



The End of Windows XP: What Does it Mean for Your Test Systems?

March 04, 2014 - Robert Cornwell – Bloomy Controls, Inc.

It's official, Microsoft will stop supporting Windows XP on April 8th, 2014. This means no more security updates or technical assistance from Microsoft, leaving XP systems vulnerable to security threats such as cyber-attacks, data theft, and viruses. Many companies have concluded that the security threats are significant enough to mandate that Windows XP computers must be removed from their networks after April 8th. Unfortunately, the test and measurement world has been slow to transition from Windows XP and there are still large numbers of systems using it. At Bloomy Controls, we received requests for new test systems running Windows XP even as recently as 2013.

Forrester Research estimates that 20% of North American and European corporate computers are still running Windows XP. But that will soon change: Forrester forecasts that only 6% of those companies' PCs will be running Windows XP by April. However, that number will be considerably higher for test and measurement users that either depend on their equipment uptime for critical manufacturing processes, or are not under the jurisdiction of the corporate IT departments that implement upgrades on most corporate computers. Clearly, after 12 years of faithful service, it's time for Windows XP to retire, so what are the factors that you need to consider in making the upgrade?

Hardware upgrade?

If your test system is running Windows XP, there is a good chance the PC is pretty old too. In most cases, it makes sense to upgrade the PC to provide sufficient computing resources to run a new operating system, reduce the risk of a hardware (e.g. hard drive) failure, and increase serviceability by avoiding obsolescence of spare parts. There are several special considerations for upgrading a test and measurement PC. For desktop or rackmount PCs you will need to make sure any plug-in PCI/PCIe cards you're using can be installed in the new PC, although there are many USB-based options that may be a better alternative. For example, NI USB DAQ and CompactDAQ are data acquisition platforms that range in scope from low-cost 12- or 16-bit plug-in DAQ card replacements, to high-performance 24-bit modular systems with signal conditioning available for many sensor types.

If you have a PXI system running Windows XP, then now may also be a good time to consider PXI Express. PXI Express (PXIe) integrates PCI Express signaling into the PXI standard, increasing bandwidth from 132 MB/s to 6 GB/s, and enhancing timing and synchronization by incorporating a 100 MHz differential reference clock and differential trigger lines. PXI vendors such as National Instruments are producing many new high-performing instruments based on the PXIe standard. In order to migrate your PXI system to PXIe and still use all of your existing PXI instruments, it is important to choose a PXIe controller and chassis containing the correct number of PXI or PXIe hybrid peripheral slots.



An additional benefit of upgrading the hardware at the same time as the operating system is that the changes are isolated to the new hardware, while the old PC or PXI controller is left intact. If a problem is encountered, you can easily swap back to the previous configuration and buy time to work out the upgrade issues. Upgrade or not, make sure that you do a full backup of the system prior to making any changes.

Which version of Windows to upgrade to?

For migrating test and measurement applications designed for Windows XP, we strongly recommend upgrading to 32-bit Windows 7. Windows Vista had numerous problems that are beyond the scope of this article, and Windows 8/8.1 is typically not a good choice for running older software because of driver availability and because the new user interface may confuse many operators. You still have a choice between 32-bit and 64-bit Windows 7. 32-bit Windows 7 is the safer choice because your Windows XP application is 32-bit, but if you are dealing with an application that is memory constrained, this may be an opportunity to explore 64-bit Windows. Bear in mind that you can still run 32-bit applications on 64-bit Windows, but make sure that all your hardware has the appropriate drivers available.

What about the Windows XP mode in Windows 7?

Some editions of Windows 7 come with a feature that allows you to run a fully licensed version of Windows XP as a virtual machine under Windows 7. At first look, this would appear to be a low risk way to move a test and measurement system to Windows 7, but unfortunately there are two problems:

- Windows XP mode will also be unsupported after April 8th so while you may be able to work around an IT department mandate, you will experience the same security vulnerabilities as sticking with Windows XP.
- Many hardware devices and data acquisition cards will not work in Windows XP mode because of the way that hardware resources are allocated to virtual machines.

Getting your application running under Windows 7

This is where things get a bit trickier. In some cases the application will install and work fine, but there's a good chance you will need to make some minor modifications to the code and recompile with a newer version of the development environment. You will need to check which versions of the software development environment are compatible with Windows 7. As an example, here is the compatibility chart for National Instruments LabVIEW:

	Microsoft Windows OS Version								
	95	98	2000	NT 4.0	ME	XP x86	Vista	Windows 7	Windows 8
LabVIEW Version									
5.1.1	Compatible	Compatible	Compatible	Compatible					
6.0.2	Compatible	Compatible	Compatible	Compatible	Compatible				
6.1	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible			
7.0		Compatible	Compatible	Compatible	Compatible	Compatible			
7.1			Compatible	Compatible		Compatible			
8.0			Compatible			Compatible			
8.2.0			Compatible			Compatible	Compatible		
8.2.1			Compatible			Compatible	Compatible		
8.5.x			Compatible			Compatible	Compatible		
8.6.x			Compatible			Compatible	Compatible		
2009			Compatible			Compatible	Compatible	Compatible	
2009 SP1			Compatible			Compatible	Compatible	Compatible	
2010						Compatible	Compatible	Compatible	
2011						Compatible	Compatible	Compatible	
2012						Compatible	Compatible	Compatible	
2012 SP1						Compatible	Compatible	Compatible	Compatible
2013						Compatible	Compatible	Compatible	Compatible

Figure 1: LabVIEW Compatibility table provided by National Instruments¹

The most likely areas to exhibit problems when upgrading from Windows XP to Windows 7 are:

- **File and registry security.** Many test applications store data and test results to folders on the c: drive and configuration information to the Windows registry. The Windows 7 security model may prevent these applications from accessing certain locations depending on the user login. In general, Windows 7 has good reasons to prevent software from accessing these locations so it is best to modify the software to store data elsewhere. If you can't modify the software you may be able to bypass these restrictions by running the code as Administrator (although we don't recommend this).
- **Firewall/network security issues.** Windows 7 has a built-in network firewall that is enabled by default. For tests that communicate to instrumentation over TCP/IP, it may be necessary to open the appropriate ports in the firewall.
- **Incompatible hardware.** Windows 7 drivers may not exist for some of your instrumentation. Typically this would apply to PCI/PCIe cards. Most devices that communicate over a standard bus (RS232, GPIB) will function normally, but drivers may not exist for older USB devices and plug-in boards.

¹ <http://digital.ni.com/public.nsf/allkb/B972242574D4BB99862575A7007520CB>



- **Multithreading and timing.** Any new PC is likely to be significantly faster and have more CPUs or cores than what it replaces. This may cause old test software to behave differently. For example, threads that may have never run truly in parallel on the prior PC, because there was only 1 core, may actually execute simultaneously on a new PC, and cause race conditions. Even without race conditions, the execution speed will be different, and any software routines that rely on the rate of sequentially executed steps will be affected.
- **Upgrading the development environment.** Some problems are not directly related to the operating system upgrade, but rather the required development environment and/or driver upgrades. A common example is LabVIEW code that uses traditional NI DAQ instead of the more modern DAQmx drivers. Newer versions of LabVIEW do not install traditional (legacy) NI DAQ drivers by default and require that you install it separately (see <http://www.ni.com/download/traditional-ni-daq-legacy-7.5/4498/en/>).

Recommendations

Even if your organization has not mandated that Windows XP machines be replaced, this is a good opportunity to upgrade your test and measurement systems to currently supported technology. Before you start, do your research and make an upgrade plan. Here are some considerations:

- Do you have a full backup of the system hard drive?
- Do you have source code and installers for the test software?
- Do you have a version of the development environment that supports Windows 7?
- Do Windows 7 drivers exist for your instruments?
- Should you upgrade the PC or PXI controller?
- How much downtime can you afford, and how to minimize?
- How will you test the system to make sure it works after the upgrade?
- What is your contingency plan if there are problems during the upgrade?

If you are unsure about some of these steps or if there are more than one system to upgrade, then get some help from your instrument vendors or a knowledgeable systems integrator. Bloomy Controls customers are encouraged to contact us for a consultation before attempting this upgrade by sending an email to info@bloomy.com.

About the Author

Robert Cornwell is VP of Operations at Bloomy Controls and has over 20 years of experience in the test and measurement industry.

Bloomy Controls is a National Instruments Platinum Alliance partner and winner of the "Most Outstanding Technical Resources" award by National Instruments (NI) at NIWeek 2013.