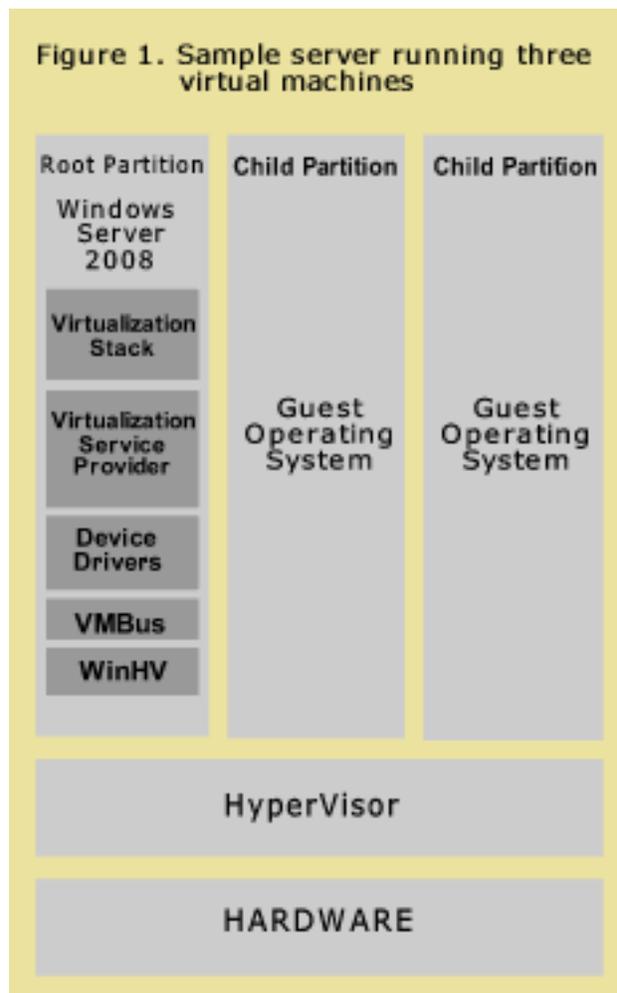


■ Virtual Machines

Businesses looking to save money and streamline their network(s) have been using the technology of virtualization. Virtualization isn't new – it was pioneered by IBM over 40 years ago. Because of the ever increasing demands on businesses to improve performance, gain efficiencies and lower costs, the benefits of virtualization are being realized and systems are being implemented at a rapid pace.

According to recent research*, in 2009, 50% of new servers at 195 Fortune 1000 companies were virtualized and it is estimated that by 2012 nearly 80% of new servers will be virtualized (*source: TheInfoPro, 2009).

Figure 1. Sample server running three virtual machines



Based on these figures, virtualization is here to stay. It's an important concept for all business managers to understand so we'll discuss some key points in this newsletter.

What is Virtualization?

In its most basic form, another word for virtualization is simulation; the hiding of physical characteristics to achieve a certain end. Examples of simulation applications would include flight simulators and online virtual communities. Flight simulators allow new pilots the opportunity to train safely without the risk of crashing an actual plane. Online virtual communities, like Second Life, allow you to create an avatar and interact with others without leaving your home.

When someone talks about virtualization in regards to servers and desktop computers, they are referring to how hardware and software relate to one another. Virtualization separates the hardware from the software so that one piece of hardware can do the same job that multiple pieces of hardware were required to do before.

Virtualization can accomplish this by using specific software to simulate the execution of programs. For instance, when you set up a virtualization platform, multiple operating systems and applications can run independently on a single server or computer regardless of the perceived incompatibility.

■ Website Worth Watching

- ▶ www.epeat.net – Using 24 environmental criteria, this site evaluates and reports on the following electronics: desktop and laptop computers, thin clients, workstations and computer monitors.

The site puts products into Gold, Silver and Bronze categories to allow users to easily evaluate, compare and review products based on toxic materials used, recycling practices and more.

When Should I Deploy Virtualization?

In a traditional environment, software and hardware are intricately entwined. Some software, like Windows SMB (Small Business Server) can only be installed with certain software. Depending on the hardware that the SMB is put on, a good portion of the resources may be underutilized. However, in the case of virtualization, Windows SMB can be installed in a virtual environment alongside other virtual machines running, for instance, a Linux server. Each virtual machine sees only itself thereby reducing any conflicts. As long as the hardware resources are robust enough, you can have multiple virtual machines residing on the same box.

Since most servers have underutilized space, setting up a virtual machine can increase efficiency and performance while reaping cost savings.

Virtualization isn't just used for servers however. For desktop computers, virtualization allows you to run a Windows OS like XP or Vista alongside Mac OS X or a Linux flavor as well as all of the respective programs on each platform. Whereas you used to have to buy a PC as well as a Mac, you can now purchase one piece of hardware and install the other OS without conflict.

Another benefit is that many virtual applications can be installed on USB flash drives and external hard drives increasing your portability options.

If you need multiple platforms either on your workstation or network wide, if you need to test new applications before rolling them out, or if you want to streamline your hardware and avoid redundancies, virtualization is worth considering.

Advantages and Disadvantages of Virtualization

For the purposes of this newsletter, virtualization can be implemented with:

- 1) **Servers**, using products such as Microsoft Hyper-V, VMware Server, or Citrix XenServer.
- 2) **Desktop computers**, using products such as VMware Workstation, Parallels or Microsoft Virtual PC on the soon to be released Windows 7.

Components of a Full Virtualization Platform

The key component to a virtualization platform is the hypervisor (Figure 1). It serves as a bridge between the host hardware and the virtual machines set up either on a server or workstation. The hypervisor monitors resources and keeps the virtual machines hidden from one another to eliminate conflicts. Each virtual machine runs its own OS and corresponding programs, like Windows XP, Mac OS X, Linux, MS SQL Server, etc.

Advantages of Virtualization

- 1) **Convenience and Efficiency:** Run multiple operating systems on one computer or server (including a mix of Windows, Mac and Linux) resulting in less maintenance and easier administration. Test software before rolling it out. Push out software patches and update security policies quickly. Manage workstations remotely.

- 2) **Cost:** Reduce capital costs by using less hardware; two or more servers can be consolidated into one server (as long as the one server has enough RAM, storage, and processing power).

- 3) **Performance:** Increase availability of applications by reducing the downtime of server maintenance. With virtualization, hardware can be maintained while clients actively access resources. Virtual applications can be restarted remotely which also decreases downtime.

Disadvantages of Virtualization

- 1) Certain databases and proprietary applications would not benefit from running in a virtual environment due to their size and access need.
- 2) Server virtualization may require significant up-front costs to purchase new hardware to support the virtual environment (such as increased processing power and RAM). For some, these up-front costs are too costly given the existing infrastructure. Only a true cost-benefit analysis will determine if and when it makes sense to implement virtualization technology.

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