HYPERVISORS AND EMERGING ECONOMIES OF THE WORLD – THE NEXT BIG THING (CASE STUDY)

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ABSTRACT

A Hypervisor is a piece of software that allows a variety of computer machines to run on a single hardware host. That being said, this paper seeks to highlight the place of hypervisors in emerging economies of the world with a view to utilising effective technology and then translating it into economic growth and development without compromising on efficiency, quality, robustness, reliability and performance.

Keywords: Hypervisor, Virtualisation, Open Source, Host, Virtual Machine and Operating Systems

1. INTRODUCTION

Technology has gone beyond just ensuring efficiency, increased productivity and ensuring ease of life wherever implemented, and to put it more precisely, computer technology has become a big money venture, one that is proving to be a key factor in economic matters and that trend is expected to continue for the foreseeable future without ceasing. Nevertheless, this computer technology concept is what is referred to as *Virtualisation,* which according to *Margaret Rouse is defined 'as the process of creating logical computing resources from available physical resources.* (Rouse, 2012).

It is however, hinged on the above assertion virtualisation be adopted in emerging economies of the world as it has proved very vital in the establishment of not just technological advancement, but massive economic growth of developed climes of the world. In addition, **VMWare Corporation**, a leading outfit in virtualisation technology has this to say about virtualisation: *'Virtualisation is the single most effective way to reduce IT expenses while boosting efficiency and agility – not just for large enterprises, but for small and midsize businesses too.'* (VMWare, 2014).

The interesting thing about the adoption of virtualisation in emerging economies is that there is already an existing template and blueprint with which it can take its cue from with a view to blossoming as expected. At least, it would be somewhat less-experimental and empirical as opposed to what initially obtained in already established and successful economies where computer technology has been implemented and being continually optimally used. There is no end to the huge potentials that this subject portends for emerging economies as these are virgin territories waiting to be explored and tapped into for the huge benefits therein.

2. HYPERVISOR

A hypervisor is a program that would enable you to host several different virtual machines on a single hardware. Each one of these virtual machines or operating systems you have will be able to run its own programs, as it will appear that the system has the host hardware's processor, memory and resources. In reality, however, it is actually the hypervisor that is allocating those resources to the virtual machines. In effect, a hypervisor allows you to have several virtual machines all working optimally on a single piece of computer hardware (Sumastre, 2014). Hypervisor can also be seen as one of many hardware virtualization techniques that allow multiple operating systems, termed guests, to run concurrently on a host computer. In computing, a hypervisor is also known as a Virtual Machine Manager (VMM), and it is aptly named because it is conceptually one level higher than a supervisory program (Roebuck, 2011).

Nevertheless, as earlier posited in the Abstract of this paper, **Hypervisor** is a piece of software that has the capability to host all other computer machines without any conflict or interoperability issues while acting as the host machine. The computer machines that would be hosted on the main machine that houses the hypervisor are virtual in nature; hence they are referred to as *Virtual Machines* or *VM* for short as it is often referred to in Information Technology circles.   An example of a virtual machine is VM-Ware.

There are two types of hypervisors namely:

- **Bare-metal or Native or Type 1:** This is a hypervisor that acts as an operating system (OS), and has the ability to host other operating systems and application software. It is built in such a way that it sits on the hardware – normal hard disk drive (HDD) that serves as the base or host hardware so to speak, while all other guest machines (virtual machines, VM for short) are placed on top of it. In order words, there is no layer between the hypervisor and the host hardware. The VMs that are placed on the hypervisor can have different types of operating systems running on them without any sort of hindrance between or amongst them depending on the number of machines hooked unto it provided the set up was appropriately done. These machines can then be connected to a network with the right protocols thereby forming a virtualized environment. Example of a hypervisor with this type of architecture is *VMware vSphere ESXi*, which is one of the hypervisors under review for the project. The illustration in Figure 1 below gives credence to the above description (Jejelowo, 2014).
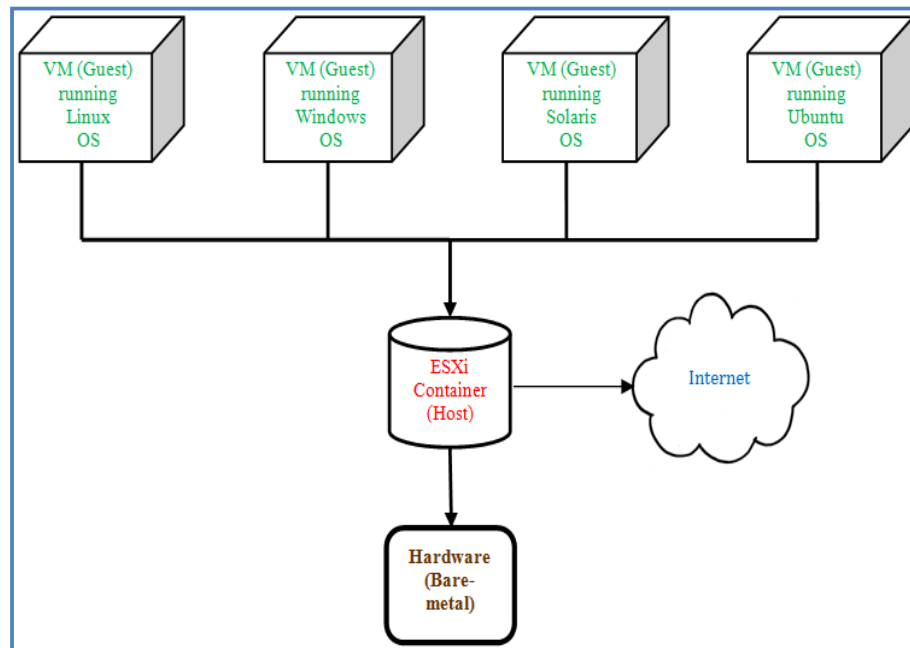

Figure 1: VMWare vSphere ESXi – Bare-metal Architecture

- Embedded or Hosted or Type 2: With this type of architecture, the layers are embedded, which is a sharp contrast to bare-metal structure. The hypervisor is designed to sit on an OS, while other VMs are attached to it. Although, it does have the ability to host multiple guests just as bare-metal hypervisors, it is limited in the amount it can accommodate. Hypervisors with this type of architecture are sometimes referred to as application hypervisors. A good example of this type of hypervisor is *VirtualBox*. The diagram in Figure 2 is a depiction of the explanation given above (Jejelowo, 2014).
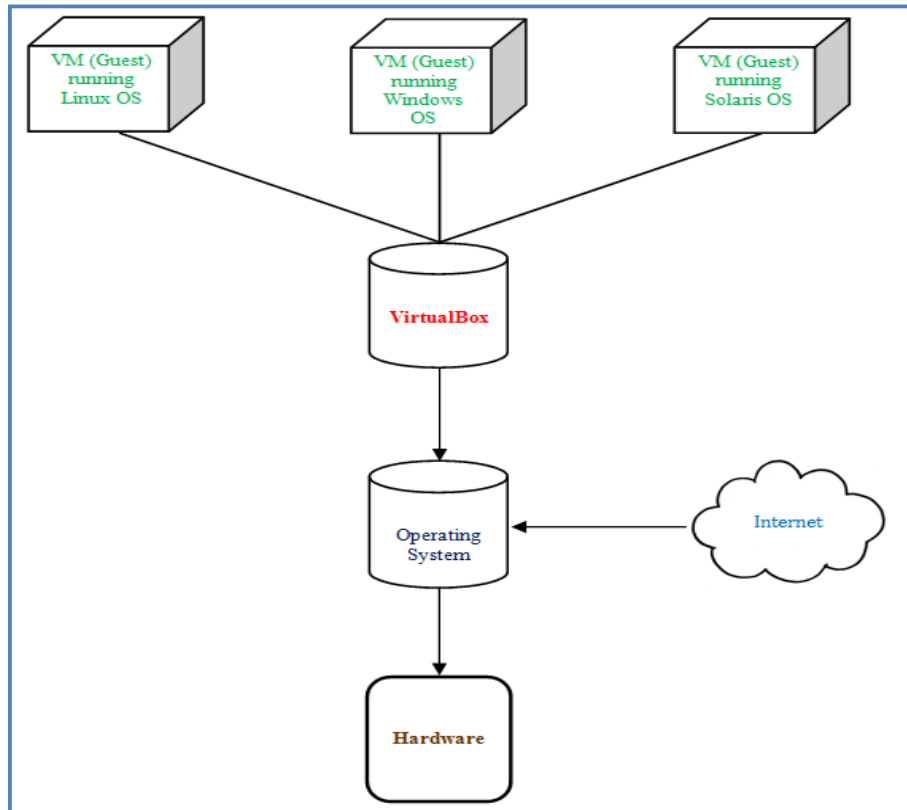
Figure 2: VirtualBox Hypervisor – Embedded Architecture

3. FEASIBILITY AND PRACTICABILITY

Having got the idea of what virtualisation and hypervisor is all about; one might want to then argue how feasible would such concept be vis-a-vis emerging economies of the world, for example Nigeria. Well, I dare say it is feasible for different reasons - the technology framework is already in existence and all that needs to be done is to incorporate and consolidate on such technologies. This can be achieved by enlightening all stakeholders on the need to buy into the concept of virtualisation/hypervisor for its numerous gains (discussed in subsequent section). Secondly, the feasibility of virtualisation can be hinged on the fact that the benefits of adopting it far outweighs its cost, its accessibility is never in doubt, its practicability and change over can be done seamlessly as it is easy to implement and use.

3.1 Benefits
The benefits that hypervisors presents are quite impressive, and can be categorised along the lines of financial, productivity, efficiency, performance and accessibility grounds. There is a huge utilisation of every server within virtualisation sphere to the tune of 80%. The ration at which hardware requirements are needed greatly reduced and has a ratio of 10:1. Hypervisors are robust, cost-effective, highly affordable and accessible (VMWare, 2014). However, there are some free/Open Source (*this is a software whose software code is made available for use or modification as end-users or other Software Developers as it suits them or their needs*) ones too like VirtualBox, ESXi, XEN just to mention but a few *(Infosecurity, 2014)*. There is a wide pool of hypervisors to choose depending on one's technological needs and financial clout. In terms of usability, hypervisors do well in that regard as they are easy to use and install. And most importantly, they are efficient and reliable.

3.2 Implementation
In order to bring home the reality of what this paper is actually all about – incorporating computer technology (virtualisation) into emerging economies with the view to enhancing economic growth and development, the paper will attempt to discuss how to achieve and implement some of the benefits mentioned above. Any organisation or establishment that wants to adopt the use of hypervisors can go about it by engaging the services of experts, who will then work out the requirements (hardware, software and peripheral accessories), needed to facilitate its smooth operations.

Once this is done, the hypervisor can then be duly installed for use. And in terms of using the hypervisor software, a simple user guide that is user-friendly needs to be drafted by the experts for the use of intended end-users.

NOTE: The choice of hypervisors is dependent on certain factors, which include, the business function of the organisation seeking the technology, its financial power and company size.

4. CONCLUSION

There is no gainsaying the fact that computer technology plays a vital role on different levels, ranging from private use to commercial and global use. However, the issue of hypervisor though fairly old concept, but still a new terrain for emerging economies of the world and as such, its benefits are there for the taking. Established economies are a testament to the fact that virtualisation with respect to hypervisors is key to development and growth of many businesses in climes where they are implemented and optimally utilised. Perhaps, if we are to encourage small and medium scale enterprises (SMEs) to grow steadily not just in terms of size, but in relation to how they contribute their own quota to the overall economic growth of the geographical regions they operate in, then we need to make them embrace technology in its totality and ultimately point them in the direction of virtualisation so as to achieve massive economic growth.

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