



COST OPTIMIZATION AND RESOURCE UTILIZATION VIA VIRTUALIZATION USING VIRTUAL BOX

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Abstract: *If manager have embraced virtualization because it reduce the cost and complexity. Virtualization also allows the separation of resources and dependencies. It enables the movement of other resources to different location in order to increase the performance of the overall system. Performance testing is very important in the software development life cycle of a Product. This work gives very exposure to the users for proper utilization of resources using virtualization and help to maintaining the performance of the System. In this paper we will study the virtualization method to increase the performance of the overall system.*

Keywords: *Virtualization; virtual box; performance; Resource Utilization; cost analysis*

I. Introduction

Virtualization first appeared in 1960s to enable timesharing of hardware between multiple users. Virtualization has covered large area but we focus on the server virtualization. Virtualization reduces the total cost, reduce power, increase efficiency etc. due to these reasons many company uses virtualization to build a no of different physical servers on a single virtual server. This can be achieved by using different virtual software such as virtual box, VMware, Xen etc. These software run on a shared physical environment. Virtualization allows two or more environments to run on the same physical machine such that the different environments are completely isolated from each other. Virtual machines support more flexible and finer grain resource allocation and configuration than physical machines .even the hardware cost will reduces. The server virtualization will convert the physical system into a pool of logical computing resources. Resources are allocated to the different operating system according to their needs this will increase the proper utilization of hardware and software resources. Many researchers have been done in the optimization of cost and resources but that is not sufficient .Hence a study of resource utilization and performance optimization using the virtual machine will help in understanding the application. This study will help to take an accurate decision and to optimize the performance of the system.

II. Virtualization

In computer science, the word *virtualization* is used for abstraction of computer resources, such as memory, network, processor, application, etc [2], [5], [6]. When we talk about virtualization, we mean the platform virtualization, which in fact represents the computer virtualization or the virtualization of the operating system [2]. The core of the virtualization which handles virtual computers is called hypervisor. The virtualization can be categorized according to the level of virtualization and operating mode of the hypervisor. Based on the operating mode, we distinguish non-hosted hypervisor and hosted hypervisor. While the first one Operates directly on hardware (e.g. Xen, ESX Server), the second one performs within another operation system (e.g. Microsoft Virtual PC and VMware Workstation) [3], [12], [16]. The categorization based on the degree of Virtualization is a bit more complicated. The main categories of virtualization are:

- a. Full Virtualization
- B. Partial virtualization
- C. Para Virtualization
- D. Hardware Virtualization
- E. Operating System level Virtualization

III. Overview of virtual machine

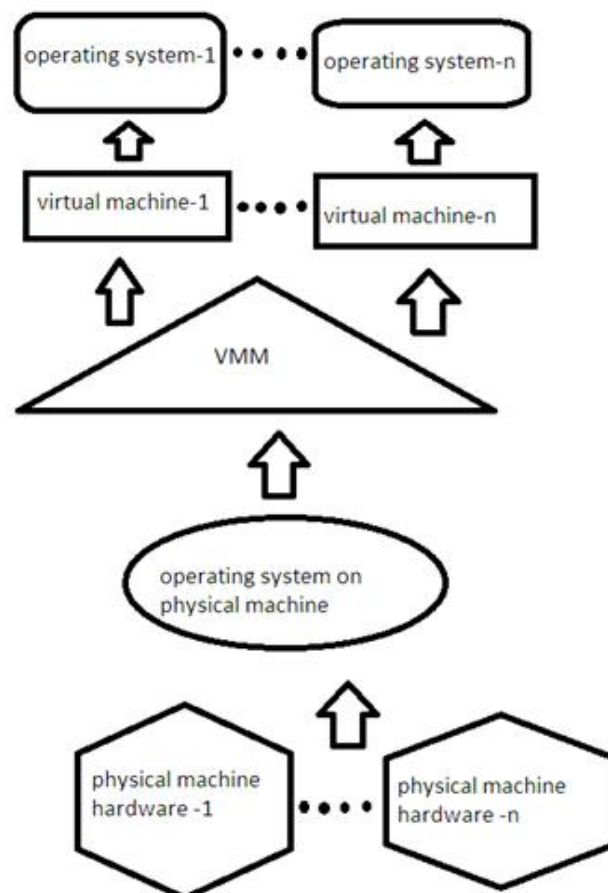
IBM develops the concept of virtual machine as a way of time sharing very expensive mainframe computer. An organization can afford only one mainframe and this mainframe is used for the development of application. Developing an application on the same system you intend to deploy on while other applications are “in production” on that system was generally considered bad practice.

The virtual machine concept allows the same computer to be shared as if it were several. IBM defined the virtual machine as a fully protected and isolated copy of the underlying physical machine’s hardware [2]. IBM designed their virtual machine systems with the goal that applications, even operating systems, run in the virtual machine would behave exactly as they would on the original hardware.

A. Benefits of Virtual Machine

- 1. Reducing Number of Servers:** the benefit of virtualization is fewer servers, which result in lower the capital expenditure.
- 2. Running multiple operating systems simultaneously:** Virtual Box allows you to run more than one operating system at a time. This way, you can run software written for one operating system on another (for example, Windows software on Linux or a Mac) without having to reboot to use it.
- 3. Easier software installation:** software vendors can use the virtual machine for the software installation. For example, installing a complete mail server solution on a real machine can be a tedious task. But with the help of virtual machine this software can be easily packed in virtual machine and installed.

Figure 1: Computational virtualization representation



- 4. Diminishing real estate costs:** Virtualization often enables data center consolidation, leading to the closure of facilities or a reduced footprint. There are also productivity savings and efficiencies that can result from virtualization:
- 5. Greater flexibility:** When requirements are modified, workgroups change or products move into development, virtualization allows supportive IT assets to keep pace more readily than a straight physical environment is able to.
- 6. USB device support:** Virtual Box implements a virtual USB controller and allows you to connect arbitrary USB devices to your virtual machines without having to install device-specific drivers on the host. USB support is not limited to certain device categories.

IV. Experimental Work

The total cost is calculated when we need to configure the different servers on different system. If we configure these servers the cost of configuration is as:

Table 1: Cost of different servers

Servers	Hardware cost
Hp Proliant ML110 G7(B6S91A)	Rs.36,500
Hp Proliant ML10 server(737650375)	Rs.39,750
Hp Proliant ML110 G7 server(647336-B21)	Rs.41,300
Dell Poweredge t110 11 Compact tower server	Rs. 43.000

By using virtualization the the cost of configuration can be reduced.with the help of virtualization the different server can be configure on a single operating system. The virtual box is software that is used to configure the different serners.virtual box will create a virtual environment in which different servers configure and rum simultaneously and reduce the capital cost and increase the stability and improve the performance of the system. The cost reduced by using virtualization is:

Table 2: Cost after virtualization

Servers	Hardware cost
Hp Proliant ML110 G7(B6S91A)	Rs.36,500
Hp Proliant ML10 server(737650375)	-
Hp Proliant ML110 G7 server(647336-B21)	-
Dell Poweredge t110 11 Compact tower server	-

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