



Raxco Software White Paper

Virtualization - Your Path to Savings

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Table of Contents

Introduction	3
How Virtualization Works	3
Benefits of Virtualization	3
The Software "Gotcha"	4
Performance Issues	4
Conclusion	5
Sources:	5

Introduction

Virtualization is certainly a key buzzword in the IT industry today. Few probably realize that virtualization was actually introduced in the 1960s as a way to partition mainframe systems for distributed processing. The introduction of minicomputers and PCs proved a more viable solution to distribute processing power, so mainframe virtualization popularity went away.

In the 1990s, it became apparent that virtualization could once again be the solution to the problem of underutilization of systems and increasing management costs. Today, virtualization is one of the hottest topics for enterprise IT. Around the globe, the largest enterprises are in varying stages of virtualization implementation. They are either using it full bore, have it selectively implemented, or are planning how to use it. According to the Yankee Group, 9 out of every 10 enterprises will have implemented virtualization somewhere in their infrastructure by the end of this year.

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How Virtualization Works

Virtualization is an abstraction layer that decouples physical hardware from the operating system. This allows multiple virtual machines, with homogeneous or heterogeneous operating systems, to run concurrently on the same physical system. The physical resources from the physical system (CPU, RAM, NIC, disk space, etc.) are partitioned from the physical system and allocated to the virtual machines created. The operating system sees these virtual machines as independent systems with what appears to be their own hardware.

Virtual systems are consolidated into files; this makes it possible to move an entire system easily from one physical system to another. This provides the enterprise with some considerable advantages.

Benefits of Virtualization

In many instances, organizations see consolidation ratios between 10:1 and 20:1. This means an organization with 500 servers could reduce its physical servers to between 25 and 50 machines, depending on the nature of its applications and the resources available on each system. In addition to the savings on the physical systems, there is an additional savings in reduced management and administrations costs.

There are other benefits besides server consolidation. Since the movement of a virtual machine can be accomplished in short order, it is possible to minimize planned downtime and ensure better service levels. Virtualization can also be part of a disaster recovery solution. And, virtualization is particularly well suited to software development and testing.

Virtual machines let you obtain more internal test mileage on a new application before it goes to beta testing. Multiple test suites can be applied in a shorter time span when the physical resources are divided among multiple virtual platforms. In those instances where scalability is a factor, virtual systems can easily test deployment and network traffic issues.

Rolling out new applications is a different experience with virtualization. The old way required purchasing new hardware, installing and patching the OS, installing and configuring the application and testing. With virtualization, the creation of a new virtual machine takes a few clicks of the mouse. Install and configure your application and you are ready to go.

According to VMWare®, the market leader in virtualization software, its customers have achieved the following results:

- 60-80% utilization rates for x86 servers; up from 5-15%
- New applications provisioned in tens of seconds, not days
- Change request response times measured in minutes
- Zero downtime hardware maintenance without waiting for scheduled time windows

The Software “Gotcha”

An article in the February 12, 2007 issue of InfoWorld described the experience of the Defense Contract Management Agency (DCMA) and its consolidation of 17 datacenters into three. Typically, software is licensed to run on a single server. If you have to license it on each virtual machine the software costs could diminish any savings from virtualization. Some companies are revising their licensing for virtualization while others will not provide support if the software is running on a virtual machine.

System security is also an issue with virtualization, according to InfoWorld. If your security software runs on a physical server, but a virtual server is moved to a second physical server without the security, it could be a problem. The security should be deployed at the network layer.

Performance Issues

While virtualization maximizes system resource utilization, it does come with a downside, particularly on workstations. As more resources are used, performance generally takes a hit. When you are using upwards of 80% of CPU across tens of virtual systems, things will slow down. There are some actions you can take to mitigate these performance issues.

If you are like most users, you run antivirus software which provides real-time protection. While this protection is great, it can adversely affect your virtual system performance. The solution to this is to create an exclusion filter for the virtual system. If you are running VMWare, you will want to exclude the

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*Raxco's PerfectDisk®
for VMware*

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.vmdk (virtual disk) and .vmem (virtual memory) files so the I/O operations on the virtual system are not subject to antivirus checking.

A second performance killer is fragmentation of the host operating system drive and virtual drives. Virtual disks can be quite large (a 4GB average minimum) and they grow as you install more software on the guest operating system, until you reach your maximum limit. If you have only one physical disk, the expanding virtual disks will cause the host operating system to increasingly fragment the virtual machines. It is important for optimal performance of the host machine to defragment it regularly. It is also important to defragment the virtual drives regularly, as well as reindex the machines, and shrink the virtual drives to reclaim space for the host machine. By performing regular defragmentation, reindexing and shrinking, you can be assured your entire virtual environment is optimized.

A final performance issue is page sharing. This feature allows guest memory pages with identical content to be stored as a single copy-on-write page. This decreases host memory use, but consumes system resources, potentially including I/O bandwidth. You can disable page sharing if there is sufficient host memory and if disk I/O is an issue.

Conclusion

Virtualization is certainly here to stay, but it is not a panacea to all distributed IT ills. Care must be taken to think through potential problems in the areas of security, performance, and maintenance. Like anything else worth doing, you need to take the time to implement virtualization correctly so you receive the maximum benefit.

Sources:

ZDNet.com

VMWare: Intro to Virtualization

VmWare: How to Improve Disk I/O Performance 11/21/2005

InfoWorld: Virtualization Reality Check, 2/12/2007