lexana \ net

Building a Dual-Boot Laptop for the Corporate Environment

By Drew Hamre

The corporation provides its consultants with computer hardware running a Standard Operating Image (SOI) based upon either Linux or Windows. The Windows version of SOI -- the context for this paper – is pre-loaded with Vista (though some older systems are distributed with Windows XP/SP2, as we'll see below). These SOI images are loaded with common productivity tools (e.g., Microsoft Office) in addition to the standard utilities required for 'good citizenship' on corporate networks (antivirus, security, and connectivity software). The systems are centrally managed.

email

A significant portion of the technical staff has traditionally replaced the SOI image with a custom build, typically a fresh installation built from licensed media for the operating system (e.g., MSDN distributions for Windows). However, before these custom systems can connect to the corporate network, they must be enhanced to include corporate security and connectivity software. Since non-SOI implementations are only minimally supported, these installations may present technical challenges.

This paper describes experiences in loading a custom (non-SOI) Windows system and adding additional components to allow remote connectivity to the company network. The system can boot into either Windows XP/SP3 or Windows Vista.

Starting Point: Compaq 6910p running SOI XP/SP2

System reloads are disruptive and time-consuming, and not an activity to be undertaken lightly. In the case discussed here, the move to a new system was forced by the demise of a legacy Compaq nw8000 laptop. The replacement laptop was a Compaq 6910p equipped with a dual-core CPU and 2-GB of memory. It shipped from inventory stock with an older version of SOI, running Microsoft Windows XP/SP2 and Office 2003 at a time when Vista/SP1 and Office 2007 were current.

The age of this pre-installed image (in addition to the 'traditional' cultural factors noted above) tipped the scales in favor of reloading the laptop with updated versions of the operating system (Vista SP1), productivity software (Office 2007), and developer tools (Visual Studio 2008 and SQL Server 2008).

The Goal: Configuring a Dual-Partition, Dual-Boot Laptop

The target laptop contained an 80-GB SATA hard drive. This was sufficiently large to partition into two usable logical drives of 40-GB each. Each partition would be loaded with an independently bootable operating system. Each partition would be readable from either OS, so that files on either NTFS partition could be accessed universally.

Ultimately, the goal was to load 'Partition 1' with a lean copy of XP/SP3 Pro (minimal utilities only). 'Partition 2' would be slightly larger (37.4-GB) and run Vista/SP1 Ultimate.

This Vista image would become the 'everyday' work environment, and would be configured with connectivity/security software, productivity tools, and Microsoft development software.

Figure 1: The Compaq 6910p

Careful, Careful: Non-Destructively Partitioning the Hard Drive

When the reload process began, it wasn't clear how much effort would be required to configure the new Vista image to communicate with the company network. Rather than wiping the system and risking an extended 'blackout' period, the decision was made to:

- Temporarily keep the SOI XP/SP2 image (and its corporate connectivity) available, while non-destructively partitioning the hard-drive
- Load Vista on the new partition and configure remote connectivity. Meanwhile, the dual-boot system could still run the older SOI partition, which would provide a bridging work environment until the Vista-based system was fully tested and functional
- Finally (after the Vista configuration steps were stable and well-documented), the entire system could be wiped and replaced with custom operating systems
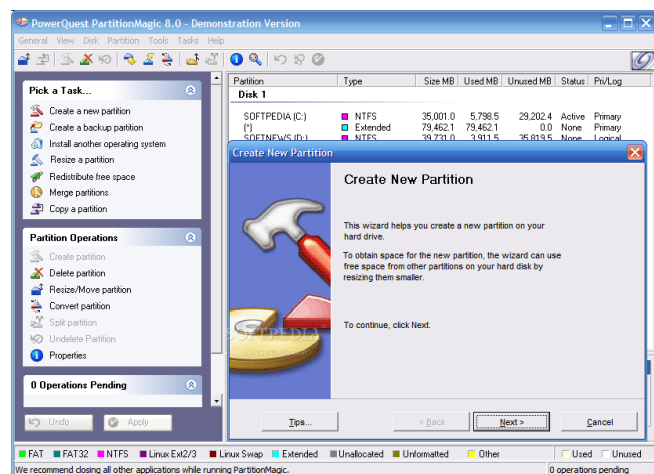
To non-destructively partition the hard-drive, I used a third-party tool, Symantec's *Partition Magic* (V8.0). This tool is similar to the low-level *DiskPart* OS command line utility, but includes additional features presented in a Windows interface.

Figure 2: Creating a partition w/ Partition Magic

Once Vista and the corporate connectivity software was installed (the steps are detailed below) and tested, we were ready to (after taking a deep, deep breath) wipe the system and begin.

Age before Beauty: Wiping the System and Loading XP/SP3

As a general rule of thumb, it's best to install layered software products on an "oldest-first" basis. This is especially true with Microsoft's development tools, and all but mandatory when building a multi-boot system with Windows XP and Vista. Microsoft states (emphasis added):

- "To create a working multi-boot configuration, *install the oldest version of the Windows operating system first*. Then, install each newer version in order. Every new Windows version preserves backward compatibility for starting earlier Windows versions."

XP doesn't understand SATA drives

XP would be the first operating system installed on the rebuilt system, so the installation process leveraged the latest comprehensive XP distribution, an MSDN image with SP3 'baked-in'. XP's integral installer was used to reformat both partitions of the hard drive and begin the installation. However, a problem was almost immediately encountered:

- The XP installer doesn't recognize SATA hard drives and therefore can't load the operating system on a Compaq 6910p.

The workaround requires that custom SATA drivers be made available on a *floppy drive* during installation. Not unexpectedly, the 6910p doesn't have an integral floppy drive (as such devices have been out of fashion for the last five years). However, the XP installer *does* allow installing drivers from portable USB-based floppies. Note that USB memory sticks can't be used.

A different machine was used to download the SATA drivers and write them to a floppy. Only a handful of vendors' USB floppy drives can be used, but luckily one of the supported drives (by Mitsumi) was on hand. (The company's USB floppy drives are not supported.) Re-running the XP install dialog, an F6 signals that you want to load other disk drivers (for

Figure 3: XP's custom disk driver installation dialog

SCSI, SATA, etc devices). This queues a request to load custom drivers (triggering the accompanying dialog to occur later in the installation).

The remainder of the installation was uneventful. Once Windows XP/SP3 was loaded, a handful of other devices also required driver updates to become fully operational. (In many cases, the default XP driver collection provided minimal functionality, only.) Google was used to search HP's web site and locate the Compaq 6910p driver site.

This driver collection allowed updating/flashing the bios (driver package sp41747), the Intel WiFi chip (sp41285), the Ricoh FlashMedia (sp36046), the ATI video chip (sp40462), Intel's gigabit Ethernet adapter (sp39773), and sound drivers from ADI (sp38529) and Microsoft (sp33867).

Once the hardware drivers were updated, Windows was 'activated' (licensed) as were Microsoft's update services. It's always interesting to observe the number of updates that have accumulated since the previous 'aggregate' built. In this case (even against a base XP/SP3 image), an additional 30 important and critical updates were applied to the system.

Loading Vista

The next step was to load Vista Ultimate on the second (unused) partition using MSDN media -- a DVD image with the latest Vista service pack (SP1) baked-in.

SATA support is included with Vista/SP1, so there was no need to retrofit disk drivers from a USB floppy. In fact, the entire Vista installation was relatively straightforward.

After Vista was installed, the dual boot functionality was re-tested (e.g., booting into XP and Vista to assure multi-boot capability was still working). Once re-verified, additional hardware drivers were loaded. Since Vista and the 6910p are of similar vintage, most of the integral drivers were up to date, and only the Intel WiFi and ATI video drivers were updated.
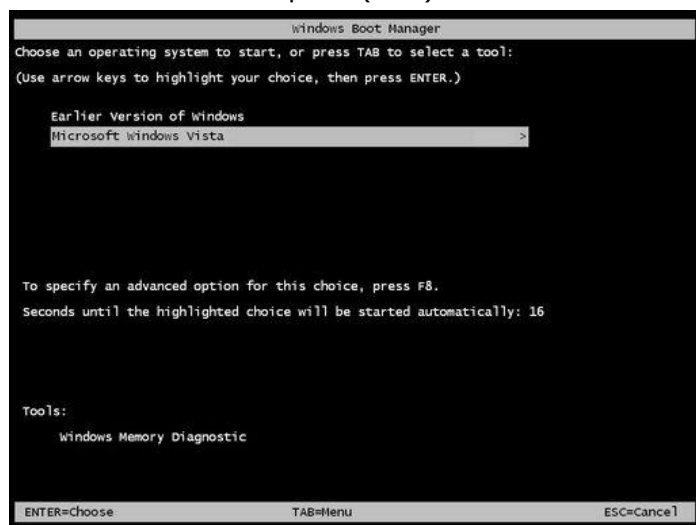


```
                    Windows Boot Manager
Choose an operating system to start, or press TAB to select a tool:

(Use arrow keys to highlight your choice, then press ENTER.)


    Earlier Version of Windows
    Microsoft Windows Vista                                      >




To specify an advanced option for this choice, press F8.
Seconds until the highlighted choice will be started automatically: 16




Tools:

    Windows Memory Diagnostic


ENTER=Choose              TAB=Menu                    ESC=Cancel
```

Figure 4: Dual-boot screen (XP is the 'Earlier Version of Windows')

At this point, Vista's user account control was disabled prior to installing the company's connectivity software and other layered products.

Installing corporate connectivity software

Two core components of the corporation's connectivity software will be discussed here – ActiveClient (token-based authentication management) and Remote Access Software (customized VPN):

- *ActivClient* v6.1.98: The ActivClient™ software 'enables organizations to secure workstations with smart cards and smart USB tokens while enforcing strong authentication for desktop access and network login'.
- *Remote Access Software* v5.0.3.0: Remote Access to the company is the 'primary remote access solution for employees and authorized contingent workers to connect to the network remotely. It is a "VPN" solution that provides Windows XP and Vista users with broad network connectivity into the corporate intranet. Employee identification authentication is done with a Class-A DigitalBadge certificate stored on an ActivKey USB device or an ActivCard smart card.'

Installation packages for both components can be downloaded from the company portal. Note that not all versions of the components interoperate with each other, and not all versions are compatible with Vista. The above two versions meet both criteria. A pre-initialized USB-based ActiveKey (transferred from the legacy laptop) was available to complete the configuration. The system did not need to join a domain for connectivity to be usable. The wizard-based installation for each component was straightforward.

Additional required packages (for example, anti-virus) can be downloaded from the intranet and installed.

Testing access to key sub-systems

The first corporate system to be tested was OWA (the web-based version of Exchange). This exercised the authentication components, though not VPN. The next tested corporate application was the web-based T&E expense tracking system that requires both authentication and VPN functionality.

Once connectivity appeared to be fully functional, the system build continued with IIS installation (the integral web server) and the update server activation (30+ updates were loaded). Windows was activated later in the process (dialog accessed from *Computer|Properties*).

Following activation, Office 2007 was among the first layered products installed. Native Outlook 2007 email access was configured at this point.

One of the most important tools for Microsoft-focused technologists is Virtual Server. When running VS 2005 R2SP1 in this configuration, note that it's important to apply the Vista support patch.

Looking back, looking ahead …

The above non-SOI system has been used daily for nearly a year, and has proven both functional and stable. Of course, the system today is also showing its age. Two cases in point: (1) At the time of this writing, Microsoft has just officially released Windows 7; and (2) the company will soon require PC encryption (with support implications for dual-boot, dual-partition operations).

Anyone considering building a non-SOI custom system should remember that installation is only the first step in a continuing process. All of us taking this step quickly learn that (with apologies to *Spiderman*), 'With great control over system customization comes great ongoing maintenance responsibilities'.

Acknowledgement

Thanks to reviewers for their time and suggestions; any inaccuracies remain mine.

References and Other Resources

Install more than one operating system (multiboot)
http://windowshelp.microsoft.com/Windows/en-us/help/8572be9b-8580-49f7-9719-b3a4c42749fe1033.mspx

How to dual-boot Vista with XP (with XP installed first) - Step-by-step guide with screenshots by James Bannan
http://apcmag.com/how_to_dualboot_vista_with_xp__stepbystep_guide_with_screenshots.htm

Windows no longer starts after you install an earlier version of the Windows operating system in a dual-boot configuration
http://support.microsoft.com/kb/919529

Summary

The corporation provides its consultants with computer hardware running a Standard Operating Image (SOI) based upon either Linux or Windows. Technical staff often replaces this SOI standard image with a custom build. However, before the custom image can access HP's network, the image must be modified to include required corporate network and security components. These installations may present technical challenges. This paper reviews the experience of building a non-SOI Windows system that can boot either XP or Vista and can access the corporate network.

Drew Hamre is a principal of lexana\net and lives in Golden Valley, Minnesota.