Windows 7 Inside Track: 64-bit and Beyond

By William R. Stanek

Know the classic rock song that says "I did a bad, bad thing, a real bad thing"? Well, Tunnel Vision is a bad, bad thing, and this article hopefully will help you avoid it when you deploy and install Window 7. As I've stated before, when it comes to favorite technologies, call me a zealot because I *probably* am. I'm not afraid to proclaim that I love technology that works, and I think Windows 7 is the best desktop OS I've seen. But even the best operating systems need to be installed, configured and operated properly to run as expected. So heading in with your eyes wide open, prepared and ready is the best way to go. As you work with Windows 7, I hope you'll take a look at my books: *Windows 7: The Definitive Guide* and *Windows 7: Administrator's Pocket Consultant*. Together, they should be able to help go further and do more with the operating system.

If you haven't thought about 64-bit, now is the time to seriously evaluate going to 64-bit installations. The majority of desktop PCs sold in the last three years are 64-bit capable and can run a 64-bit edition of Windows 7. With laptops, it's a slightly different story. Although many laptops sold in the last 18 months or so are likely to be 64-bit capable, don't necessarily expect this, especially with netbooks designed for Windows XP.

You'll find that 64-bit Windows 7 editions perform much better than their 32-bit counterparts. There are some gotchas, however. 64-bit Windows editions natively run 64-bit drivers and that's it. In the past, this might have meant using generic drivers, in some cases, with sound cards, video cards, etc but the good news with Windows 7 is that we're finally at the sweet spot for 64-bit technology. Hardware vendors are ready. They've been doing their 64-bit homework for quite some time now and they have implemented and proven 64-bit drivers for the vast majority of their current products. That's good news. Almost good enough to make a techno zealot like me have a big old happy grin. But (and you knew there was a but didn't you ;-) if you can't live with the possibility of using generic drivers, don't jump ship without ensuring vendor-specific 64-bit drivers are available for your hardware components.

Although hardware finally is at the sweet spot for 64-bit, the same is not true with software. 64-bit software is increasingly becoming available, but we're a long way off from that sweet spot. Best case scenario: We likely are 18 to 36 months away from the greatest software "catch up" race in the history of computing. And while I could of course be wrong, I call it a "catch up" race for a reason—and that's because increasingly, to be competitive, software vendors are going to have to offer the real deal: full on 64-bit architected software (and not 32-bit software masquerading as the same). When it comes to current 64-bit offerings, be sure to read the fine print. Some applications in a particular application suite may be 64-bit; others may not.

So if you're wondering why upgrade to 64-bit if software's not entirely there yet? I'll say this: the 64-bit operating system itself runs faster and better and the benefits to using 64-bit drivers are phenomenal performance. Not to mention that 64-bit Windows can natively access more than 4 GB of RAM. Home Basic can have up to 8 GB of RAM; Home Premium can have up to 16 GB of RAM; and higher editions can have more than 128 GB of RAM.

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You've probably heard some grumblings about the upgrade and migration options that are available for Windows 7. Mac users seem to voice the complaints the most (though few seem to remember the OS 9 to OS X days (you know: classic, blue box, Carbon, etc.) or the fact every release from Cheetah to Snow Leopard has been a dot rev of 10).

The simple truth is Windows Vista represented a radical departure from previous releases of desktop Windows operating systems. Windows 7 is the continuing evolution of this brave new world. This brave new world brought PC users truckloads of new features and capabilities, including

- Language independence
- Modularization
- Hardware independence
- Windows imaging
- Windows PE 2.0 (to replace the MS DOS)
- Windows Pre-boot environment

This brave new world put up a dividing line between earlier desktop releases of Windows and everything that comes after. It is the reason why you can't upgrade Windows 95, Windows 98, Windows ME, or Windows XP to Windows 7. Setting aside Windows XP for a moment, why in the world would you want to drag forward Win 95/98/ME baggage? That would be a nightmare even if you could as you're coming from what was primarily an MS DOS and 16-bit world to full on 32-bit (and 64-bit options largely didn't even exist back then).

Now back to Windows XP. You can't upgrade directly from Windows XP to Windows 7. Only Windows Vista includes upgrade paths from Windows XP. This is because the baggage required to support the transition from Windows XP (a legacy OS) to the new architecture is enormous. If you absolutely must upgrade, you could upgrade Windows XP to Windows Vista and then upgrade Windows Vista to Windows 7. Licensing options should be available, as you likely only need a few Vista licenses to support such a transition (but would need to confirm for enterprise scenarios). But again, why drag around legacy baggage? Why not make a clean break to the new architecture? Your installations will be cleaner and your PC operations will run more smoothly.

As both Windows Vista and Windows 7 implement the new architecture, you can of course upgrade Windows Vista to Windows 7. The upgrade options are fairly straightforward but there are some gotchas and these gotchas exist because Windows gives you so many options.

To get started, you'll need to ensure your computers are running at least Service Pack 1 (SP1) to upgrade. Only Windows Vista with SP1 or SP2 can be upgraded to Windows 7. Generally, you can upgrade like or higher editions. This means you can upgrade from:

- Windows Vista Home Basic to Windows 7 Home Basic, Home Premium or Ultimate
- Windows Vista Home Premium to Windows 7 Home Premium or Ultimate
- Windows Vista Business to Windows 7 Professional, Enterprise or Ultimate
- Windows Vista Enterprise to Windows 7 Enterprise
- Windows Vista Ultimate to Windows 7 Ultimate

If you've purchased a computer with a home edition of Windows Vista, you may want to go to a business edition of Windows 7. You can do this, and without having to shell out the additional cash for Windows 7 Ultimate. As with Windows Vista, Windows 7 supports anytime upgrades. With an anytime upgrade, you can go from more basic editions of Windows 7 to higher editions of Windows 7. This means you can upgrade from:

- Windows 7 Home Basic to Windows 7 Home Premium, Professional or Ultimate
- Windows 7 Home Premium to Windows 7 Professional or Ultimate
- Windows 7 Professional to Windows 7 Ultimate

Thus, you could upgrade a home edition of Windows Vista to a home edition of Window 7 and then anytime upgrade that home edition to Windows 7 Professional. And if you've done an anytime upgrade before, you know it's fast and easy.

Upgrades and Migrations

So far we've discussed upgrade paths to Windows 7 from earlier releases of Windows. There are a few more gotchas in the upgrade process we should talk about before we go into migrations. The most important ones have to do with:

- Cross-architecture upgrades
- Cross-language upgrades
- Cross-variant upgrades

When you upgrade from Windows Vista to Windows 7, you must upgrade to the same architecture, language and variant. This means that you must:

- Upgrade 32-bit Windows Vista to 32-bit Windows 7 (and likewise 64-bit Windows Vista to 64-bit Windows 7)
- Upgrade to the same language version, such as US English to US English (rather than say US English to Japanese). If you have a particular language version with add-on language packs, you also might have to remove the add-on language packs to upgrade.
- Upgrade to the same or higher edition in keeping with variants. You cannot upgrade from Windows Vista to the Windows 7 N, K, KN or E variants.

I can hear the groaning and grumbling already, but these restrictions make perfect sense. For instance, 64-bit Windows is an entirely different animal than 32-bit Windows. Trust me, you don't want all that 32-bit OS baggage on your 64-bit computers. 64-bit is where computing is going and you want to be there bathing in all the high-power 64-bit glory. And there are always options and workarounds. An example? Sure. User State Migration Tool (USMT) 4.0 makes it possible for you to migrate 32-bit settings to 64-bit environments. To do this, you'll need to extract the current state before installing Windows 7.

When you upgrade from Windows Vista to Windows 7, a Windows.old directory is created with the settings and files from Windows Vista. As long as you do a straight installation (and don't modify or remove partitions during installation), the Windows.old directory is available for you to use. USMT 4.0 can use this directory to transfer settings and files from Windows Vista to Windows 7 and it can do so after the upgrade (in most cases). More on this later but first let's circle back to Windows XP.

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Although you can't upgrade Windows XP directly to Windows 7, you can maintain your Windows XP settings when installing Windows 7 on a computer running Windows XP. To do this, you must migrate files and settings prior to installing Windows 7. One tool that allows you to migrate settings is Windows Easy Transfer (Migwiz.exe). You'll find it on the Windows 7 installation media in the Support\Migwiz folder. You can use Windows Easy Transfer to transfer settings and files from any computer running Windows XP or Windows Vista to Windows 7.

You can transfer files using a network drive, a USB flash drive, or an Easy Transfer Cable. Of the three options, my favorite is the USB flash drive. With network drives, you have to transfer the data over the network. If you have a lot of data to transition, you likely will find the process very slow and frustrating on a 100 Mbps network. Even if you are on a 1 Gbps network, this process will seem fairly slow but doable for the patient technician. And that's why I prefer a USB flash drive. Just make sure you purchase a newer flash drive with high-speed memory and a lot of capacity, such as 16 or 32 GB. A 32-GB flash drive will handy most any transfer and it will do it much faster than a network transfer.

Keep in mind that you cannot use Windows Easy Transfer to move program files or system files, such as fonts or drivers. Windows Easy Transfer only moves program settings and files. You'll need to migrate, then install your programs, fonts and drivers as needed.

If you can't perform an in-place upgrade of your computer, you may be able to migrate file and settings. Migration is supported in several scenarios. You can:

- Migrate files and settings from Windows XP or Windows Vista to Windows 7 on the same computer.
- Migrate files and settings from Windows XP or Windows Vista to Windows 7 on a new computer.

With either scenario, the migration techniques you use are similar. In one scenario, you are moving to a new operating system and in the other, you are moving to a new computer. The two main migration tools you'll use are Windows Easy Transfer and User State Migration Tool (USMT). Although both tools are old standbys from migrations in the past, there are some changes that make the tools easier to use and work with.

With Windows Easy Transfer, you normally transition files and settings in two stages. First you use Windows Easy Transfer to copy them to a network folder or USB flash drive then you use Windows Easy Transfer to move the copied files to the new operating system or the new computer. You also can use an Easy Transfer cable to copy files and settings directly from an old computer to a new computer. Keep in mind a standard USB cable is not an Easy Transfer cable. You'll need to purchase the cable if you don't have one.

You use Windows Easy Transfer to move program settings and user files. Generally, the files transitioned only include those files in the user profile folders, such as the contents of C:\Users\%UserName% and all subfolders. Windows Easy Transfer does not move program files or system files, such as fonts or drivers. You'll need to migrate, then install your programs, fonts and drivers as needed.

In the past, the biggest problem with Windows Easy Transfer has been that the more data you have, the longer it takes to complete the migration process. Transferring a few gigabytes of data over a network

twice (once for the copy; once for the final move) is slow (very slow at 100 Mbps and painfully slow at 10 Mbps). The good news: many more computers have 1 Gbps network cards these days, which is 10X faster than 100 Mbps and 100X faster than 10 Mbps. If you're computers don't have 1 Gbps network cards, there's never been a better time to upgrade (and upgrade before migrating if you plan to use Windows Easy Transfer over the network).

You can safely skip all the copy/move over the network craziness by using a USB flash drive (UFD) or an external hard drive. A 16 GB or 32 GB UFD can handle just about any single-computer migration. If you've going to use a UFD, make sure you use one that has 100% high-speed flash RAM--you'll have a smoother, faster migration. Stay away from cheap UFDs. Most of the cheapos have a mixture of slow and fast flash RAM, especially if they are a few years old.

Although Windows Easy Transfer is a good choice for transitioning several computers from Windows XP or Windows Vista to Windows 7, it's not a good choice for transitioning many computers. When you have a lot of computers, you'll want to automate the process and this is where USMT comes in handy.

Performing Migrations

In the previous section, I talked about migrations and the options for using Windows Easy Transfer. So now let's look at the actual migration process. Keep in mind that migration is only necessary if you can't perform an in-place upgrade. Generally, in-place upgrades are supported when you are moving from a like edition of Windows Vista to a like edition of Windows 7 but there are many gotchas as discussed in my previous blog entries.

Also, last time, I forgot to talk about using external hard drives with Windows Easy Transfer. With external hard drives, you'll want to look at speed as well. Most external hard drives have USB 2.0 connections. Generally, USB 2.0 has a maximum transfer rate of 480 Mbps with sustained rates of 10 to 30 Mbps. As with UFDs, transferring multiple gigabytes will take a while. In contrast, FireWire 400, FireWire 800 and eSATA generally will be much faster (up to 3X faster with eSATA) and there are a few high-performance external hard drives that support these interfaces. The catch is that your computers (both old and new if you are transitioning from one computer to another) must support the interface and removable media type.

With Windows Easy Transfer, your migration has two phases:

1. Copy the data you want to transition.
2. Move the data to its destination.

You kick start phase one of the migration process on the old computer or operating system using the Windows 7 installation media. The process is similar to the following:

1. Insert or attach the Windows 7 installation media while running Windows XP or Windows Vista. On the installation media, in the Support\Migwiz folder, double-click MigSetup.exe to start Windows Easy Transfer.
2. When the wizard starts, click Next, select the "An external hard disk or USB flash drive" option and then click "This is my old computer." You can specify that you want to migrate all user profile data, select specific user profiles or customize the process.

3. Enter a password to protect the data you are transitioning and then click Save. Next, select the external location or external media where you want to save the data. Click Save again.
4. Click Next and then wait for the copy process to complete. Click Close.

Once you've confirmed that the data has been transitioned, you can move the data to the new computer. Or you can upgrade the Windows XP or Windows Vista computer to Windows 7 by performing a clean installation and then move the data back to the computer. Remember, this migration process with a clean installation is only necessary if you can't perform an in-place upgrade.

To move the user data to its final destination, the process is similar to the following:

1. Attach the UFD or external disk to the computer or make sure you can access the shared network location where the data is stored.
2. Insert or attach the Windows 7 installation media while running Windows XP or Windows Vista. On the installation media, in the Support\Migwiz folder, double-click MigSetup.exe to start Windows Easy Transfer.
3. When the wizard starts, click Next, select the "An external hard disk or USB flash drive" option and then click "This is my new computer."
4. Click "Yes, open the file," and then browse to where the Easy Transfer file was saved. Click the file name and then click Open.
5. You can transfer all the files and settings you saved or only those files and settings for specific users. To transfer all the saved data, click Transfer. To select the saved data to transfer, click Customize, select the user profiles to transfer, and then click Transfer.
6. Wait for the copy process to complete. Click Close.

That in a nutshell is how the copy/move processes work. Hope this gives you the core details you need to successfully migrate your computers using Windows Easy Transfer!

Now let's kick it up a notch and look at automating migrations using User State Migration Tool (USMT) Version 4.0.

As you learned from my earlier blog entries, Windows Easy Transfer is best suited for personal use or for transitioning several computers from Windows XP or Windows Vista to Windows 7. When you have a lot of computers to transition, you'll want to automate the process using USMT 4.0.

Unlike Windows Easy Transfer, which doesn't require much pre-planning, you'll need to perform some fairly extensive planning before you use USMT to transition your computers. As part of your planning, you'll need to identify the settings you want to migrate.

USMT 4.0 can help you migrate operating system settings, application settings, user data and more. As examples, operating system settings that you can migrate include:

*   Appearance settings for the desktop, menus and the overall user interface.
*   Keyboard and mouse settings as well as folder options
*   Internet options for home pages, favorites, bookmarks, cookies, security, connections and proxies
*   Mail settings, rules, contacts, views and signature files

USMT 4.0 allow you to configure your migration using these migration rule (.xml) files:

- MigUser.XML Sets the rules for migrating user profiles and user data
- MigDocs.XML Sets the rules for automatically finding user documents that should be migrated
- MigApp.XML Sets the rules for migrating application settings

To control exactly which files and settings are migrated, you'll need to modify these scripts to suit your environment. You may need different versions of these rule files for different departments or different types of users.

USMT also allows you to configure user account migration using ScanState and LoadState command-line tools. You use ScanState to collect settings and data, and LoadState to restore settings and data. As USMT 4.0 now supports offline migrations, you can run ScanState in Windows PE and you also can perform migrations from previous installations of Windows contained in Windows.old directories.

As part of the migration process, you can use the MigUser.Xml file to define the user data to migrate and also to control how access control lists (ACLs) for user data are migrated. By default, all user folders from each user profile are migrated including Desktop, Downloads, Favorites, Links, My Documents, My Music, My Pictures, and My Videos. Folders from the All Users in Windows XP and Public profiles in Windows Vista are migrated as well, which ensures any shared data is migrated.

If you use the MigUser.Xml file, ScanState searches fixed drives, collecting and migrating files. The files collected are determined by the file extension. Although you can edit the MigUser.Xml file to add or remove file extensions, the default files collected include those with the following file extensions:

> .accdb, .ch3, .csv, .dif, .doc*, .dot*, .dqy, .iqy, .mcw, .mdb*, .mpp, .one*, .oqy, .or6, .pot*, .ppa, .pps*, .ppt*, .pre, .pst, .pub, .qdf, .qel, .qph, .qsd, .rqy, .rtf, .scd, .sh3, .slk, .txt, .vl*, .vsd, .wk*, .wpd, .wps, .wq1, .wri, .xl*, .xla, .xlb, .xls*.
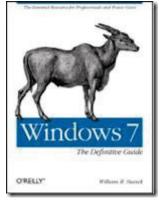
USMT 4.0 can migrate ACLs along with user data. However, to do so, you must specify the folders to migrate. The source ACL information is migrated only when you explicitly specify the folders to migrate.
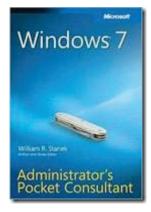
Thanks for reading!

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Note that this is excerpted from a blog. Send comments or corrections to **williamstanek at aol dot com**

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