

WHITE PAPER

Virtualized Dedicated Hosting in the SME Market

The purpose of this paper is to discuss and evaluate the use of Virtualization in the Dedicated Hosting space, with a focus on its use in the Small / Medium Business Market. More specifically, small / medium IT companies that already have some access to a dedicated hosting environment.

The audience for this paper is the newcomer to the concept of Virtualization.

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Basic Definitions

To begin with, let's discuss a couple of definitions:

Dedicated Hosting – This is a situation where a business has a need to run one or more applications on a server, which is in some way exposed to the Internet.

Some common examples of this are

- A business that hosts a number of web sites for itself or on behalf of its customers. Commonly such a business will choose a server operating system such as Windows 2003 or Linux, then will operate a shared hosting environment to manage the web sites and email services.
- A business that needs to centralize the management of files / data to be accessed by a number of different branch offices.

Virtualization – The act of running one or more virtual computers on a single piece of hardware. The virtual computers share the resources of the host, e.g. RAM, Storage and CPU. Generally, the virtual computers can be different operating systems and be running quite independently of each other.

How does Virtualization work?

There are many ways to implement virtualization. At the desktop level, there are more and more products appearing that allow a single notebook or desktop computer to run more than one operation system. Two popular examples are VMware (<http://www.vmware.com>) and Parallels (<http://www.parallels.com/>).

Both of these products will run either on a Windows PC or Mac OS, and will allow you to install virtual machines that are any combination of Windows or Linux on top of them. This is a boon for developers, now they can test an application in

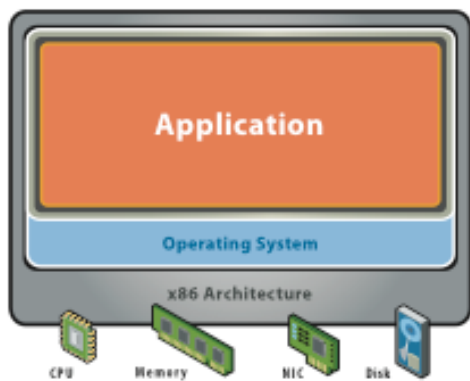
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many different operating systems all from one computer, or the Mac user who wants to run one or two Windows applications without the need for a second computer.

However, in the Dedicated Hosting space, these desktop oriented virtualization products do not scale well, and so there are also emerging specific products that are aimed at usage at the Data Centre level.

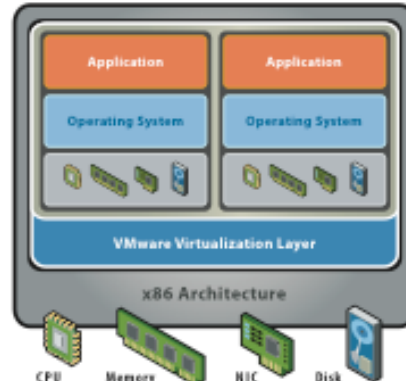
The recognized leader in this field is VMWare, their Enterprise level products are geared towards use in the data centre.

The approach taken here is to control the hardware with a custom built operating system, specifically designed for virtualization, then to present virtual devices to the client operating system. (e.g. Windows / Linux etc.)



Before Virtualization:

- Single OS image per machine
- Software and hardware tightly coupled
- Running multiple applications on same machine often creates conflict
- Under-utilized resources
- Inflexible and costly infrastructure



After Virtualization:

- Hardware independence of operating systems and applications
- Virtual machines can be provisioned to any system
- Can manage OS and application as single unit by encapsulating the into virtual machines

Source: <http://www.vmware.com/pdf/virtualization.pdf>

Add to this the ability to cluster together multiple pieces of hardware, and the ability to host the virtual computers on top of this cluster you really start to see some major advantages when compared to the single server approach. In this environment, even with hardware failure the clustered virtual machine host is able to keep running the client operating systems without missing a beat.

Benefits of Virtualization

a. Hardware Independence and Redundancy

Dedicated virtual servers are load balanced across a clustered set of Enterprise Grade Servers. Utilizing virtualization technology, businesses simply will not suffer from hardware failure and can opt to seamlessly upgrade their configuration without a visit to the data centre. In a virtualized environment, with clustering at the host level, the client virtual computers are nearly un-stoppable; hardware failure is a thing of the past in this context.

b. Flexibly Upgrade and Manage a Virtual Machine.

In a single server environment, if you would like to add more RAM, more disk space or even upgrade the CPU on the server, it means a visit to the Data Centre, down time for the machine and costly parts that need to be sourced for the installation.

Now in the virtualized environment, an upgrade can be conducted in minutes, often without even needing to reboot the client operating system.

This offers the ultimate in flexibility, don't think just upgrades, this is godsend for short terms increases in requirements as well. Say you have a Virtual Dedicated Server that is running your web site, you run a promotion that means that for 3 weeks you are going to receive 500% more traffic than you normally do, and this

extra traffic is really going to test your server. Simply upgrade it for the period of time that the promotion is on and return it to the normal specifications once you are done!

c. Energy Savings

Using virtualized machine infrastructure reduces energy consumption by allowing businesses to run their applications on fewer physical servers, which in turn reduces power and cooling requirements. Consolidating 30 physical servers into 30 Dedicated Hosting accounts running on one server would save over 100,000 kWh per year. That's as much energy as is consumed on average by 10 houses, and can save up to 84% on the energy bill.

d. Backup and Disaster Recover

Again, when set-up correctly a virtualized environment can make backing up and restoring a Dedicated Server very easy indeed. Take a simple process where you create a snapshot or copy of the Virtual Computer at regular intervals, these snap shots are stored in disk or tape and allow you to restore your server to a previous state with very little fuss. While, the same thing can be done in a single server environment, it usually means you are paying for external tape drives, the cost of rotating them, how often do you get a chance to test a restore (if you only have one server near on impossible to test until you really need it to work).

Consolidation – Moving from physical servers to a virtual environment

The need to have a dedicated server doing a specific task is not new - there is a thriving industry both in Australia and overseas of Internet Providers that host servers in data centers connected to the Internet. What is new however is the

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trend for these customers to be migrating to virtualized environments. There are a number of things driving this trend:

- As hardware comes out of a lease agreement, it is common practice for a company to migrate to new hardware, pay the same amount of money but have newer, more up to date hardware. Now with virtualization becoming commonplace users have another choice, instead of migrating to new hardware they are migrating to a virtualized environment.
- Power and cost of hardware are also playing a part; today for a few thousand dollars you can purchase hardware that is a lot more powerful than 3 – 4 years ago. In many instances the hardware is overkill for the application, meaning users are thinking “I will buy one piece of hardware and run multiple Virtual Computers on top of the single system”.
- Finally, migration between physical servers and Virtualized Servers is now very easy. Most vendors of Virtualization software commonly provide a process for migrating a single server onto a Virtualization Platform. In many instances this can be done with next to no down time to the service being provided. It is a much more straightforward process than migrating from one server to another physical server.

To find out how TPP Internet can help you to set up a virtual solution, please call us on 1300 665 491 or visit our website: www.resellers.tppinternet.com

Glossary

Virtual Machine

A representation of a real machine using software that provides an operating environment, which can run, or host a guest operating system.

Guest Operating System

An operating system running in a virtual machine environment that would otherwise run directly on a separate physical system.

Virtual Machine Monitor

Software that runs in a layer between a hypervisor or host operating system and one or more virtual machines that provides the virtual machine abstraction to the guest operating systems. With full virtualization, the virtual machine monitor exports a virtual machine abstraction identical to a physical machine, so that standard operating systems (e.g., Windows 2000, Windows Server 2003, Linux, etc.) can run just as they would on physical hardware.

Hypervisor

A thin layer of software that generally provides virtual partitioning capabilities which runs directly on hardware, but underneath higher-level virtualization services. Sometimes referred to as a “bare metal” approach.

Hosted Virtualization

A virtualization approach where partitioning and virtualization services run on top of a standard operating system (the host). In this approach, the virtualization software relies on the host operating system to provide the services to talk directly to the underlying hardware.

Para-virtualization

A virtualization approach that exports a modified hardware abstraction, which requires operating systems to be explicitly modified and ported to run.

Virtualization Hardware Support

Industry standard servers will provide improved hardware support for virtualization. Initial hardware support includes processor extensions to address CPU and some memory virtualization. Future support will include I/O virtualization, and eventually more complex memory virtualization management.

Hardware-level virtualization

Here the virtualization layer sits right on top of the hardware exporting the virtual machine abstraction. Because the virtual machine looks like the hardware, all the software written for it will run in the virtual machine.

Operating system–level virtualization

In this case the virtualization layer sits between the operating system and the application programs that run on the operating system. The virtual machine runs applications, or sets of applications, that are written for the particular operating system being virtualized.

High-level language virtual machines

In high-level language virtual machines, the virtualization layer sits as an application program on top of an operating system. The layer exports an abstraction of the virtual machine that can run programs written and compiled to the particular abstract machine definition. Any program written in the high-level language and compiled for this virtual machine will run in it.

Source: <http://www.vmware.com/pdf/virtualization.pdf>