, desktop background, desktop icons, cursor icons and sounds played during events (Rathbone 2007 29-31). Another feature that has since ceased to function called Gadgets allowed users quick access to single-purpose applications, such as a calculator, CPU meter, weather reports and many more as users created more of Gadgets (Rathbone 2007, 44-45). However, Microsoft discontinued Gadgets as they claim that the applications were a major security threat and could potentially grant control of a computer (Microsoft 2012a).

Windows Explorer, the program that shows a graphical user interface that allows browsing files and folders (also known as File Manager), received numerous changes as well, such as Favourite Links section in the navigation pane and a details pane listing properties of a file or folder that is currently selected (Rathbone 2007, 55-56).

The Start menu has changed as well, not only in the case of the button itself, as its shortcuts to 'Run' and 'Printers' have been removed, but they can be added back, so it is not permanent. The Start menu received a search box where users can type in anything and if indexing of the menu is on then the results will be given on-the-fly while the query is being typed in (Rathbone 2007, 34). The search box also works as the aforementioned 'Run' command from previous versions of Windows, typing in a command and pressing the Enter key will execute the command (Microsoft 2007a).

The user can now hover the mouse pointer over a program on the taskbar to reveal a thumbnail image of that program (Rathbone 2007, 38). Graph 16 shows the next significant change in the graphical environment, which is using 3D accelerated rendering. The Start button does not show the word 'Start' and instead is replaced with a ball with Windows' logo in it. The Start menu itself has had its Run icon removed, but the newly added search box can perform the same function. When the user chooses 'All Programs', the list of applications will switch places with the recently used applications list. On the right side of Graph 16 one can see Windows Gadgets, which has since been discontinued. The default gadgets were an analogue clock, a slide show and an RSS feed reader that was connected to Internet Explorer. The gadgets can be added, removed and have their size adjusted between two sizes; Graph 16 demonstrates their bigger size.

GRAPH 16. The Start menu of Windows Vista (Toasty Technologies 2008.)

Graph 17 shows an example of a new feature called Windows Flip 3D which is accessed by using the Windows key-Tab keyboard shortcut. It works as changing windows when using the Alt-Tab keyboard shortcut, but it renders all of the windows in 3D and shows their contents as well.
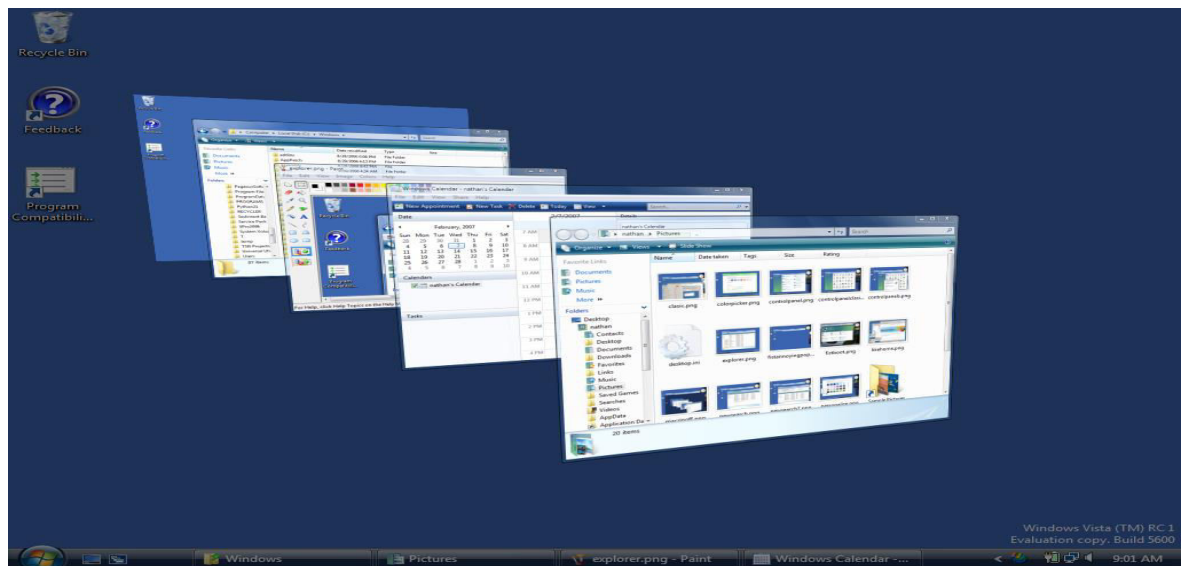
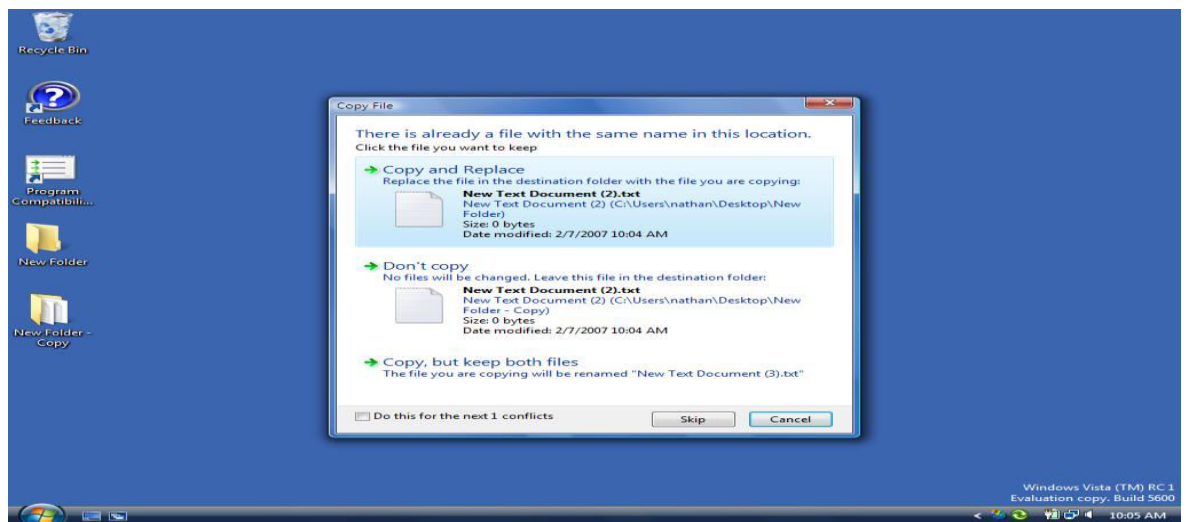GRAPH 17. Windows Flip 3D (Toasty Technologies 2008.)

Graph 18 presents how the process of file browsing looks like in Windows Vista and after pressing the Ctrl-F keyboard shortcut that shows the folder tree on the left pane. The left pane features Favourite Links as well, providing quick access to certain files. The Explorer toolbar which comprise options like File, View is hidden by default, but can be accessed by pressing the Alt key.
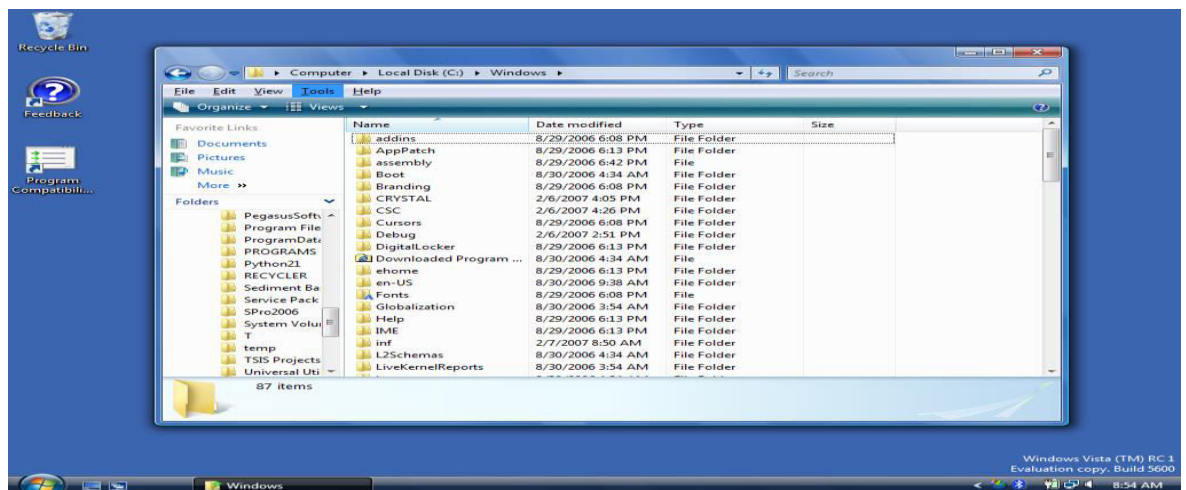
GRAPH 18. Browsing files in Windows Vista (Toasty Technologies 2008.)

The dialog boxes related to file operations have been redesigned, incorporating the possible tasks as large buttons that explaining that option and including the possibility to

apply the chosen task for every other file or folder affected by the file operation, as shown in Graph 19. This allows clearer explanation of possible options, so that the user knows what will happen after choosing one of them. There is one detail in those windows that might confuse some users and that is the fact that the options are not shown as buttons but rather as a part of a dialogue box until the mouse cursor is placed on top of one of the options.

GRAPH 19. New dialogue boxes in Windows Vista (Toasty Technologies 2008.)
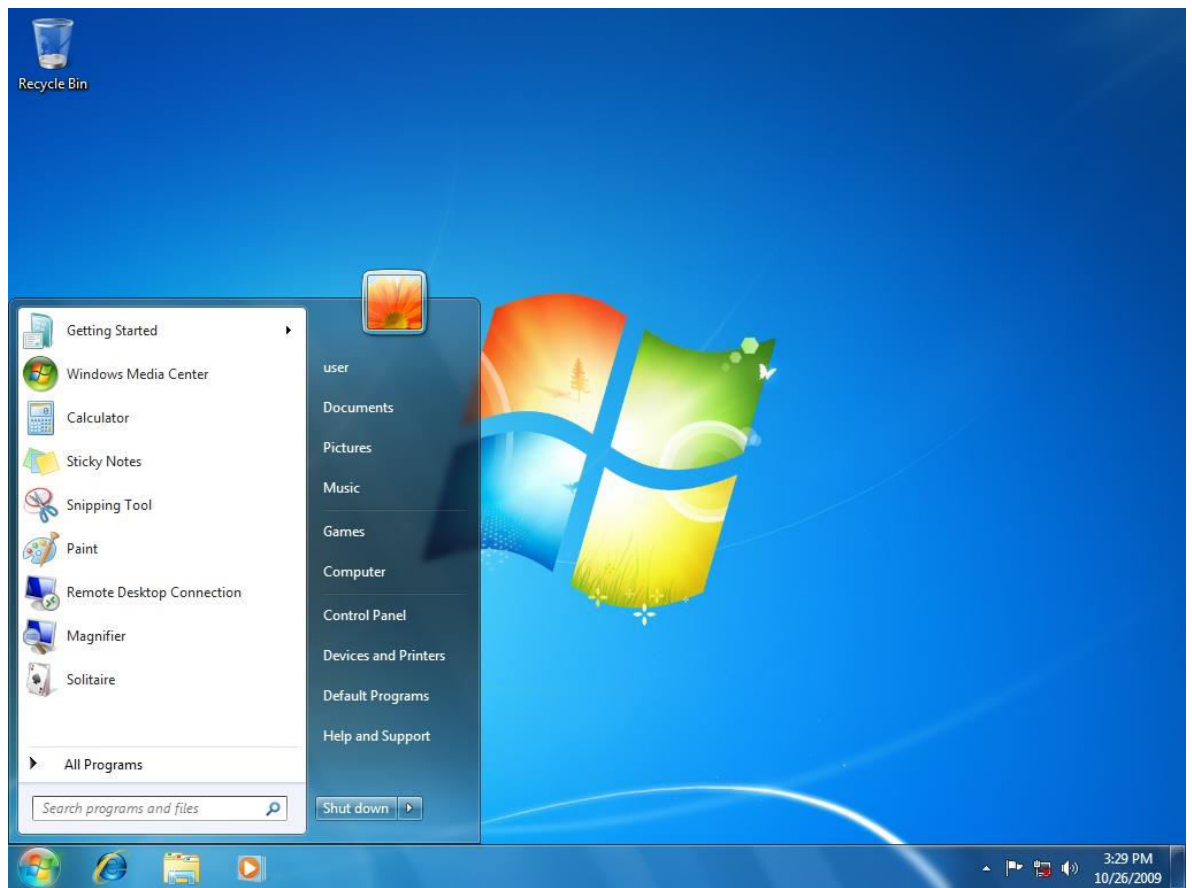
3.9 Windows 7

The user interface in Windows 7 did not go through as many changes as its predecessor, but they were significant. The Themes from Windows Vista received the ability to adapt a theme from 'theme packs' which are cabinet files thus once a theme pack file is opened, the operating system will switch the theme to the one the file held. In addition, the desktop background can be a slideshow, changing at a period of time to a picture selected either by hand or downloaded from an RSS feed (Microsoft 2009, 62-63.)

When right clicking a program on taskbar or clicking on an arrow next to an application in Start Menu, Windows 7 will show a Jump List, which is a list that allows swift access to common tasks. Those are either recently opened files or in case of selected programs, for example Windows Media Player, access the program's features without opening its window (Microsoft 2009, 31.)

Windows Explorer began supporting file libraries that scans all content relevant to that library from various locations, including shared folders on a local area network. Libraries do not show the location the file is stored in, but a user can still access them through the library itself. The default libraries in Windows 7 are Documents, Music, Pictures, and Videos. It is possible for the Libraries to have their view changed based on metadata of the contents, such as showing photographs per month they were taken or music shown per albums they were released on (Microsoft 2009, 35-36.)

Windows Explorer's search box is now able to suggest a search, abide by recent searches done by the user and it can also search by tags (Microsoft 2009, 37). There are also new features to Windows 7 that allow easier control of opened windows such as Aero Shake, Aero Snap (shown in Graph 22) and peeking at your desktop (shown in Graph 21). Aero Shake causes to minimise all windows except for the one the user is currently shaking, i.e. clicking and holding left mouse button on a window's title bar, and moving it rapidly to the sides. Aero Snap works by maximising a window whenever the user drags its border or title bar to the top of the screen or filling half of the screen if the window is dragged to either left side or right side of the screen (Microsoft 2009, 32-33.)

GRAPH 20. The Start menu in Windows 7 (Toasty Technologies 2010.)

The Start menu has slightly changed in appearance, as seen in Graph 20, but not by much. One can see the icons on taskbar that open certain applications. More can be added by pinning them to the taskbar. Once the application is open, the icon will have a border around it and will change colour according to its state, with transparent meaning open, green showing that progress is being done on a task, yellow showing paused progress and red showing that an error has occurred. The system tray has been slightly modified, it no longer shows every single icon at once, but hiding those that are not often used instead; accessible by clicking the white arrowhead button to the left of the system tray.
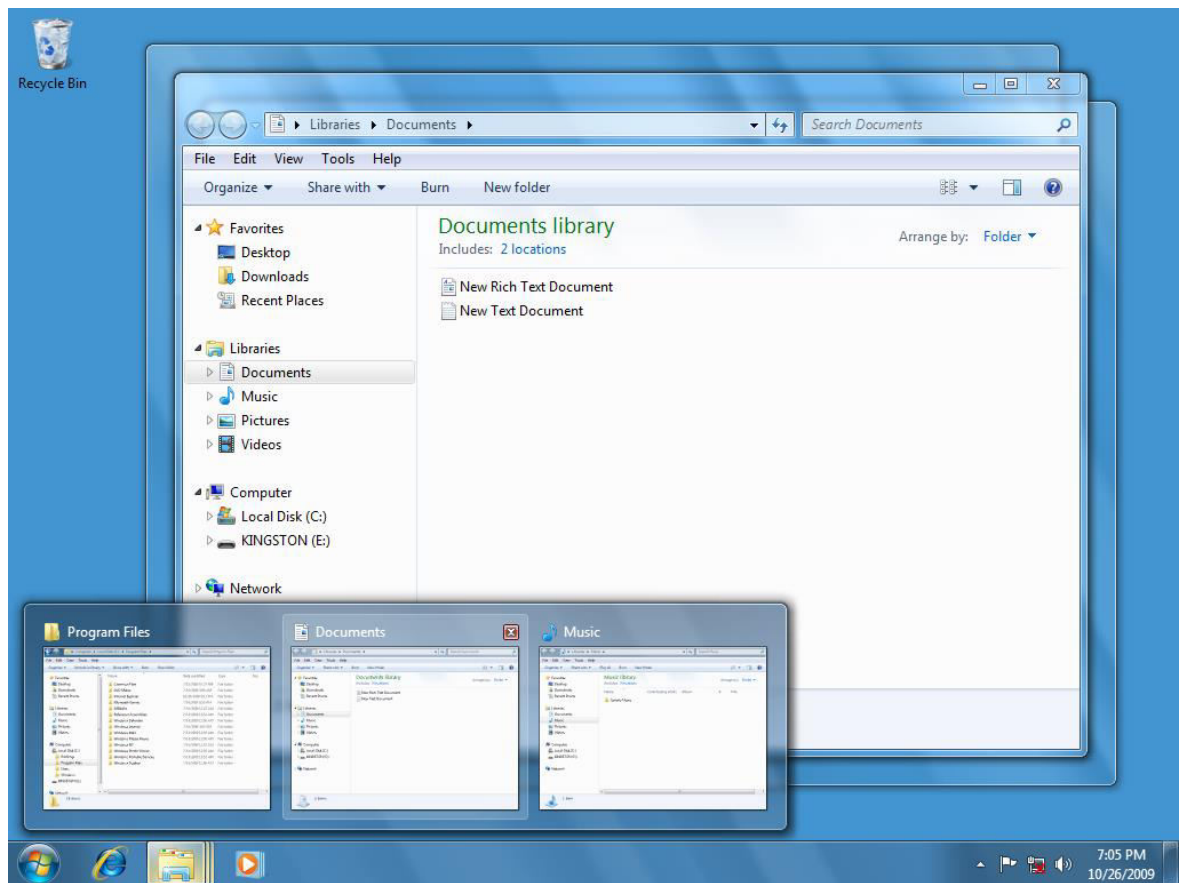
GRAPH 21. Peeking on open windows (Toasty Technologies 2010.)

When the user hovers over an application icon, Windows 7 will show thumbnails of them, as shown on Graph 21. This feature was implemented in Windows Vista, yet when the user moves his or her mouse from the application icon to one of the windows, the user will see that window through transparent versions of all other windows, that particular feature is new in Windows 7. This feature allows the user to keep informed on the applications current status.
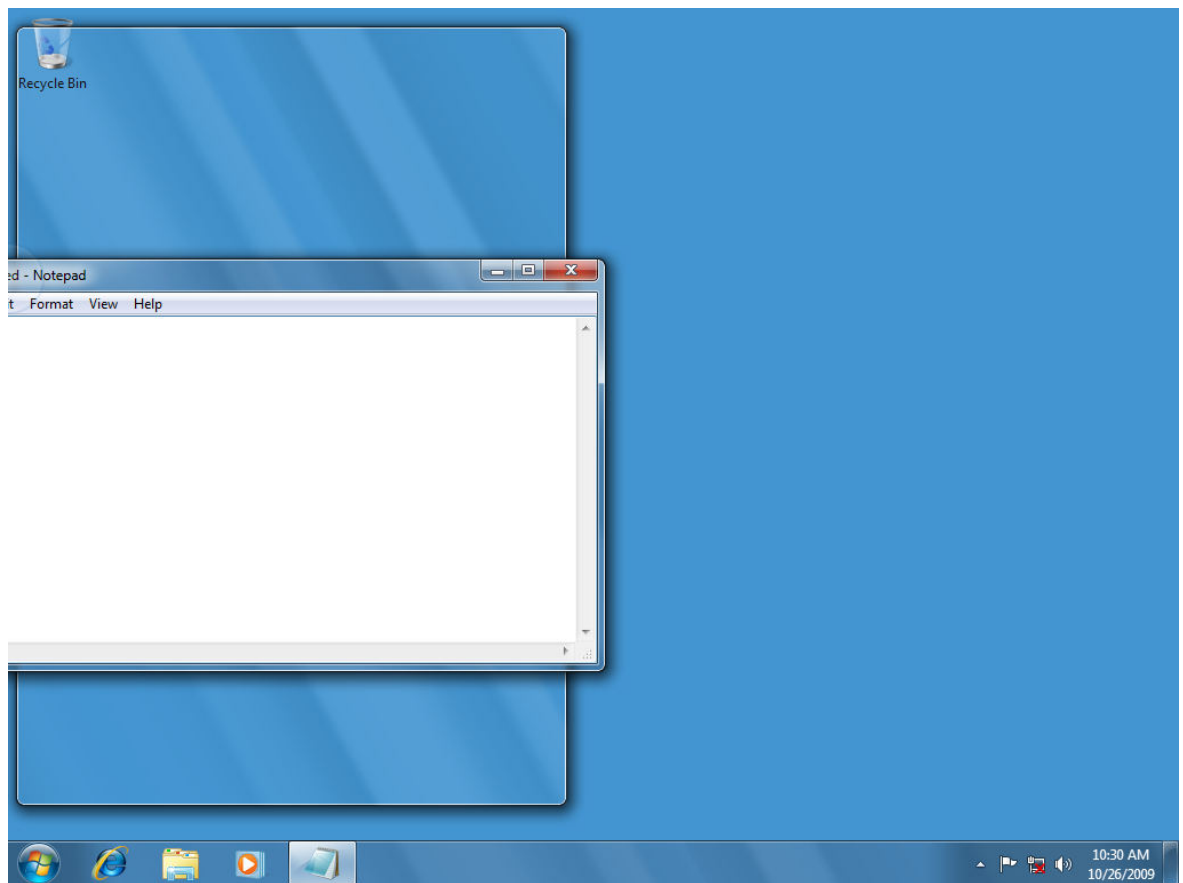
GRAPH 22. Aero Snap in action (Toasty Technologies 2010.)

3.10 Windows 8

Windows 8 was made primarily with tablets with touchscreens in mind which is why it is so different from any Windows before it. Windows 8 is the first Windows to use the Metro user interface, which has been used by Microsoft in several other products, such as Xbox One gaming console and Windows Phone. It also came with many polarising changes such as lack of Start Menu, which many users found pointless to the point of developing their own version of the Start Menu that would imitate the one from Windows 7, such as Start Menu 8 (Download.com, 2014.)

In the place of the Start menu, Microsoft introduced the Start screen, which is shown on Graph 23. It is filled with 'live tiles' which work similarly to desktop icons, but continuously update to show any news and changes related to that particular application, or

app, as they are referred to. The Start screen is fully customisable by the user, allowing enlarging, shrinking and grouping live tiles. There is also a separate list of all applications that are installed on the computer, which can be pinned to the Start screen (Microsoft 2012b, 7-9.)


GRAPH 23. The Start Screen in Windows 8 (Toasty Technologies 2014)

Another addition were so called 'charms' which are accessible from the right side of the screen as shown on Graph 24. The charms were as follows: Search, Share, Start, Devices and Settings. Search allows searching for a file, Share enables file sharing, Start directs the user to the Start screen, Devices lists all devices connected to the computer, such as scanners and printers; Settings charm lists allowed changing volume, brightness and such. The Settings charm comprises the buttons for shutting down, restarting or hibernating the computer (Microsoft 2012b, 10-11.)
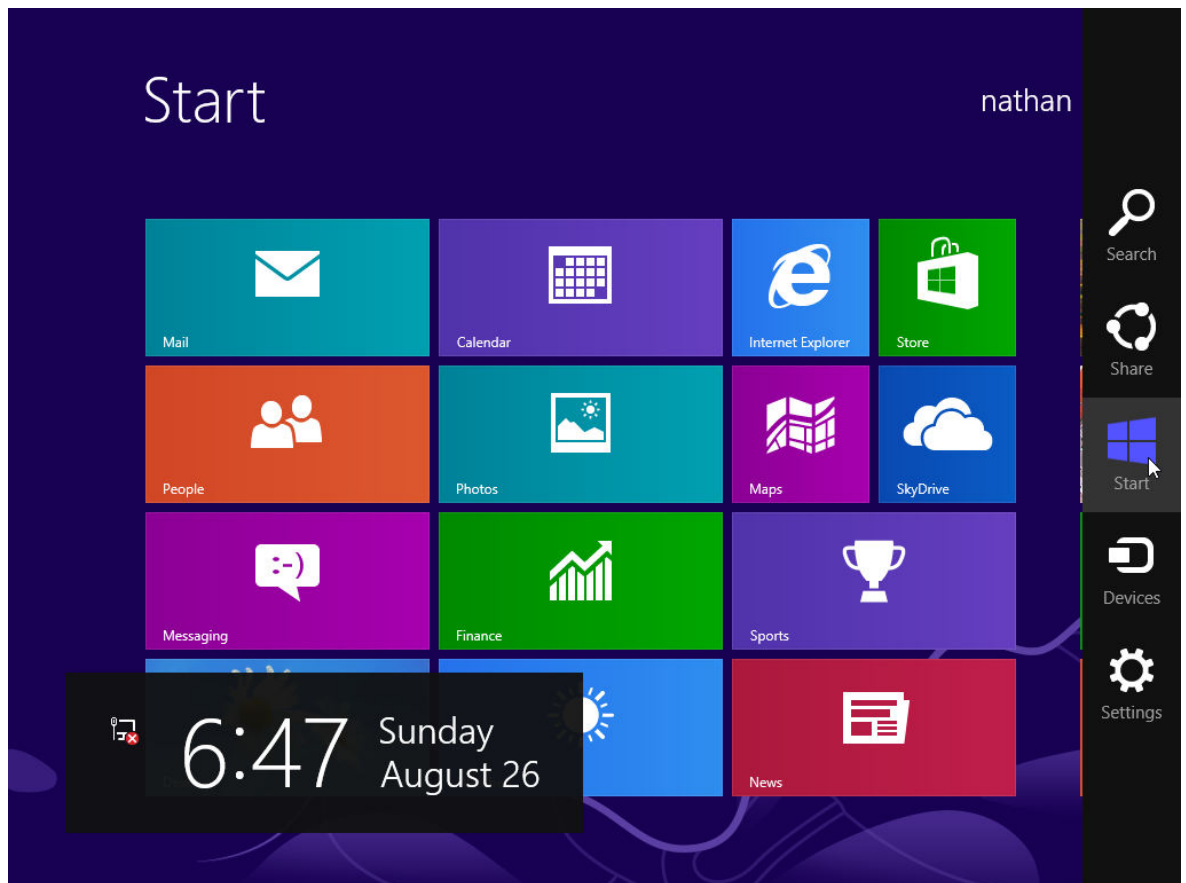
GRAPH 24. The Start Screen with Charms open (Toasty Technologies 2014.)

As mentioned, installed programs are referred to as apps. This is due to Microsoft pushing its new vision, where all programs used in their operating systems are bought and downloaded from Windows Store. Apps have to be coded in an entirely different way than programs for older Windows' and can only be used in either full screen or snapped to the side of the screen as shown on Graph 25 (Miller 2011.)
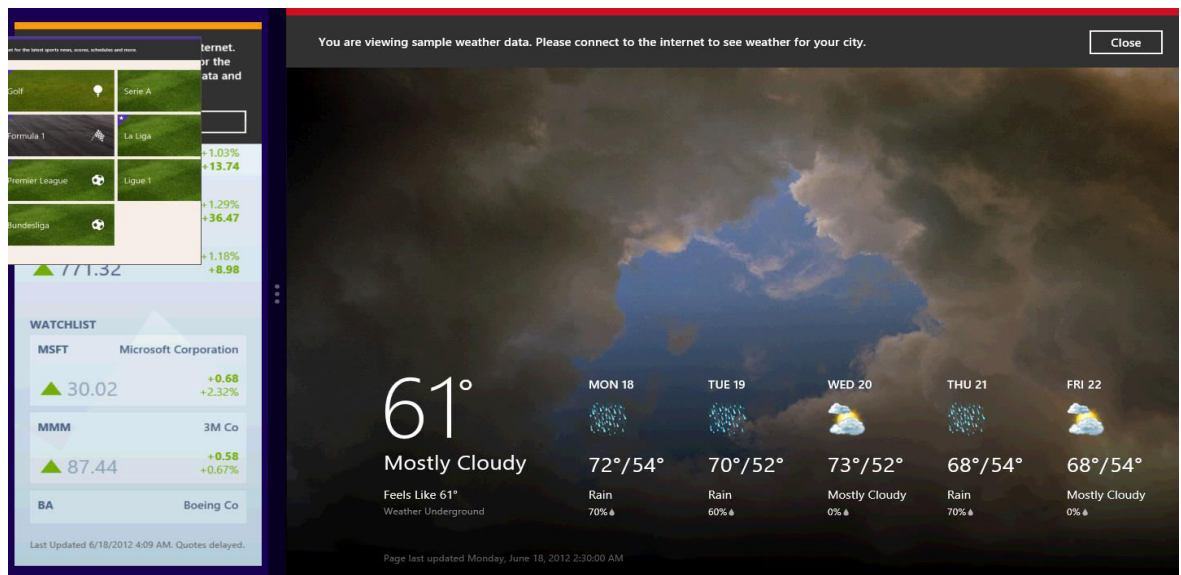
GRAPH 25. Two Apps open at the same time (Toasty Technologies 2014.)

The Explorer windows had changed as shown in Graph 26, resulting in the addition of the Ribbon which is the list of regularly conducted tasks at the top of the window, which have seen first usage in Microsoft Office 2007. In Graph 26 one might notice the lack of the Start button, Instead when the user hovers the mouse cursor at the bottom left corner of the screen and clicks, the Start Screen will show up (Microsoft, 2012.)
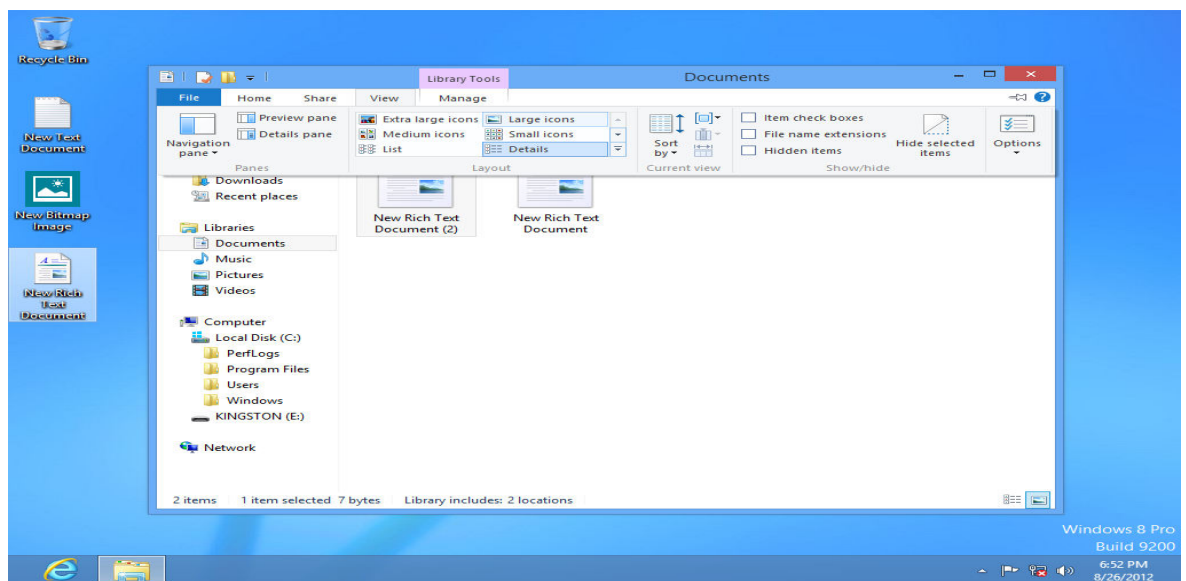
GRAPH 26. Browsing files in Windows 8 (Toasty Technologies 2014.)

3.11 Windows 10

At the time of writing, Windows 10 is not yet released and available only as a technical preview. That means that some of the features listed here may change or be entirely removed. Microsoft might also add new features as well.
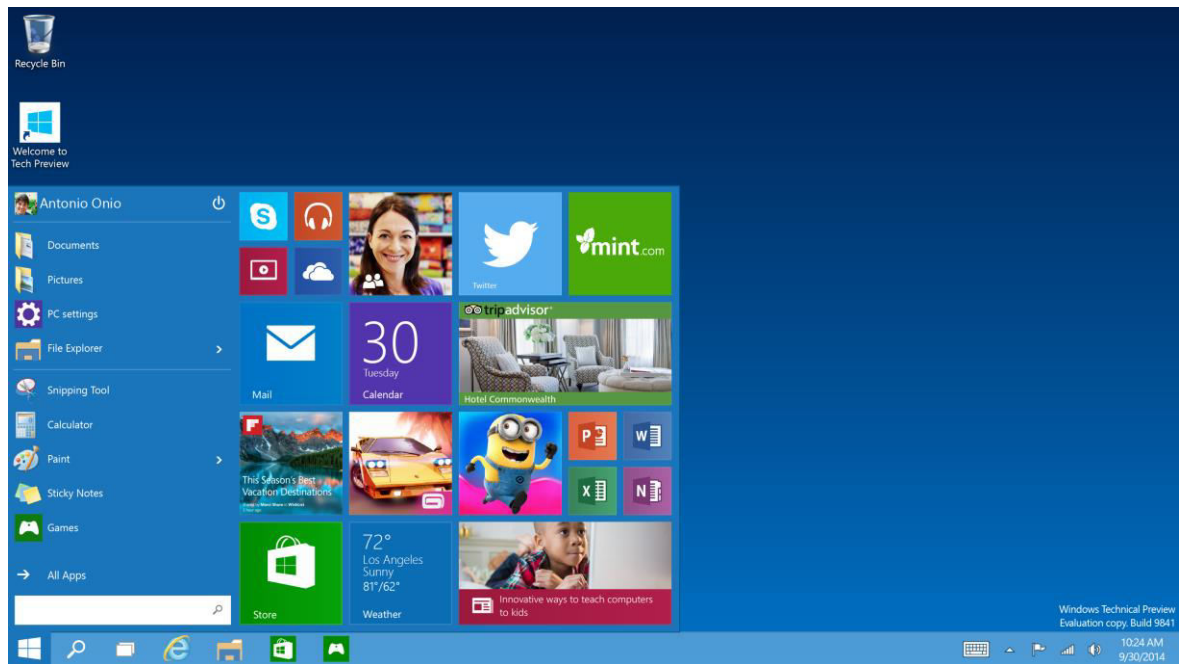
GRAPH 27. The Start menu in Windows 10 Technical Preview (NGOHQ 2014.)

The Start menu was added back into Windows 10 as shown in Graph 27, although now it is a fusion between the Start menu from Windows 7 and the Start screen from Windows 8, with frequently accessed programs listed on the left side and live tiles on the right side of the Start menu (Microsoft 2014, 3). Windows Apps can now be run in a window, and be resized and moved like every other window (Microsoft 2014, 5).
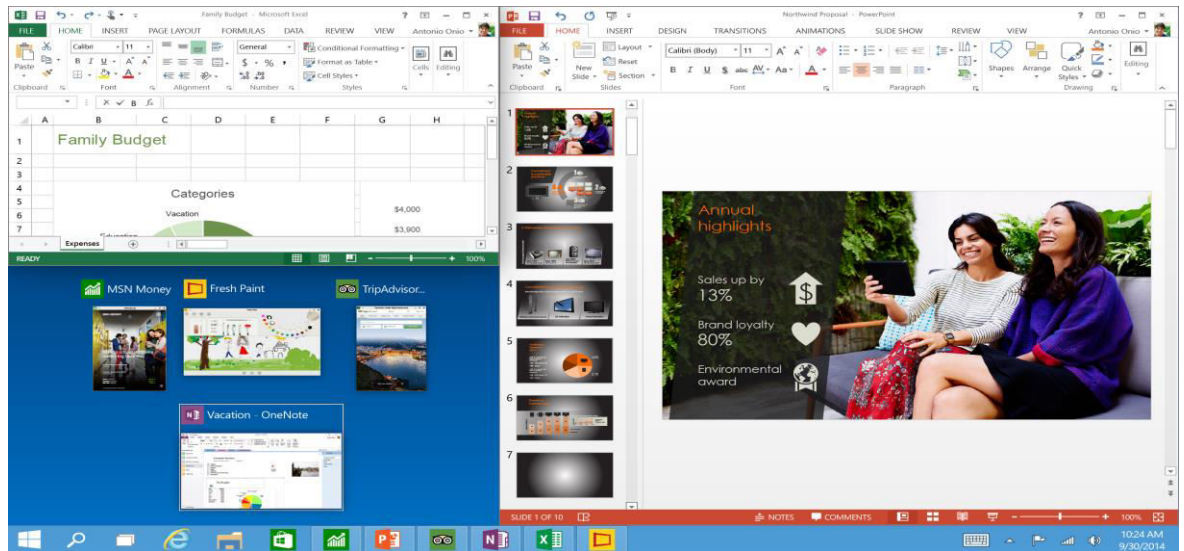
GRAPH 28. Managing multiple windows in Windows 10 Technical Preview (NGOHQ 2014.)

Aero Snap, which was introduced in Windows 7, has received the ability to fill quadrants of the screen by dragging a window to the corner of the screen as shown on Graph 28 (Microsoft 2014, 6). One of the most significant features introduced in Windows 10 is the ability to create and manage multiple desktops with separate programs open as shown in Graph 29 (Microsoft 2014, 8).
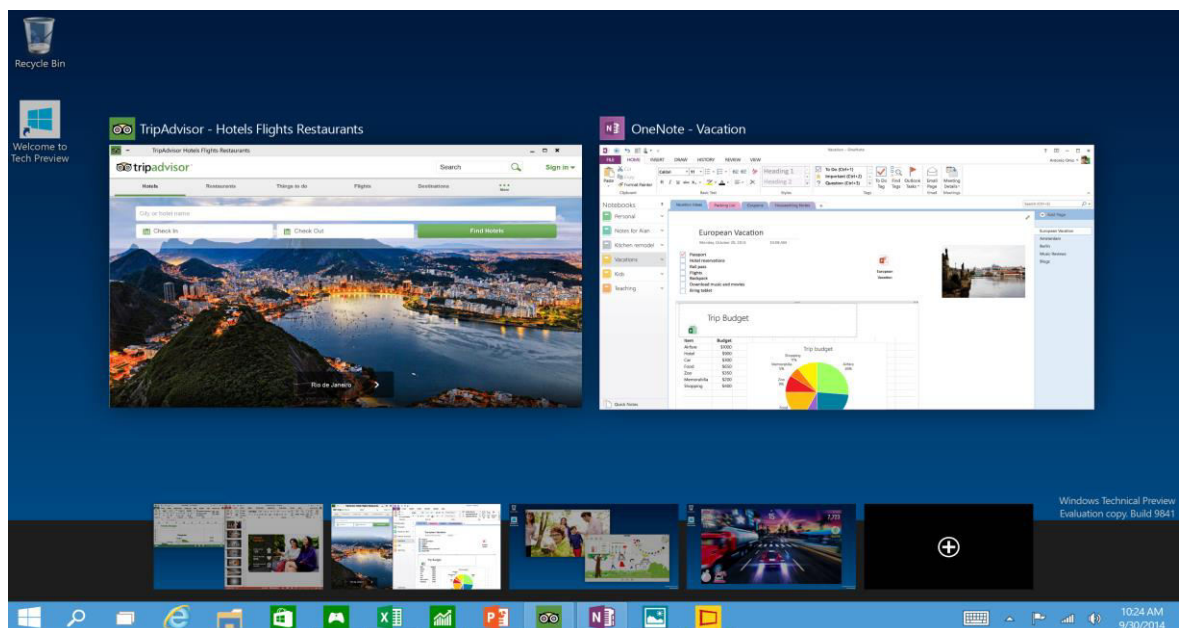
GRAPH 29. Task View screen in Windows 10 Technical Preview (NGOHQ 2014.)

4 CONCLUSIONS

As one may see, Windows changed and had many features added, while a number of them have remained to this day, such as the Start menu and taskbar, while others have been removed, like Active Desktop and Gadgets. This shows that Microsoft is always ready to try new things and at the same time retreat from their position when they hear the users' voices, just like in case of removal of the Start menu in Windows 8 and its return in Windows 10. Technology keeps improving daily, with no limit in sight, and the company from Redmond does not hesitate from implementing features that use said technologies.

Since this thesis is based on literary works rather than practical experiences, there were difficulties with finding reliable sources for the older Windows' and Windows ME. While Microsoft has made an article titled 'A history of Windows', it is very scarce in details and easy to misinterpret. In addition, none of the websites related to older Windows still exist aside from a few exceptions. This led to being forced to use third party sources as well as obtaining a Windows 2.0 User's Guide from the library in Helsinki.

Mankind has invented devices such as Omni Treadmill, a treadmill that is primarily used for virtual reality purposes, and Oculus Rift, a peripheral that allows the user to put his or her head into the virtual reality. This never ending pursuit of technological progress might one day push user interfaces into an entirely different level; not necessarily using those particular devices, but possibly something even more incredible. As technology advances, so do the users' needs and there is little doubt that Microsoft will attempt the challenge of satisfying them.

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