

USING VIRTUAL MACHINES TO SAVE REAL MONEY, SPACE, AND TIME



by Francis Chao

fchao2@yahoo.com

(520)331-5465

TuCSon COMPUTER SOCIETY

GREATER SOUTH BAY PC USERS GROUP

TMUG
TUCSON
MACINTOSH
USERS GROUP



Mac version



Windows version



1 Linux version

Web location for this
presentation:

<http://aztcs.org>

Click on “Meeting Notes”

SUMMARY

For any "Windows", "Macintosh", or "Linux" desktop computer that has at least two Gigabytes of RAM, you can install free "virtual machine programs" that allow you to create "virtual machine" computers, in order to save money, space, and time.

HERE IS A DEMO TO
SHOW YOU THE
POSSIBILITIES:

VirtualBox



Windows 7 Enterprise Trial 32-bit [Running] - Oracle VM VirtualBox

Recycle Bin

shared from ubuntu 10.10

Network > UBUNTU11 > shared from ubuntu 10.10

Name	Date modified	Type	Size
test document 1 in Ubuntu 10.10 VM.txt	10/30/2011 3:51 PM	Text Document	0
EasyBCD 2.1	10/30/2011 4:07 PM	Shortcut	2

EasyBCD 2.1 Shortcut Date modified: 10/30/2011 4:07 PM Date created: 10/30/2011 4:07 PM Size: 1.14 KB Offline availability: Not available

Start | shared from ubuntu... | 5:08 PM 10/30/2011 | Right Ctrl

Explanation of the Demo

A virtual machine running “Windows 7 Enterprise Trial” is nested inside a virtual machine which is running “Ubuntu 10.10” which is running inside a “Windows 7..” host computer.

The two virtual machines and the host computer are all sharing files with each other.

Explanation of the Demo (continued)

Real, host computer runs "Windows 7 Ultimate 64-bit"

"VMware Player 4.1" virtual machine program

"Ubuntu 11.10" virtual machine

"Oracle VM VirtualBox 4" virtual machine program

**"Windows 7 Enterprise Trial 32-bit"
virtual machine**

Explanation of the Demo (continued)

Elapsed time to: start "VMware Player" program, start "Ubuntu 11.10" virtual machine, start "Oracle VM VirtualBox" program, and finally: start nested "Windows 7" virtual machine:

2 minutes
and 31 seconds:

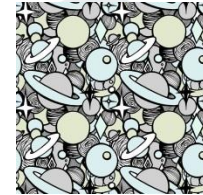


http://www.highspheres.com/products/pc_chrono/

OBJECTIVES

1. Save real money \$

2. Save real space



3. Save real time



STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY \$

- You can use "virtual machines" to reduce the number of physical computers that you operate and this can help you to avoid buying additional computers:



STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued)

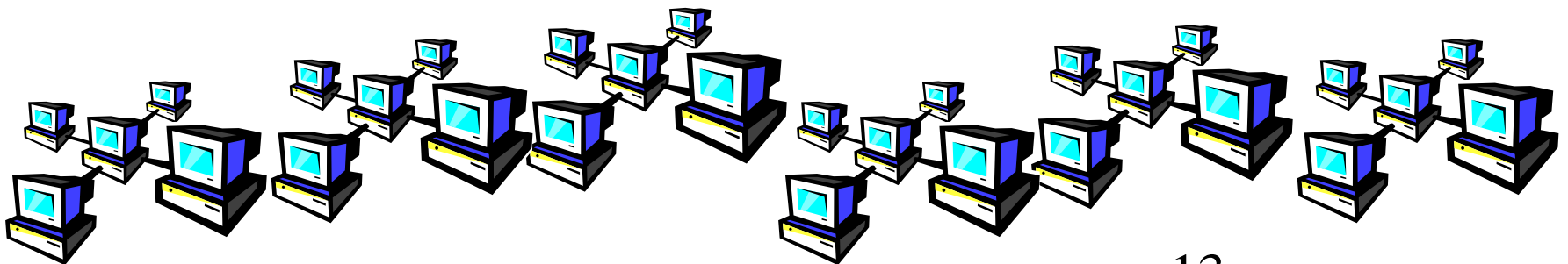
- Virtual machines can help you to avoid buying more hard drives because, by default, they are set up to "fool" their guest operating systems into "seeing" more hard drive space than is actually physically available:

STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued) \$

- In a virtual machine system, each guest operating system can be "shown" a much larger amount of hard drive space than is actually utilized by it, but the actual usage of physical hard drive space is just the "used" space--not the "free space" that the virtual machines "see".

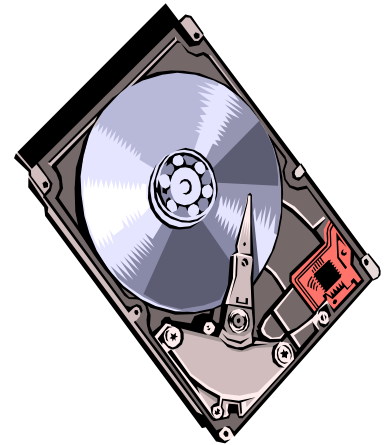
STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued) \$

- When you use virtual machines in free "virtual machine programs", it is like getting a pile of computers to use for free with all of them residing inside your existing physical "host" computer.



STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued) \$

–You can use a virtual machine to attempt to repair failed hard drives.



- See

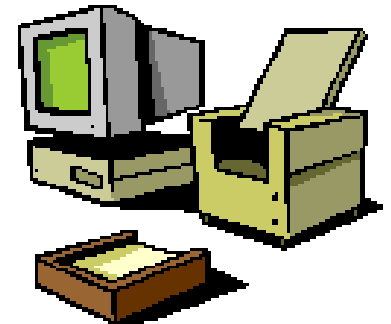
http://aztcs.org/meeting_notes/winhardsig/harddrives/repairing/030-HDsoftrepairs.pdf

STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued) \$

–You can use a virtual machine to manage real print server devices.

- See

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/printservers/printservers.pdf



STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued)

- You can easily run software that normally conflicts with each other or slows each other down (such as multiple versions of “Microsoft Office”) in separate virtual machines so that they do not "see" each other.

STRATEGIES FOR OBJECTIVE 1 TO SAVE MONEY (continued)

- You can test beta software such as the prolific "Mozilla Firefox" betas without causing permanent problems with the production version of the same software, since many betas inactivate or remove the existing production version of the same program.

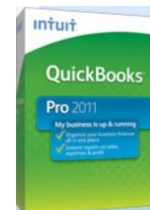
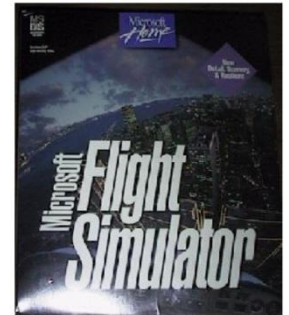
STRATEGIES FOR OBJECTIVE 2 TO SAVE SPACE

- When you run virtual machine programs, you can use fewer real computers because you can create “virtual machines” instead of keeping old computers around or buying additional new computers.

STRATEGIES FOR OBJECTIVE 2 TO SAVE SPACE (CONTINUED)



- With virtual machines, you no longer need to keep older computers around in order to run those beloved MS-DOS games or to run prior year versions of income tax software or old versions of financial software such as "Quicken", "QuickBooks" or "Turbotax".



STRATEGIES FOR OBJECTIVE 3 TO SAVE TIME

- You can clone existing "virtual machines" in a fraction of the time that it takes to set up, "reload", or "re-image" real, physical computers.

STRATEGIES FOR OBJECTIVE 3 TO SAVE TIME (continued)



- If you use a cloned "virtual machine" for accessing the Web and it catches a virus/malware/trojan, you can delete the cloned "virtual machine" and create a fresh new one in tens of minutes.

ADDITIONAL BENEFITS OF VIRTUAL MACHINES

- You can provide your son or daughter or a friend who is less experienced with computers with a virtual machine to use in order to minimize the possibility that they might cause data loss to your real, physical computer:

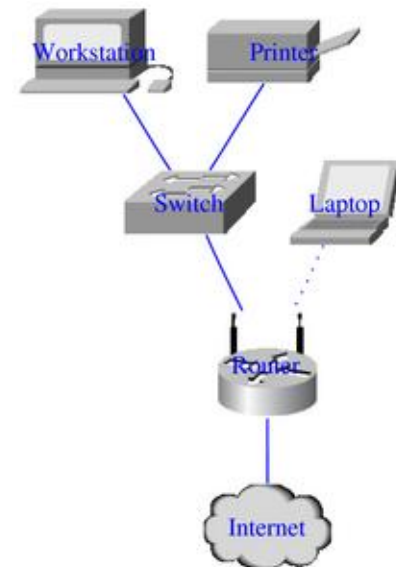


ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- You can even set up a computer to automatically start up into a virtual machine with a batch file.
 - See “Appendix 102”.

ADDITIONAL BENEFITS OF VIRTUAL MACHINES

- All virtual machine programs provide you with "virtual networks":
 - By default, the "virtual networks" give you an extra measure of security when you are accessing Web sites on the Internet.



ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- All "virtual machine" programs provide you with "virtual networks" (continued):
 - The "virtual networks" allow you to test networking capabilities of operating systems and applications software, without actually having to purchase and install piles of network equipment.

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- Some "virtual machine programs" come with mechanisms for recovering virtual hard drives from virus/malware infections:



ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- “Windows Virtual PC” and “Microsoft Virtual PC 2007” have “Differencing Disks”.

See

http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/Windows_VirtualPC/differencingdisk.pdf

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- When you create a virtual machine with a differencing disk, the original .VHD virtual disk is treated as if it was a read only file. Then it creates a new .VHD “differencing disk” that stores all of the changes. Your virtual machine “sees” the combination of the “source disk” and the “differencing disk” as a single hard drive.

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- ..Differencing disks (continued)

Name	Date modified ▾	Size
 Windows 7 from Microsoft VHD with Differencing Disk.vhd	5/26/2011 11:00 PM	1,522,294 KB
 Windows 7 from Microsoft VHD source disk.vhd	5/26/2011 10:31 PM	13,518,308...

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- “Oracle VM VirtualBox” has
“Snapshots”:

See

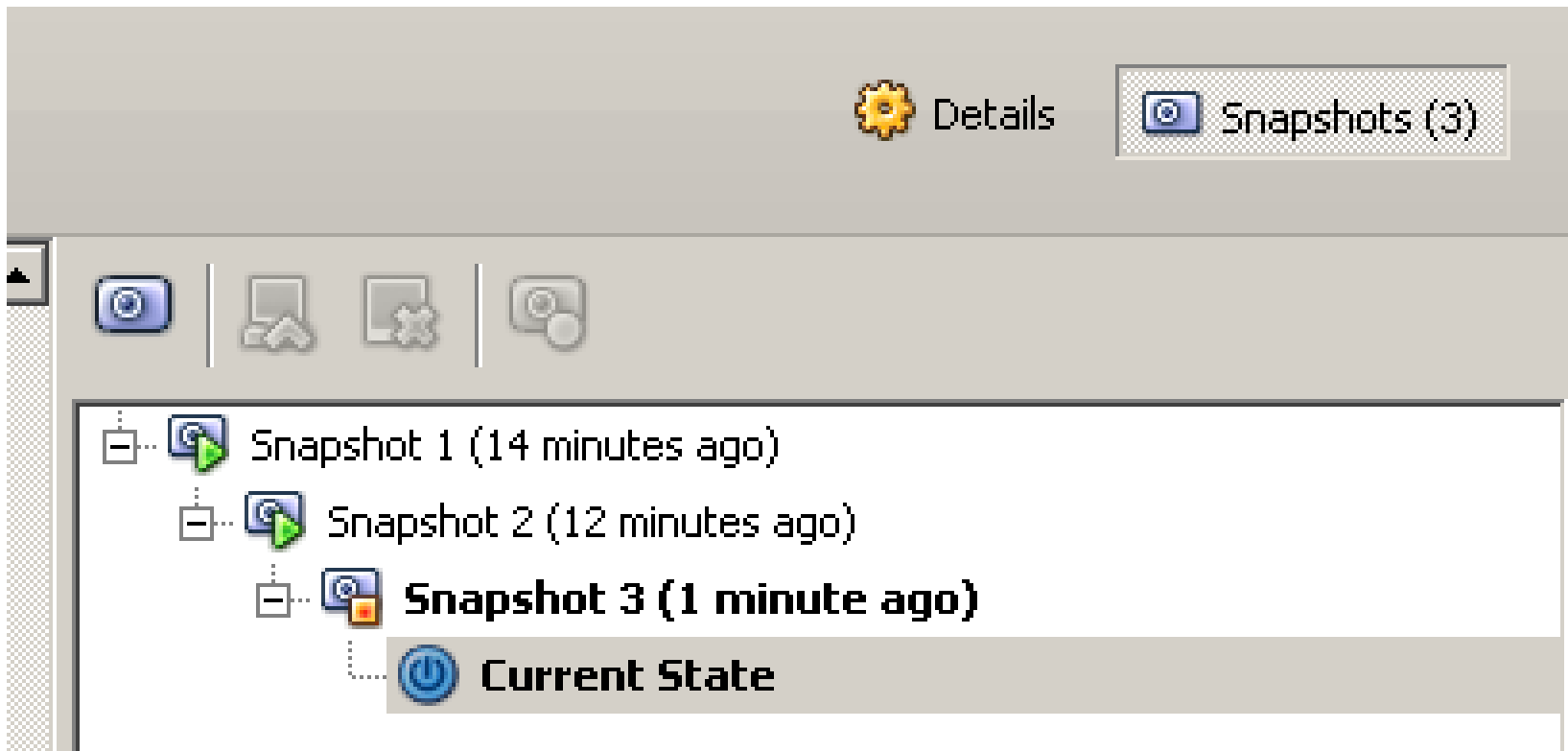
[http://aztcs.org/meeting_notes/winhardsi
g/virtualmachines/virtualbox/snapshots.
pdf](http://aztcs.org/meeting_notes/winhardsi
g/virtualmachines/virtualbox/snapshots.
pdf)

and

[http://www.virtualbox.org/manual/ch01.h
tml#idp10902256](http://www.virtualbox.org/manual/ch01.h
tml#idp10902256)

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- “Oracle VM VirtualBox” has “Snapshots” (continued)







ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- When you use “Snapshots”, the original .VDI virtual disk(s) is treated as if it was a read only file. Then it creates a new .VDI “differencing image” that stores all of the changes. Your virtual machine “sees” the combination of the “parent disk” and all “differencing images” as a single hard drive.

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

– “Oracle VM VirtualBox” has
“Snapshots” (continued)

Name	Date modified [▲]	Size
 {f7ea3fc4-b3b2-4319-9200-6964c653129d}.sav	5/27/2011 5:09 PM	324,462 KB
 {9bb54efd-342e-4984-8c0b-90a30ba5dc0d}.vhd	5/27/2011 5:09 PM	36,230 KB
 {9849bd79-3bff-45f6-88bb-9de8358ab238}.sav	5/27/2011 5:10 PM	327,799 KB
 {81422d6e-9777-4c42-9f22-06339c1a435b}.vhd	5/27/2011 5:10 PM	396,766 KB

ADDITIONAL BENEFITS OF VIRTUAL MACHINES (continued)

- You can use virtual machines as a robust defense against zero-day virus/malware infections.

– See

http://www.pcworld.com/article/191312-4/tech_secrets_21_things_they_dont_want_you_to_know.html

– See

<http://www.suite101.com/content/use-virtualization-to-improve-desktop-security-a73715>

ADDITIONAL BENEFITS OF

VIRTUAL MACHINES (continued)

–You can use a virtual machine to test and practice the restoration/rescue of hard drives using existing "Acronis..", "Macrium Reflect Free", or "Clonezilla" "hard drive image" or "Windows 7 Backup" backups.

- See

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/uses/RestoringAcronisImagettoVMwareVM.pdf

IMPLEMENTATION

- PROJECT 1:
Choose "Virtual Machine Programs"
- PROJECT 2:
Install "Virtual Machine Program(s)"
- PROJECT 3:
Create Virtual Machines
- PROJECT 4:
Do "Physical to Virtual ("P2V")"
- PROJECT 5:
(Learn to) Use Virtual Machines

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- A “host computer” is the real, physical computer where you install one or more “virtual machine programs”.

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- You can download and install one or more of the following free “virtual machine programs” into a “Windows” host computer:
- "VMware Player"
- "Oracle VM VirtualBox"
- "Windows Virtual PC"
- "Microsoft Virtual PC 2007"

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- “Windows Virtual PC” will can be installed into host computers that are running the 32-bit and 64-bit versions of “Windows 7 Professional” and higher.

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- A major update to “Windows Virtual PC” was issued by Microsoft in March 2008. See http://blogs.msdn.com/b/virtual_pc_guy/archive/2010/03/18/windows-virtual-pc-no-hardware-virtualization-update-now-available-for-download.aspx

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- “Microsoft Virtual PC 2007” can be installed into host computers that are running the 32-bit and 64-bit versions of: “Windows Vista Business” and higher, “Windows XP Professional” and higher, and “Windows XP Tablet Edition”.

PROJECT 1 DETAILS

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- “Microsoft Virtual PC 2007” has no USB support
- For a comparison of the differences between “Windows Virtual PC” and “Microsoft Virtual PC 2007”, see [http://technet.microsoft.com/en-us/library/ee706516\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ee706516(WS.10).aspx)

PROJECT 1 DETAILS (continued)

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- You can download and install free "Oracle VM VirtualBox" into an Apple Mac OS X host computer.
 - "Oracle VM VirtualBox" is a free alternative to the not-free "VMware Fusion" and "Parallels" programs that many Mac owners are currently using.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- You can download and install free "VMware Player" and/or "Oracle VM VirtualBox" into a "Linux" host computer.

PROJECT 1 DETAILS (continued): (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- These above-mentioned "virtual machine programs" allow you to run various operating system "guests" such as various distros of "Linux" and various versions of "Windows" and "DOS" as "virtual machines".
 - The terms "guest operating system" and "virtual machines" are synonymous.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- There are no conflicts from **installing** all three of the free "virtual machine programs" into the same "Windows" host computer. You can even **run** more than one "virtual machine program" at the same time, if you have enough RAM except for the following three incompatible pairings:

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Incompatibility 1:
You cannot run both “Windows Virtual PC” virtual machines and both “Oracle VM VirtualBox” virtual machines in the same host computer at the same time.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Incompatibility 2:

You cannot run both “Microsoft Virtual PC 2007” virtual machines and both “Oracle VM VirtualBox” virtual machines in the same host computer at the same time.

PROJECT 1 DETAILS (continued)

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Incompatibility 3:

When running “bridged” virtual machines in both “Oracle VM VirtualBox” and “VMware Player” at the same time, the virtual machine in “VMware Player” will fail to acquire an IP address unless you perform the workaround at

http://www.aztcs.org/meeting_notes/win_hardsig/virtualmachines/vmware/VMwareWorkaround--Windows.pdf

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC”:
 - If you are inside its “Windows XP Mode” virtual machine, and you install a software program, it will be added to the “Windows XP Mode Applications” submenu of the “Start menu”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):
 - This means that if you want to run an “embedded software application program” inside “Windows XP Mode”, you do not have to start “Windows XP Mode” first.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):
 - “Windows Virtual PC” has “Application Integration” so that you can start applications that have been installed inside a virtual machine without first starting the virtual machine.

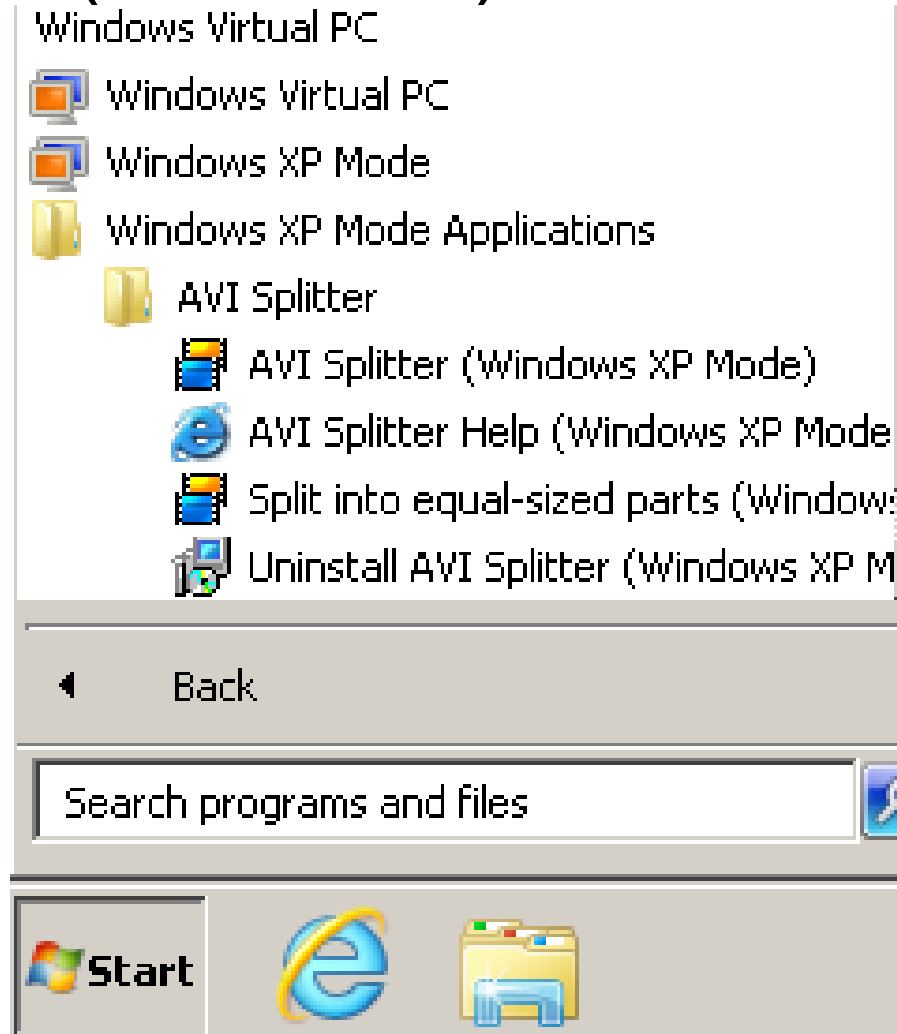
PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):
 - A “Windows XP Mode” virtual machine running inside “Windows Virtual PC” can let you install an application so that clicking on it in the Windows “Start menu” can also start the virtual machine.

PROJECT 1 DETAILS (continued)

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):



PROJECT 1 DETAILS (continued)

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):
 - Microsoft’s “Application Integration” feature is also available for “Windows 7..” and regular “Windows XP..” virtual machines that you install into “Windows Virtual PC”: Applications inside these virtual machines can be launched from the “Start menu” without first starting the virtual machine.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” (continued):
 - In comparison, in “Oracle VM VirtualBox” and “VMware Player”, you have to start the “virtual machine program” and then start the virtual machine before you can run a computer program that is “embedded” inside a virtual machine.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” and “Microsoft Virtual PC 2007” (continued):
 - It is very difficult and often impossible to install “Linux” operating systems into virtual machines in “Windows Virtual PC” and “Microsoft Virtual PC 2007”.
 - There is lots of advice about how to do so on the Internet but we have never succeeded.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” and “Microsoft Virtual PC 2007” (continued):
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” will not run any 64-bit version of “Windows” as a guest inside a virtual machine.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” and “Microsoft Virtual PC 2007” (continued):
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” will only run 32-bit versions of “Windows” inside a virtual machine.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” and “Microsoft Virtual PC 2007 (continued):
 - “Windows Virtual PC” will not allow you to create a virtual hard drive that is larger than 127.4 Gigabytes.
 - “Microsoft Virtual PC 2007” will not allow you to create a virtual hard drive that is larger than 130.5 Gigabytes.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Windows Virtual PC” and “Microsoft Virtual PC 2007” (continued):
 - Irrespective of how many cores the CPU chip of your host computer have, “Windows Virtual PC” and “Microsoft Virtual PC 2007” will only use one for operating a virtual machine.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “VMware Player”:
 - It is much easier and faster to clone a virtual machine in “VMware Player”, compared to “and “Oracle VM VirtualBox”, Windows Virtual PC” and “Microsoft Virtual PC 2007”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “VMware Player” (continued):
 - To clone a virtual machine in “VMware Player”, you just use a file manager such as “Windows Explorer” to copy the entire virtual machine folder.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “VMware Player” (continued):
 - To clone a virtual machine other virtual machine programs, you have to follow a longer and more involved procedure.

PROJECT 1 DETAILS (continued)

(CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox”:
 - Unlike “VMware Player” and “Windows Virtual PC”, “Oracle VM Virtualbox” does not support all of the “Aero” features such as “Aero Peek at Desktop”, “Aero Preview a Window”, “Aero Snap”, and “Aero Shake” in a virtual machine that is running “Windows 7”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox” (continued)
 - In addition to its own .VDI virtual hard drive format, “Oracle VM VirtualBox” can use .VMDK virtual hard drives that were created by “VMware Player” and .VHD virtual hard drives that were created by “Windows Virtual PC”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox” (continued)
- The degree to which a “Oracle VM VirtualBox” virtual machine can use a .VMDK or a .VHD file depends on the specific operating system that is being installed into the virtual machine. Sometimes you can boot up from the .VMDK or .VHD file and sometimes you can only use the .VMDK or .VHD file as a data drive.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox” (continued)
 - “Oracle VM VirtualBox” provides you with more options for the type of virtual hard drive controller (that is used to connect to the virtual hard drive of a virtual machine).

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox”(continued)
 - “Oracle VM VirtualBox” provides you with virtual IDE, SCSI, SATA and SAS hard drive controllers.
 - “VMware Player” only provides virtual machines with IDE and SATA virtual hard drive controllers.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox”(continued)
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” do not give you any virtual hard drive controller options when you are setting up a virtual machine: You get a virtual “Intel” “IDE Controller”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for
“Oracle VM VirtualBox” (continued)
 - In “..VirtualBox”, if your host computer has a CPU chip with Intel VT-# support or AMD-V support, even if you are running a 32-bit host operating system, you can create virtual machines with 64-bit operating systems.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- Some special considerations for “Oracle VM VirtualBox” (continued)
 - “Oracle VM VirtualBox” starts up virtual machines faster than “VMware Player” and “Windows Virtual PC”/“Microsoft Virtual PC 2007”.

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- However, after a virtual machine is started and its guest operating system load's its "desktop", there is very little difference between the virtual machines of the three free "virtual machine programs", with "VMware Player" only a little bit faster than "Oracle VM VirtualBox" and "Windows Virtual PC".⁷³

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- More differences between “VMware Player”, “Oracle VM VirtualBox”, and “Windows Virtual PC”/ “Microsoft Virtual PC 2007 can be found at http://aztcs.org/meeting_notes/winhardsig/virtualmachines/comparison/comparison-WEI-Winhost.pdf

PROJECT 1 DETAILS (continued) (CHOOSE "VIRTUAL MACHINE PROGRAMS")

- More differences between “VMware Player”, “Oracle VM VirtualBox”, “Windows Virtual PC”, and “Microsoft Virtual PC 2007” can be found in “Appendix 10”.

PROJECT 2 DETAILS

(INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install “VMware Player” into a “Windows..” host computer, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/vmware/VMwarePlayer--Windows.pdf

PROJECT 2 DETAILS (continued) (INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install “Oracle VM VirtualBox” into a “Windows..” host computer, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/virtualbox/VirtualBox--Windows.pdf

PROJECT 2 DETAILS (continued) (INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install both “Windows XP Mode” and “Windows Virtual PC” into a “Windows 7 Professional” or higher host computer, see

[http://aztcs.org/meeting_notes/winhardsi
g/virtualmachines/WindowsVirtualPC/Wi
ndowsVirtualPC.pdf](http://aztcs.org/meeting_notes/winhardsi
g/virtualmachines/WindowsVirtualPC/Wi
ndowsVirtualPC.pdf)

PROJECT 2 DETAILS (continued) (INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install “Windows Virtual PC” without “Windows XP Mode” into a “Windows 7 Professional” or higher host computer, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/WindowsVirtualPCwithoutXPMode.pdf

PROJECT 2 DETAILS (continued) (INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install “Microsoft Virtual PC 2007” into a “Windows XP” or “Windows Vista” host computer, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/VirtualPC2007intoXPorVista.pdf

PROJECT 2 DETAILS (continued) (INSTALL "VIRTUAL MACHINE PROGRAMS")

- For instructions on how to install “Microsoft Virtual PC 2007” into a “Windows 7 Home Premium” host computer, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/VirtualPC2007intoWindows7HomePremium.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1:

Use the installation media provided by the maker of the operating system.

- Method 2:

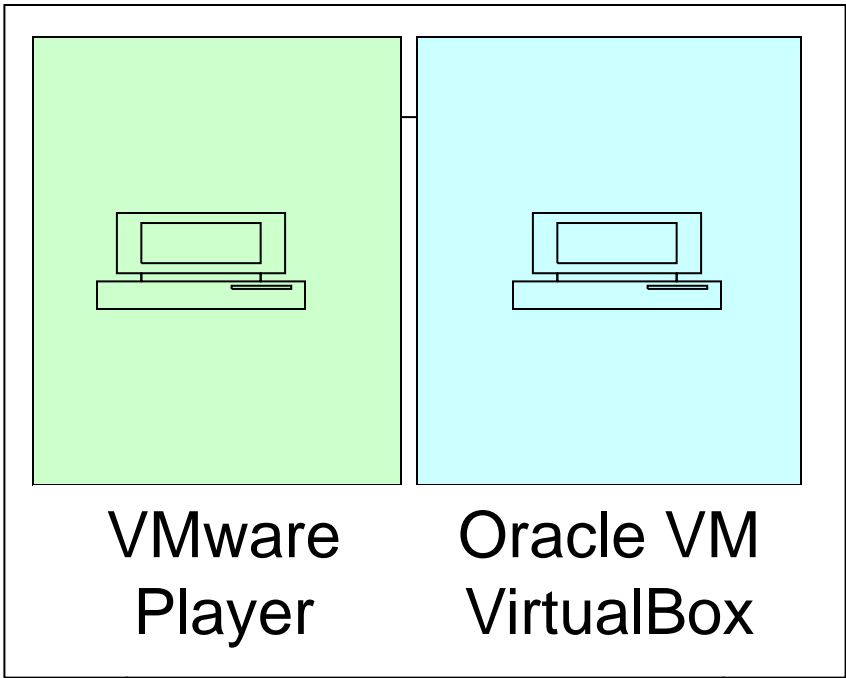
Clone an existing virtual machine so that it runs in the same “virtual machine program”.

- Method 3:

Clone an existing virtual machine so that it runs in a different “virtual machine program” (= “V2V”)

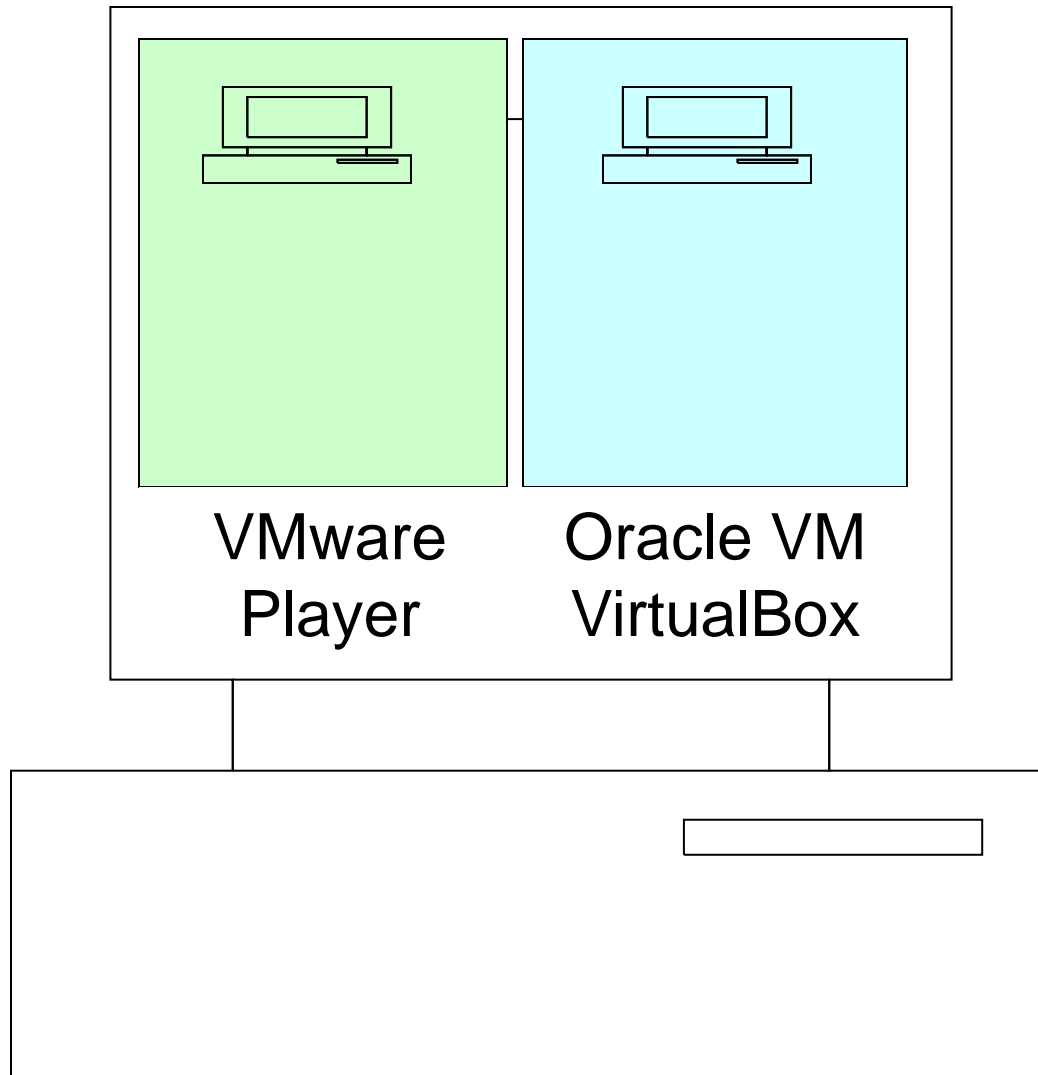
PROJECT 3 (CREATE VIRTUAL MACHINES)

Method 1: Use Installation Media (or an .ISO file)



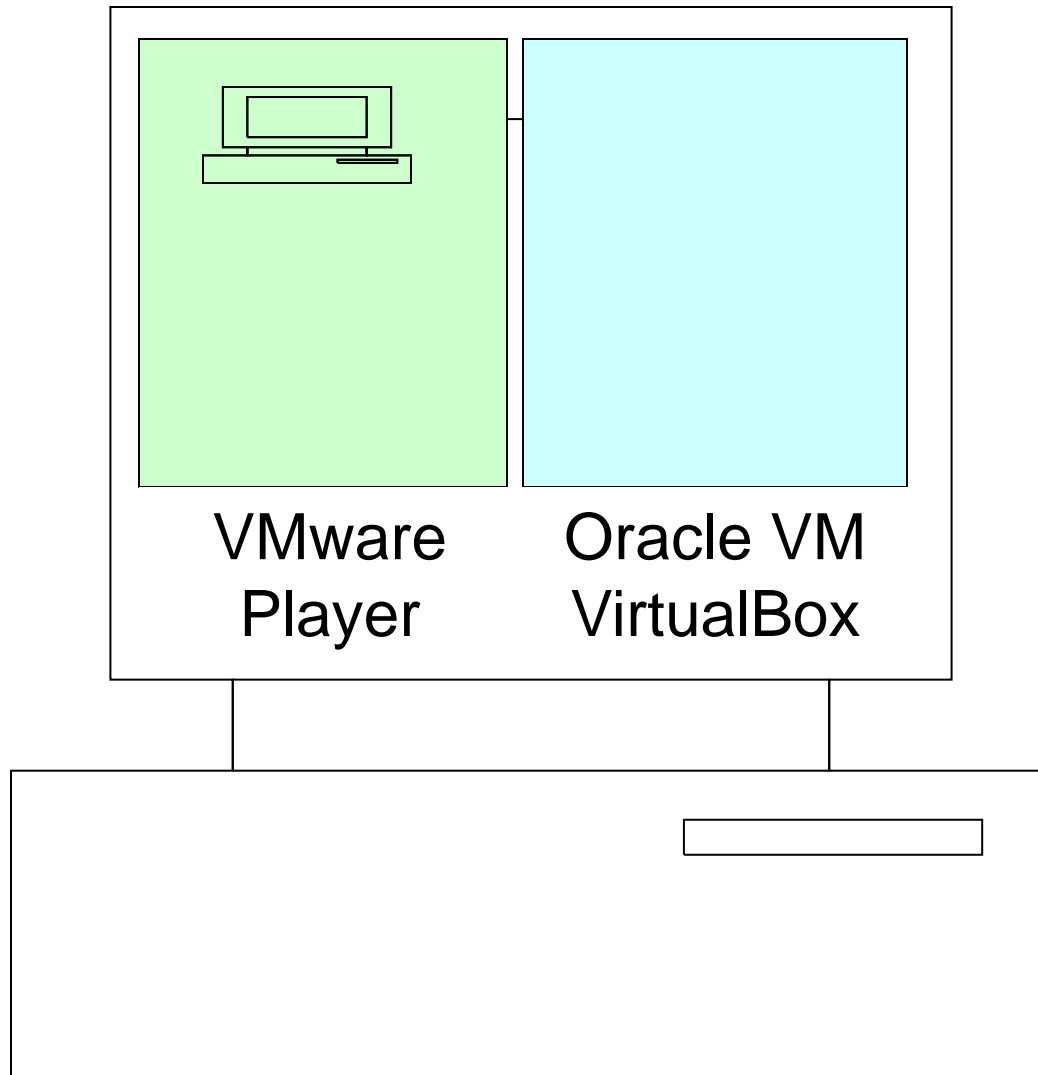
PROJECT 3 (CREATE VIRTUAL MACHINES)

Method 2: Clone an Existing Virtual Machine So That it
Runs in the Same “Virtual Machine Program”



PROJECT 3 (CREATE VIRTUAL MACHINES)

Method 3: Clone a Virtual Machine So That It Runs in a Different “Virtual Machine Program” (V2V)



PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

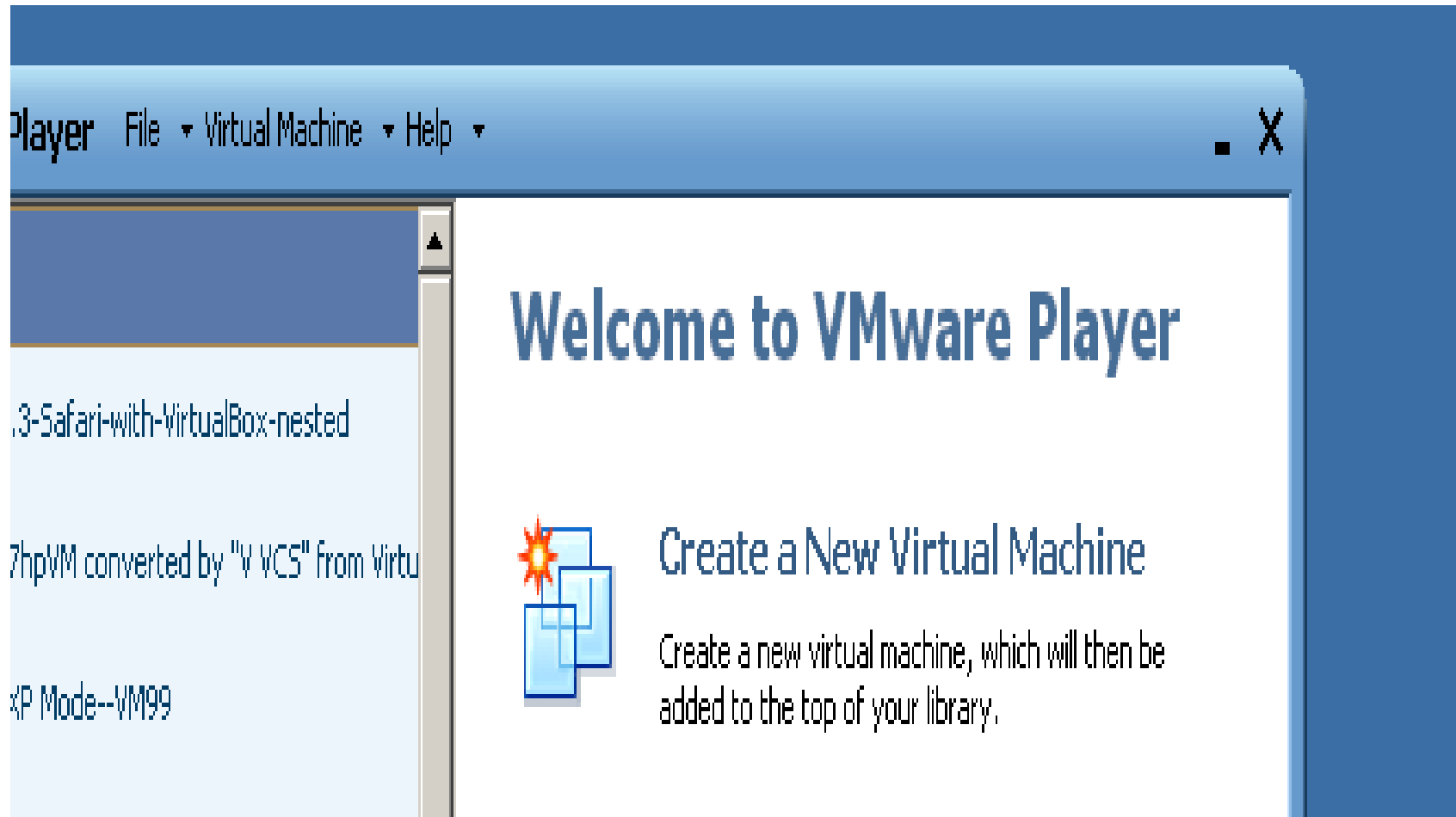
- Method 1 Details:

Use the installation media (floppy disks, CDs, DVDs, or .ISO files) provided by the maker of the operating system.

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

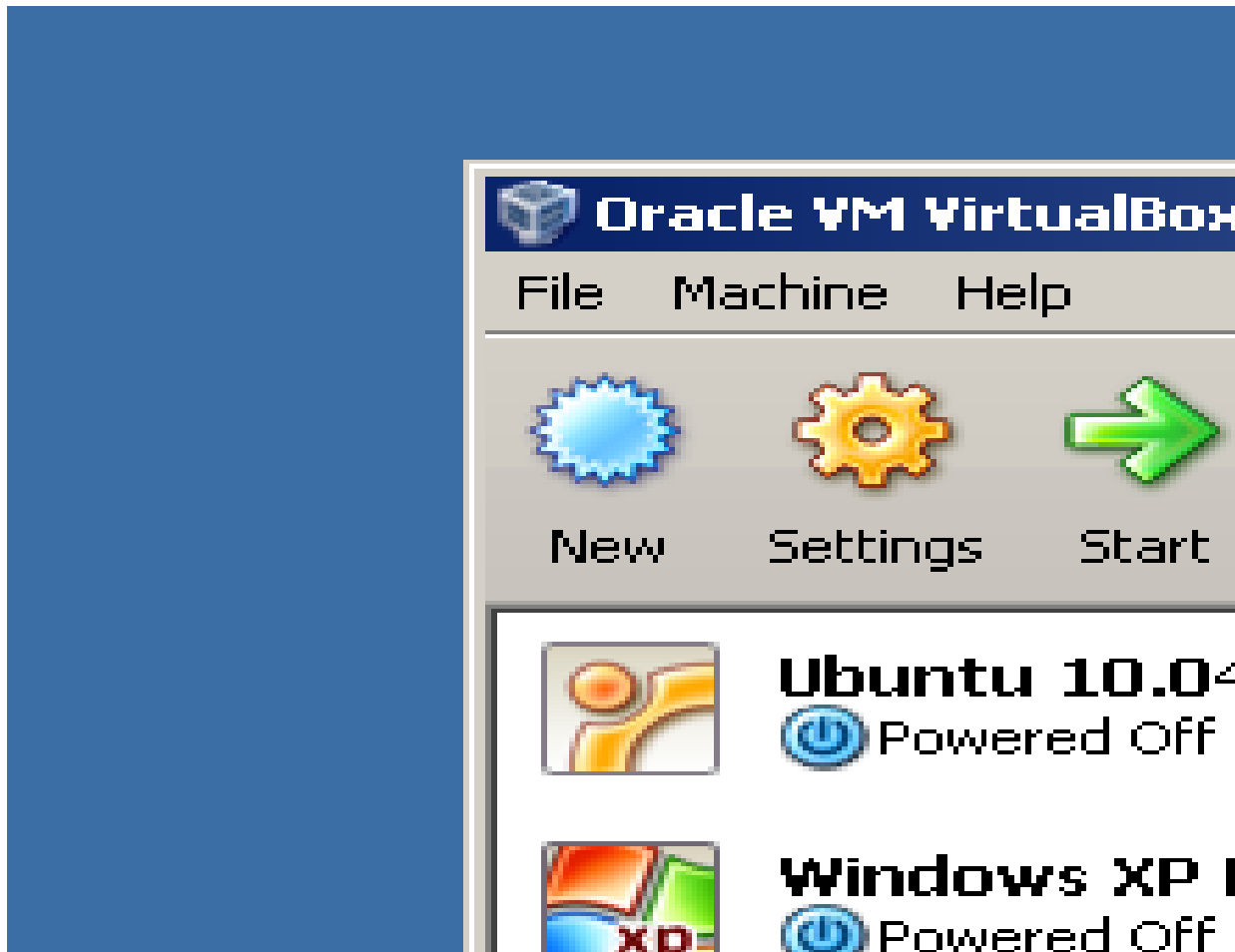
- Method 1: Use Installation Media (continued)



PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

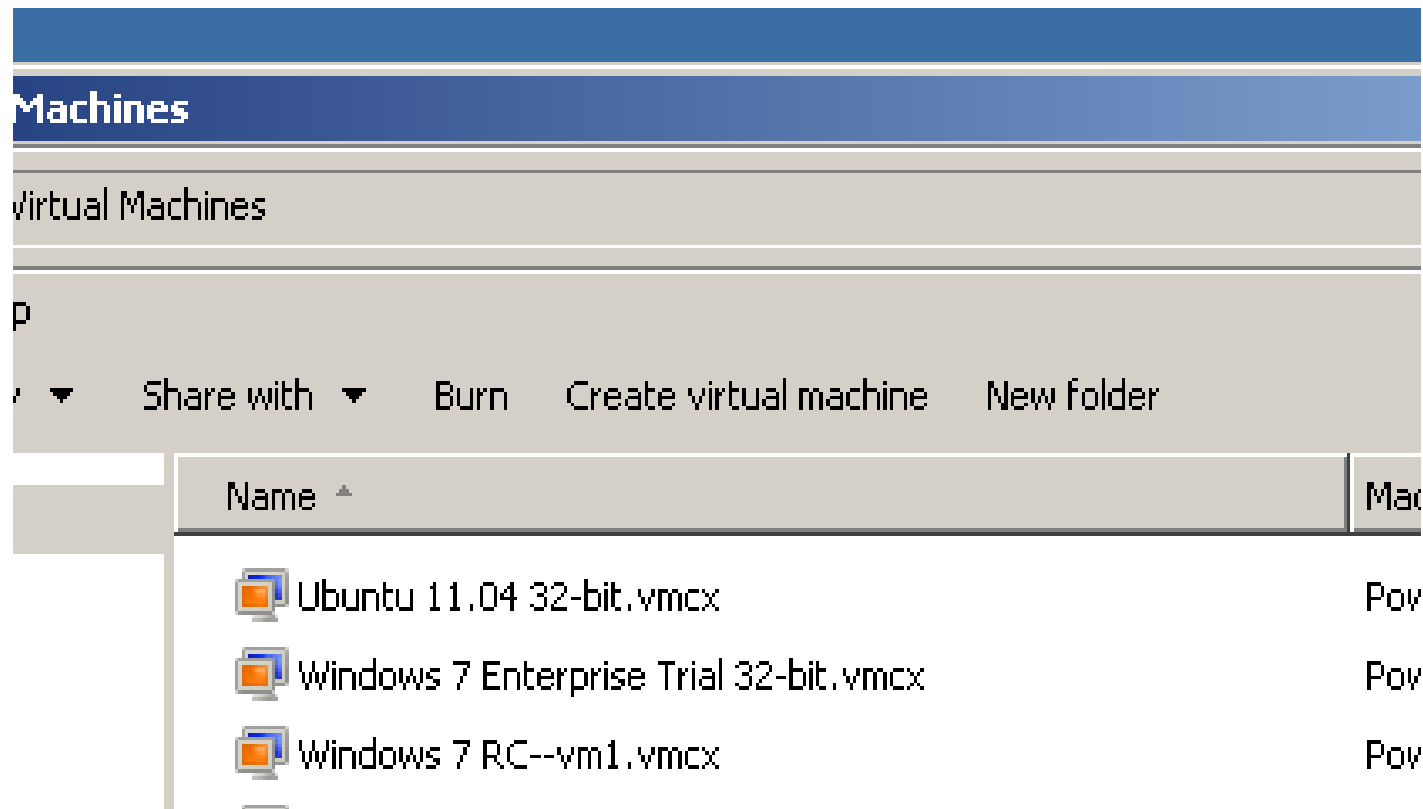
- Method 1: Use Installation Media (continued)



PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

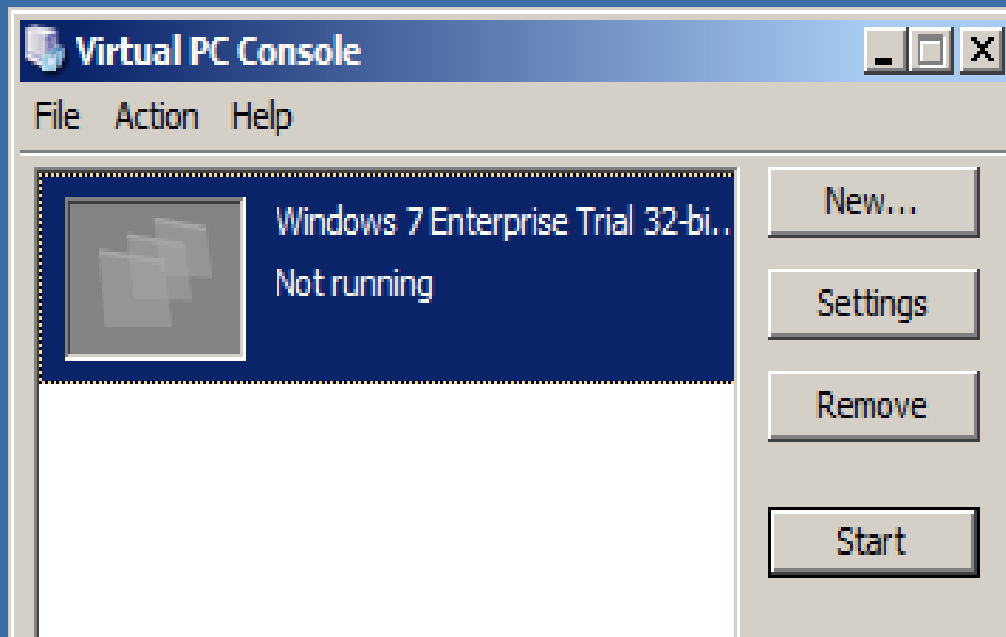
- Method 1: Use Installation Media (continued)
For “Windows Virtual PC”, click on “Create..”:



PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1: Use Installation Media (continued)
For “Microsoft Virtual PC 2007”, click on the “New” button:



PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1: Use Installation Media
(continued)

For advice on using installation media to create a virtual machine in “VMware Player”, see www.vmware.com/pdf/VMwarePlayerManual10.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1: Use Installation Media
(continued)

For advice on using installation media to create a virtual machine in “Oracle VM VirtualBox”, see <http://www.virtualbox.org/manual/ch03.html#guestsupport> and <http://www.virtualbox.org/manual/ch01.html#gui-createvm>

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1: Use Installation Media
(continued)

For advice on using installation media to create a virtual machine in “Windows Virtual PC”, see

<http://www.petri.co.il/creating-a-virtual-machine-in-virtual-pc-on-windows-7.htm>

and

<http://www.microsoft.com/windows/virtual-pc/support/requirements.aspx>⁹³

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 1: Use Installation Media
(continued)

For advice on using installation media to create a virtual machine in “Microsoft Virtual PC 2007”, see http://www.petri.co.il/virtual_create_virtual_machines_virtual_pc_2007.htm

#

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 2 Details:

Clone an existing virtual machine (so that the cloned virtual machine runs on the same “virtual machine program”).

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

Method 2: Clone Virtual Machines (continued)

- To clone a virtual machine in “VMware Player”, see http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/vmware/Cloning_VM_in_VMwarePlayer--Windows.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

Method 2: Clone Virtual Machines (continued)

- To clone a virtual machine in “Oracle VM VirtualBox”, see http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/virtualbox/Cloning_VM_in_VirtualBox--Windows.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

Method 2: Clone Virtual Machines (continued)

–To clone a virtual machine in
“Windows Virtual PC”, see

http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/Windows_VirtualPC/Cloning_VM_in_Windows_VirtualPC.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

Method 2: Clone Virtual Machines (continued)

- To clone a virtual machine in “Microsoft Virtual PC 2007”, see http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/Windows_VirtualPC/Cloning_VM_in_MSVirtualPC2007.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 3 Details:

Use an existing virtual machine to create a new virtual machine that runs on a different “virtual machine program” (= “V2V” which stands for “Virtual to Virtual”)

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 3 Details (continued):
Using the free “VMware vCenter Converter Standalone” program to use a “Oracle VM VirtualBox” virtual machine to create a “VMware Player” virtual machine. See http://aztcs.org/meeting_notes/winhardsig/virtualmachines/v2v/VVCS-v2v-convert-VirtualBox-to-VMware.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 3 Details (continued):
Using the free “Disk2VHD” program to use a “Oracle VM VirtualBox” virtual machine to create a “Windows Virtual PC” or “Microsoft Virtual PC 2007” virtual machine. See http://www.aztcs.org/meeting_notes/winhardsig/virtualmachines/v2v/Disk2VHD-v2v-VBoxtoVHD.pdf

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Method 3 Details (continued):

For “VMware Player” the “Import Windows XP VM” feature can be used to convert “Windows XP Mode” from a “Windows Virtual PC” virtual machine to a “VMware Player” virtual machine. See

<http://www.howtogeek.com/howto/10911/run-xp-mode-on-windows-7-machines-without-hardware-virtualization/>

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- “ADD-ON” SOFTWARE TO INSTALL INTO EACH VIRTUAL MACHINE:
AFTER YOU CREATE A VIRTUAL MACHINE USING ANY OF THE 3 METHODS, YOU SHOULD START THE VIRTUAL MACHINE AND INSTALL “ADD-ON” SOFTWARE THAT IS PROVIDED BY THE MAKER OF THE “VIRTUAL MACHINE PROGRAM.

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Add on “VMware Tools” into each “VMware Player” virtual machine to enable enhanced functions such as the “Shared Folders” virtual network. See

<http://www.vmware.com/download/packages.html>

and

<http://www.hackernotcracker.com/2007-02/obtaining-vmware-tools-for-vmware-player-through-extraction.html>

and

http://www.ehow.com/how_6809913_install-tools-vmware-player.html

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Add on “Guest Additions” software to each “Oracle VM VirtualBox” virtual machines to enable enhanced functions such as the “Shared Folders” virtual network

See

<http://www.virtualbox.org/manual/ch04.html>

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Add on “Virtual PC Integration Components” software into each “Windows Virtual PC” virtual machine to provide enhanced functions such as the “Other” virtual network.
 - “Virtual PC Integration Components” is also known as “Integration Features” in the pull-down menu of each virtual machine.

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- For information on installing “Virtual PC Integration Components, see

[http://technet.microsoft.com/en-us/library/ee449409\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/ee449409(WS.10).aspx)

or

<http://www.7tutorials.com/boost-performance-integration-components-windows-virtual-pc>

or

http://www.ehow.com/list_7380069_virtual-pc-integration-components.html

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

- Add on “Virtual Machine Additions” software” into each “Microsoft Virtual PC 2007” virtual machine to provide enhanced functions such as the “Shared Folders” virtual network.

See

<http://www.vistax64.com/tutorials/247857-virtual-pc-2007-install-virtual-machine-additions.html>

or

<http://www.pctips3000.com/how-to-install-virtual-machine-additions-in-virtual-pc-2007/>

or

PROJECT 3 DETAILS

(CREATE VIRTUAL MACHINES)

Add on “Virtual Machine Additions” software” into each “Microsoft Virtual PC 2007” virtual machine to provide enhanced functions such as the “Shared Folders” virtual network (continued)

or

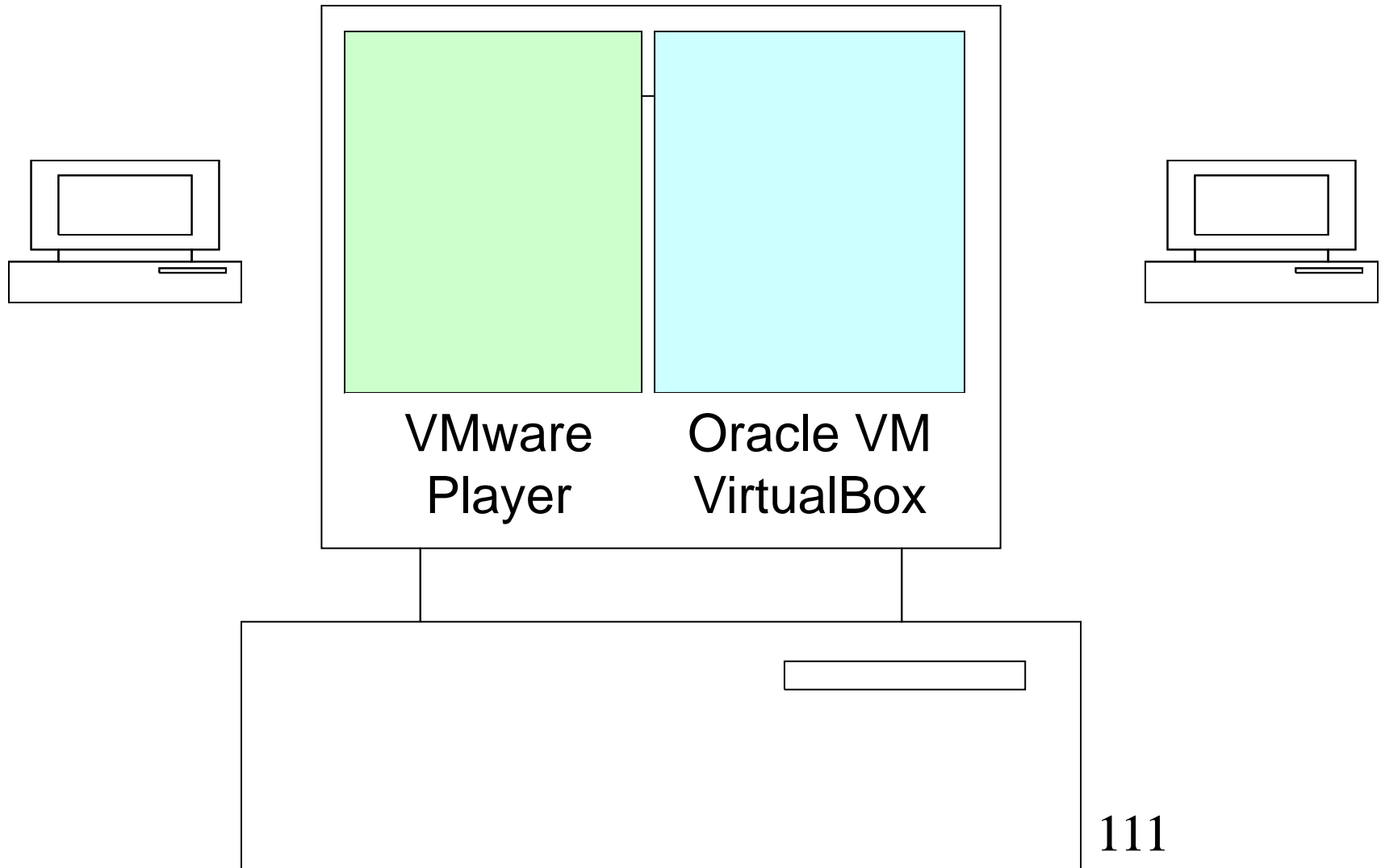
<http://lifehacker.com/238071/geek-to-live--run-windows-xp-inside-vista-with-virtual-pc>

or

<http://lifehacker.com/238071/geek-to-live--run-windows-xp-inside-vista-with-virtual-pc>

PROJECT 4 (P2V="PHYSICAL TO VIRTUAL")

Use a Real Computer to Make a Virtual Machine



PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- To use a real, physical computer to create a "virtual machine" (P2V) that can be "played" in any Windows computer that has a "VMware Player", "Oracle VM VirtualBox", or "Windows Virtual PC", you can use "VMware vCenter Converter Standalone", or Microsoft's "Disk2vhd".

PROJECT 4 DETAILS (continued) (DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Free “VMware vCenter Converter Standalone” Program
 - You can get a free copy of this program at <http://www.vmware.com/products/converter/>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Free “VMware vCenter Converter Standalone” Program (continued)
 - After installing it into Windows 2000, Windows XP, Windows Vista, or some distros of Linux, you can use it to perform a “Physical to Virtual” to create a virtual machine for “VMware Player”.

PROJECT 4 DETAILS (continued) (DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Free “VMware vCenter Converter Standalone” Program (continued)
 - For instructions on using “VMware vCenter Converter Standalone” to convert a real “Windows 7” computer into a virtual machine, see <http://www.tumfatig.net/20100727/p2v-from-se7en-to-virtualbox/>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Free “VMware vCenter Converter Standalone” Program (continued)
 - Advice on doing a P2V for a Linux computer can be found at <http://enterpriseadmins.org/blog/virtualization/linux-p2v-with-vmware-converter-stand-alone/>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Free “VMware vCenter Converter Standalone” Program (continued)
 - The steps for using “VMware vCenter Converter” to create a virtual machine from a real computer are almost exactly the same as the (V2V) steps for converting a “Oracle VM VirtualBox” virtual machine to a “VMware Player” virtual machine.

PROJECT 4 DETAILS (continued) (DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program
 - The “Disk2VHD” program can be downloaded from <http://technet.microsoft.com/en-us/sysinternals/ee656415>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By the Microsoft’s Free “Disk2VHD” Program
 - You can install it into any physical computer that has Windows XP Service Pack 2 and higher, Windows Vista, or Windows 7 computer and use it to create a .VHD virtual hard drive file that can be used to create a virtual machine in “Windows Virtual PC”, “Microsoft Virtual PC 2007”, or “Oracle VM VirtualBox”.

PROJECT 4 DETAILS (continued) (DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)
 - If you use the free “Disk2VHD” program to create a .VHD file from a 64-bit version of Windows, you will be unable to use the .VHD file in “Windows Virtual PC” or “Microsoft Virtual PC 2007, since these two “virtual machine programs” only allow 32-bit “Windows” as guest operating systems.

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)
 - However, with some tweaking, you can use the any .VHD file (that is created by “Disk2VHD”) to create a virtual machine in “Oracle VM VirtualBox”, even if the .VHD file was created from a source computer that was running a 64-bit version of “Windows”.

PROJECT 4 DETAILS (continued)

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)
 - When any.VHD file is used to create a virtual machine in “Oracle VM VirtualBox”, you have to connect it to a virtual IDE hard drive controller (instead of the virtual SCSI hard drive controller that is provided by default by “Oracle VM VirtualBox”). See <http://www.sysprobs.com/virtualbox-p2v-disk2vhd-errors-fix>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)
 - For detailed instructions for using “Disk2VHD” to use a “Windows XP” computer to create a virtual machine that runs in “Windows Virtual PC”, see <http://www.techrepublic.com/photos/convert-xp-into-a-windows-7-virtual-machine-with-disk2vhd/466302>

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)
 - The steps for using “Disk2VHD” to create a virtual machine from a real computer are almost exactly the same as the (V2V) steps for using a “Oracle VM VirtualBox” virtual machine to create a “Windows Virtual PC” or “Microsoft Virtual PC 2007” virtual machine.

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

PROJECT 4 DETAILS (continued)

(DO "PHYSICAL TO VIRTUAL")

- “Physical to Virtual” (P2V) By Microsoft’s Free “Disk2VHD” Program (continued)

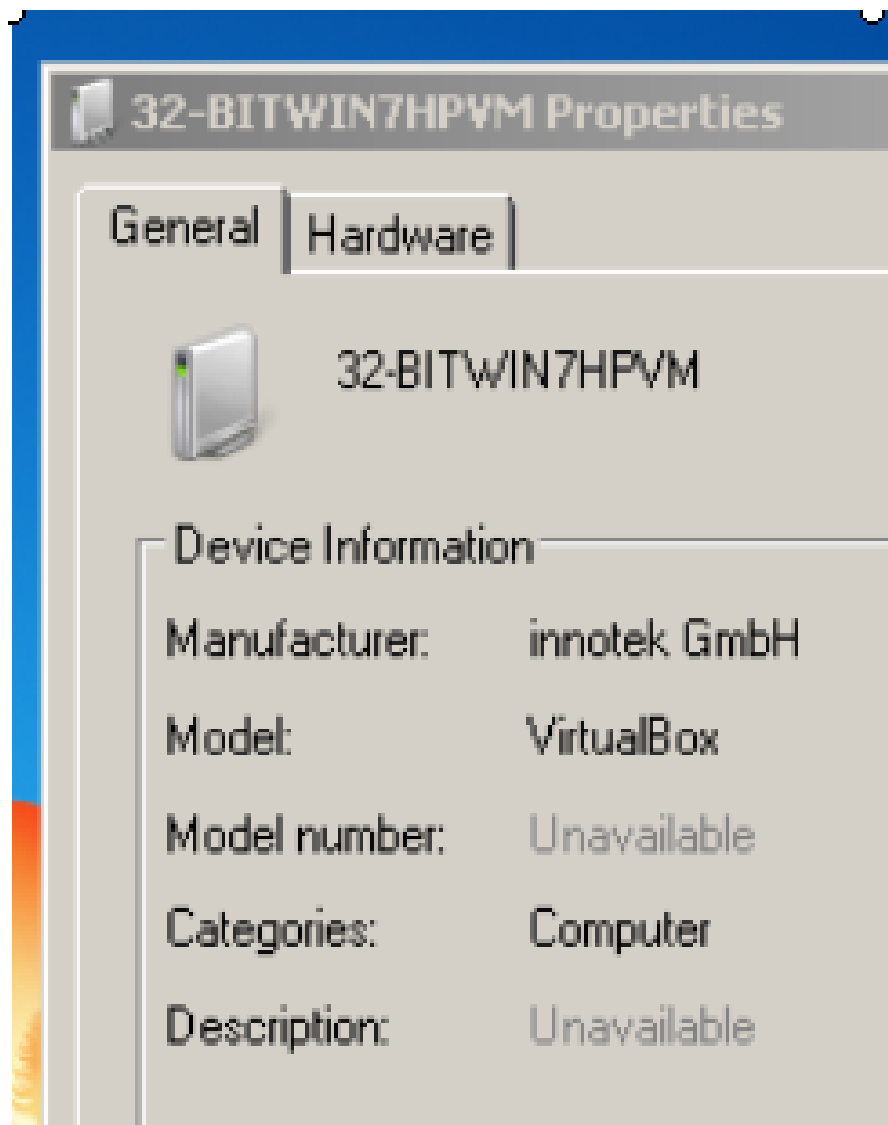
PROJECT 5 DETAILS

USE VIRTUAL MACHINES

- Virtual Hardware
 - A view of itself from inside a “Windows 7” virtual machine inside “Oracle VM VirtualBox”:

PROJECT 5 DETAILS: USE VIRTUAL MACHINES

- Virtual Hardware (continued):



The manufacturer of this virtual machine computer is shown to be "innotek GmbH" of Germany, the original developers of "VirtualBox".

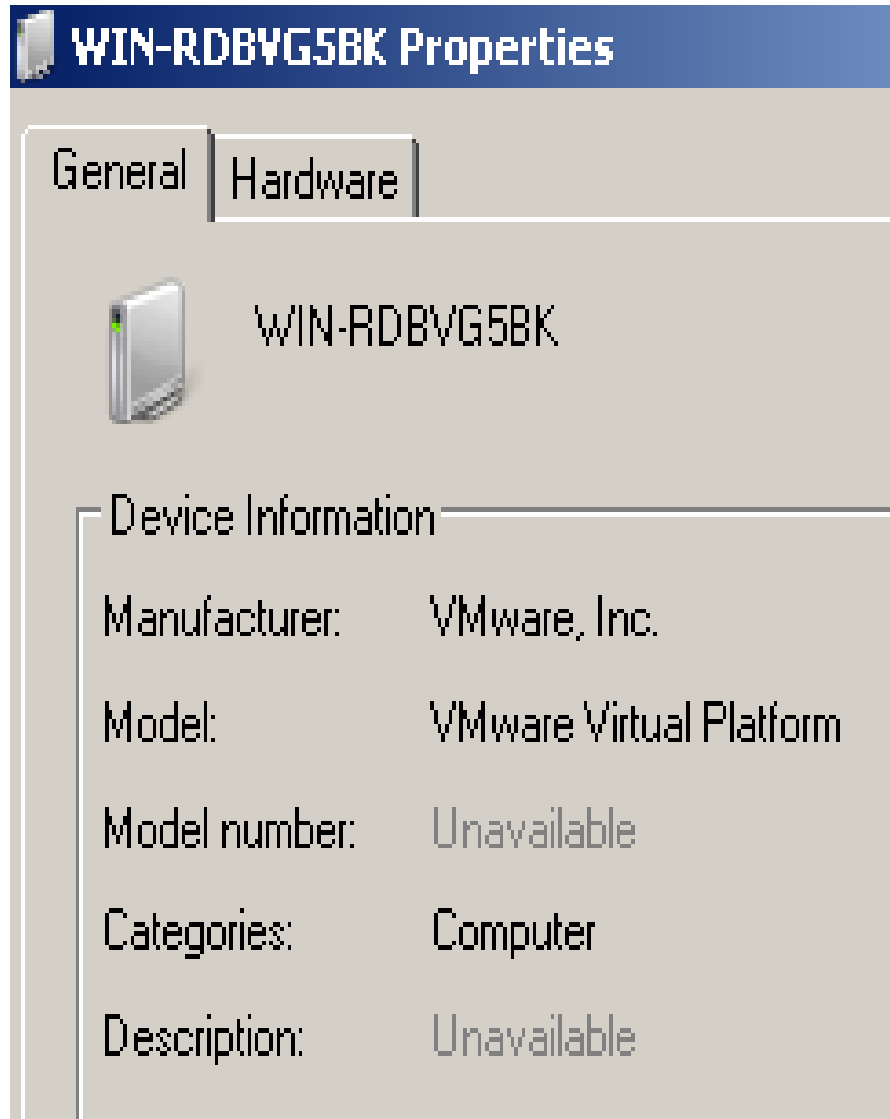
PROJECT 5 DETAILS

USE VIRTUAL MACHINES

- Virtual Hardware
 - A view of itself from inside a “Windows 7” virtual machine inside “VMware Player”:

PROJECT 5 DETAILS: USE VIRTUAL MACHINES

- Virtual Hardware (continued):



The manufacturer of this virtual machine computer is shown to be “VMware, Inc” and the model is “VMware Virtual Platform”

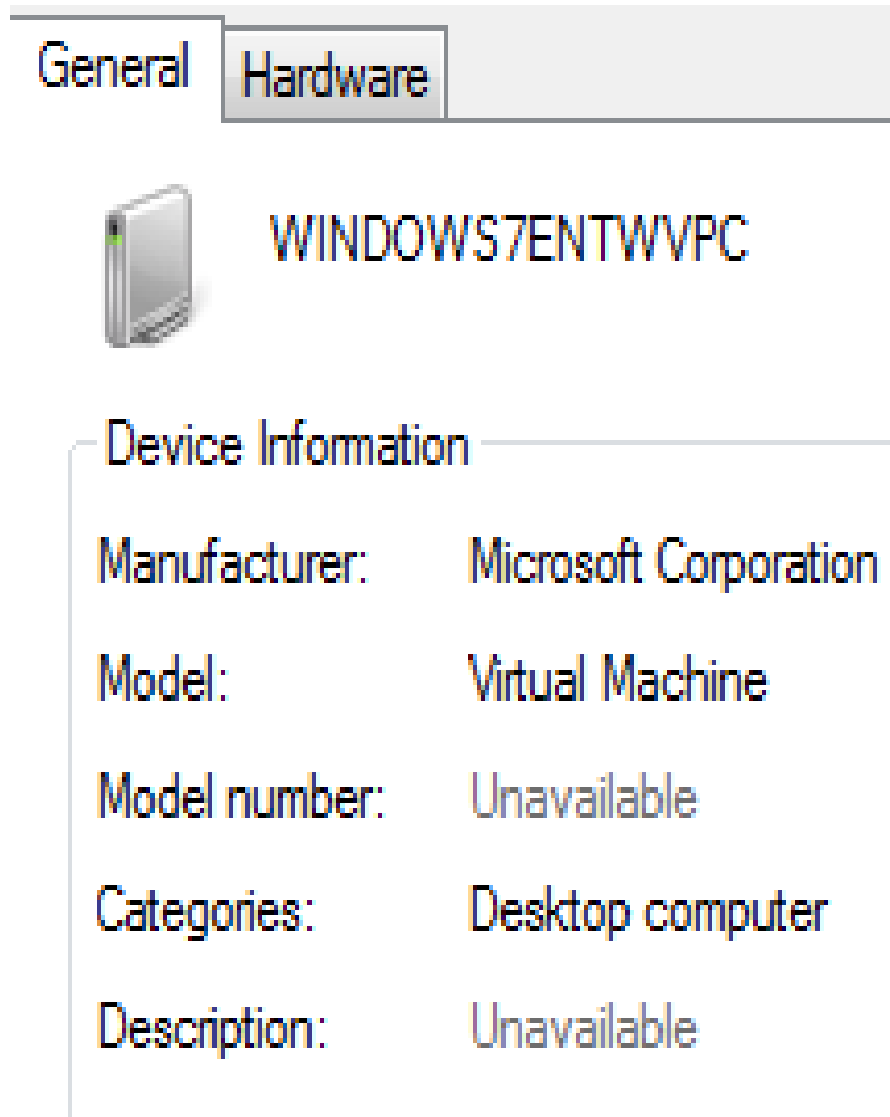
PROJECT 5 DETAILS

USE VIRTUAL MACHINES

- Virtual Hardware
 - A view of itself from inside a “Windows 7” virtual machine inside “Windows Virtual PC”:

PROJECT 5 DETAILS: USE VIRTUAL MACHINES

- Virtual Hardware (continued):



The screenshot shows the Windows System Information window with the 'Hardware' tab selected. The device name is 'WINDOW\$7ENTWVPC'. Under the 'Device Information' section, the following details are listed:

Manufacturer:	Microsoft Corporation
Model:	Virtual Machine
Model number:	Unavailable
Categories:	Desktop computer
Description:	Unavailable

The manufacturer of this virtual machine computer is shown to be “Microsoft Corporation”.

PROJECT 5 DETAILS

USE VIRTUAL MACHINES

- Virtual Hardware
 - A view of itself from inside a “Windows 7” virtual machine inside “Microsoft Virtual PC 2007”:

PROJECT 5 DETAILS: USE VIRTUAL MACHINES

- Virtual Hardware (continued):



WINDOWS7ENTWVPC

Device Information

Manufacturer: Microsoft Corporation

Model: Virtual Machine

Model number: Unavailable

Categories: Desktop computer

Description: Unavailable

The manufacturer of this virtual machine computer is shown to be “Microsoft Corporation”.

PROJECT 5 DETAILS

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - With the exception of the emulated processor, the emulated, virtual hardware of any virtual machine in a “virtual machine program” will not be the same as the real hardware of the host computer.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - Instead, the virtual hardware is a standardized virtual computer that consists of a set of standardized hardware that the "virtual machine program" creates for each virtual machine.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - This makes virtual machines easy to transfer from one computer to another as long as we run them in the same “virtual machine program.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - Each "virtual machine program" creates a different set of default "virtual hardware" for the virtual machines that you create with it
 - See http://en.wikipedia.org/wiki/Comparison_of_platform_virtual_machines

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - For a description of the virtual hardware for a virtual machine in “Windows Virtual PC” or “Microsoft Virtual PC 2007”, see the “Emulated Environment” section in http://en.wikipedia.org/wiki/Windows_Virtual_PC

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - For a description of the virtual hardware for a virtual machine in “VMware Player”, see

http://www.dpunkt.de/leseproben/1686/Kapitel_2.pdf (for a very detailed virtual hardware description)

and

<http://communities.vmware.com/message/481419> (for a description of “full virtualization”)

and

<http://en.wikipedia.org/wiki/VMware>

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - For a description of the virtual hardware for a virtual machine in “Oracle VM VirtualBox”, see the “Hardware Device Emulation” section in
[http://en.wikipedia.org/wiki/VirtualBox#
Hardware_device_emulation](http://en.wikipedia.org/wiki/VirtualBox#Hardware_device_emulation)

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual Hardware (continued)
 - For a description of the virtual hardware for a virtual machine in “Windows Virtual PC” and “Microsoft Virtual PC 2007”, see the “Emulated Environment” section in http://en.wikipedia.org/wiki/Windows_Virtual_PC

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual CPUs

–“Oracle VM VirtualBox” provides each virtual machine with a virtual processor that is the same as the actual processor of the physical host computer. Each virtual machine can be provided with as many CPUs for each virtual machine as you have in the real, physical processor of the host computer.

PROJECT 5 DETAILS (continued)

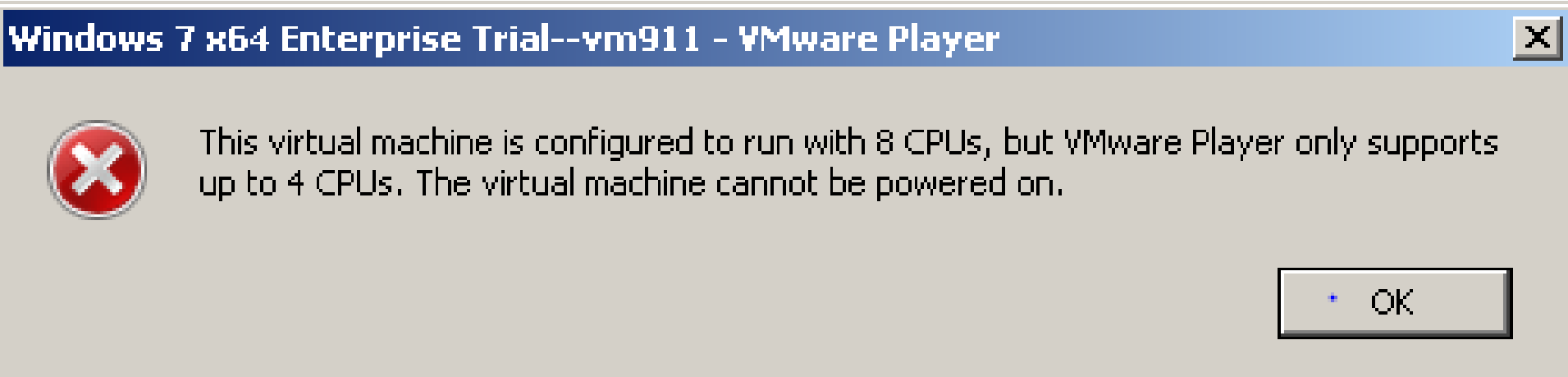
USE VIRTUAL MACHINES

- Virtual CPUs (continued)
 - “VMware Player” provides each virtual machine with a virtual processor that is the same as the actual processor of the physical host computer, up to a maximum of 4 CPUs for a virtual machine, regardless of how many CPUs that the processor of the physical host computer actually has.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual CPUs (continued)



PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual CPUs (continued)
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” provides each virtual machine with a virtual processor that is the same as the actual processor of the physical host computer but only one CPU is provided to each virtual machine, regardless of how many CPUs that the real processor of physical host computer actually has.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual motherboards
 - “Oracle VM VirtualBox” provides each virtual machine with a virtual no-name motherboard.
 - “VMware Player provides each virtual machine with a virtual “Intel Corporation 440BX Desktop” motherboard.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual motherboards
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” provides each virtual machine with a virtual “Microsoft Corporation Virtual Machine 5.0” motherboard.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual BIOS
 - For “VMware Player” virtual machines, you can configure the virtual “PhoenixBIOS” settings by pressing the F2 key during the “Power On Self Test” of the bootup of the virtual machine

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual BIOS (continued)
 - For “Oracle VM VirtualBox” virtual machines, you can configure the settings of the virtual “innotek GmbH” BIOS by a combination of two methods:
 - Using the “vboxmanage” command at the command line of the host computer
 - Clicking on the “Settings” button of the “Oracle VM VirtualBox Manager” window

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual BIOS (continued)
 - For “Windows Virtual PC” and “Microsoft Virtual PC 2007” virtual machines, you configure the settings of the virtual “American Megatrends” (“AMI”) BIOS (dated in 2002 and 2009 respectively) by rebooting the virtual machine and pressing the “Delete” key during the “Power On Self Test” to get into the BIOS setup screens of the virtual machine.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual BIOS (continued)

–See

<http://www.howtogeek.com/59084/how-to-change-the-virtual-machine-boot-device-in-virtual-pc/>

and

http://blogs.msdn.com/b/virtual_pc_guy/archive/2005/07/14/438482.aspx

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Allocated RAM

- For “Oracle VM VirtualBox, you can set the amount of RAM for a virtual machine up to the total physical amount of RAM in the host computer. There is no hard limit to the amount of RAM that you can assign to a virtual machine.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Allocated RAM (continued)
 - For “VMware Player”, you can set the amount of RAM for a virtual machine up to the total physical amount of RAM in the host computer with a hard upper limit of 32GB for systems with 64-bit host operating system and 8GB for systems with 32-bit host operating system

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Allocated RAM (continued)
 - “Windows Virtual PC” and “Microsoft Virtual PC 2007” allow a maximum of 3712 megabytes of RAM for a virtual machine

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- An extensive comparison between various “virtual machine programs” can be found at http://en.wikipedia.org/wiki/Comparison_of_platform_virtual_machines

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drives
 - When you create a virtual machine, you also create a "virtual hard drive" for it.
 - Each of the three free "virtual machine programs" creates virtual hard drives in a different file format.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drives (continued)
 - A virtual hard drive file in “Windows Virtual PC” or “Microsoft Virtual PC 2007” will have a file extension of .VHD
 - A virtual hard drive file or file set in “VMware Player” have a file extension of .VMDK

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drives (continued)
 - A virtual hard drive file in “Oracle VM VirtualBox” will have a file extension of .VDI when the virtual machine is created from installation media in “Oracle VM VirtualBox”.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drives (continued)
 - “Oracle VM VirtualBox” virtual machines can also use the .VMDK virtual hard drives that have been created by “VMware” and the .VHD virtual hard drives that have been created by “Windows Virtual PC” and “Microsoft Virtual PC 2007” but you usually cannot boot an “Oracle VM VirtualBox” virtual machine from these “foreign” virtual hard drives.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drives (continued)
 - “Windows Virtual PC” will not allow you to create a virtual hard drive that is larger than 127.4 Gigabytes.
 - “Microsoft Virtual PC 2007” will not allow you to create a virtual hard drive that is larger than 130.5 Gigabytes.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drive controllers
 - The type of virtual hard drive that a “guest operating system” “sees” depends on which type of virtual hard drive controller that you connect to the virtual hard drive.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drive controllers
(continued)

For a “Oracle VM VirtualBox”
virtual machine:

.vdi virtual hard drive file

+ virtual SATA controller

= guest operating system sees a
SATA hard drive

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Virtual hard drive controllers
(continued)

For a “Oracle VM VirtualBox”
virtual machine:

.vdi virtual hard drive file

+ virtual IDE controller

= guest operating system sees an
IDE hard drive

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Mouse cursor control rule #1:
When you first click inside a window of a virtual machine, you might be just activating the mouse for that window. Then you usually have to click again to make something happen inside the virtual machine window.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Mouse cursor control rule #2:
For each virtual machine window,
your mouse cursor will either be in
"integration mode" or in
"captured"/"in jail" mode.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Mouse cursor control rule #2
(continued):

To get your mouse cursor "out of jail" in "Oracle VM VirtualBox" or "VMware Player", look for a keyboard sequence at the bottom of a virtual machine's window.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

Mouse cursor control rule #2
(continued):

To release the mouse cursor from a "Windows Virtual PC" virtual machine (such as "Windows XP Mode") either press Ctrl + Alt + Left arrow once or press Alt + Tab.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

Mouse cursor control rule #2
(continued):

To release the mouse cursor from a
“Microsoft Virtual PC 2007” virtual
machine, either press the right Alt
key of your keyboard

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Keyboard control:

The keyboard of your computer will only work inside a virtual machine's window if you have the mouse cursor inside the virtual machine window AND maybe if you have already clicked at least once inside the virtual machine window.

PROJECT 5 DETAILS (continued) : USE VIRTUAL MACHINES

Keyboard control (continued):

Other keyboard shortcuts for
“Windows Virtual PC” are located at

http://blogs.technet.com/b/windows_vpc/archive/2009/11/04/tip-using-the-keyboard-to-access-useful-functionality-in-windows-virtual-pc.aspx

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Window ownership by which virtual machine??

To determine if a Window belongs to a specific virtual machine, move the Window from side to side and watch the borders of the window.

In “Windows 7” do not shake the Window too fast, or all the other Windows might minimize (“Aero Shake”).

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- "Virtual Networks" are provided by all virtual machine programs.
- Each of the three free "virtual machine programs" provides various "virtual networks" for the "virtual network adapters" of a "virtual machine" to attach to.

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- All "virtual machine" programs provide you with "virtual networks" (continued)
 - For information on the “virtual networks” that are provided by “VMware Player”, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/vmware/Virtual_Networks_in_VMware--Windows.pdf

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- All "virtual machine" programs provide you with "virtual networks" (continued):
 - For information on the “virtual networks” that are provided by “Oracle VM VirtualBox”, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/virtualbox/Virtual_Networks_in_VirtualBox-Windows.pdf

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- All "virtual machine" programs provide you with "virtual networks" (continued):
 - For information on the "virtual networks" that are provided by "Windows Virtual PC" see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/Virtual_Networks_in_WinVirtualPC.pdf

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- All "virtual machine" programs provide you with "virtual networks" (continued):
 - For workarounds for some of the networking problems that occur for “Windows XP Mode” and “Windows Virtual PC”, see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/NetworkProblemswithWVPC.pdf

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- All "virtual machine" programs provide you with "virtual networks" (continued):
 - For information on the “virtual networks” that are provided by “Microsoft Virtual PC 2007” see http://aztcs.org/meeting_notes/winhardsig/virtualmachines/WindowsVirtualPC/Virtual_Networks_in_MSVirtualPC2007.pdf

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Using virtual machines for secure Web browsing, see

<http://www.suite101.com/content/use-virtualization-to-improve-desktop-security-a73715>

and

<http://www.mobileandsecure.co.uk/articles/safe-surfing-virtual-pc.html>

and

<http://superuser.com/questions/48939/virtual-machine-and-virus>

and

http://www.trustware.com/index.php?mact=News,cntnt01,detail,0&cntnt01articleid=85&cntnt01origid=15&cntnt01detailtemplate=press_detail_with_image&cntnt01returnid=56

PROJECT 5 DETAILS (continued)

USE VIRTUAL MACHINES

- Using “VMware..” virtual machines for malware analysis

– See

<http://zeltser.com/vmware-malware-analysis/>

APPENDIX 1 : USE AND MENTION OF VIRTUAL MACHINES BY COMPUTER USER GROUPS

- See the hyperlinks to Web sites and newsletters of various user groups at http://aztcs.org/meeting_notes/winhardsig/virtualmachines/UserGroupUse.pdf

APPENDIX 2

VIRTUALIZATION “BIG PICTURE”

- Real fax machine → Virtual fax
 - “Windows Fax and Scan” inside “Windows” and fax modem instead of a fax machine
 - See http://aztcs.org/meeting_notes/winhardsig/windowsfax/windowsfax.htm

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real hard drive → Virtual Hard Drive
 - Windows 7 allows you to boot from a .vhd “virtual hard disk”.
 - See <http://www.techrepublic.com/blog/window-on-windows/expand-the-number-of-windows-7-installs-with-bootable-vhds/1578>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real Television Set → Virtual TV
 - “live TV” option inside “Windows Media Center” software
or Hauppauge “WinTV” software program
 - USB tuner “stick” or PCI/PCIe tuner card
 - See
http://www.hauppauge.com/site/products/data_hvr950q.html

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real physical computer
→ Virtual machines

See

<http://www.windowsitpro.com/article/virtualization2/marketwatch-virtualization-from-the-desktop-to-the-datacenter-129722/3>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real Local Area Network (LAN)
 - Virtual networks
 - from “virtual machine programs”

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real Router → Virtual Router
 - "Internet Connection Sharing" inside "Windows"
 - See <http://support.microsoft.com/kb/306126>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real Router → Virtual Router
 - "Internet Connection Sharing" inside "Windows" (continued)
- See also
 - <http://windows.microsoft.com/en-US/windows-vista/Using-ICS-Internet-Connection-Sharing>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Real network bridge
 - Virtual network bridge
 - “Network Bridge” capability of “Windows”
 - See <http://windows.microsoft.com/en-US/windows7/Create-a-network-bridge>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Hardware Wireless Access Point → Virtual Wireless Access Point
 - Free "Connectify" software for "Windows 7"
 - See <http://www.connectify.me/>

APPENDIX 2 (continued)

VIRTUALIZATION “BIG PICTURE”

- Hardware DVD/CD Drive

→ Virtual DVD/CD Drive

- “Virtual CloneDrive” software by “SlySoft”

- See

<http://www.slysoft.com/en/virtual-clonedrive.html>

APPENDIX 3

LEGAL ISSUES

OF USING VIRTUAL MACHINES

- If you are recommending, planning, or installing virtual machine software for your business, school, or other non-profit organization, please read the End User License Agreements for all virtual machine programs and guest operating system software, to determine what is legal.

APPENDIX 3 (continued) LEGAL ISSUES OF USING VIRTUAL MACHINES

–See

http://aztcs.org/meeting_notes/win_hardsig/virtualmachines/legal.pdf

APPENDIX 4

TROUBLESHOOTING VIRTUAL MACHINES

- In “Windows Virtual PC”, if a virtual machine is not in the list of virtual machines, use the right mouse button to click on the *.vmc file of the virtual machine, click on “Open with..”, and click on “Windows Virtual PC”.

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- In “Microsoft Virtual PC 2007”, if a virtual machine is not in the list of virtual machines, use the right mouse button to click on the *.vmc file of the virtual machine, click on “Open with..”, and click on “Microsoft Virtual PC”.

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- In “Oracle VM VirtualBox”, if a virtual machine is not in the list of virtual machines, use the right mouse button to click on the *.vbox file of the virtual machine, click on “Open with..”, and click on “Oracle VM VirtualBox Manager”.

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- In “VMware Player”, if a virtual machine is not in the list of virtual machines, use the right mouse button to click on the *.vmx file of the virtual machine, click on “Open with..”, and click on “VMware Player”.

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- In “VMware Player”, if a virtual machine will not start, delete all .LCK folders in the virtual machine and this often will repair it. See

<http://thebackroomtech.com/2009/04/02/fix-for-vmware-error-could-not-open-virtual-machine-this-virtual-machine-appears-to-be-in-use/>

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- Some excellent advice for repairing a “Windows XP Mode” virtual machine running in “Windows Virtual PC” can be found at http://www.tempusfugit.ca/techwatch.ca/xpm_broken.html

APPENDIX 4 (continued)

TROUBLESHOOTING VIRTUAL MACHINES

- When part of a virtual machine program fails, you can usually get it to repair itself by running its installation process and selecting “Repair”.

See

http://aztcs.org/meeting_notes/winhardsig/virtualmachines/virtualbox/VirtualBox--repairing.pdf

APPENDIX 5

SECURITY VULNERABILITIES

- See the “Vulnerabilities” section in http://en.wikipedia.org/wiki/VMware_Workstation
- See <http://www.zdnet.co.uk/news/security-threats/2009/06/09/virtual-machine-exploit-lets-attackers-take-over-host-39661637/>

APPENDIX 6

FULL VIRTUALIZATION, PARAVIRTUALIZATION, AND EMULATION

- See

<http://www.virtualbox.org/wiki/Virtualization>

and

<http://shortrecipes.blogspot.com/2009/03/xen-performance-of-full-virtualization.html>

and

http://en.wikipedia.org/wiki/Virtual_machine#Emulation_of_the_underlying_raw_hardware_.28native_execution.29

APPENDIX 6 (continued) FULL VIRTUALIZATION, PARAVIRTUALIZATION, AND EMULATION

and

<http://www.invincea.com/blog/2010/10/hwvirtvapp/>

and

http://en.wikipedia.org/wiki/Virtual_machine

and

<http://en.wikipedia.org/wiki/Sandboxie>

APPENDIX 7

NESTING VIRTUAL MACHINES

- The “nesting” of virtual machines is a technique that is useful in special situations
- “Nesting” causes a significant slowdown for the inner virtual machines of the nested configuration

APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES

- The convenience of the nested configuration often compensates for the slowness of the inner virtual machines.
- Nesting often results in unreliable mouse cursor tracking for the inner virtual machines of the nested configuration.

APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES

- Nesting is not for everyday use.
- Never hibernate a virtual machine that is nested inside another virtual machine. Doing so will bring the outer virtual machine to a crawl.

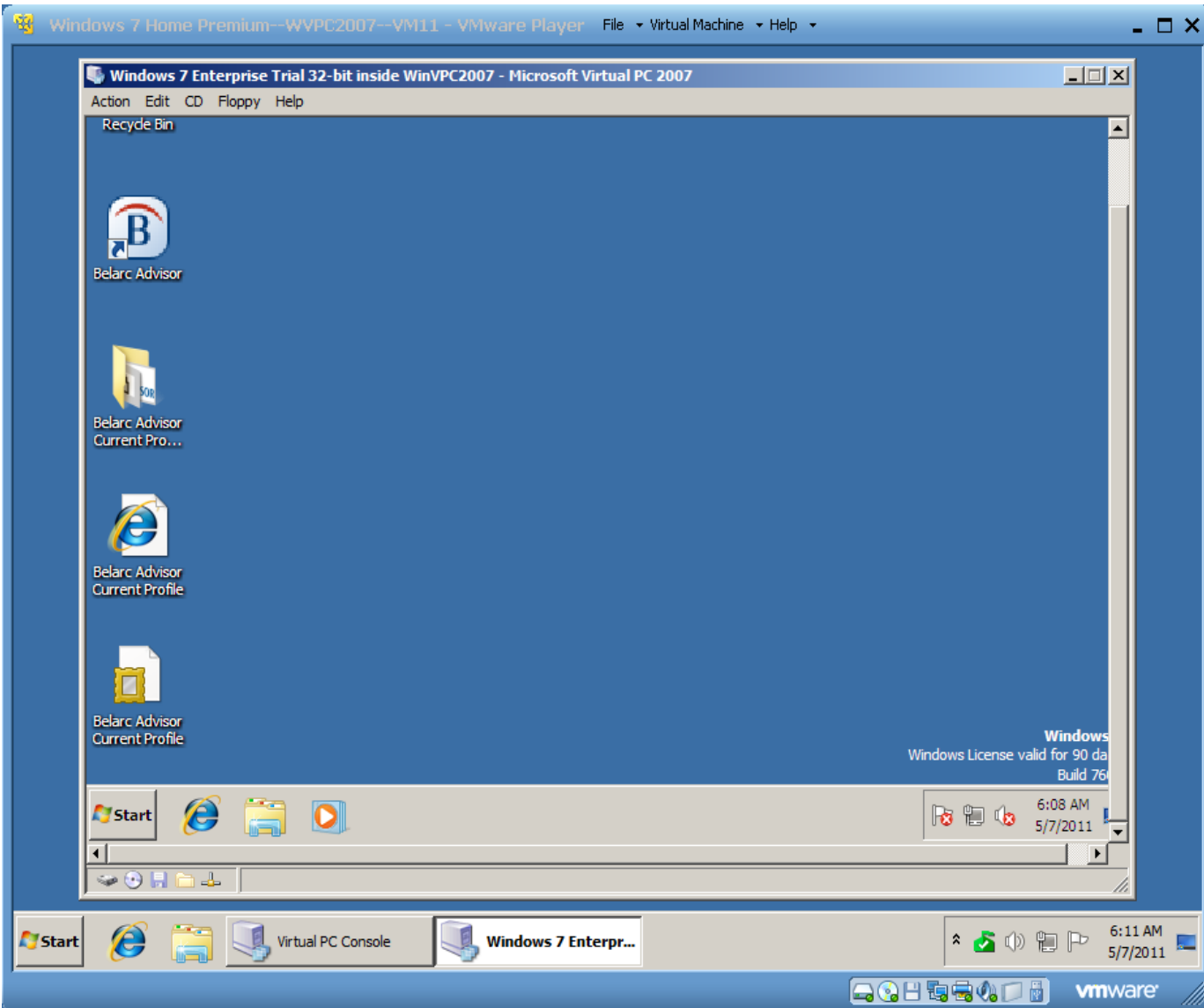
APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES

- Here is our first example of nesting:
 - A “Windows 7 Enterprise Trial 32-bit” virtual machine running in “Microsoft Virtual PC 2007” which is running inside a “Windows XP Pro” virtual machine which is running inside the “VMware Player” program which is hosted in a “Windows 7” computer: 216

APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES



APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES

- Advice for nesting a “VMware Player” virtual machine inside a “VMware Player” virtual machine can be found at <http://communities.vmware.com/docs/DOC-8970>

APPENDIX 7 (continued)

NESTING VIRTUAL MACHINES

- Here is our second example of nesting:

An "Oracle VM Virtual Box" virtual machine is running inside a "VMware Player" virtual machine, which is running inside a "Windows 7" host computer:

Explanation of the Demo

A virtual machine running “Windows 7 Enterprise Trial” is nested inside a virtual machine which is running “Ubuntu 10.10” which is running inside a “Windows 7..” host computer.

The two virtual machines and the host computer are all sharing files with each other.

Explanation of the Demo (continued)

Real, host computer runs "Windows 7 Ultimate 64-bit"

"VMware Player 4.1" virtual machine program

"Ubuntu 11.10" virtual machine

"Oracle VM VirtualBox 4" virtual machine program

**"Windows 7 Enterprise Trial 32-bit"
virtual machine**

Explanation of the Demo (continued)

Elapsed time to: start "VMware Player" program, start "Ubuntu 11.10" virtual machine, start "Oracle VM VirtualBox" program, and finally: start nested "Windows 7" virtual machine:

2 minutes
and 31 seconds:



http://www.highspheres.com/products/pc_chrono/

APPENDIX 8

FREE SOFTWARE TRIALS FROM MICROSOFT

You can download and use software trials from Microsoft. They provide time-limited trial copies their operating systems and their application software programs for you to use.

FREE SOFTWARE TRIALS FROM MICROSOFT (continued)

- “Windows 7 Enterprise Trial” at <http://technet.microsoft.com/en-us/evalcenter/cc442495.aspx?ITPID=wtcpgs>

downloads as an .ISO DVD image file that can be installed into any real computer or virtual machine program.

FREE SOFTWARE TRIALS FROM MICROSOFT (continued)

- Our general instructions for downloading and installing “Windows 7 Enterprise Trial” are located at http://aztcs.org/meeting_notes/win_hardsig/win7eval/win7eval.pdf

FREE SOFTWARE TRIALS FROM MICROSOFT (continued)

- Our specialized instructions for installing “Windows 7 Enterprise Trial” into a “VMware Player” virtual machine are located at http://aztcs.org/meeting_notes/winhardsig/win7intovmware/win7intovmware.pdf

FREE SOFTWARE TRIALS FROM MICROSOFT (continued)

- Our specialized instructions for installing “Windows 7 Enterprise Trial” into a “Oracle VM Virtualbox” virtual machine are located at http://aztcs.org/meeting_notes/winhardsig/win7intovirtualbox/win7intovirtualbox.pdf

FREE SOFTWARE TRIALS FROM MICROSOFT (continued)

- “Microsoft Office 2010” trial at http://www2.buyoffice.microsoft.com/usa/?torb=4&WT.mc_id=ODC_ENUS_GenTry_Control downloads as an .exe file that can be installed into any real computer or virtual machine program.

FREE SOFTWARE TRIALS FROM MICROSOFT

(continued)

- “Internet Explorer Application Compability VHD Images” at <http://www.microsoft.com/downloads/en/details.aspx?FamilyID=21eabb90-958f-4b64-b5f1-73d0a413c8ef>

that can be used to create virtual machines in “Windows Virtual PC”, “Microsoft Virtual PC 2007”, or “Oracle VM VirtualBox”.

FREE SOFTWARE TRIALS FROM MICROSOFT

(continued)

- When any.VHD file is used to create a virtual machine in “Oracle VM VirtualBox”, you have to connect it to a virtual IDE hard drive controller (instead of the virtual SCSI hard drive controller that is provided by default by “Oracle VM VirtualBox”). See <http://www.sysprobs.com/virtualbox-p2v-disk2vhd-errors-fix>

PUBLIC AVAILABILITY OF "WINDOWS 8 PRE-BETA"

- The "Windows Developers Preview" pre-beta of "Windows 8" became available to the general public on September 13, 2011.
- To download a copy as an .ISO file that is "burnable" to a DVD, go to <http://msdn.microsoft.com/en-us/windows/apps/br229516>

PUBLIC AVAILABILITY..(continued)

- The "Product Key" for the "Windows Developers Preview" pre-beta of "Windows 8" is available at <http://social.msdn.microsoft.com/Forums/en-US/windowsdeveloperpreviewgeneral/thread/ea402fb2-7192-4599-b999-22ad6b28c55a>

PUBLIC AVAILABILITY..(continued)

- The expiration date for the "Windows Developers Preview" pre-beta of "Windows 8" is March 8, 2012

PUBLIC AVAILABILITY..(continued)

Microsoft Software License Terms

As described below, the software will automatically activate. Using the software also operates as your consent to the transmission of certain computer information during activation and for Internet-based services.

If you comply with these license terms, you have the rights below for each license you acquire.

1. INSTALLATION AND USE RIGHTS.

- a. **Software License.** You may install and test any number of copies of the software on your premises. You may not test the software in a live operating environment unless Microsoft permits you to do so under another agreement.
- b. **Term.** The term of this agreement will expire on March 8, 2012 ("the expiration date"). You have no right to use the software after the expiration date. Starting from the expiration date, you may not be able to access any unsaved data used with the software. Any applications you receive through the Windows Store will also cease to be available to you in future versions, unless they are made available for re-download and you re-acquire them. You may not receive any other notice.
- c. **Product Key.** The software may require a key to install or access it. If it does, you are responsible for the use of keys assigned to you. You should not share the keys with third parties.

OK

APPENDIX 9

SPEEDING UP A “WINDOWS” COMPUTER

- When you run one or more “virtual machine programs”, you will be using more RAM and CPU cycles than when you run a single host computer by itself. There is a big payoff in terms of computer performance if you tweak “Windows” host computers and virtual machines for optimum performance when you run virtual machines.
- If you run any version of “Windows” in a host computer or in a virtual machine, you can speed up “Windows” by following our detailed directions.

APPENDIX 9 (continued)

SPEEDING UP A “WINDOWS” COMPUTER

- To speed up a “Windows 7” computer, follow our instructions at http://aztcs.org/meeting_notes/winhardsig/speedupWindows/win7speedup.pdf

APPENDIX 9 (continued)

SPEEDING UP A “WINDOWS” COMPUTER

- To speed up a “Windows Vista” computer, follow our instructions at http://aztcs.org/meeting_notes/winhardsig/speedupWindows/vistaspeedup.pdf

APPENDIX 9 (continued)

SPEEDING UP A “WINDOWS” COMPUTER

- To speed up a “Windows XP” computer, follow our instructions at http://aztcs.org/meeting_notes/winhardsig/speedupWindows/xp_speedup.pdf

APPENDIX 10

COMPARISONS BETWEEN “VMWARE PLAYER”, “ORACLE VM VIRTUALBOX”, AND “WINDOWS VIRTUAL PC”

- http://aztcs.org/meeting_notes/winhardsig/virtualmachines/comparison/comparison-WEI-Winhost.pdf
- <http://www.sysprobs.com/virtualbox-316-vmware-player-3-desktop-virtualization-software>

APPENDIX 10 (continued)

COMPARISONS BETWEEN “VMWARE PLAYER”, “ORACLE VM VIRTUALBOX”, AND “WINDOWS VIRTUAL PC”

- <http://raywoodcockslatest.blogspot.com/2011/01/windows-xp-running-in-virtual-machine.html>
- <https://www.pcmech.com/article/vmware-player-vs-virtualbox-which-is-right-for-you/>

APPENDIX 10 (continued)

COMPARISONS BETWEEN “VMWARE PLAYER”, “ORACLE VM VIRTUALBOX”, AND “WINDOWS VIRTUAL PC”

- <http://fileforum.betanews.com/detail/VirtualBox/1172769426/1>
- <http://fileforum.betanews.com/detail/VMware-Player/1129825589/1>
- <http://fileforum.betanews.com/detail/Microsoft-Windows-Virtual-PC/1249399819/1>
- <http://fileforum.betanews.com/detail/Microsoft-Virtual-PC/1061956712/1>

APPENDIX 11

WORKAROUND FOR LACK OF FIREWIRE SUPPORT BY VIRTUAL MACHINES

- None of the free virtual machine programs have support for firewire devices. The workaround is to use the “Shared Folders” virtual network to attach a virtual machine to a host-connected firewire device. See http://aztcs.org/meeting_notes/winhardsi/virtualmachines/FirewireDevices/FirewireDevices.pdf

APPENDIX 12

INSTALLING “WINDOWS VIRTUAL PC” AND “MICROSOFT VIRTUAL PC 2007” INTO THE SAME HOST COMPUTER

- See

<http://nookkin.com/content/run-virtual-pc-2007-and-windows-virtual-pc-on-the-same-machine.php>

APPENDIX 13

.VHD COMPLEXITIES

- When you use “Windows..” installation media to create a new “virtual machine” in “Windows Virtual PC”, you will create a new .VHD virtual disk file.

APPENDIX 13

.VHD COMPLEXITIES

- When you use “Windows..” installation media to create a new “virtual machine” in “Microsoft Virtual PC 2007”, you will create a new .VHD virtual disk file.

APPENDIX 13

.VHD COMPLEXITIES (continued)

- A .VHD file that has been created by “Windows Virtual PC” or “Microsoft Virtual PC 2007” when you create a virtual machine using installation media or that has been created by “Windows XP Mode” cannot be used to create a virtual machine in “Oracle VM VirtualBox”.

APPENDIX 13

.VHD COMPLEXITIES (continued)

- A .VHD file that has been created by running the “Disk2VHD” program (to convert a real computer (P2V) or virtual machine (V2V)) can be used to create a virtual machine in “Windows Virtual PC”, “Microsoft Virtual PC 2007”, or “Oracle VM VirtualBox” BUT WITH TWO EXCEPTIONS:

APPENDIX 13

.VHD COMPLEXITIES (continued)

- A .VHD file that you download from Microsoft as a time-limited software trial can be used to create a virtual machine in “Windows Virtual PC”, “Microsoft Virtual PC 2007”, or “Oracle VM VirtualBox” BUT WITH TWO EXCEPTIONS:

APPENDIX 13

.VHD COMPLEXITIES (continued)

– Exception 1:

You cannot run a 64-bit operating system in “Windows Virtual PC” or “Microsoft Virtual PC 2007”. This means that a .VHD virtual hard disk file that was created by “Disk2VHD” from a 64-bit version of “Windows” can only be installed into “Oracle VM VirtualBox”, into a server version of “Windows..”, or “Hyper-V” running in “Windows 8..”.

APPENDIX 13

.VHD COMPLEXITIES (continued)

– Exception 2:

When any .VHD file is used to create a virtual machine in “Oracle VM VirtualBox”, you have to connect it to a virtual IDE hard drive controller (instead of the virtual SCSI hard drive controller that is provided by default by “Oracle VM VirtualBox”).

See

<http://www.sysprobs.com/virtualbox-p2v-disk2vhd-errors-fix>

APPENDIX 100

STARTING A VIRTUAL MACHINE WITH A BATCH FILE

- To start a “Oracle VM VirtualBox” virtual machine from the command line or with a batch file or Powershell script, see <http://www.virtualbox.org/manual/ch08.html#vboxmanage-startvmndows-Virtual-PC/1249399819/1>

APPENDIX 100 (continued)

STARTING A VIRTUAL MACHINE WITH A BATCH FILE

- To start a “Oracle VM VirtualBox” virtual machine from the command line or with a batch file or Powershell script (continued) and

<http://forums.virtualbox.org/viewtopic.php?f=1&t=30245>

and

<http://forums.virtualbox.org/viewtopic.php?f=2&t=18794>

APPENDIX 100 (continued)

STARTING A VIRTUAL MACHINE WITH A BATCH FILE

To start a “Oracle VM VirtualBox” virtual machine from the command line or with a batch file or Powershell script (continued)

and

<http://scottlinux.com/2011/04/15/quick-intro-to-vboxmanage/>

APPENDIX 100 (continued)

STARTING A VIRTUAL MACHINE WITH A BATCH FILE

- To start a “Windows Virtual PC” virtual machine from the command line or with a batch file or Powershell script, see http://blogs.msdn.com/b/virtual_pc_guy/archive/2009/08/03/starting-virtual-machines-via-scripting-with-windows-virtual-pc.aspx and <http://www.slickit.ca/2009/05/windows-7-virtual-pc-management.html>

APPENDIX 100 (continued)

STARTING A VIRTUAL MACHINE WITH A BATCH FILE

- You cannot start a virtual machine with a batch file or shell script in “VMware Player”. This feature is available when you upgrade to the not-free “VMware Workstation”.

APPENDIX 101

MAKING A VIRTUAL MACHINE START UP AUTOMATICALLY WHEN A “WINDOWS..” HOST COMPUTER IS POWERED ON

- You can make a “Windows..” computer automatically launch into a virtual machine from a “Standard User” Windows account. This protects the host computer from unintentional damage by end-users.
- Step 1: Create a user account in the host computer that is a “standard account”.

APPENDIX 101 (continued)

MAKING A VIRTUAL MACHINE START UP AUTOMATICALLY WHEN A “WINDOWS..” HOST COMPUTER IS POWERED ON

- Step 2: Make your Windows.. Computer log in automatically:

For “Windows Vista” or “Windows 7”, see <http://www.howtogeek.com/howto/windows-vista/make-windows-vista-log-on-automatically/>

- For “Windows XP”, see http://aztcs.org/meeting_notes/winhardsig/controluserpasswords2xp.pdf

APPENDIX 101 (continued)

MAKING A VIRTUAL MACHINE START UP AUTOMATICALLY WHEN A “WINDOWS..”

HOST COMPUTER IS POWERED ON

- Step 3: Create a virtual machine for use.
- Step 4: Follow the instructions in “Appendix 100” to create a batch file for starting up your virtual machine.
- Step 5: Place this batch file in one of the “Startup” folders: See

<http://indiawebsearch.com/content/where-is-the-startup-folder-located-in-windows-7-for-a-user-and-all-users-profile>