

Operating System Convergence

The revolution is underway! Apple Boot Camp recently announced that they were able to hack their own code base! The ultimate manifestation of this hack is the ability to successfully boot and run Windows XP Professional off the new Intel-based Macintosh hardware environment. This dual-boot functionality across OS platforms represents a fundamental shift in the way people will approach both the purchase of their next personal computer, and the way in which software developers adjust their target audiences. Additionally, this convergence of OS interoperability raises new questions that previously were moot because of the lack of inter-operable components.

The thrust of this article is three-fold. First, I will endeavor to explain the meaning of dual boot environments and the benefits that can be derived from these advances in functionality. Second, I will also demonstrate how this fundamental change will affect the next generation of computer purchasers both from a Macintosh and a Windows perspective. Finally I shall highlight some of the new questions and issues that remain to be addressed for both Windows and Macintosh development.

Dual Boot Environments Explained

A dual boot environment refers to the scenario where a computer, on initial startup, will give the end user the option to load a particular environment. In the past, this has primarily been used for situations where legacy software requires the older version of a particular operating system in order to function correctly due to driver configurations, file structures, and other coding limitations.

For example, a particular program may be designed for operation under the layout of a system running Windows 2000, but may not work in a Windows XP environment. To get around this issue, many people would install both operating systems to their computer and on startup, depending on what they wanted to do, they would select which operating system to load into the system memory.

The same functionality also exists in Macintosh environments, as legacy applications (outdated software) would sometimes need OS 9.3 to run, but the person has a Macintosh running some flavor of OS X. The dual boot environment would allow the user to load OS 9 or OS X at startup depending on their purpose.

Until very recently, Macintosh and Windows were unable to load their counterpart operating systems due to hardware discrepancies between the two environments without the use of very expensive Virtual Machine (VM Ware) applications. Even then, the VM Ware clients are also known to utilize a lot of system resources which in turn slows down everything else. The architectural differences between the processors used in Macintosh computers and IBM-based computers prevented the different structures of the operating systems to work in the divergent environments. With the migration of Macintosh to the Intel based architecture for its processor, and the endeavors of the Mac Boot Camp team (see the requirements here: www.apple.com/macosx/bootcamp), Macintosh users can now load the Windows XP operating system onto their computer and thus bridge the gap between the two operating systems. This realization leads to yet another question: What does this mean for current Macintosh and Windows users? The next section shall address this question from both a Macintosh and a Windows perspective.

There are also some hardcore enthusiasts that have also been successful in loading OS X onto a PC environment (Dell is one I personally have witnessed). While the OS does load, problems with hanging after startup prevent this from being considered a viable alternative for the time being. Rest assured though, eventually the kinks will be worked out so that the larger consumer population would eventually be able to load any OS they want onto any hardware configuration they want.

Dual Boot Limitations

While the ability to boot between operating systems of different code bases does offer advantages, there are also limitations. The primary of these would be the accessibility factor – meaning that an application installed under one OS is still not accessible under the alternate environment. This requires a re-boot into

the alternate OS to utilize applications designed for one particular environment. This tedium is being addressed even as we speak, as developers and hardcore enthusiasts alike look for ways to load both operating systems simultaneously.

The alternative to the dual boot scenario is the virtual machine scenario where one OS is loaded, then an application is launched that allows a virtual version of the alternate system to load so the feature set of the second OS can be utilized without having to toggle between operating systems. While the benefits of this are clear, the cost is quite large when you consider both the software and hardware requirements. The software itself runs in the neighborhood of \$200 - \$1000 depending on your needs and number of licenses purchased. The hardware requirements to run the software are for some of the faster processors on the market, and extra RAM investments are needed to offset the performance degradation involved in this environment. The minimum required for any virtual machine environment would be 1 GB of RAM with a standard configuration of 2 GB. Since most motherboards on the market can recognize this level of RAM, there aren't any restrictions there, but processor limitations could also cause performance hits, thus a recent processor would also be one of the system requirements, with a minimum capability of 2.5 Ghz, with a recommended rating of 3.0 Ghz or higher. Clearly, virtual machine alternatives are not for those on a budget.

While expensive, these environments are highly desirable for individuals that have need for the feature sets of different operating systems, and many do have the budget to allow for such investments. Additional information on virtual machine environments and many of the reputable vendors can be found in at the following web resource: http://en.wikipedia.org/wiki/Virtual_machine

Benefits of Convergence

For the Macintosh faithful, this convergence of operating system compatibility through the use of Bootcamp® represents access to resources that previously had been unavailable in the form of Windows software applications. Given that Microsoft operates from a dominant position in the marketplace, most software applications have been designed and programmed with this in mind. As such, the market for Macintosh applications has been limited in terms of selection. As software designers and programmers work to make the current software applications dedicated for Macintosh use compliant with the new Intel architecture, the consumer benefits from the current software designed for Windows thanks to BootCamp.

For the Windows users that have been tempted to switch in recent years due to the sleek and stylish casing that Apples have become famous for, this represents the ability to make that transition to take advantage of the feature set while not losing the systems and interface that they are accustomed to. This gives the Windows user an opportunity to learn a new interface at their own pace, while not losing the ability to get things done the way they are accustomed to. Additionally, Windows users can also gain access to the muscle that lies underneath the hood of the Macintosh. Powerful processors, motherboards, FSB, and graphics cards have also been one of the trademarks that Apple has become known for.

From a more neutral perspective, convergence of OS support allows for true apples to apples benchmarking of both software **and** the operating systems themselves. A recent article in Maximum PC actually addressed the OS issue head-on, running benchmarking tests on Windows XP Professional versus Macintosh OSX. The results were quite surprising actually, and can be found in their July issue, available on news stands now.

Unilaterally, this convergence will allow individuals to decide for themselves which GUI they prefer and this could have a dramatic impact on the future of software development as well as a re-drawing of the battle lines for Microsoft and Apple. People will no longer be limited to one operating system family based on their computing needs or function.

Remaining Issues

For the Macintosh crowd, the largest remaining issue is the waiting factor – how long will they wait while software developers re-write their applications for the x-86 code base? Applications that ran native to the

Apple processor architecture no longer work on the Intel-based Macintosh. With the change in the API layout, the software needs to be redesigned to accommodate the new hardware. As a result, the former applications need to run on top of an emulation layer, and as a result, now run slower. As the previously mentioned Maximum PC article noted, this may result in some Macintosh users moving toward Windows systems as the performance factor, now combined with the cost factor starts to enter into play.

For the Windows crowd, the fundamental issue revolves around perception. For the longest time, Macintosh was the province for hardcore graphics-oriented people. Designers, video editing, image editing and the like, all of which require very specific color management simply did not have the same accuracy or control in Windows that they did with Macintosh. As Microsoft closes the graphics gap, and Apple superiority diminishes in benchmarks, the perception of Apple superiority will continue unless Microsoft makes efforts to demonstrate the minimal differences that exist in the current IT environment.

What to Look For

The convergence of operating system architectures will lead both Apple and Microsoft in new directions. While usability and a user-friendly interface have always been key underpinnings of operating system development, the cross-architecture support will likely heighten this factor when consumers go to market. Both companies will have to look to new measure for attracting people to their sales desks. Software availability, customer service, system reliability, included software packages, and ultimately cost will all be more serious considerations for future generations of computer consumers.

What does this mean for the consumer? Ultimately, the cost factor is probably the most visible factor that will be affected. The high price tag previously associated with Apple systems will likely drop so they can compete with Microsoft. In addition, you will likely see more applications being developed for universal usage across both OSX and XP environments. Renewed promises and increased expenditures toward customer service areas will also likely happen in both camps. Finally, you will also likely see more applications come standard with the purchase of a new system. All of these considerations will enter into play when consumers make ultimate decisions on their next computer purchase.

Customer loyalties are the final consideration in this arena. Until recently, the two predominant crowds of Apple and Windows faithful had been just that – faithful. With the advent of virtually identical code bases, and as the gap narrows in performance, security, and other benchmarks, the trend will likely be to venture into new waters in search of not only the best performance solution, but also the best cost-based solution.

Draft – Jason Peterson, 2006