Nash Networks Inc
IT Consulting

Serious about technology. Serious about your business.

Virtualization: A Small Business Perspective

"Making every IT dollar count!"

Part 5, May 2009

Contents

Executive Summary

What is Virtualization?

➢ Virtualization means splitting up a single physical computer into several "virtual" computers.

➢ Server virtualization is the most common, and involves splitting up a single physical server into several virtual servers.

➢ In desktop virtualization, a central server is divided up into multiple virtual desktop computers that are accessed remotely.

Main Pros

➢ Savings on hardware, energy usage, management and co-location.

➢ Faster and cheaper backup and disaster recovery.

➢ Ability to set up test computers without disrupting live ones.

Main Cons

➢ Single point of failure. No virtualized system should be put in place without proper contingency planning.

➢ Higher costs for individual servers, higher bandwidth costs.

➢ Because of economies of scale, hardware and other savings may not materialize for small and medium businesses.

Does Virtualization Make Sense for Small and Medium Businesses?

Expert opinion is divided as to whether virtualization can pay for itself in environments with fewer than 20 servers.

The biggest benefits are faster and cheaper backup and disaster recovery, scalability and greater technical potential and flexibility.

Benefits are most likely to be in TCO rather than direct, immediate savings in, say, hardware and energy costs.

What is Virtualization?

Virtualization means splitting up a single physical computer into several "virtual" computers.

Imagine the average single-application server as a single employee kicking around in a huge office. This person does his or her specific work effectively, but most of the office space is wasted. Next-door is another huge office, with another employee performing another specialized function. Each office is managed and organized separately.

That's how most companies run their conventional servers.

Some brave souls try to improve resource utilization by running several applications on one server. But having ten people doing different jobs in a single huge office is awkward and causes problems with space utilization, boundaries and resource allocation.

Now, imagine the typical office that's divided into cubicles. Each cubicle worker has a specific job, clearly demarcated space and resources, and is separately managed. The entire office benefits from unified management – heating, cooling, security and so on.

That's virtualization.

Is It Just Another Fad?

No. Virtualization is a very hot technology and there is certainly a lot of hype around it – but there seems little doubt that it's here to stay. It makes huge sense for data centres and large companies in particular, and continues to gain ground. In its "Top 10 Strategic Technologies for 2009", the Gartner IT research group put virtualization at number one.
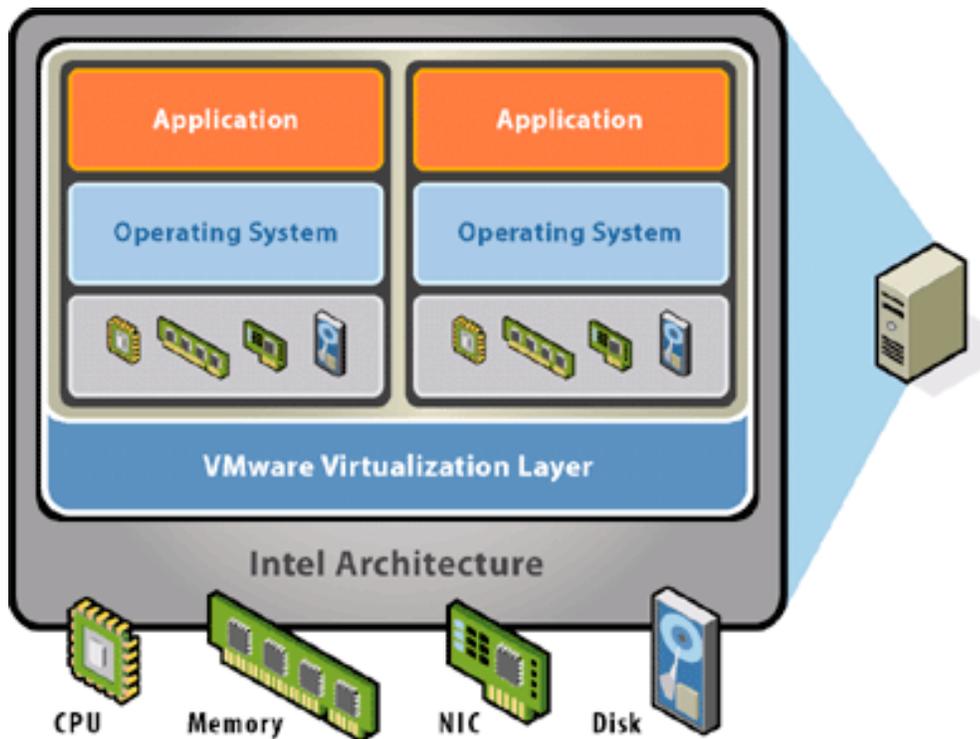
Types of Virtualization

There are quite a few types of virtualization, and some are conceptually complex. For small and medium businesses, though, the most important types are server and desktop virtualization.

Server virtualization

This is the most common, and involves splitting up a single physical server into several virtual servers.

Diagram of a virtualized server

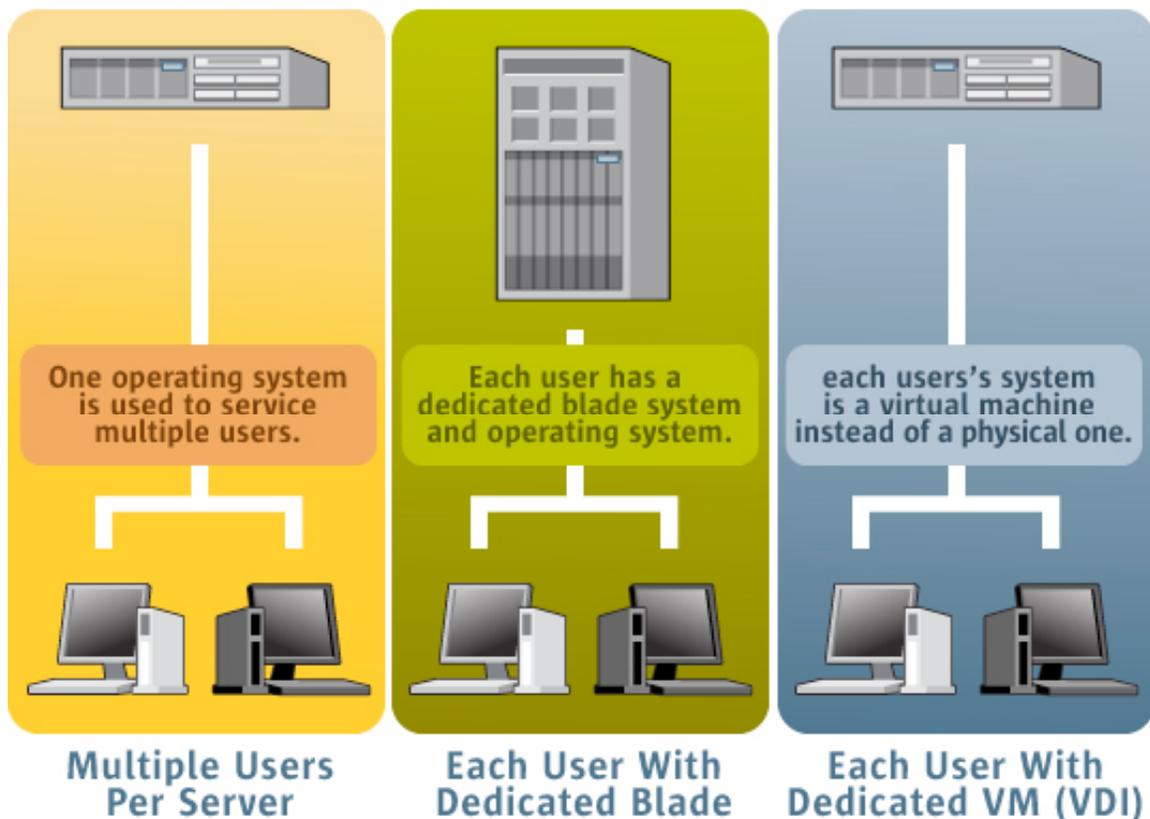**(Source: Cornerstone IT, http://cornerstone.it/solutions_server.php)**

Desktop virtualization

Here, a central server is divided up into multiple virtual desktop computers. Users remotely access the central server. From the user's perspective, the look and feel is that of a normal desktop. Conceptually, it's like the old mainframe model with "dumb" terminals.

Diagram of virtualized desktop servers

**(Source: Sun Inner Circle
http://www.sun.com/emrkt/innercircle/newsletter/0108/feature.html)**

One operating system is used to service multiple users.

Each user has a dedicated blade system and operating system.

each users's system is a virtual machine instead of a physical one.

Multiple Users Per Server

Each User With Dedicated Blade

Each User With Dedicated VM (VDI)

Advantages of Virtualization

➢ **Efficient use of hardware.** The typical conventional server runs only one major application (e.g. Exchange) and might be using only 10-15% of its processing capacity. Virtualized hardware works hard and is more cost-effective, particularly if it is running many virtual servers.

➢ **Better and cheaper backup and disaster recovery.** A virtual computer can be backed up very easily as an "image" - unlike conventional backups, which require complex and often expensive software. The images can be restored onto dissimilar hardware, unlike conventional backups, which often can't. The image can be brought up almost instantly. This provides a working service while the primary computer is restored, and dramatically reduces downtime. It's also very fast and easy to roll back a computer to a previous version, instead of having to fix it in, say, the case of a virus infection.

➢ **Better management.** Virtual computers can be centrally and efficiently managed. Central administration and "locked-down" desktop environments dramatically reduces support costs. Software can be installed and updated quickly and automatically across a virtual network. Virtual test machines can be created almost instantly so that testing can be done without any disruption of live machines.

➢ **Ability to set up and test new machines.** This can be done easily and with no disruption to live services.

➢ **Less network infrastructure.** Fewer physical machines mean less physical infrastructure – meaning lower purchase costs and less maintenance.

➢ **Lower power and cooling costs.** This is particularly relevant to data centres or organizations with many servers.

➢ **Lower co-location costs.** Fewer physical servers take up less space, slashing co-location costs. This has allowed the hosted application industry (e.g. hosted Exchange, hosted QuickBooks) to fly.

➢ **Better security.** Virtualization can provide centralized and secured computing environments. Desktop virtualization takes data off individual workstations and laptops, removing the risk of data loss through physical theft or loss of desktop machines.

Disadvantages of Virtualization

➢ **Single point of failure.** If a virtualized server fails, the entire organization can be paralyzed. If a company uses virtualized desktops and the central hosting server goes down, users can literally do nothing on their desktops – compared with conventional desktops where users can keep functioning even if the network is down, and a single desktop failure doesn't impact anyone else. This is a **significant** downside and no virtualized system should be put in place without proper contingency planning.

➢ **More powerful hardware needed.** Virtualization uses fewer servers, and uses them better, but because they need to be more powerful, the reduction in total hardware costs may not be as dramatic as expected.

➢ **Greater demands on the network.** Network and bandwidth requirements will be greater. If the virtualized server is hosted remotely, adequate and redundant bandwidth are needed, and this can push up running costs.

➢ **Complexity.** Virtualization increases complexity on a computer, making it harder to manage and troubleshoot, particularly if it is not properly set up and documented. Without good automation tools, a virtual server can be almost impossible to manage.

➢ **Potential security problems.** Some sources feel that security can be more difficult to manage on a virtualized system. New forms of attack could target the virtualization software itself – though so far this has not happened.

➢ **Third-party support issues.** Some vendors may not be willing or able to support their software if it is running on a virtual server.

➢ **Lower tolerance for poor management.** Operators of virtualized systems have to manage and document virtual environments properly. If they don't, they could end up with a messy jumble of virtual machines that can be costly in terms of time and unnecessary licences.

Pros and Cons of Desktop Virtualization

Aside from the general pros and cons of virtualization, some factors are particularly relevant to desktop computing:

Pros

➢ **Centralized management.** Desktop virtualization solutions let administrators manage user desktops centrally, making it easier to keep desktops updated and secure. Desktops are standardized, hardware-independent and controlled.

➢ **Improved uptime.** In the virtualized desktop environment, a user with a virus infection doesn't have to wait days for the infection to be cleaned out. Instead, a new clean image can simply be installed and the user can be up and running almost instantly.

Cons

➢ **One down, all down.** The most significant downside of a central "master computer" is this: If the central server or the network goes down, users are 100% computerless. In the conventional environment, users can still work offline during an Internet outage, or other users can continue to work when one desktop is down. In this situation, there is simply nothing anyone can do until the server or network is back up.

➢ **Loss of flexibility.** The downside of that is that users lose their flexibility and customization – much of the reason that the computing world moved from mainframes to PC in the first place.

Does Virtualization Make Sense For Small and Medium Businesses?

Yes, no, and maybe.

It all depends on the specifics of the situation, and on which expert you ask.

➢ For large data centres and companies with more than 50 servers, virtualization has become pretty much a no-brainer, offering significant cost reductions and rapid ROI.

➢ It's less clear whether virtualization can pay for itself in environments with less than 20 servers, let alone the more typical small business environment with perhaps 1 to 6 servers.

➢ If a company is starting a network from scratch, it might well make financial sense to virtualize rather than buying multiple conventional servers that will each run at 10-15% capacity. In most cases, though, there's an existing network, and the cost of replacing it is high.

➢ Whether or not virtualization will be of benefit depends very much on the specifics of the business - its needs, plans, budget and situation.

In our view, the major potential benefits of virtualization for small businesses are:

➢ **Better and cheaper disaster recovery.** Not to belabour the point, but this is probably the biggest advantage of virtualization for the typical small business.

➢ **Scalability.** More servers can be added without extra hardware costs.

➢ **Flexibility.** Servers can be added and removed, test servers can be created, and computers can be rolled back to previous versions.

There's surprisingly little to say on this topic, despite the fact that a certain amount has been written about it. One reason is that this really is a decision that has to be made on a case-by-case basis, with the specifics of each company's needs and budget taken into account.

The main reason, though, is that in general, virtualization technology is still too heavyweight for most smaller companies. Virtualization technology that makes less demands on the system and management resources would change this – but it's not on the horizon yet.

Cost implications of virtualization for small businesses

Item	Effect	Comments
Hardware	Same or down	Fewer computers needed, but they need to be more powerful. Less network infrastructure needed.
Licences	Same or up	Small business virtualization software is usually free or inexpensive but can be costly. Minimal to no savings can be expected for other software.
IT support	Same or down	Some extra skills are needed, but management is easier and faster.
Bandwidth	Same or up	Bandwidth has to be more robust and with redundant connections if the servers are in a data centre.
Disaster recovery	Down	Planning, implementation and recovery are much cheaper and faster.
Data centre co-location space	Down or up	Fewer computers mean less space to pay for – but many businesses might not have needed data centre space at all prior to virtualization.
Power and cooling	Down	Savings are only significant if costs were high in the first place.

Sources

3 Reasons to Virtualize Your Small Business
Steve Norris
http://ezinearticles.com/?3-Reasons-to-Virtualize-Your-Small-Business&id=2116982

Can Virtualization Help My Small Business?
Clint Eschberger
http://blog.cretec-web.com/index.php?/archives/109-Can-Virtualization-Help-My-Small-Business.html

Cheap or free virtualization tools that work wonders for small firms
Paul Venezia, 2009
http://www.itbusiness.ca/it/client/en/home/News.asp?id=52295

Microsoft blog on Hyper-V versus VMware pricing
Steve Kaplan, 2009
http://roidude.typepad.com/

Obtaining maximum ROI from virtualization
Greg Shields, 2008
http://searchservervirtualization.techtarget.com/generic/0,295582,sid94_gci1314819,00.html

ROI Analysis: Virtualization
Tom Kaneshige, 2008
http://www.informationweek.com/news/storage/virtualization/showArticle.jhtml?articleID=208403469

Server Virtualization
Oscar Cwajbaum, 2008
http://www.oscarc.net/blog/2008/08/server-virtualization/

SMBs Moving to Virtualization, SAAS in 2009
eWeek, 2009
http://www.devsource.com/c/a/Architecture/SMBs-Moving-to-Virtualization-SAAS-in-2009/

The advantages of application virtualization
Michael Pietroforte, 2009
http://4sysops.com/archives/the-advantages-of-application-virtualization/

The Downside to Virtualization: Security Risks machines
Minda Zetlin, 2009
http://technology.inc.com/security/articles/200904/virtualization.html

The Hidden Costs of Virtualization
Dave Leonard, Infocrossing, 2007
http://www.virtual-strategy.com/Features/The-Hidden-Costs-of-Virtualization.html

The Pros and Cons of Virtualization
Business Trends Quarterly, 2007
http://www.btquarterly.com/?mc=pros-cons-virtualization&page=virt-viewresearch

The security benefits and risks of virtualization
Bill Brenner, SearchSecurity.com, 2008
http://searchsecurity.techtarget.com/news/article/0,289142,sid14_gci1302706,00.html

The tricky math of server virtualization ROI. Virtualization is a good thing, but it's not a slam dunk when it comes to saving money
Tom Kaneshige, 2008
http://www.infoworld.com/d/virtualization/tricky-math-server-virtualization-roi-192

Virtualization Comes to Small and Midsize Businesses
Alan Radding, 2009
http://www.accelerateresults.com/category/5/article/152-virtualization-comes-to-small-and-midsize-businesses/1

Virtualization fits in small business
Walter Scott, 2007
http://news.zdnet.com/2100-3513_22-151936.html

What Gartner Didn't Say About Client Virtualization
Bernard Golden, CIO.com, 2008
http://pcworld.about.com/od/softwareservices/What-Gartner-Didn-t-Say-About.htm

What is Virtualization, and Why Should You Care?
Laurie McCabe, 2009
http://www.smallbusinesscomputing.com/biztools/article.php/3819231

What Virtualization Means for Small Business
Drew Robb, 2008
http://www.smallbusinesscomputing.com/news/article.php/3725081

About Nash Networks

What we do
We manage and maintain IT networks for small businesses.

Philosophy
We understand that every business is unique, with unique technology needs. We provide and support the mix of technology that's right for each client.

We aren't a one-solution shop. There's no such thing as one-size-fits-all in technology (or socks).

Skills
We know a lot about a lot: Windows, Unix, Macintosh, programming, connectivity, VoIP, virtualization, security, disaster prevention … and much more.

People
Our consultants are all university-educated, experienced, highly skilled and excellent problem-solvers.

Vendors & subcontractors
We recommend and use only quality vendors whom we know and trust.

Technology
We use state-of-the-art monitoring, remote support and backup tools.

We constantly update and upgrade our tools and capabilities - but where it makes sense, we continue to use tried and trusted, older technologies. We're not driven by fads.

Core Team

Paul Nash
President
paul@nashnetworks.ca
(416) 848-3335 x 402

Jacques Lauzon
Senior Consultant
jacques@nashnetworks.ca
(416) 848-3335 x 403

Susan Fazekas
IT Consultant
susan@nashnetworks.ca
(416) 848-3335 x 405

Linda Jacobson
General Manager
linda@nashnetworks.ca
(416) 848-3335 x 401

Website
http://www.nashnetworks.ca