

BY BRENT GOODFELLOW,
CPA, CITP, MCSA, MCSE, MST, MCT



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Matrix Revisited

Most of you should remember the movie with Keanu Reeves where he played Thomas A. Anderson (aka Neo) and worked with his futuristic cohorts in virtual reality to combat the evil forces led by Agents Brown, Smith and Jones. The film was pure fiction, but as with many fictional ideas there is some reality. I'm writing this month about the world of virtual servers and desktops. Virtualization can be defined as a technique for hiding the physical characteristics of computing resources from the way in which other systems, applications or end users interact with those resources. In other words, applications, other systems and end users don't know (or care for that matter) that the server to which they're connecting isn't a physical box filled with a motherboard, processor, memory and network cards, but rather a piece of software that is using a small portion of those physical resources.

Virtualization is fast becoming mainstream, with businesses attracted by the significant cost savings associated with running eight to 10 virtual servers on a single hardware host system. Previously, hardware manufacturers hadn't included support for virtualization into their various hardware platforms, perhaps for obvious reasons since virtualization tends to eliminate the need for more hardware. However, current hardware components have specific support for virtualization. Case in point: Intel Virtualization Technology (Intel VT). This technology is a set of hardware enhancements to Intel server and client platforms that is intended

to improve traditional software-based virtualization solutions. Software virtualization solutions enhanced by Intel VT can improve the performance and robustness of software-only virtual machine solutions. Not to be outdone, AMD has also introduced hardware support for virtualization called *AMD Virtualization*.

These new generation motherboards and processors, along with virtualization software, more efficiently use resources provided to the host system. Most servers chug along at 10 to 20 percent of capacity. So instead of seven machines running at 10 percent utilization, you run one machine at

70 percent utilization. Beyond the savings in hardware, you'll reap savings in power, space and cooling since there are fewer machines running, and there are personnel savings as fewer administrators are needed for hardware maintenance. These software-only virtual machines are encapsulated into files, making it possible to rapidly save, copy and provision a virtual machine. Full systems (fully configured applications, operating systems, BIOS and virtual hardware) can be moved, within seconds, from one physical host server to another for zero-downtime maintenance and continuous workload consolidation.

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Ever have a server go down? This creates significant anxiety while high hourly rate professionals sit around waiting for their services to be restored. With virtual machines, the encapsulated file can be quickly moved to a functioning host and restarted. If the virtual machine image itself has stopped functioning perhaps because of a software update or change, the previous copy of that image allows for a 'roll-back' option to a previous time when the server was functioning. Obviously, virtual machines facilitate testing also. For example, Windows Vista was recently released, and I was curious as to how many of the tax and accounting applications would behave well when installed on Vista. Installing these on a 'virtual Vista' machine allowed for an answer to my question, and, if the machine became non-functional as a result of my testing, I simply deleted that virtual machine file and fired up the original one. Since I wanted to move to Vista on my desktop machine (and many of these applications didn't run on the new operating system), I have a virtual machine running XP on my Vista host system. This worked well for me as I fired up the XP virtual machine every time I needed to use one of those applications that didn't run on Vista and quickly switched back to my Vista host for other tasks that did.

Perhaps the two most common virtualization software companies are Microsoft and VMware. However, there are several others like Parallels, for example, which makes virtualization software for the Apple Macintosh operating system to allow for running applications designed for Windows. Microsoft's virtualization software comes in two varieties: Virtual PC 2007 for running desktop (workstation) operating systems and Virtual Server 2005 R2. VMware, Microsoft's major competitor, has recently released VMware Infrastructure 3 (VI3), which has added tools for quickly moving a virtual machine from one hardware host to another, maintaining that valuable uptime. VMware also has a desktop product called VMware Workstation, which is designed for desktop virtualization. Microsoft's Virtual PC 2007 is available (and can be downloaded) without charge at www.microsoft.com/windows/products/winfamily/virtualpc. You can get an evaluation copy of VMware's Workstation without charge, but if you want to use it beyond the 30-day evaluation period, you'll need to pay the \$189 license fee. On the server side, Microsoft's Virtual Server 2005 R2 is also available without charge at www.microsoft.com/technet/virtualserver/software. You can also get VMware's Virtual server product without charge at <http://register.vmware.com/content/download.html>, but if you want the full-featured VI3, you'll have to be serious because it carries a hefty price tag. VI3 comes in three editions: Starter, Standard and Enterprise. The Starter edition's license fee is \$1,000 plus mandatory support, while the Standard edition will cost \$3,750 plus mandatory support, and the Enterprise edition costs \$5,750 plus mandatory support.

Which is the best virtualization software? The answer to that question, of course, depends on who you ask. *Windows IT Pro* magazine gave its best virtualization software Reader's Choice award to Microsoft's Virtual Server 2005, but consider the source. The best advice is to spend some time evaluating the various options, and choose the one that best meets your needs and budget. Personally, I like Virtual PC 2007, and I've used the VMware workstation also. On the server side, VI3 has some nifty tools that Virtual Server 2005 R2 doesn't. From a management standpoint, I like VI3; but you pay dearly for those nifty tools. And, by the way, if Neo stops by, say, "Hello!" for me. ■

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