White Paper

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Windows 10:
The Big New Opportunity for Developers

By Embarcadero Technologies

July 2015

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Windows 10: the big new opportunity for developers

Microsoft will release Windows 10 on July 29 2015, and will be delivering the update to millions of existing users of Windows 7 and 8. The release is part of a new wave of Windows releases which Microsoft's Terry Myerson, Executive Vice President of Operating Systems, projects will be on 1 billion devices worldwide within 2 or 3 years.

Microsoft has also added a strong upgrade incentive by removing the cost for most users. Windows 7 and 8 Home and Professional editions qualify for a free upgrade to Windows 10 during the first year after release. Windows 7 and 8 Enterprise editions are excluded, but typically these customers are on Software Assurance schemes that allow free upgrade by another route.

If Microsoft comes anywhere close to its estimates, it suggests a huge opportunity for developers. Here is a closer look at Windows 10, what it is, and why RAD Studio developers are well placed to take advantage.

What is Windows 10?

Windows 10 is not just another release. Microsoft is introducing a concept it calls "Windows as a service," which means that the operating system will be continuously updated, though with options for businesses to move at a slow pace in order to retain stability.

Further, Windows 10 is not just for PCs. Microsoft has refactored Windows so that the same operating system, in different configurations, will run on a range of devices including PCs, laptops, tablets, smartphones, Xbox consoles and "HoloLens" augmented reality headsets.

Windows 10 is Microsoft's second attempt at moving its core operating system into the mobile era. Windows 8, released in late 2012, was a bold re-imagining of Windows that divided the system into two personalities, one that was a new touch-friendly environment originally called Metro, and the other the traditional desktop. Metro is powered by a runtime layer called the Windows Runtime (WinRT), for which apps are written using the .NET languages (C# or Visual Basic), HTML and JavaScript, or C++. WinRT apps are sandboxed from each other and from the operating system, with data sharing only through a controlled mechanism called Contracts. Apps are normally delivered from the Windows Store – hence the alternative name, Store apps – though businesses and developers can also use "sideloading" to install these apps without using the Store.

Windows 8 has not proved altogether successful. Users familiar with Windows struggled to navigate between two different environments, and the new-style apps often look huge and unwieldy on PCs with large displays. A particular point of contention was how the Start menu, introduced in Windows 95, was replaced with a full-screen implementation that forces users to go back and forth between Metro and desktop. Microsoft mitigated some of these issues in a Windows 8.1 update, but many businesses have remained on Windows 7, now over five years old. In addition, the Windows app market did not take off in the way the company hoped,

Microsoft's aim with Windows 10 is to create a version of Windows that will be an easy and familiar upgrade for Windows 7 users while also introducing many new features, and remaining suitable for tablet and mobile users as well as desktop PCs.

The revived Windows 10 Start menu

Windows 10 no longer has a dual personality, with a revised Start menu back on the desktop, and all apps running in Windows, whether they are written for WinRT, or with the Win32 (or Win64) Windows API. This arrangement means that users no longer need to think about whether an app is or is not a Store app (now also known as the Universal Windows Platform (UWP), thanks to compatibility with Windows 10 on other devices); they are all just Windows applications.

Under the covers, there are still key differences between WinRT and the full Windows API. UWP apps are still sandboxed, and only a subset of the Windows API is available. The user interface for a WinRT app is most often defined in XAML, the XML language also used by Silverlight and Windows Presentation Foundation, but with different controls and enough incompatibilities that code cannot be ported directly.

The Win32 and Win64 API, on the other hand, is common to all versions of Windows, and now that WinRT apps also run in a window, there is no longer a sharp distinction from the user's perspective. This means that by writing to the full Windows API developers can support Windows 7 or even Windows XP as well as running well in Windows 10.

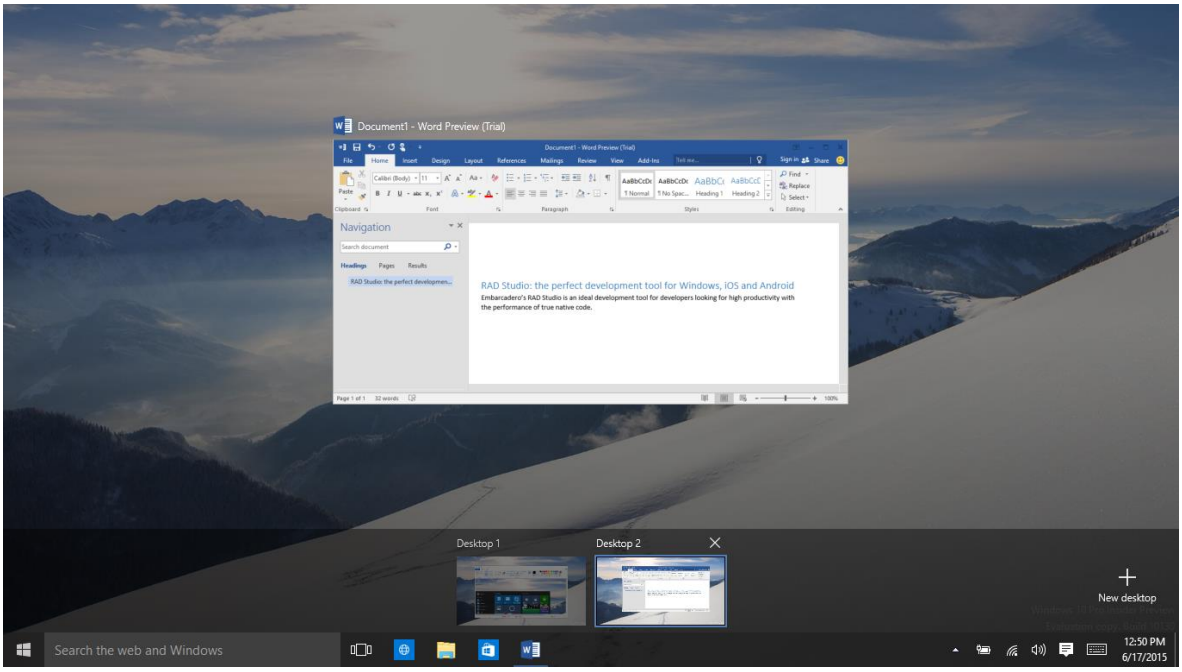
What's new in Windows 10?

Simply being more approachable than Windows 8 will not win users over to Windows 10. Fortunately there are a host of new features that may prove effective.

Here are some of the highlights:

1. New Start Menu with Live Tiles. This counts as a new feature whether you come from Windows 7 or Windows 8, since it differs from both. An "All apps" hierarchical view on the left functions in a similar way to the Windows 7 Start Menu, while a new panel of tiles lets users pin frequently used applications and see updates.

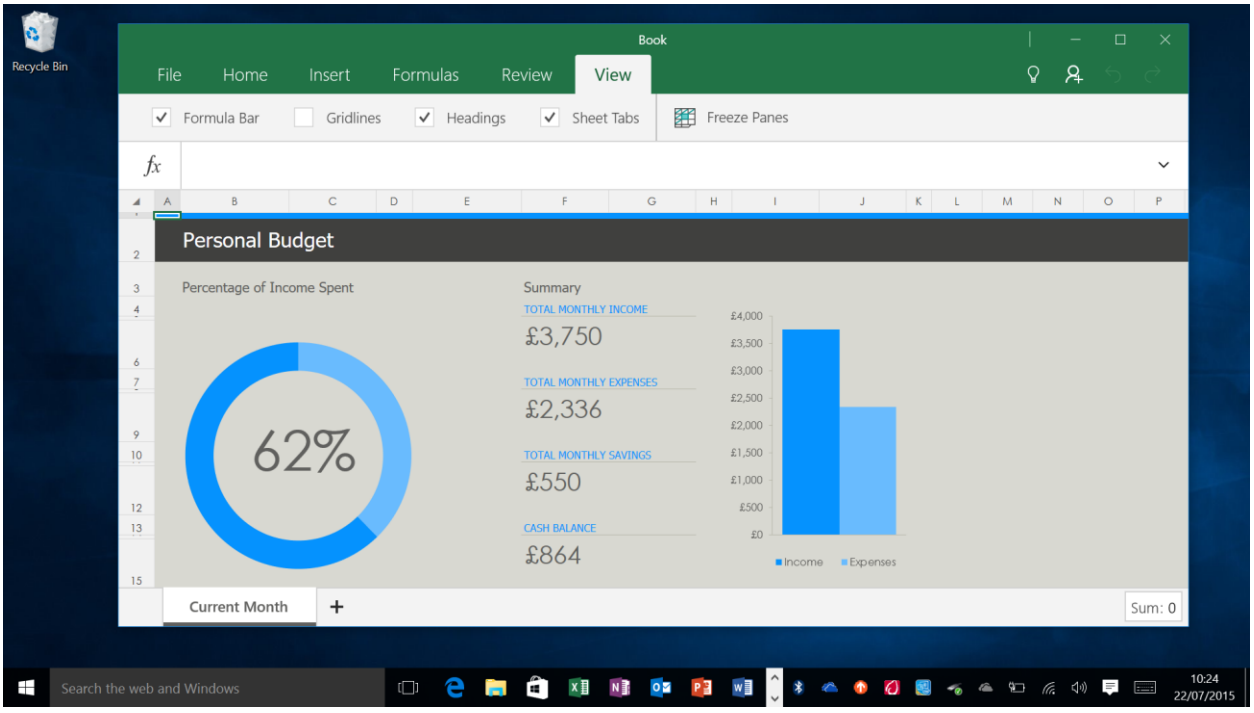
2. Multiple desktops. Windows 10 lets you add virtual desktops so you can organize your work more easily. For example, you could have a document open in one desktop, and graphics applications in another, switching between them when your focus changes from one to the other. A new Task View button on the taskbar shows all open desktops as well as the applications running on the current desktop, so you can easily switch between them.



Multiple desktops in Windows 10

3. DirectX 12. The latest version of the Windows hardware-accelerated graphics API is a major upgrade. Microsoft is claiming 20% performance improvement as well as support for more GPU features. Key to the improved performance is better use of GPU parallelism as well as the ability to scale better across multiple CPU cores. Many existing GPUs can take advantage of DirectX 12, so users need only upgrade to Windows 10.

4. Tablet and touch-screen support without the hassles of Windows 8. Touch-friendly apps written for Windows 8 still run, but in a window. Another feature aimed at tablet users is Continuum, which prompts the user to engage Windows 10 "tablet mode" when a tablet is undocked or the keyboard on a convertible is folded back. In tablet mode, apps including the Start menu run full-screen. It is also worth mentioning the Universal version of Microsoft Office, which provides mobile versions of Word, Excel and PowerPoint, freely downloaded from the Windows Store.

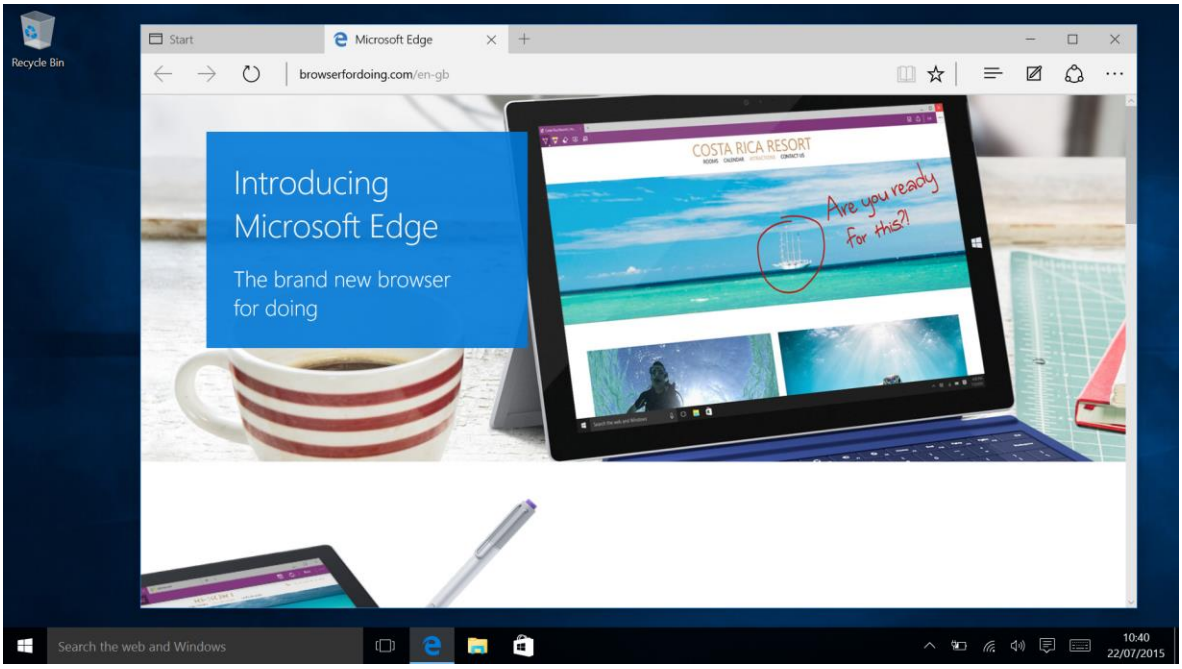


New "Universal" versions of Microsoft Office applications including Excel, Word and PowerPoint will only run on Windows 10

5. Cortana, Microsoft's personal assistant, is built into Windows 10, though users do have an option to disable it as required. Cortana can answer queries – using typed or voice input - such as "when is my next meeting" or "what is the weather tomorrow". Developers can extend Cortana with custom voice commands and interactions with third-party apps.

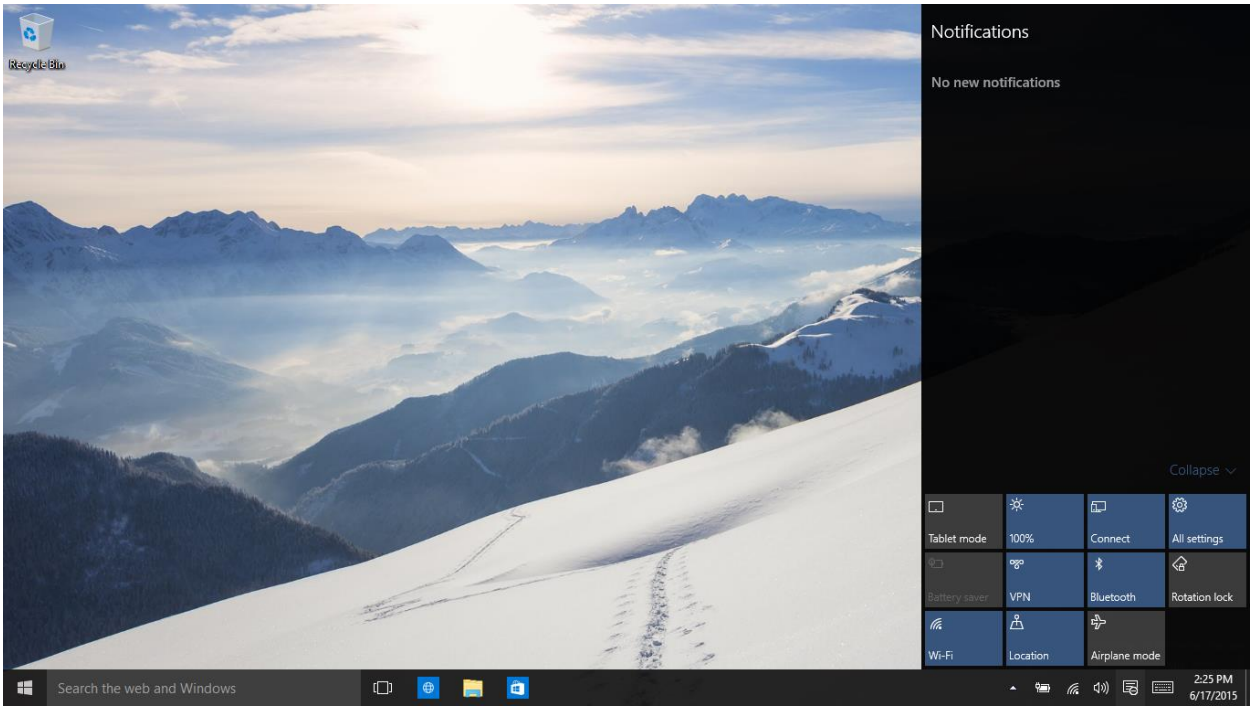
6. Enhanced command prompt. It sounds a small thing, but advanced Windows users frequently turn to the command prompt to get things done. The Windows 10 command prompt supports standard clipboard shortcuts like Ctrl-C and Ctrl-V, for copy and paste, line-by-line text selection, word wrap, Find dialog, and automatic buffer resize when you resize the command window.

7. The Edge browser is Microsoft's new web browser, and focuses on modern web standards without attempting to maintain compatibility with earlier versions of Internet Explorer (IE). The result is a much faster web browser that will be improved with new standard support more quickly than was possible with IE. Edge already outperforms IE on many benchmarks, such as Google's Octane 2.0 where Edge is typically at least 80% faster than IE.



The Edge browser, new in Windows 10, offers fast, standards-based web browsing

8. New Notification panel includes instant access to key settings. In Windows 7 or Windows 8, you often need to open Control Panel, or the Metro-style Settings app, to make configuration changes. Windows 10 has common settings such as network and VPN, screen brightness, Bluetooth and Airplane mode, in a panel which you can open from the taskbar or, on a tablet, by swiping in from the right. The full Settings app is also improved in Windows 10, with better organisation, a more consistent appearance, and fuller coverage.



The Notifications panel in Windows 10 brings together key settings and alerts

9. Business features including Mobile Device Management and Azure Active Directory. Windows 10 is better suited to modern cloud-oriented or BYOD (Bring Your Own Device) environments. You can sing into a PC using Azure Active Directory (the user directory behind Office 365), for example, or enrol a Windows 10 PC into Mobile Device Management software, so that organizations which are mobile-focused can manage PCs alongside tablets and smartphones.

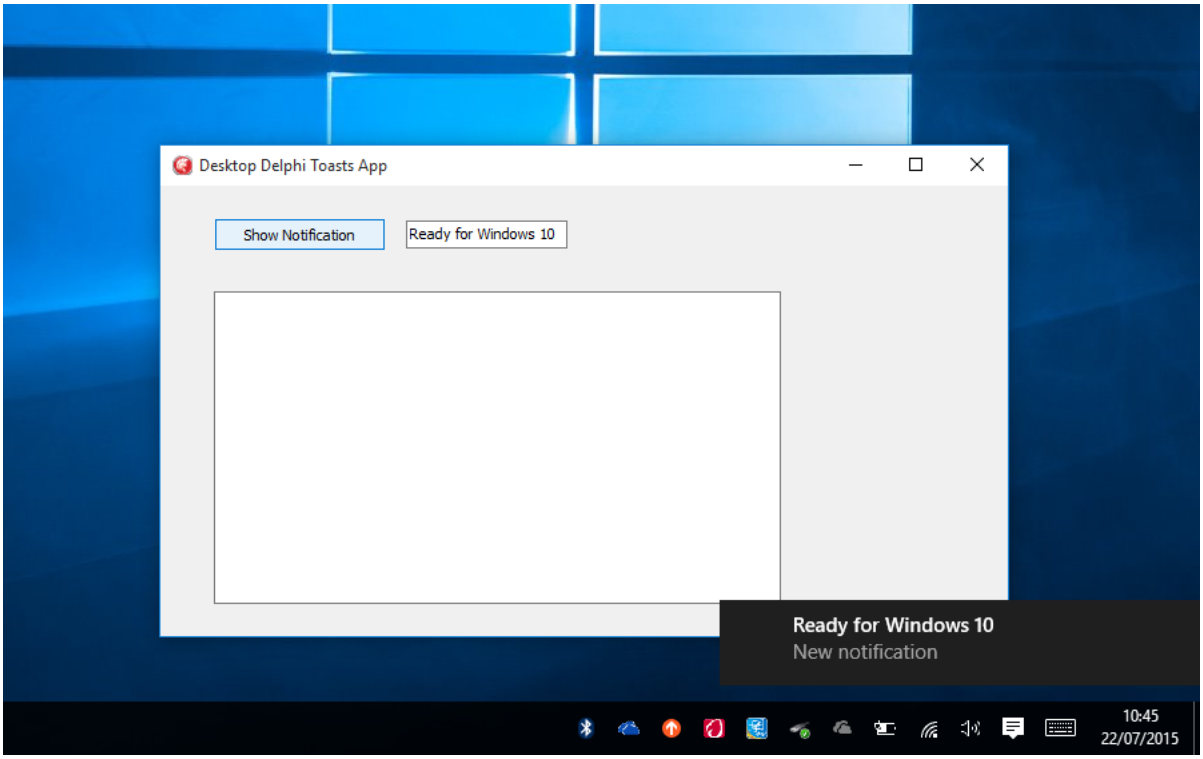
10. Windows 8 enhancements that you may have missed. With all the noise about Metro, improvements Microsoft made to the Windows 8 desktop may have gone unnoticed. Copying files works better than in Windows 7, for example, thanks to an improved file copy dialog that supports multiple file operations, pause, resume and cancel. The Windows 8 Task Manager is also improved, with a detailed Performance view, colour coded to show the most stressed resources. Multiple display support is better, with desktop scaling for high-resolution displays and the ability to show the taskbar across multiple monitors. Start up is faster than Windows 7 thanks to "hybrid boot", which uses elements of hibernation to speed up the boot process. These features and many more all carry over to Windows 10.

Windows 10 and RAD Studio

RAD Studio has great support for Windows 10, though it does not currently compile WinRT apps. There are several reasons.

First, Windows 10 (unlike Windows 8) is a desktop-first operating system. Applications build using the Windows API (Win32 or Win64) are first-class citizens with full access to Windows.

Another advantage of coding to the Windows API, rather than WinRT, is that applications will run on Windows 7 as well as Windows 8 and 10. Despite Microsoft's ambitions, not everyone will move quickly to Windows 10 and retaining Windows 7 compatibility means a larger installed base that can your application.



Using the WinRT bridge, RAD Studio developers can support Windows 10 notifications

Second, many WinRT APIs are also accessible via the Windows API. This is important for features like new-style notifications, which are only exposed through WinRT. Embarcadero has created a WinRT bridge, meaning a wrapper classes that will make it easy to call these APIs, and a first implementation of this support has been delivered to XE8 customers. This will make it possible for Delphi and C++ Builder developers to write apps that work as Windows 10 users expect. Of course developers need to take care that APIs specific to Windows 8 and higher, or to Windows 10, will only be called if the app is running on a compatible version.

Project Centennial: bringing desktop apps to the Windows Store

The app store concept pioneered by Apple has changed user expectations concerning how to discover, install and remove applications. Instead of finding and downloading installation files, and having concerns over the integrity and safety of the download, users go to the store on their device or computer to find and install the app they need.

The idea of the store is not only to assist app discovery and deployment. App stores enable the operating system vendor to check apps for conformance to required standards, and easy installation and removal is built into the system. Funky installations that place files all over the operating system, download other applications, or take over file associations without consulting the user, are simply not permitted into the store.

The Store concept is also important for businesses. Following the release of Windows 10, Microsoft is enabling businesses to create private sections within the Windows Store for deploying custom apps. Users will log in using Azure Active Directory, the identity provider for Office 365, which can also be synchronized with Active Directory running on premises.

Microsoft introduced the Windows Store with Windows 8, but while it did most things right in terms of technology, its value was limited because the "Metro" platform failed to win sufficient user acceptance to attract developers. This may change in Windows 10, but in order to ensure strong availability of apps in the Store, Microsoft is also making it possible for desktop apps such as those compiled by RAD Studio to appear in the Store. These are not just links to third-party sites, as found in the Windows 8 Store, but full Store citizens that users can purchase and install directly.

The enabling technology for this is called Project Centennial (Project C), and was presented at Microsoft's Build conference in San Francisco at the end of April 2015. It is based on an existing Windows product called App-V, which stands for Application Virtualization. The idea is that an application is bundled into an isolated package so that it can be installed and removed without running into dependency issues. Developers package an application for App-V

by running the installer and letting App-V capture changes made to the system. At runtime, App-V redirects calls to libraries normally installed into system locations so that they are handled by libraries in the App-V package instead.

Project C applications have some special requirements and some special privileges, compared to normal desktop applications or even App-V packages. Project C applications have more complete access to WinRT APIs such as Live Tiles, so that they can behave exactly like Store apps. However, developers do need to compile applications specifically for Project C, whereas App-V works with existing setup binaries. The result is an AppX package (the format for deploying Windows Store apps) that can be uploaded to the Store in the normal way.

A Project C application is not sandboxed in the same way as other Store apps, though there are some restrictions such as a requirement to run as a standard user, rather than one with administrative rights.

This technology is in preview, and will not be available when Windows 10 first ships. It is ideal for RAD Studio, and Embarcadero plans to introduce full support for Project C when it is released.

RAD Studio and the Internet of Things

Windows 10 is not just about PCs, but about a range of devices from the £30/$35.00 Raspberry Pi 2 to the huge 55" wall-mounted Surface Hub. In addition, Windows applications increasingly connect to sensors and tiny devices, running many kinds of operating systems, in order to power smart systems that gather data or monitor the environment.

RAD Studio includes a feature called App Tethering which is designed for mobile and the Internet of Things (IoT). App Tethering enables discovery and interaction with applications running on iOS, Android, Windows or Mac, including the ability to gather data or trigger actions on those remote applications. For example, you could scan barcodes on a smartphone and have the data sent to a Windows app. The connection can be made over Bluetooth or using TCP/IP.

Developers can use App Tethering in conjunction with beacons to create proximity-aware applications, such as screens which adapt their content according to who is close by. A beacon is a tiny device which broadcasts its identity and location over Bluetooth LE, a low energy wireless connection that can run for long periods without draining power. Beacon support is available on iOS, Mac OS X and Android, including apps created with RAD Studio. This means you can have an app running on iOS that communicates with beacons, for example, and sends the data to a Windows app using App Tethering.

Getting ready for Windows 10

Windows 10 is the most significant PC release for many years, and promises to revitalise the PC. RAD Studio developers are ideally placed to take advantage, so now is the time to check out Microsoft's preview releases and prepare for new ways of developing and deploying Windows applications.

Learn more about Windows 10 application development with RAD Studio at http://www.embarcadero.com/rad-studio.