

Lab and Classroom Update Status
Tom Burt
Presented to the SCSCC Board Meeting
Wednesday, March 7, 2007

The classroom and lab instructor PCs have been built and are now being configured with software. Key configuration components include:

Intel Core 2 Duo 6600 CPU, 2GB of DDR2-800 RAM, 320GB SATA 3 hard drive and two SATA mobile racks, PCIx Video Card with 500MB of RAM (Vista Aero compatible), Windows Vista (Ultimate / Home Premium). Each instructor station is also equipped with a special “KVM” switch to allow the new Vista PC and the old XP PC to share a single keyboard, video monitor and mouse.

Thanks to Avery Hughes, Allan Pogensky, John Palubinskas and Ted Wagner for procuring the components and doing the assembly.

A key question in setting up the new classroom PC is whether to continue having separate hard drives for many of the SIGs. Currently, aside from the “regular” classroom PC hard drive, SIGs with dedicated IDE hard drives include: BKK, Digital Music, Photoshop, Creative Graphics, Flight Simulator, Video Editing and Linux. Each of these drives also has a “backup”, created by cloning the original. So we have a potential need for 16 (8 x 2) new SATA hard drives to support classroom Vista or XP activities at a cost of about \$75 each (total \$1200). If we instead make Acronis image backups to a single large (\$100) SATA backup drive, this can save about \$500. If some of the dedicated hard drives can be converted to virtual machines, we can achieve even further savings in money and backup and maintenance time.

Tom Burt has successfully installed Microsoft’s Virtual PC 2007 (virtual machine manager) on his HP A1730n Windows Vista PC at home. Using VPC 2007, Tom created an empty virtual machine and then, in that virtual machine, installed Windows XP Pro plus Microsoft Office XP (2002). So far the experience running XP in the virtual machine has been excellent.

Remzi Guder inquired about Linux running in virtual machines. Reportedly (in Tom’s reading of online reviews of VPC 2007), many Linux “distros” will run under Virtual PC or under VMWare. Remzi claimed the two “distros” he tried under VPC 2007 “didn’t work”. Tom Burt again authorized Remzi to purchase one copy of VMWare Workstation 5.5 (~\$200) for the Club to use in testing running Linux in virtual machines.

The discussion then turned to plans for upgrading 16 to 18 lab student PCs (subject to budget limits). As has been pointed out by Tom in several presentations and even as far back as the November budget meetings, the existing lab student PCs are failing. There are only 12 PCs still working well enough to be used for boot camp instruction. So the primary driving motive for

upgrading is to get new, reliable PCs with more modern features, such as USB 2 ports, DVD burners, flash card readers, larger hard drives, and over-all better performance.

The nominal hardware specs for the replacement PCs are for a “medium range” dual core CPU, 1 or 2 GB of RAM, 16x dual layer DVD R/W drive, USB 2 ports, 250GB SATA hard drive, Windows Vista Aero compatible video subsystem. These machines do NOT need to support high-end gaming. In the interest of cost saving, we have also planned that these PCs will be bought with Windows Vista Home Premium pre-installed, so that we won't have to purchase upgrades later. The plan is to buy only the PC towers, since we already have flat panel LCD monitors at all stations. For the 12 PCs in the center of the lab, we propose to procure USB Wireless 54g LAN Adapters. These USB devices plug in to an external USB port, so we won't have issues with invalidating the warranty by installing add-in wireless LAN cards.

Representative examples are the HP A1700n (Athlon 64x2 3800+ CPU, 1GB of RAM, 250GB SATA hard drive, NVidia GeForce 6150LE graphics chip) for about \$600 or the HP A1710n (Athlon 64 4200+ CPU, 1GB of RAM, 250GB SATA hard drive, NVidia GeForce 6150LE graphics chip) for about \$650.

A side-benefit, when we buy new name brand PCs, is that we automatically get Windows Vista Home Premium installed at no extra cost. Having these new, high performance machines available during open lab will allow our members to come in and “try before they buy” a new Vista PC or before they buy Vista as an upgrade to their existing PCs. Also, these PCs will have high-speed USB ports and high capacity DVD burners, which should be much nicer for open lab users.

Another need discussed by Tom as part of the upgrade requirements is to be able to continue to run Windows XP on these same PCs, for both open lab users who haven't yet learned Vista and for various classes, such as Windows XP boot camp. To achieve this, two options are possible:

- Configure the student PC's hard drive partitions to allow dual booting of either Windows Vista or Windows XP.
- Use a Virtual Machine Manager, such as Virtual PC 2007 or VMWare 5.5 to run Windows XP as a regular Windows application. A simple desktop icon would allow a user to start up the Windows XP virtual machine.

To set up each student PC for dual booting, we would have to use a tool like Acronis Disk Director or Symantec Partition Magic to shrink the pre-installed Vista partition and then create a separate boot partition for XP-Pro. Further, while there are documented procedures for installing XP-Pro in a dual boot configuration with Vista, it is quite complex to do so when XP is the *second* OS to be installed. It is likely that these actions would invalidate the vendor warranty.

The Virtual Machine option is attractive because the Virtual PC 2007 software is free (as is the VMWare Player) and it is proven out. Since a virtual machine is stored as a few files in a folder on the hard drive, there are no extra steps needed to back up a Windows XP virtual machine beyond those used to back up the main Windows Vista partition. If a Windows XP virtual machine is running, it can automatically use Windows Update to download any hot fixes. During the March 7 discussion, John Palubinkas pointed out that, at all the recent Developer, IT

and product launch events he has attended, Microsoft's own presenters have consistently used virtual machines (often 4 or 5 at once) to run their demos.

As a security measure, on each student PC, we can keep a "hidden" second copy of the WinXP virtual machine. Then a damaged XP virtual machine can be almost instantly restored without needing to get out the external backup drive. It may even be desirable, every time the student PC is booted, to automatically "refresh" the XP virtual machine from its hidden copy. This would eliminate the need for Deep Freeze to be installed in the XP virtual machines. Further, we plan to configure the regular login accounts for the student PCs as "standard" users, rather than Administrators.

In whichever approach is used to run Vista and XP on the same PC, the Club's existing Windows XP Pro volume licenses will be used to install the OS. Similarly, the Club's volume licenses for Office XP (2002) will be used in each XP virtual machine image as well as on the underlying Windows Vista Host OS. To be compliant with Microsoft Licensing terms, the old PCs being replaced will have their hard drives erased and then will be loaded with an open source (free) Linux "distro" such as Ubuntu.

Since each installed copy of Vista will have its own product key, our current maintenance procedure of cloning from a common master hard drive will not work. The Vista clones would refuse to boot until reactivated. So a backup approach using Acronis imaging to image each separate PC seems like the best choice. We evaluated using the lab's network to create all the backup images on a single large hard drive on the classroom instructor pc or on some other "server". However, even with the wireless 54G LAN, effective data rates would only be about 25 M-bits a second, which is too slow for high volume backups. Instead we propose using 3 or 4 high capacity external USB drives as the backup image targets.

Although the March General Meeting authorized expenditures "**not to exceed \$24,000**" for the *entire* upgrade project, Tom's goal is to procure the new student PCs for \$650 or less each, if we feel 1GB of RAM is adequate. To run Windows XP in a virtual machine, we will likely want to have 2 GB of RAM, especially if the onboard video chip is stealing 128MB or more of RAM for the video display buffer.

On Sunday, March 11, Tom checked the HP online store and found a HP Pavilion a1750e regular tower unit (AMD Athlon 64x2 3800+) that, after customization to have 2GB of RAM, 160GB SATA hard drive, a factory installed wireless LAN card, front mounted 9 in 1 card reader and Windows Vista Home Premium, could be bought for **\$710 with free shipping**. That would let us purchase **16 units for \$11,360** – a bit under our planned limit of \$12,000.

As indicated previously, Tom has arranged to have the Administration Office issue the actual Purchase Order and payment on behalf of the Club. Tom has recently talked to the Tech Depot account rep, who *may* be able to get us a further discount, depending on the model purchased.

Finally, there is no urgent rush by the Upgrade Team to go purchase these new lab student PCs. The only concern is that at some point soon, more of the existing PCs will fail and that will impact the ability to conduct classes. Tom Burt recommended that we continue to check prices and features and solicit bids until at least after April 1, preferably until after May 1.