What's New in Windows 10?

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Abstract: *Windows 10 represents the first step of a whole new generation of Windows, unlocking new experiences to give customers new ways to work, play and connect. This will be our most comprehensive operating system and the best release Microsoft has ever done for business customers, and look forward to working together with broader Windows community to bring Windows 10 to life in the months ahead. 'update items' which include changes to the Metro UI (Microsoft still calls the modern UI Metro internally, apparently), Windows Defender, One Drive and improved Windows activation. There's also a mention of Cortana, Windows Phone 8.1's personal assistant, which could mean it's coming to Windows 9. Windows 10 is very much unified across all types of devices with screen sizes from 4 inches to 80 inches. It confirmed that the next version of Windows Phone - after 8.1 - would be 10.*

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1. Introduction

Windows 10 is a personal computer operating system developed by Microsoft as part of the Windows NT family of operating systems. Unveiled on September 30, 2014 as a successor to Windows 8.1, it is scheduled to be released in 2015, and is currently in public beta testing for non-touch screen devices (such as desktop computers and laptops First presented in April 2014 at the Build Conference, Windows 10 aims to address shyortcomings in the user interface introduced by Windows 8 b improving the user experience), including a revival of the desktop Start menu seen in Windows 7, a virtual desktop system, and the ability to run Windows Store apps within windows on the desktop as well as in full-screen mode. Windows 10 will also mark the culmination of a plan by Microsoft to unify the Windows, WindowsPhone, and Windows Embedded product families around a common internal core.

2. Development Steps of Windows10

In December 2013, technology writer Mary Jo Foley reported that Microsoft was working on an update to Windows 8, Halofranchise[1].Similarly to "Blue" (which became Windows codenamed Threshold after a planet in Microsoft's 8.1)[2], Foley called Threshold a "wave of operating systems" across multiple Microsoft platforms and services, scheduled for the second quarter of 2015. Foley reported that among the goals for Threshold was to create a unified application platform and development toolkit for Windows, Windows Phone and Xbox One (which all use a similar Windows NT kernel)[1][3]. It was speculated that Threshold would be branded as "Windows 9" upon its public release[4].

In April 2014, at the Build Conference, Microsoft's Terry Myerson unveiled an updated version of Windows that added the ability to run Windows Store apps inside desktop windows, and a more traditional Start menu in place of the Start screen seen in Windows 8. The new Start menu takes after Windows 7's design by using only a portion of the screen and including a Windows 7-style application listing in the first column. The second column displays Windows 8-style app tiles. Myerson stated that these changes would occur in a future update, but did not elaborate[5].Microsoft also unveiled the concept of a "universal Windows app," allowing Windows Runtime apps to be ported to Windows Phone 8.1 and Xbox One while sharing a common codebase, and allowing user data and licenses for an app to be shared between multiple platforms[5][6].

In July 2014, Microsoft's new CEO Satya Nadella explained that the company was planning to "streamline the next version of Windows from three operating systems into one single converged operating system for screens of all sizes," unifying Windows, Windows Phone, and Windows Embedded around a common architecture and a unified application ecosystem. However, Nadella stated that these internal changes would not have any effect on how the operating systems are marketed and sold. Screenshots of a Windows build which purported to be Threshold were leaked in July 2014[7], showing the previously presented Start menu and windowed apps[3] followed by further screenshot in September 2014 of a build identifying itself as "Windows Technical Preview", numbered 9834, showing a new virtual desktop system, a notification center, and a new File Explorer icon inspired by the Metro design language[8].

Threshold was officially unveiled during a media event on September 30, 2014, under the name **Windows 10**;Myerson said that Windows 10 would be Microsoft's "most comprehensive platform ever," providing unified platform for desktop computers, laptops, tablets, smart phones, and all-in-one devices.[4]

3. Windows System Architecture

The Windows application programming interface (API) is the programming interface to the Microsoft Windows operating system family. It provides services used by all Windows-based applications to enable applications to provide a Graphical User Interface (GUI), access system resources, incorporate audio and much more. The API consists of thousands of documented, callable subroutines such as Create Process and Create File. Major categories of

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Windows API functions include Base Services, Component Services, Graphics & Multimedia, Messaging, Networking and Web Services. There are hundreds of books and websites that cover programming using the Windows API - but let me just add the disclaimer that programming using the Windows API is by no means an "entry-level" type task! And with that, it's time to move on to Services

Now, let's take a look at Programs, Processes and Threads. One of our Escalation Engineers uses a very simple analogy for explaining the difference between these three terms: Think of a process as a room and a thread as a person in the room. A program is a set of instructions for the person in the room to carry out. A thread lives in a process, and executes the instructions of the program. With that analogy in mind, a Windows process includes the following:

- An executable program, consisting of initial code and data
- A private virtual address space
- System resources that are accessible to all threads in the process
- A unique identifier, called a process ID
- At least one thread of execution
- A security context (also known as an access token)

The diagram below which is in the Windows Internals book shows how the components interact
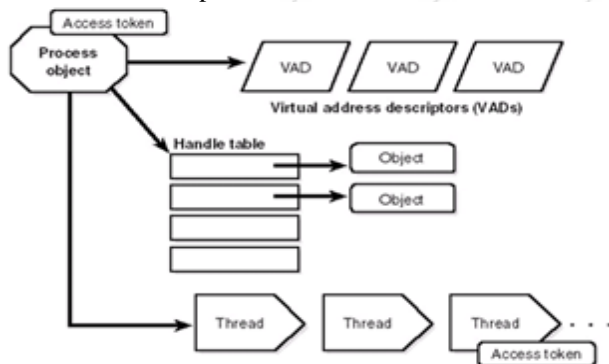

Figure 1: Windows System Architecture

The thread is what Windows schedules for execution within a process. Without threads the program used by the process cannot run. Threads consist of the following components.

- The contents of the registers representing the state of the processor
- Two stacks - one for the thread to use when executing kernel-mode instructions, and one for user-mode
- A private storage area used by the subsystems, run-time libraries and DLL's
- A unique identifier, called a thread ID.

4. Various Features of Windows10

4.1 Better Battery Life

Intel's 2013 Haswell chips provided a big jump in battery life, which can be seen in the latest crop of Ultrabooks. Windows machines have long been known to burn through battery power quicker than their Mac OS X counterparts. Ars Technica gave a detailed breakdown of how OS X Mavericks saves power. The system schedules tasks to run in clumps to maximize processor idle time and minimize power consumption. The latest version of Apple's OS was so efficient, it even added an extra 60 minutes of battery life to older hardware which upgraded to this operating system. Microsoft needs to better implement power-saving features into Windows 10 or risk being left further behind next-gen Mac products.

4.2 Universal Apps

Microsoft has been vocal about wanting to create a more unified experience across PCs, phones, tablets and its other platforms, and Windows 10 indeed looks set to take this concept a step further.[6]For example, it was announced that Windows apps will run in a traditional-style desktop window on the new OS, rather than taking over the entire screen as had been the case with Windows 8. This gives the apps more of a place for users who wish only to use the desktop.

The idea of universal apps will indeed unify Windows 10 across all of Microsoft's devices, which could in turn make the OS more inviting to developers who had previously opted for iOS and Android instead. The move could even put Microsoft ahead of Apple, as iOS and Mac OS still requires developers to build separate apps for both.

4.3 Downplayed Metro UI

The Metro UI has alienated many loyal Windows users and the firm is going to have to work hard to appease them. Windows 8.1 went some way towards making things better with the option to boot straight to desktop. The option to switch Metro off entirely, for example, would be very welcome for many users. This would mean that when you turn on the desktop-only mode, images should open in Windows Gallery instead of the Metro Preview app.

With Windows 10 mobile devices, it had previously been reported that Microsoft was planning to ditch the desktop entirely, and additional rumoured suggested that PCs running the OS may be sold with the Metro view disabled as a default. Desktop-only mode would let users work in peace and placate some of Microsoft's critics, while allowing the company to keep experimenting with Metro for consumers.
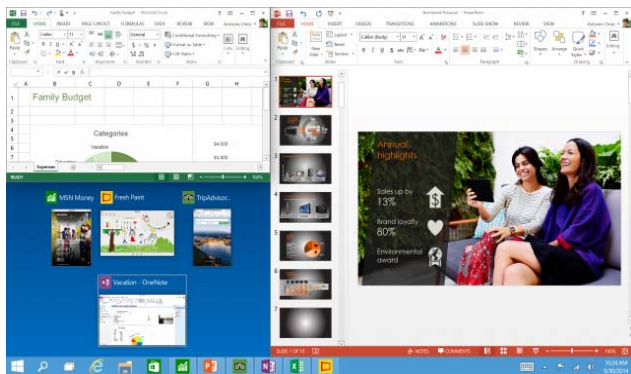
The Charms bar - another unpopular element of Windows 8's redesign[9] - was also rumoured to have been dropped, with the search, share, devices and settings options previously housed there moving to new title bars on modern Windows 10 apps, but that appears not to be the case. Instead, a different version of the Charms bar will appear as part of the new operating system, though specific details are thin on the ground.

4.4. Virtual Desktops And Task View

OS X and Linux have had virtual desktops for years. They allow you to keep multiple sets of windows open on one computer, to improve productivity when juggling multiple projects. Microsoft has announced that virtual desktops will improving productivity is Task View, which has been introduced indeed be part of Windows 10,[11] allowing

users to enjoy multiple desktop displays with individual settings, making it easier to separate work and home activities on the same device.

Another feature aimed at to show the user which apps are currently running on their system, thus allowing them to more easily organize activity and multi-task more efficiently.

Snapshot 1: Windows 10 Task View and improved snapping

4.5 The Return Of The Real Start Button

It's amazing how so many people can miss such a small feature. Microsoft gave into popular demand when it put a Start button in Windows 8.1, but this just brings you back to the Start screen[4].

As demonstrated at Microsoft's event, we will indeed see the real start button return with Windows 10, and it is described by Microsoft as an "expanded" version of the Windows 7 start menu "experience" with no necessary learning curve.

Previous reports that the new-look Start Menu[10][9] would include both the classic layout of previous iterations and a new Metro panel with live tiles for Windows Store apps turned out to be more or less correct. Users can also drag programs between the two columns, depending on whether they want it to display as a live tile or a traditional shortcut. The search function of the Start menu will now also search the web for results in addition to the contents of the PC or device, and the menu will sport a power button (which had been very confusingly relocated on Windows 8.).

Snapshot 2: Windows 10 Start Button

4.6 Over-The-Air System Recovery

Microsoft could also make it easier to restore Windows in the event of a malfunction. Mac devices can reinstall OS X by simply downloading files from the internet. A similar system would make it easier to recover Windows computers, as it is much simpler than digging through BIOS boot settings and trying to find your recovery USB. Keeping so many system-specific files would be difficult, but it's possible. Microsoft could convince hardware manufacturers to contribute the necessary files so users could recover their systems over-the-air.

4.7 Better Display Scaling

Windows has not been able to cope with the high-resolution devices manufacturers have started pumping out. As screen resolutions climb north of 1920 x 1080, programs such as Adobe Premiere and Vegas Pro can be rendered unusable in some cases as icons can appear tiny and pixel rated. *Howtogeek* put up a useful guide explaining how to change the compatibility settings for troublesome Windows apps in order to make the text readable again, but this shouldn't even be necessary. Microsoft needs to add better support for Retina-quality displays to make sure the new version of its OS still looks good on devices like the Surface Pro 3.

4.8 Improved Security

Windows is a primary target for viruses, if only by virtue of its dominant market share. Redmond's OS attracts the lion's share of malware, while OS X and Linux aren't as vulnerable. Microsoft releases regular security patches and has built Microsoft Security Essentials into Windows 8 - but this has been critically panned. In Dennis Publishing tests, it missed 39 per cent of malware thrown at it.

Windows 10 for business users, Microsoft has highlighted security advancements, claiming that the OS has beefed up "resistance to breach, theft or phishing."Windows 10 promises to provide additional protection through the use of containers and data separation for application and files. This means that sensitive data inherent to many businesses' use of Windows will be protected even after it is transferred away from the device (such as a tablet, USB drive or the cloud).

4.9 Fixed Windows Update

Updating Windows software has driven many people to the brink of insanity. If ignored for too long, Windows may reboot your PC at the worst moment possible and then you can be trapped in what seems like a never-ending cycle of updating and rebooting.

Windows 10 thankfully looks to be making moves to rectify these problems with Windows 10, with single click updates rumoured to be introduced. The feature is a part of the Windows 10 Technical Preview[12], which makes its inclusion in the final operating system likely though not confirmed. This would finally make Windows updates more

efficient and less annoying to apply, thus encouraging users to keep their operating system up to date.

4.10 Lower Price

Microsoft needs a carrot to dangle in front of consumers and businesses to convince them to invest in Windows 10 machines. The firm might even have to go so far as to offer users the chance to upgrade to the next-iteration of Windows for free. Reducing the cost of upgrading will help people finally part with Windows XP - the aged operating system that entered end of life in April 2014.Microsoft's updates have long been priced higher than Apple's, and this is yet another factor deterring consumers from upgrading.

If the rumors that Windows 10 will be offered to Windows 8.1 users for free turn out to be true, then this should encourage many people to upgrade more quickly. Windows 8 users could also be offering the new OS at a discounted price, and those still using XP may be offered additional incentives to switch.

5. Conclusion

It is likely that Windows10 will increasingly play an vital role in the future of computer . For Microsoft, it's an effort to unify its entire ecosystem of products that run versions of the OS, with a shared codebase that works with desktops, laptops, tablets, phones, Xbox consoles, servers, connected. Windows 10 a killer OS for all of those disaffected mouse-and-keyboard users — both normal Desktop and also the big enterprise customers who were rather displeased with Windows 8's Metro interface.

6. Acknowledgement

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