DESKTOP VIRTUALISATION AS A TOOL TO SUPPORT IT VIRTUAL TEAM

Ghailan AlShifay[1], Joshua Udofia[1], Ibrahim Zuhair[1] and Hasnani Hassan[1]

[1]*Infrastructure University Kuala Lumpur, Malaysia*

ABSTRACT

This paper provides an insight into the characteristics and benefits of desktop virtualisation to organisations implementing virtualisation services and solutions across their organisation. With the wide spread of technology and tremendous increase in organisations using cloud and virtualisation products to increase overall performance and serve clients efficiently, we can see a trend in more and more organisations implementing it and setting up virtual teams. Virtualisation which is part of cloud computing technology has extended from initially installing traditional software on a computer to use of internet and login username and password and directly access applications from anywhere and at any time. This study aims to add to the research in virtualisation and cloud computing technologies and discuss on the future implications of virtualisation.

Keywords:

Desktop Virtualisation; Virtual Desktop Infrastructure; Virtual Machine; IT Professional

INTRODUCTION

For most of us the word virtualisation is becoming very familiar especially when we have used software such as VMWare, Oracle VirtualBox and Citrix to run two or more operating systems and access our PC and stored files by using DropBox, GoogleDrive and LogMeIn. Virtualisation makes it possible to run multiple operating systems and applications from one single computer. This technology has emerged to our desktop environments as well.

Desktop virtualisation allows us to manage and control, through a central point, multiple client environments. It separates the desktop environment from the physical operating system itself and stores this desktop environment on a remote central server which then allows a user to work from their remote desktop and access and applications through it.

For large business organisations it is a guaranteed way to reduce hardware and support costs while delivering services to customers. It is also provide the potential for communication and collaboration of virtual teams.

LITERATURE REVIEW

In essence, system virtualisation is the use of an encapsulating software layer that surrounds or underlies an operating system and provides the same inputs, outputs and behaviour that would be expected from physical hardware. The software that performs this is called a Hypervisor, or Virtual Machine Monitor (VMM). This abstraction means that an ideal VMM provides an environment to the software that appears equivalent to the host system, but is decoupled from the hardware state [1].

DOI:10.63646/j.ijirm.2014.020111

According to Pearce, desktop virtualisation has two quite different usages.

1) Thin client - remote desktop usage which is similar to application streaming, except that it is targeted at the user experience. The entire operating OS appears to the user to be running locally, but is in fact running elsewhere. This is also referred to as Virtual Desktop Infrastructure (VDI).

2) System virtualisation in a Type-II environment - used by some to refer to the running of a virtualised machine on a standard workstation. Generally this is an incorrect usage of the term desktop virtualisation, as the whole OS is virtualised and not just the desktop.

A study revealed that virtualised infrastructure provides a layer of abstraction between computing storage, networking hardware and the applications running on it. Their study further explained that the deployment of virtual infrastructure is non- disruptive to the system, because the user experiences are typically un-noticed or unchanged. The authors concludes by emphasising that virtual infrastructure provide enterprise system management, the opportunity to manage pooled resources across the enterprise, thereby, allowing Information Technology (IT) managers to be more responsive to dynamic system needs to better leverage infrastructure investments [10].

Virtual teams can use computer-mediated communication technologiesto work interdependently across space, time and organisational boundaries. Virtual team members may be located across the office, but almost as easily across the country or across the world, and may rarely or perhaps never meet face to face. Town send, characterise virtual teams as "groups of geographically and/or organisationally dispersedco-workers that are assembled using a combination of telecommunications and information technologies to accomplish an organisational task" [11].

METHODOLOGY

This paper gathers data from the following sources:

- Primary data from the authors own experience in using the virtualisation systems
- Secondary data gained from online journals which discussed on virtualisation and virtual team.
- Secondary data from the Internet to extract some relevant information.
- Extracting some survey's findings which conducted by previous researchers to check the importance of the technology discussed and the benefits to the virtual team/IT Professional.

THE BENEFITS OF VIRTUAL DESKTOP

Desktop virtualisation has numerous benefits, including but not limited to data security, reducing cost and saving power consumption by limiting the number of clients systems to thin

clients. Its technology can prepare us for new client operating system migrations and also for moving to cloud computing. Desktop virtualisation is better in terms of speed and makes it easier to manage and to deploy new applications. A survey results which was conducted among IT professionals by Intel IT centre reports that the number one reason why organisations go for desktop virtualisation is due to security while reducing cost is second.

We asked IT professionals about the key drivers influencing their move to desktop virtualisation, and security was at the top of the list. While upper management has some security concerns about desktop virtualisation, IT views the technology as a way of improving client security (39 percent). Almost equally important are desktop management drivers, with lowering the cost of desktop management (38 percent) and improving overall client manageability (34 percent) ranking high on the IT professionals' list. Larger IT initiatives are also driving desktop virtualisation, as shown by the number of IT professionals reporting that they are virtualising both the server and client environments (36 percent) and those who see desktop virtualisation as part of their overall move to cloud computing (34 percent) [8].

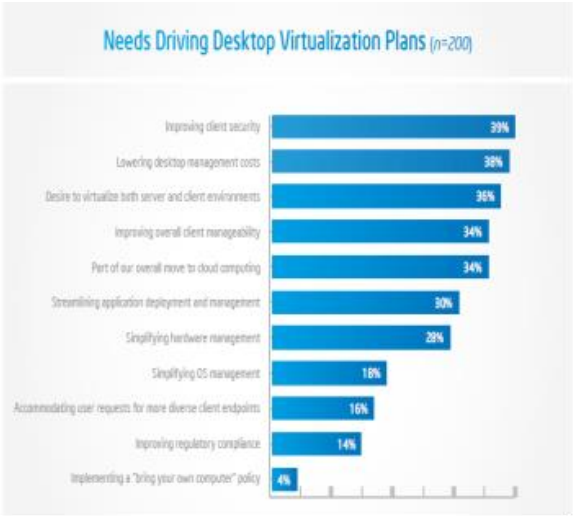

Figure 1: The Drivers to Virtualisation Plan
Source: Intel IT Center, September 2011.

4.1 Data Security

Many organisations have various systems with different applications and configurations, most of the time patching and securing these systems takes a huge amount of time and effort and during the process data might be lost or possibility of malware attacks on unpatched systems especially in large organisations with thousands of PC's for different user groups. This is where desktop virtualisation solves the problem by creating a centralised virtual desktop with all sets of applications and configurations whereby you can easily manage all the patches and security updates in a regular interval to ensure it is secured and also saves the time and task of updating each system one at a time. Desktop virtualisation also aids in risk of data leakage and theft by centralisation.

4.2 Cost Reduction

Reduce operational expenses by simplifying lifecycle management, including patching, provisioning, packaging and delivery [2]. Microsoft reports that desktop virtualisation reduces operation expenses and simplifies management and that more organisations are actively deploying desktop virtualisation today. It tends to reduce cost by reducing the number of clients, making it centralised and simplified management, controlled, easier to manage, patch, update, maintain, faster and reduces energy consumption costs.

4.3 Energy Saving

It simply provides more energy savings by reducing the consumption of organisation's numerous servers to only one centralised machine. Also when the user desktop goes to sleep a proxy server continues to host user's machine thereby saving more energy. In the United States alone, the Environmental Protection Agency reports that data centres consumed 60 billion kWh of power in 2006. The EPA also has calculated that if all computers sold in the United States met the Energy Star requirements, the total savings in energy costs would be around $2 billion [3]. Desktop virtualisation solution uses only 18% of the energy an average PC uses and even less when in sleep mode.

4.4 Disaster and Data Recovery

Virtual machines can revert back to their last known good states in case of disaster or crash occurring. It simplifies the storage of data and can be backed up easily, in case of crash or hard disk failure it can be reverted back easily. Storage space can be a problem especially when you have so many systems to maintain but virtual desktop makes it possible for a centralised storage which is easier to manage, organised and backed up.

4.5 IT Enterprises Utilising Virtual Team

A Virtual Team involves groups of people who work across time, space, and organisational boundaries using technology such as cloud computing and virtualisation to achieve task, communicate and make decisions that affects an enterprise. The virtual team must have skills and are committed to a common goal of an organisation, they must also share a common work ethic, even though they are geographically dispersed but with the use of virtualisation technology their task can be done efficiently without regards to time zone, destination.
Virtual team enables an organisation to coordinate task, faster communication, faster decision making and allows for entrepreneurs to share knowledge and ideas. Benefits that virtual teams provide: Emphasize teamwork skills - "In order for virtual teams to achieve their greater potential (and take advantage of their functional and structural diversity), members must first and foremost be able to establish a basis for the effective exchange of their varying capabilities — all of which requires teamwork-related skills as a critical ingredient. Otherwise, the virtual team could very likely perform worse than a collocated group. Thus, managers need to consider teamwork skills as a necessary attribution when selecting the members of a virtual team". Provide for face-to-face meetings, "Periodic face-to-face meetings of dispersed team members can be particularly effective for initiating and maintaining key social processes that will encourage informal communication, team identification and cohesion". Foster a "global culture

- "Our research suggests that a global mind-set, in which people see themselves as part of an international network, helps provide an environment that is conducive to dispersed teams" [6].

4.6 Desktop Virtualisation and Virtual Teams

Using desktop virtualisation can benefit virtual teams in several ways. Communication is very important to ensure that all tasks are done on time. Usually virtual teams are dispersed across the geographical destinations but by use of desktop virtualisation these individuals can work from any location.

One important software that supports virtual team and utilises virtualisation technology is TeamViewer. TeamViewer, is a leading software for remote control and online meetings. In a study of TeamViewer benefits to schools emphasised that 'TeamViewer is the perfect IT tool for universities, and any organisation that demands high security requirements to protect sensitive data and define access rights,' said Kornelius Brunner, Head of Product Management, and TeamViewer. IT departments like the team at St. Edward's choose TeamViewer because it delivers a comprehensive solution for their remote access needs, gives staff flexibility with the devices they choose to work on and has strong reporting and logging capabilities." TeamViewer offers St. Edwards University a cost management advantage by allowing them to purchase software licenses based on the number of administrators rather than the number of people being supported. Using TeamViewer, the university was able to purchase five licenses to serve the needs of more than 1,000 users. Prior to TeamViewer, the university worked with another remote access tool to solve faculty and staff IT problems, until they began to experience issues stemming from the platform itself " [7].

VIRTUAL DESKTOP INFRASTRUCTURE

Virtual Desktop Infrastructure (VDI) provides enterprise class control and management of desktop virtualisation. Built by VMware one of the big names in virtualisation software and solutions. VDI is the leading platform that provides efficiency and reliability for virtual desktop environments. It improves data security and reduces hardware expenditures and also allows centralised patching and application installation without loading the network. Another feature is its portability whereby users can reconnect from any location from different devices. VDI utilises resource pooling.

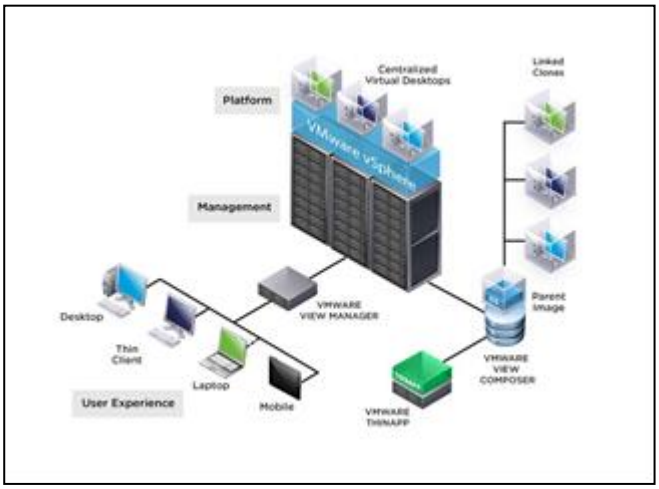

Figure 2: Virtual Desktop Infrastructure.

Source: [5]

Key features explained

- User Experience: Users get a virtual desktop that is exactly like normal PC, no change to applications or desktop.
- VMWare View Manager: This is where the administrators can control and manage client environments, allow users to install applications, customize their desktop and use printers and usb devices.
- VMWare ThinApp: It speeds up application deployment and makes it easier for application migration.

VMWare ViewComposer: It provides advance virtual image management whereby saving disk space. You can update and patch hundreds of desktops from a single master image while retaining user settings and configuration.

CHALLENGES FACED USING VIRTUALISATION

- Scalability

Scalability is a challenge because of balancing load and balancing connections especially for an increasing number of concurrent users. The need to ensure that a user does not loses their session which would cause loss in their work. Also, virtual desktops although they behave like physical systems while delivering better performance, security, and user experience it is important to remember that its technology is different and needs to be treated in that respect.

- Secure Remote Access

The problem of secure remote access occurs since users will have access to the entire application environment once you log in. The use of authentication and authorisation through SSL VPN is required to provide more control.

- Authentication and Authorisation

You need authentication and authorisation to remote access to your desktop environment. Without this there is a possibility of making your system vulnerable to attacks and malwares.

FINDINGS

According to Opara and Soluade, Enterprise IT practitioners find that virtualized environments create new general conditions which require new operational processes that create new demands for management solutions. The future requirements on new virtualized infrastructures in enterprise systems should be key indicators as to which components and products are appropriate for implementation. The authors concluded that IT Practitioners should conduct a precise analysis of risks relating to various operating processes as part of virtualisation project in mid-size and small organisations. Emphasis should be made in relations to the variants, about how many of enterprise virtual machines are to be run on real servers and identify the implications if the servers unexpectedly fail due to unforeseen circumstances.

In general, desktop virtualisation delivers benefits to business and end users. IT professional see its benefits throughout the organisation and in a survey conducted by Intel IT Center the graph below shows the expected benefits of desktop virtualisation.

Figure 3: Benefits of Desktop Virtualisation
Source: Intel IT Center, September 2011.

According to Berry, virtual teams can amplify both the benefits and downsides of traditional teamwork. On the positive side, virtual teams that are designed, managed and implemented effectively can harness talent and knowledge from anywhere in the world to solve problems and complete work tasks on a 24/7 schedule. However, if these teams are poorly designed and managed, the team dynamic may be weak or even fail, and outputs might be inept or non-existent. Organisations must consciously create the conditions for effective virtual teamwork, and the success or failure of virtual teams (or the organisation itself) may well be a

consequence of inept leadership or management more than a consequence of technology or other factors [11].

CONCLUSION

Intel report concludes that forty-two percent believed that desktop virtualisation increases user productivity by enabling workplace flexibility and decreasing downtime. More IT professionals believe that desktop virtualisation will deliver better business outcomes by enabling employees to use the right tools (34 percent) than believe desktop virtualisation will reduce money spent on client hardware (32 percent). At the bottom of the list—though still important to 13 percent of IT professionals—is the ability for them to say yes to senior business management who want IT to support new client types, such as tablets [1]. Desktop virtualisation is highly recommended to IT professionals in their organisation to help them reduce their work load by providing the various advantages we discuss in this paper and also improving their overall efficiency and IT services. However, problems commonly encountered using virtual desktop includes security, scalability, complexity and persistence.

Virtualisation technology enables virtual team to work closely and encourages collaboration and be able to access from anywhere and at any time. It is hoped that organisations planning to cut cost and implement virtualisation can consider the benefits of virtualisation and use of desktop virtualisation to increase performance while reducing costs.

REFERENCES

[1] Pearce, M., Zeadally, S., & Hunt, R. (2013). Virtualization: Issues, Security Threats, and Solutions. *ACM Computing Surveys, 45(2),* 17-17:39. doi:10.1145/2431211.2431216

[2] Orady, A. (2009, April 10). Going Green with Desktop Virtualization. Virtual-Strategy Magazine. N.p., Web. Accessed: 1 Sep 2013.

[3] Wall, T. (2009). Virtualization and Thin Client: A Survey of Virtual Desktop environments. MA thesis. Dublin Institute of Technology.

[4] Stefan, G. (2012). Cloud computing and virtual desktop infrastructures in afloat environments. MA thesis. NAVAL POSTGRADUATE SCHOOL MONTEREY, CALIFORNIA.

[5] Insight UK. (2013, September 1). Key new features of vmware view 5. Insight Direct (UK) Limited. Retrieve from <http://uk.insight.com/en-gb/shop/vdi/vmware/features

[6] Siebdrat, F., Hoegl, M., & Ernst, H. (2009, July 1). How to manage virtual teams: MIT sloan management review. Retrieved September 20, 2014, from http://sloanreview.mit.edu/article/how-to-manage-virtual-teams/

[7] TeamViewer®. (2014, September 10). Delivers Remote Access Solution for Higher Education. Retrieved September 20, 2014, from http://www.customerzone360.com/customer-service-software/news/-teamviewerreg-delivers-remote-access-solution-higher-education-/2014/09/10/8010914.htm

[8] Intel IT, Center. (2011). Peer Research: Desktop virtualization insights for IT strategic planning. 6-7, Web. Accessed on 1 Sep. 2013.

[9] Scott, A. S. (2013). The People Side of Virtualisation. Annual International Conference On Enterprise Marketing & Globalization, 172-175. doi:10.5176/2251-1970_BizStrategy13.32

[10] Opara, E. U., & Soluade, O. A. (2013). Effect of Virtualization on Enterprise Network, Server/Desktop Systems on Small and Mid-Size Businesses (SMB). *Journal of International Technology & Information Management, 22(2),* 35-48.

[11] Berry, G. R. (2011). Enhancing Effectiveness on Virtual Teams. *Journal of Business Communication, 48(2),* 186-206. doi:10.1177/0021943610397270