Business Virtualization

Why should I consider server virtualization?

- **Save money.** Often servers are dedicated to just one or two applications. As a result servers in many organizations are only using 15 or 20 percent of their actual capacity. Using virtualization organization can consolidate server providing for efficient use of resources. Instead of replacing each server with a new system, organizations can replace 4 or even 10 servers with in most cases just one or two systems. That reduces the cost of hardware and operating systems.
- **Save energy.** It can cost a lot of money to power a business's servers and to cool those very same servers. By reducing the number of physical servers being used an organization can dramatically reduce the power need to run and cool those systems and yes this saves money too.
- **Save time.** Regardless of how many physical servers you have there are always maintenance issues that must be address. Reduce the number of systems and you reduce the time needed to complete those maintenance requirements.
- **Enhance Disaster recovery.** The most beneficial aspect of server virtualization and yet not fully appreciated until it is really needed. It can take days to recover lost physical servers and install the applications on those servers. Virtual servers can be recovered in hours what could have taken days to do with physical servers

What can server virtualization do for me?

This is the 64 thousand dollar question and an important one to ask if you are looking at server or desktop virtualization. Server virtualization can save organization money and time in a number of ways. For example let's consider a situation where Joe's Corp has been running a server application on a Windows 2000 server for the past 8 years. The program was customized to meet the specific needs of Joe's Corp and still fills that purpose today and is critical to the organizations daily operations. Now this 8 year old server is starting to have some problems and Joe wants to upgrade the system to a new server and newer operating system. Sounds like a really good idea but there are some problems with his idea
   1) The software will not function properly on Windows 2008 or 2003.
   2) The company that Joe's Corp purchased the software from went out of business in v 2008.
   3) And this is the biggest problem; Joe's Corp has lost the source code for the program. So even if Joe's Corp wanted to try using a Windows 2008 or 2003 server, they were out of luck!

Prior to server virtualization Joe's Corp was pretty much up the preverbal creek without a paddle. When the inevitable hardware failure finally stopped their server in it tracks, it was also going to mean the end of their custom software. Which also could, in this scenario mean the end of Joe's Corp!

Today however, Joe's Corp critical piece of software can be saved through the use of server virtualization. In many cases, Joe's Corp's server can be transferred directly to a virtual system running on new hardware and a new operating system.

How does virtualization work?

A typical server is made up of a CPU, one or more hard drives, a video card, a mouse and keyboard and a network interface card. Once an operating system is installed these physical components can run end users or back room applications that provide organizations with everything from data storage to live video feeds.

Current virtualization software works at the hardware level to partition a physical server so that multiple operating systems can be run simultaneously in protected virtual hardware space. This allows multiple operating systems to operate independently of each other while share the same physical hardware

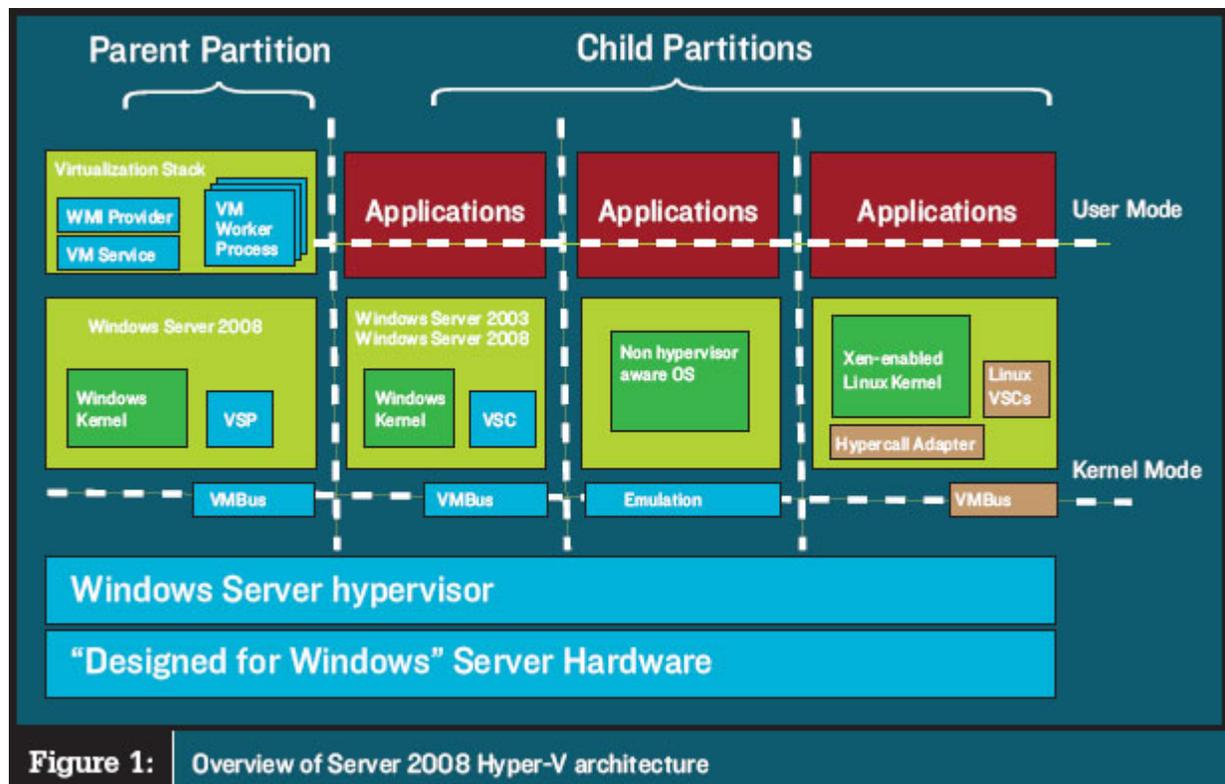**Figure 1:** Overview of Server 2008 Hyper-V architecture

Image from Windows IT Pro January 30, 2008

Hyper-V allows a single server to run a number of operating systems both windows and Linux base. Additionally in a process known as Physical to Virtual conversion existing systems can be converted directly from a physical server to virtual server. In the case of online conversion with little or no down time. Older operating systems like windows 2000 must be converted using an offline process. Such systems are booted up in a special environment where the data and system information is transferred to the virtual environment. In either the offline or online process the original server will still operate as before should the conversion process not complete successfully.

Can I virtualize all of my servers and what about desktops?

You can also virtualize a desktop and benefit from moving an old workstation to a new more stable physical system. Just like with servers you may have an application that will not correctly work or may not work at all on Vista or Windows 7. Perhaps you purchased software for a Windows 2000 PC 9 years ago and no longer have the install disks. Desktop virtualization can add life to those old applications that may be critical to you.

So is every system a candidate for virtualization? The short answer is NO. We can help you determine which system both desktop and servers are good candidates and which are not.

Two examples would be a desktop that require very high end graphics or a server that uses a bank of modems. Virtual systems do not have access to the physical hardware and as such often cannot utilize specialized peripherals and high end graphics capabilities.

What server configuration can I use as my virtual host system?

In large organizations virtual server consolidation often utilize such technologies as Fiber Networks and Store Area Networks costing tens of thousands or even hundreds of thousands of dollars even before the first virtual host or virtual server is deployed. Cost like this is really not viable for the vast majority of small and midsized business. So you are probably wondering what kind of system I need to take advantage of server virtualization.

Let's say you have a single server running on older hardware that you really want upgraded. We can help you get that server running on current hardware platform for not too much more than the cost of the new server and the new operating system. In such a scenario there is no need for anything more than a standalone server. However you still get many of the advantages afforded organizations using server virtualization.

If you want to move 2 to 4 servers again you may want to consider a single host server solution to save considerable money on hardware and operating system. However, you are going to want to probably invest in a considerably more robust system for such a deployment. While such systems are more costly they are still much less than deploying multiple physical systems.

At the higher end, where you have a 8 servers running on hardware of varying ages, that run mission critical and time sensitive applications. It would be possible to implement an ISCSI SANS type environment using Microsoft Data Server and two virtual host servers. In such an environment fail over of the application servers can achieved at fraction of the cost of deploying physical servers. This type of configuration is quite a bit higher in cost but offers a much more robust infrastructure.

We would be more than happy to look over your current environment and discuss the options that are likely to help your organization release the benefits server virtualization can provide.

So I have virtualized my servers what now?

Disaster Recovery

Once an organizations server has been converted to virtual servers there are a number of benefits to an organization. Probably the most beneficially is the easy of disaster recovery. Something most organization will not fully appreciated until they need to recover their systems from a disaster.

Let's look a simple case of a small organization that has a single old server running windows 2000. The box has been running fine for years and has had no indications of hardware problems. This server stores your accounting records and business files for the essentially the entire company. You do a complete backup every other day so everything is great in the case of a disaster right? Actually, even with current full backup you may have some serious issues to overcome to get back up and running. Windows 2000 actually came out in Feb 19 2000 but let's assume you purchased your server several years later in 2003 and not being a first adopter of technology you had Win2000 installed on it instead of Windows 2003. Even though your servers is quite a bit newer that the operating system running on it, there is little if any change that a replacement server purchased today will have any of the same hardware subsystems. So when you restore your backup on to the new server most if not all the drivers will be missing to run the new system. So what will you get when you boot the system up? If you are very, very lucky you will receive error message followed by error message more likely your server will freeze up and fail to boot. So what can you do to get around this problem? You can do a fresh install of windows 2000 on the new server, apply the correct drivers and install your applications from your original installation media (CDs). Then restore just the data files from your backups and take the necessary steps to get your programs to use that data. Not exactly, a an easy or speed process especially if Windows 2000 drivers are no longer part of your hardware drive list.

You could upgrade to Windows 2003 or 2008. However, you have to worry about software compatibility issues, will you old Win2000 apps run on the newer operating system. Then

there is the question of is that original installation CD still around and are they still readable. Perhaps you will need to contact your vendor if they are still in business and obtain a newer version of your software. In any event, if you cannot obtain a reasonable approximation to your original server's configuration the chances of having an easy recovery even with current backups are not good.

In a virtual environment your server exists as a set of several files. The most important of these files is a virtual hard drive or drives. If you have backup up these drives and your system is destroyed you can literally fire up a windows 2008 server, configure it to have a Hyper-v role and you can be back up and running in a little more time than it takes to copy over your virtual server source files. What could easily take days with a physical server, can be done in a few hours with a virtual server?

Software Patches and Upgrades

Then there are software patches for either your operating system of your programs running on your virtual server. In the physical environment you need to backup your server and once that is done. Apply your patches. If there is a problem you have to take steps to recover from whatever that problem may be by whatever means is necessary. To include possibly doing a restore from your backup you just made in extreme cases.

In a virtual environment patches to either the operating system or programs running on your servers can easily be handled through the use of "Snap Shots" of the System. Prior to applying a patch you take a snap shot of your system. You can think of a snap shot, just like it sounds a picture of your server, frozen a specific point in time. So you take a snap shot of your system then apply your patches or updates. If there are no problems simply delete your snap shot and reboot your server. If there is a problem you can select to deploy the snap shot. The change since the snap shot can simply be discarded. Your server is easily rolled back to the point where the snap shot was taken. Any problems resulting from the patches or upgrade is history.