



Five Misunderstood Features in Windows Vista

Understanding Their Rationale and How to Make Them Work for You

No one would expect a new OS adoption to be easy, and certainly adopting Windows Vista® across a desktop infrastructure can come with a few challenges. In this article, we will look at five features of Windows Vista that are often misunderstood, provide their background and rationale, and present the straight scoop on how to deal with them.

So what's on your list? You might have already guessed some of them, but based on feedback from IT Pros in the trenches, here are the features that often cause confusion and slow Windows Vista adoption for many folks:

- User Account Control
- Image management
- Display Driver Model
- Search
- 64 bit architecture

Each of these features has specific benefits for Desktop (and Laptop) management, but they also make adoption a bit tougher, since they affect two key areas: application compatibility and hardware performance. We will explain the rationale behind these features, show how they actually make PC administration more controllable and robust for you, and provide

guidance and tips to make them easier to work with.

User Account Control

If there's one feature that has received a bad rap it's User Account Control. One reason this feature is misunderstood is because UAC isn't a single feature; it's a set of technologies to help end users run with standard user privileges, and reserves Local Administrator privileges for IT staff or limited specific circumstances. One way to think about standard user mode versus Local Administrator mode is to consider a home with or without locks. Certainly ingress and egress is easier without locks, but you wouldn't feel very safe. With standard user mode configured across the PC infrastructure, you help ensure intruders are unable to get where they can cause problems.

While it has been a design best-practice since Windows® NT for software to fully function in standard user mode, many software developers still assume local administrator rights will be in place, and develop applications accordingly. With UAC, any action unable to execute in standard user mode is either blocked or flagged, depending on the security model in

place. Instead of allowing applications to manipulate registry, file system, and kernel layers, standard user mode limits the locations where an application can write data—in this case, only to the user account folders, limiting risk. Part of the advantage of UAC is precisely the difference between standard and administrator privileges, such that any action that cannot be handled by a standard user must be handled by a user with administrator rights.

A key goal of UAC in Windows Vista is to help nudge Independent Software Vendors towards designing applications that function in standard user mode.

Deploying administrator rights across your user base will mean that in most cases your applications will work as before—but your exposure to malicious code is much higher than in a controlled standard user environment. In addition, standard user mode reduces the configuration changes end users can make—reducing potential disruption and help desk calls.

So how does UAC affect PC user experience?

- If you are logged in as an administrator on your personal workstation, you'll see a consent prompt each time you go to exercise a task that requires administrator privileges. Many IT Professionals perform administrator tasks regularly—managing systems via

Microsoft® Management Console (MMC), installing new software, and other similar operations. IT Professionals who regularly perform administrative operations can change the behavior of this prompt for their workstations, including suppressing it entirely via Group Policy. If you suppress the consent prompt, and your account is a member of the local administrators group, any process that requests administrative privileges will be granted those privileges without any prompt appearing.

- A standard user desktop will be prompted to input administrator credentials when performing tasks blocked by UAC. Standard users in Windows Vista gain flexibility compared with Standard User mode in Windows XP, with access to routine settings such as time zone or power management. In addition, UAC enables file/registry virtualization to allow applications to write to protected locations without an escalation in privilege. This allows many legacy applications that required administrative privileges under Windows XP to run with standard user privileges, with no prompts, under Windows Vista.

In some cases, prompts are triggered by third-party applications that have not been written to run with standard user privileges.

As mentioned earlier, software design best practices have long held that applications should write data into a user's profile rather than using the Program Files directory for per-user storage. In Windows Vista, file system and registry virtualization redirects many writes to Program Files to per-user locations automatically, to help ensure legacy applications will run as standard user. For third-party software that requires administrative privileges, check with your ISV to see if they have a version of the software that will work well for standard users; if not, there are many options for mitigating incompatibilities from shimming to recoding your applications. For more information, visit [Application Compatibility](#) on TechNet.

Tip: While running as an administrator is more convenient than running as a standard user, it's a best practice to move users to a standard user (non-administrator) profile to reduce risk and increase manageability. The Application Compatibility Toolkit can also help to troubleshoot and remediate applications that fail to run under standard user privileges in Windows Vista

Image Management

Few people relish change, especially when it comes to getting their jobs done. For IT Professionals managing the image creation and deployment process, Windows Vista

represents some significant changes over Windows XP, and image management is an area where Windows Vista provides the most benefit for implementation. The goal of the architectural change is to simplify the image creation and management process, but this does involve a few differences and tradeoffs:

- One of the most important changes with Windows Vista for IT administration is the adoption of file-based imaging, using the Windows Imaging Format (WIM). This architecture allows a single language-independent and hardware-independent image to be deployed across the infrastructure, and allows deploy-time injection of deployment packages (drivers, updates, language packs) into the image. This means you rarely need to recapture the base image, but instead can apply updates by adding the packages as components to the automated installation process. This format also provides a fail-safe environment for deployment, since it does not disturb the current file settings.
- Several new capabilities in Windows Vista do result in a larger memory footprint, such as Search and Windows Defender. These capabilities are designed to enhance the productivity of end users and help secure the desktop, but will require more robust hardware and adequate RAM. If you have third-party

tools for desktop search or malware protection, it is recommended that you select one tool per function to avoid a redundant drain on system resources.

- The Windows Vista SP1 integrated image is typically about 3-4GB, depending on the number of applications included in the captured core image. These image files can be delivered to targeted computers via DVD media, USB devices, or via network deployment using Windows Deployment Services. WDS also now enables multicast transmission of WIM files, so if you are concerned about passing a 4 GB image a hundred times over your network (400 GB total bandwidth consumption), multicasting allows you to perform the action and limit the bandwidth consumption to 4 to 8 GB.
- Planning, preparing, testing and distributing these images over the network is easier than with previous operating systems, but it is still a good idea to look at deployment guidance process integration tools such as those provided with the [Microsoft Deployment Toolkit](#).

Tip: An IT organization should have a robust multi-casting solution (such as the capability provided by Windows Deployment Services in Windows Server® 2008) to balance out the network load when deploying Windows Vista across the infrastructure, and the use of the Microsoft Deployment Toolkit can automate the deployment process with zero-touch and light-touch options.

Display Driver Model

One of the key changes in Windows Vista was the introduction of a new display driver model that provides greater system stability, and enables the Aero® desktop experience. This visual interface technology goes beyond just improving the visual design: The architecture delivers significant gains in reliability and performance.

In Windows Vista, the Display Driver Model has two components, a streamlined kernel mode driver, and a user-mode driver that does most of the calculations. The design is simplified by eliminating the need to include code for the various device driver interfaces introduced through the years; instead, a single interface recognizes previous version drivers. The Display Driver Model architecture elevates most of the driver execution out of the kernel mode, so a driver problem can be contained, instead of affecting the full OS. The Display Driver Model also provides fault tolerance against display driver hangs, with the Timeout Detection and Recovery function enabling Windows Vista to restart the display driver without a full system reboot.

The Windows Vista driver model takes advantage of advances in powerful, inexpensive display processing power, and enables the Aero interface to provide a richer user experience. One trade off of the Aero interface is that it requires a graphics processing unit (GPU) that supports the Display Driver

Model, and has dedicated memory on the graphics card. PCs with an integrated graphics card may not support the Aero visual interface. However, the stability and performance advantages of WDDM are available independent of Aero.

Tip: PCs that are not up to the hardware requirements for Windows Vista should be operated in "Basic" mode with Aero turned off.

Search

One of the most significant improvements in Windows Vista is the ability to rapidly search all the files on the desktop, whether they reside in folders, as an email attachment, or somewhere else on the PC. Search does require that the system index file locations so they can be quickly retrieved at will, though the approach taken by Windows Vista should not interfere with system performance while in use.

On Windows Vista, the search engine is set up as a service rather than an application. This approach allows the system to index user's data even when the user isn't logged on the machine, making the index ready for the time when user logs on. With Windows Vista, the indexing function doesn't crawl the disk constantly. Instead, after indexing the content for the first time, it waits for changes in the file system and then only indexes the updated files. Beyond that,

indexing goes idle when a user or the system opens a document or performs a task, so the actual impact on performance is minimal

Tip: Because of the system overhead required, it is unwise to have multiple desktop indexing technologies operating simultaneously.

64-bit Architecture

64-bit computing is definitely the direction of the future, and its primary advantage over 32-bit computing is in access to system memory. The 32-bit edition of Windows is Vista limited to 4GB of memory, and depending on the devices present, can access between 2 and 3.5 GB of "user available" memory. In contrast, the Business, Enterprise and Ultimate editions of 64-bit Windows Vista can access 128GB of memory.

An important consideration, however, is when and how a user should install Windows Vista in 64-bit (x64) over 32-bit (x86). For mainstream consumers and businesses, Windows Vista x86 will be the preferred operating system for the next couple of years.

High End Workstations (HEWs) users should choose the 64-bit version. Complex engineering, audio, or graphics applications often come with the requirement for access to additional memory, so x64 would be the preferred platform. For example, 3DS Studio

Max, Maya, and Cakewalk are available today compiled in 64-bit. However, the number of native 64-bit applications is small relative to the availability of native 32-bit applications.

While 64-bit processors are standard in almost all machines shipping on the market today, you will want to consider other factors when thinking about 64-bit deployments:

- The application compatibility between 64-bit Windows and 32-bit Windows is significantly higher than between 16-bit Windows and 32-bit Windows. Indeed, many 32-bit Windows applications will simply run out of the box. However, there are exceptions—64-bit architecture does not support 16-bit applications, and Windows 3.1 sub-systems are unavailable. In addition, a number of older 32-bit applications use 16-bit installers, which prevents them from installing on 64-bit Windows.
- All logoed Windows Vista device drivers must have both 32-bit and 64-bit versions. This means that over time there will be a great variety of 64-bit device drivers available. However, because a 32-bit device driver won't work with the 64-bit edition of Windows Vista, a device that is just a few years old may not have a driver available. This driver issue may also affect specific 32-bit

applications that attempt to install drivers for software protection, as those drivers will not run on 64-bit Windows.

- Specific applications, for example those that are very math intensive, may see performance increases when tuned to 64-bit Windows. However, most applications will see little change in performance. In most cases, 32-bit applications (such as Microsoft Office 2007) are just as responsive running on 64-bit Windows as they are on 32-bit Windows.

Tip: If you are thinking about deploying the 64-bit edition of Windows Vista, the first step is to inventory and test your applications and peripherals to see whether 32-bit Windows Vista might be a better choice.

Adoption Impact

So what is the impact of these features on the two issues that affect Windows Vista adoption—application compatibility and performance?

Application compatibility is the biggest issue preventing IT Professionals from adopting Windows Vista into their organization. Part of this is perception based on fact—Windows Vista is built on a new architecture that promises tightened security and reliability.

Consequently, the applications that ride on top of Windows Vista need to communicate with the kernel in different ways. So what has helped fuel current perception around application compatibility? Why did many applications 'break' in the migration from Windows XP to Windows Vista? Most application compatibility issues with early versions of applications can be attributed to one of the following:

- Standard user mode limits file and registry access by applications on the computer. User Account Control exposes non-compliant actions, with permission prompts to standard and administrator users. Changes in permissions will cause most of the issues with earlier versions of applications, where administrative access was assumed during development and testing.
- Internet Explorer® 7 safeguards against elevation-of-privilege attacks by restricting ability to write to any local computer zone resource other than temporary internet files—like UAC for Internet Explorer. If you have a web-based Line of Business application that fails to run under Internet Explorer protected mode, try placing the application in the Trusted Sites zone in which Internet Explorer protected mode is disabled.
- Operating system and browser version numbers change with each release, which might cause issues with applications that check for a specific version number upon installation. Application shims are available to fool the application into thinking the operating system or browser is the application-required version.
- Windows Resource Protection (WRP) enables applications to function properly by redirecting attempts to write to protected files or registry locations, but may reject installing applications that improperly attempt to modify these protected locations (see UAC above).
- In the new driver model, drivers have been moved out of the kernel, so applications need to be modified to address the new location. This provides an advantage for managing Images in Windows Vista, such as offline

edits, but requires a different access model in the application.

- Applications written with undocumented APIs may fail at runtime.

Since RTM, the number of Windows Vista compatible applications and devices has increased substantially, to more than [2,500 applications](#), and to more than 15,000 signed devices and components. Ninety eight of the 100 top selling applications and 46 of the top 50 downloaded applications on [www.download.com](#) are now compatible with Windows Vista. See [www.appreadiness.com](#) for a comprehensive list of Windows Vista compatible applications.

Windows Vista SP1 is now available. This version includes all previously released updates and improving reliability, security and performance, along with improvements in administration and hardware support. For more information on Windows Vista SP1, please see the [Overview of Windows Vista Service Pack 1](#).

Tip: Before moving into a pilot with Windows Vista, conduct a complete assessment of the Application inventory in your organization. The Application Compatibility Toolkit (ACT) can help automate this assessment. You might consider running LOB applications that can't be moved to Windows Vista in a virtualized instance of their compatible OS on the Windows Vista desktop.

Hardware Performance

We've heard some of you say that Windows Vista runs slower than Windows XP on a given PC. So what's really happening here? First, we need to avoid comparing apples to oranges—Windows Vista is doing a lot more than Windows XP, and it requires resources to conduct these tasks. That said, it is important to make sure a PC running Windows Vista has enough horsepower to function properly, especially for older PCs running a minimal amount of RAM, since the Windows Vista footprint is larger, bottlenecks will occur. The [Microsoft Assessment and Planning \(MAP\) Solution Accelerator](#) is valuable for making infrastructure-wide assessments of hardware capability, and provides both macro (overall organization) and micro (individual PC drill-down) perspectives.

While the minimum requirements for the Windows Vista operating system are highlighted on the Windows Vista TechCenter, it is a good idea to validate hardware performance with your intended application stack before setting your organization's standard hardware specifications. When standardizing on Windows Vista operating systems—especially for those using the Windows Aero appearance settings—many organizations have found that 2 or more GB of RAM, 2 GHz or faster processors, and compatible graphics adapters yield good results.

Organizations using “Basic” appearance settings in their PC environment instead of Aero can reduce these recommendations considerably and approach published minimum system requirements for those PCs. This may be useful if your organization is in the middle of a hardware refresh cycle and would like to standardize the operating system version to qualified existing hardware. Depending on how workstations are used in your organization, you can tailor hardware specifications and operating system configurations—including appearance settings—according to your user roles and operational needs.

On machines configured with the appropriate specifications for the operating systems they are running, the speed of most operations and tasks between Windows Vista and Windows XP is virtually equal. This is pretty remarkable when you consider one key thing Windows Vista is doing that Windows XP isn't: for example, indexing for near instantaneous search results for desktop files, even those embedded in e-mail messages; preventing malware with Windows Defender; and dynamically delivering rich content to the desktop with Windows Sidebar. The results are that users are better protected and can find information significantly faster (measured in minutes), increasing productivity far in excess of the loss in speed of operations (measured in milliseconds).

Tip: The Microsoft Assessment and Planning Solution Accelerator can aid in determining your organization's readiness for Windows Vista, both on a macro level (infrastructure-wide perspective), and can drill down to any specific PC requiring updates to run Windows Vista.

So what else is on your list that you would like to hear about? Do let us know—please e-mail us at <mailto:winpro@microsoft.com>. We understand that adopting a new operating system into the desktop environment is a complex and challenging undertaking, and we hope that this article offers a useful perspective on perceived challenges, and to help you plan preventative measures to avoid disruption.

For more straight-talk advice and adoption guidance, please visit www.microsoft.com/springboard

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