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Syncing and Integrating Windows and Mac OS in the Solitary Macintel, Power PC and x86 Intel Environments

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Abstract - Windows users claim that Mac users are conceited, citing that old "computer for the rest of us" advertising while Mac users claim the same about Windows users. The truth of the matter is that both are about the same. All they are nothing but the different OS GUIs; slightly different ways of opening applications. Once the application is open, the only differences might be whether you use a single button mouse or a multi-button mouse, and even that difference vanishes with third party hardware. First of all, we'll look at some pros and cons for each, then we'll dispel some myths perpetuated about both platforms. Remember both Microsoft and Apple share a good deal of technology. Both Windows and Mac OS use hundreds of patents shared between the two. Also remember that Microsoft makes a lot of software for the Mac including Microsoft Office which was created by a separate department for the Mac. So our concept here is to get the user access to both Mac OS and Windows OS on a single system. It must be done in such a way that it is applicable to both mac Intel and x86 based pc. This can be done with the help of third party applications in which few of them are even legally recognized by Microsoft and Apple. This paper deals with enabling "PC for fun, Mac for work" in a single system.

I. Introduction

There are two types of people, Mac people and PC people. If the marketing is to be believed, the former is a hip, sport-coat-and-sneakers--wearing type of guy who uses his computer for video chatting, music mash-ups and other cool, creative pursuits that starchy, business-suited PC users could never really appreciate unless they tried them on the slick Apple interface. Then again, Windows PC enthusiasts probably think that Mac guy is a smug slacker with an overpriced toy that can't do any serious computing anyway. Funny thing is, both stereotypes are wrong. With a 7.5 percent market share, Macs are no longer just the computer choice of artists and unemployed writers. (Apple is, in fact, the fourth largest computer manufacturer in the world.) And now, more than ever, the guts of both platforms are remarkably similar. Both types of machines use Intel processors. Both buy memory, hard drives and graphics cards from the same small pool of suppliers. The underlying operating systems have distinctly different flavors, but in terms of functionality, Microsoft Windows 7 and Mac OS X Leopard have surprisingly similar built-in multimedia, Internet and productivity applications.

Fig (i) Mac OS install

Yet what make the platforms feel so dissimilar are their approaches to these applications. Internet Explorer versus Safari, Windows Media Center versus Front Row, Photo Gallery versus iPhoto, Backup and Restore Center versus Time Machine—these system components from Microsoft and Apple are designed to accomplish essentially the same goals. To users, however, the position and movement of the virtual knobs and levers make all the difference.

Windows computers are perpetual targets for spyware and viruses. Macs are targeted, too, but not to the same degree. The Mac OS and Apple computers both come from the same company. While Macs aren't trouble free, you're less likely to experience as many unexplainable crashes and incompatibilities as you might be on a Windows PC. Apple has earned top scores from PC World readers in reliability and service. The Mac OS X Leopard is a clever, nimble operating system and a pleasure to use. Windows Vista is a behemoth. While not the demon it's often made out to be, it isn't the Mac OS, either. Apple laptops have thoughtful design touches, such as keyboards that illuminate automatically in dim lighting. There are many more laptop choices in the Windows world, and at a greater variety of price points. There are still plenty of software applications available for Windows only.

II. Boot camp

The results gave us a clear winner in the performance categories, but the big surprise was how little difference we found in user preferences. So that users don't need to stick with the single OS and should get engaged with what he wants from different environment aspect.

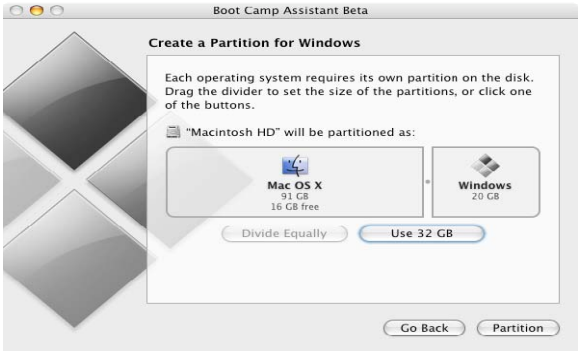

Fig (ii) Boot camp setting partition for windows

Boot Camp is a utility included with Apple Inc.'s Mac OS X v10.5 "Leopard" and v10.6 "Snow Leopard" operating systems that assists users in installing Microsoft Windows XP, Windows Vista, Windows 7, or GNU/Linux operating systems on Intel-based Macintosh computers. Boot Camp Assistant guides users through non-destructive re-partitioning (including resizing of an existing HFS+ partition, if necessary) of their hard disk drive and using the Mac OS X Leopard or Snow Leopard disc to install Windows drivers. In addition to device drivers for the hardware, the disc includes an applet for the Windows control panel for selecting the boot operating system.

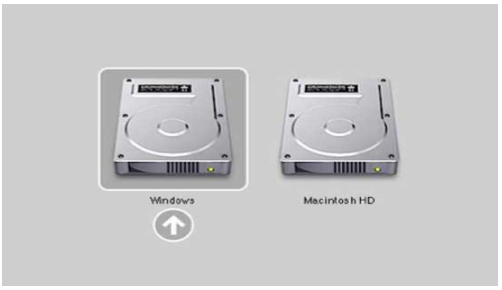

Fig (iii) Selecting OS using Boot camp

Therefore this brings about the working of windows in the Apple system which is made of mac-Intel based hardware. Also we know that these are legally permitted by the company as we can see that it comes along with the OS X installation disc. This adds an advantage to the windows users who want to shift to Apple systems along with their OS environment. It is even possible to completely format the Mac OS and install Windows in the Apple systems with the help of this third party application. Boot camp also installs a file with drivers for the windows in Apple based systems for the proper working of Windows.

Read Mac Volumes - Using Boot Camp 3.0, you can open and read files on Mac OS X volumes when booted into Windows. You can also copy photos, documents and other files from a Mac OS X volume into the Windows partition.

Support for advanced features on Apple Cinema displays - The Boot Camp control panel includes new features that allow you to change the behavior of the power button on an Apple Cinema Display and disable the display's brightness controls.

Improved tap-to-click support - The ability to tap the track pad to click the mouse button is now supported on all Mac portables that run Boot Camp.

Command line version of the Startup Disk Control Panel - A system administrator can now

change the startup disk selection of a Mac running Windows using Boot Camp through a command line utility.

III. OS X 86 and iAtkos

OSx86 (from OS X and x86) is a collaborative hacking project to run the Mac OS X computer operating system on non-Apple personal computers with x86 architecture and x86-64 compatible processors. The effort started soon after the June 2005 Worldwide Developers Conference announcement that Apple would be transitioning its personal computers from PowerPC to Intel microprocessors.

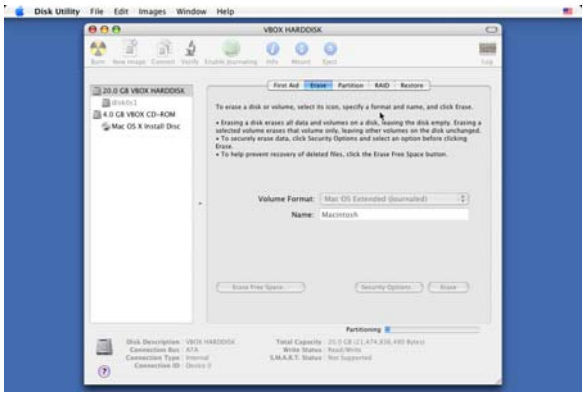

Fig (iv) Disk utility

A computer built to run this type of Mac OS X is also known as a Hackintosh, a portmanteau of the word "hack" and the name of Apple's main brand of computers, Macintosh. Hackintoshed notebook computers are also referred to as "Hackbooks". The Apple software license does not allow Mac OS X to be used on hardware that is not "Apple-branded". The legality of this form of tying is disputed by companies such as Psystar and PearC, who have attempted to release products using Mac OS on non-Apple machines. However, Apple claims the methods it uses to prevent Mac OS X from being installed on non-Apple hardware are protected by the DMCA, and in November 2009 won a summary judgment against Psystar on these grounds.

The boot camp enables the windows users to install windows in their Apple systems whereas this kind of third party software help the mac users install their Mac OS X in the pc. This can be achieved by stimulating the hardware for these kinds of systems. When the hardware gets mentioned here, we have to note that pc hardware and Apple system hardware are both made of different type of Intel based processors. The iAtkos is something which makes the OS X 86 project to reach the people by making iAtkos based Mac OS X installation discs.

IV. Boot loaders and emulators

EFI emulation Extensible Firmware Interface (EFI) is a specification that defines a software interface between an operating system and platform firmware. Since this method generally does not require copying or modification of Mac OS X, it is the considered to be the most legal way of installing Mac OS X on non-Apple computers.

In early November 2007, a group of hackers (fronted by a Russian hacker known as Netkas), using an already modified boot-132 source root from David Elliot developed a method of emulating an EFI environment using a specially modified Darwin boot loader. In practical terms, this meant that regular PCs meeting a minimum set of hardware requirements could now be "seen" as real Macintosh computers by the OS, allowing the use of unmodified, "stock" Apple kernels (as long as the CPU supports it) and thus giving a more transparent and reliable operation. Several methods for real world deployment of this innovative solution have arisen all around the net.

Fig (v) Mac OS X desktop

True EFI emulation was a highly sought after asset for the OSx86 community. Previous efforts based upon Apple's open source Darwin Project and

Hackintosh gurus allowed users to enjoy OS X on normal PCs, with patched kernels/kernel modules which simply bypassed EFI. Using the EFI patch, a Hackintosh could boot off "vanilla" (unmodified) OS X kernels and use vanilla kernel extensions. This not only allowed the system to be compatible with future system updates, but also offered increased stability. This method also circumvents one aspect of Apple's End User License Agreement, which states that the modification of non-open Source components of the OS is forbidden.

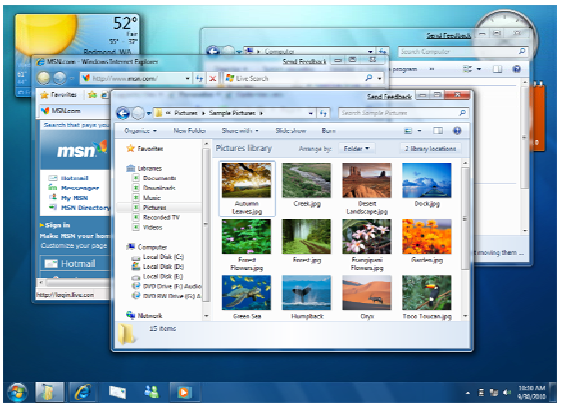

Fig (vi) Windows 7 Desktop

Nowadays, there is another commercial product that created by Taiwanese called Maqboot, use different kind of boot loaders (Chameleon and Bootthink) on their different level of hackintosh which they called it as MAQ, now support up to 10.6.7. It was thought that Windows 7 support of EFI would result in PC motherboards replacing BIOS with EFI. MSI announced the Efinity mainboard in early 2008, but it (and similar products) has not been sold.

Boot-132 is a boot loader provided by Apple for loading the XNU kernel. The luxury of this new installation method includes the ability to boot and install from retail Leopard DVD and update straight from Apple without breaking the DMCA. The only possible problem here is that it breaks the Mac OS X EULA.

DUETDUET is a boot loader developed by Tianocore that enables you to "boot" into an EFI enviornment in a non-EFI computer that supports legacy boot.

Live DVD: In March 2007, the OSx86 community made some significant progress with the development of a Live DVD. The Live DVD allows booting to a working system with Mac OS X v10.4.8. The method was more reliable than previous methods, as it manipulated Apple's existing Netboot and Imageboot functionalities, and behaved as if the system was running off a network disk.

V. Virtualization

It is the concept where the testing can be done. Nowadays it is not necessary to try out anything new on our original hardware. So that we can simply use the virtual software for handling such kind of experiments. It stimulates the integration between OS and their hardware demands.

Parallel Desktop for Mac is simply the world's bestselling, top-rated, and most trusted solution for running Windows applications on Mac. With Parallels Desktop for Mac, we can seamlessly run both Windows and Mac OS X applications side-by-side without rebooting. Drag-and-drop files between Windows and Mac applications, launch Windows applications from your Mac dock, and do much more with speed, control and confidence.

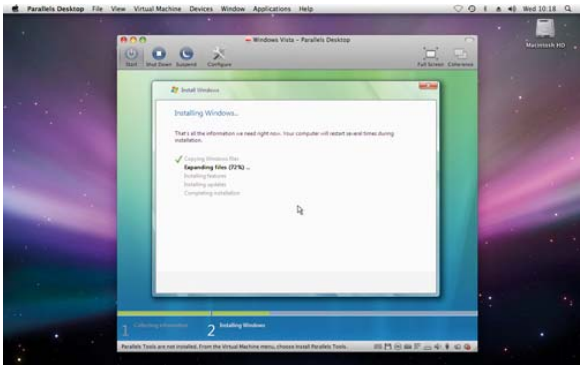

Fig (vii) Parallel Desktop

Improve the efficiency and availability of IT resources and applications through virtualization. Start by eliminating the old "one server, one application" model and run multiple virtual machines on each physical machine. About 70% of a typical IT budget in a non-virtualized datacenter goes towards just maintaining the existing infrastructure, with little left for innovation.

An automated datacenter built on the production-proven VMware virtualization platform lets you respond to market dynamics faster and more efficiently than ever before. VMware vSphere delivers resources, applications—even servers—when and where they're needed. VMware customers typically save 50-70% on overall IT costs by consolidating their resource pools and delivering highly available machines with VMware vSphere.

•Run multiple operating systems on a single computer including Windows, Linux and more.

•Lets Mac run Windows creating a virtual PC environment for all your Windows applications.

•Reduce capital costs by increasing energy efficiency and requiring less hardware while increasing server to admin ratio

•Ensure enterprise applications perform with the highest availability and performance

•Build up business continuity through improved disaster recovery solutions and deliver high availability throughout the datacenter

•Improve enterprise desktop management & control with faster deployment of desktops and fewer support calls due to application conflicts.

VI. Mac-Intel, Power PC and x86 Intel

Every developer uses the term "Macintel" to refer to Macs with Intel processors. Macintosh + Intel = Macintel. Some prefer to use the term "Mactel" which combines the same words but uses the format from the Windows world (Windows + Intel = Wintel). The macintel is mainly used for the more featured use in Apple based systems, whereas the x86 and x64 Intel are being used in other varieties of PC. This is mainly used to run Windows and Linux based environments.

PowerPC (short for Performance Optimization with Enhanced RISC – Performance Computing, sometimes abbreviated as PPC) is a RISC architecture created by the 1991 Apple–IBM–Motorola alliance, known as AIM. PowerPC, as an evolving instruction set, has since 2006 been renamed Power ISA but lives on as a legacy trademark for some implementations of Power Architecture based processors. Originally intended for personal computers, PowerPC CPUs have since become popular as embedded and high-performance processors. PowerPC was the cornerstone of AIM's PReP and Common Hardware Reference Platform initiatives in the 1990s and while the architecture is well known for being used by Apple's Macintosh lines from 1994 to 2006 (before Apple's transition to Intel), its use in video game consoles and embedded applications far exceeded Apple's use.

This mainly brought about the separation in support provided to Windows on Mac-Intel and Power PC , and the installation and working of Mac OS in x86 and x64 based Intel machines.

VII. Legal issues

Apple does not provide technical phone support for installing, using, or recovering Microsoft Windows. Support is available for using Boot Camp Setup Assistant, as well as installing or restoring Boot Camp software while booted into Windows. Support articles and discussions may also be available on Apple's support website. Also, Apple does not authorize the use of the Mac OS on any x86 PC other than the ones it has developed itself. The company used a Trusted Platform Module, or TPM, to tie Mac OS to the systems it distributed to developers after announcing its switch to Intel's chips.

The Mac OS X EULA forbids installations of Mac OS X on a "non-Apple-branded computer". On July 3, 2008, Apple filed a lawsuit against Psystar Corporation for violating this restriction, among other claims. Apple claimed Psystar "violated the Digital Millennium Copyright Act (DMCA) by dodging copy-protection technologies Apple uses to protect Mac OS X. This brief revealed that Apple considers the methods that it uses to prevent Mac OS X from being installed on non-Apple hardware to be protected by the DMCA.

On January 14, 2009, the Gadget Lab site of Wired Magazine posted a video tutorial for installing Mac OS X on an MSI Wind netbook, but removed it following a complaint from Apple. Textual

instructions remain, but include a EULA violation disclaimer.

VIII. Conclusion & Future Work

In this work we have presented a simple but effective solution to use various operating systems without hardware being a hindrance in developing the solution. But as we see in the passages above, Apple though supports Boot camp through which it is possible to install Windows in Mac-Intel and Power PC, the support is limited. So further support can be increased by both the companies regarding the support, and Apple can legally produce an own software or authorize a third party software like Boot camp for mac-Intel and Power PC for installation of Mac on other PC.

Fig (viii) Mac OS X Lion Developer Preview Desktop

The Lion OS X should me made compatible to the x86 Intel which is one of the future work of OS X 86 projects and this can be implemented to the x64 based Intel machines when the Apple approves it. This brings about the more enhanced relation between multiple OS Environments such as the iTunes, safari, QuickTime which are Apple products available for Windows now and Microsoft Office, Silverlight plug in which are the Microsoft products available for Mac OS.

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