

SHARED COMPUTING — WHERE PCI PERFORMS AND USB LAGS



This article explores the evolution of shared computing, and evaluates the value proposition that a shared computing environment can offer to organisations. Also included are the test results conducted to gauge the efficacy of two methods (PCI and USB) that can be used for desktop virtualisation.

The genesis of shared computing dates back to the time when mainframes fed dumb clients. Then came the era of server-based computing, when these mainframes were replaced by servers and the earlier dumb clients by full-fledged PCs. Over time, thin clients have gained traction in many server-based computing setups — where most, if not all applications are run on the server.

This server-based computing was intended to provide the same advantages as mainframe computing, while mitigating the cost and environmental factors — but it created a completely different set of disadvantages, the key one being the constrained user experience with limited desktop interface performance, especially when graphical applications are used. Apart from this, thin clients, which can be called scaled-down versions of PCs, invariably require special customisation and administration, expensive high-end server components, and so on.

Another option that has emerged to overcome these disadvantages, while still tapping the benefits of server-based computing, has been the zero client, based on the concept of desktop virtualisation. The concept behind these virtual desktops is to optimally use the power of the PC, which remains under-utilised in most cases, as most of us use a small fraction of its power. Desktop virtualisation enables a single PC to be “virtualised” (or shared) by many users — where all users get to experience their own individual computing session.

Relevance of desktop virtualisation for organisations

It is important to evaluate the suitability of desktop virtualisation for organisations of different sizes. There are a number of reasons and advantages that CTOs of companies of all sizes and markets can consider before adopting desktop virtualisation.

Shared computing or desktop virtualisation is an ideal solution for companies moving to cloud and Web-based computing. It works fine for CIOs seeking to better manage PC proliferation and costs. It is ideal for education and public sector institutions seeking to provide desktop access to all constituencies at a low initial cost of purchase, and even for those who want to achieve sustainability through low on-going costs.

Other benefits of desktop virtualisation include ease of centralised management, enhanced security as a result of limited access to critical infrastructure, low cost of entry, and dramatically reduced life-cycle and maintenance costs. And, what if we use open source operating systems along with desktop virtualisation?

This makes the solution even more compelling from the cost perspective.

Desktop virtualisation methods

To explore further, we decided to try out two popular methods of desktop virtualisation — USB and PCI. To evaluate how both of these methods fare, we performed a test using the available USB and PCI solutions to assess the difference in client PC performance, where server configuration remained the same — and are the server configuration details:

- ♣ Computer system used: HP MS6000 extended configuration
- ♣ Operating system: Ubuntu 10.04
- ♣ Processor: Intel Core 2 Quad Q9500
- ♣ Chipset: Intel Q43 Express
- ♣ RAM: 6 GB DDR3 (1333 MHz)
- ♣ Hard disk drive: 500 GB SATA 3.0 Gb/s

- ♣ Removable media: 16x SATA DVD writer drive
- ♣ Graphics: Integrated Intel Graphics Media Accelerator 4500 (Intel Graphics Media Accelerator driver installed using Nvidia graphics driver 96.43.18 for Ubuntu 10.04.)

We installed Ubuntu 10.04 on the server, then we installed a desktop virtualisation software that is required to connect client machines with the server. We also installed VLC Player. After configuring the server, we connected a total of three clients, first using USB and then PCI.

We then recorded readings for server performance while playing HD video on VLC — initially on the first client; then we connected the second client and played the same video on both client machines. Subsequently, we recorded the performance of the server with three clients connected to it and playing the same HD video.

Desktop Virtualization Method	Test No.	Test Case	CPU Performance Percentage	Load Average	Memory Used in GB
	1	Host PC (server) without any client	1-3%	0.2	0.9
	2	With single client viewing HD video on VLC	20-25%	1.9	2.4
	3	With two clients viewing HD video on VLC	45-50%	2.3	3.1
USB	4	With three	95%	4.0	4.9

Desktop Virtualization Method	Test No.	Test Case	CPU Performance Percentage	Load Average	Memory Used in GB
		clients viewing HD video on VLC			
	1	Host PC (server) without any client	1-3%	0.2	0.9
	2	With single client viewing HD video on VLC	14%	0.9	1.1
	3	With two clients viewing HD video on VLC	24%	1.4	1.15
PCI	4	With three clients viewing HD video on VLC	35-36%	1.7	1.3

Here are a few inferences based on the readings as shown in the above table:

- ♣ PCI is technically more reliable than USB for networking. You are less likely to experience dropped connections or a sluggish response time to your modem when using PCI instead of USB.
- ♣ Ethernet cables can reach a longer distance than USB cables. A single Ethernet cable can run 10 metres (32 ft) on a direct connection with PCI, while USB cable runs are limited to approximately 5 metres (16 feet).

The test demonstrates that PCI is better suited for network computing, while USB works well for peripheral connectivity.

In a nutshell

According to recent studies, desktop virtualisation solutions result in 75 per cent lower maintenance and 90 per cent lower energy costs. The low entry and reduced lifecycle cost of desktop virtualisation is turning the old economics of PC purchasing and maintenance on its head.

Amongst the different variants of virtual desktop devices, PCI scores over USB significantly in terms of performance, optimum utilisation of resources as well as user experience. This indeed makes shared computing using PCI a superior value proposition over USB for organisations that want to enable wider access to computing at a low cost.

Source : <http://www.opensourceforu.com/2011/06/shared-computing-where-pci-performs-usb-lags/>