

Cloud Building on core-i3 using VMware Workstation

Tarun Goyal
M.Tech (Student), CSE department
Bipin Tripathi Kumaon Institute of
Technology
Dwarahat, India

Ajit Singh
Assistant Professor, CSE department
Bipin Tripathi Kumaon Institute of
Technology
Dwarahat, India

Aakanksha Agrawal
M.Tech (Student), CSE department
Bipin Tripathi Kumaon Institute of
Technology
Dwarahat, India

Abstract— Cloud building means virtualization of whole system (Hardware, Software) and that system to be accessible through network any time anywhere in this world.

VMware workstation provides the facility of virtualization. As we can virtualize our physical machine using VMware as well made it accessible offline over the host based physical machine.

In this paper we have shown the development procedure of cloud on Core-i3 using VMware workstation. We have also discussed about the problems with their solutions which we had faced during this development work.

Keywords— cloud computing, VMware workstation, virtualization & core-i3.

I. INTRODUCTION

Cloud used to be developed (built) after the virtualization of whole hardware and software platform. So, the cloud computing delivers the infrastructure, platform and software as a services, on the basis of the pay-as-per click according to your demand. According to the Prof. Patterson in the Feb 2009 Berkeley Report [1] et al. “Cloud Computing, the long-held dream of computing as a utility, has the potential to transform a large part of the IT industry, making software even more attractive as a service”.

The concept of virtual machine was invented by IBM [2, 3]. As defined by IBM, a “virtual machine” is a fully protected and isolated copy of the underlying physical machine’s hardware. Thus, each virtual machine user is given the illusion of having a dedicated physical machine.

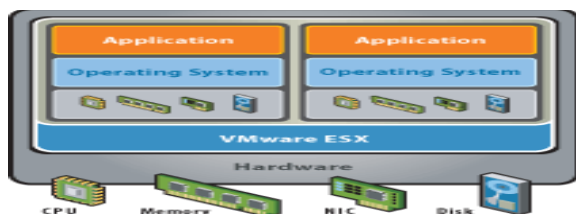


Figure 1. Basic Organization of virtual machine.

Figure 1 illustrates the basic organization of the virtual machine, as the figure shows the layers of the virtual machine over the physical machine.

Intel based PC’s are also increasingly being used as host to build the virtual machine. In this arena, virtual machines can be used to host applications, provide better resource utilization, and ease system manageability. Virtual machines can contain identical virtual hardware, even on hosts with different native hardware, making virtual machines freely portable between different physical machines.

II. VIRTUALIZATION OF PHYSICAL MACHINE

Several technical and pragmatic hurdles must be overcome when virtualizing the PC platform. The traditional mainframe approach runs virtual machines in a less privileged mode in order to allow the VMM to regain control on privileged instructions, and relies on the VMM to virtualize and interface directly to the I/O devices. Also, the VMM is in complete control of the entire machine. This approach doesn’t apply as easily to PC’s for the following reasons.

A. Processor Privileges

The Intel core-i3 processor architecture is not naturally virtualizable. Popek and Goldberg [4] showed that architecture can support virtual machines only if all instructions that trap when executed from any but the most privileged mode. Because the core-i3 processor does not meet this condition, it is not possible to virtualize the processor by simply executing all virtual machine instructions in a less privileged mode.

B. Problem of diversity in PC hardware

There is a large diversity of devices that may be found in PCs. This is a result of the PC’s “open” architecture. In a traditional implementation, the virtual machine monitor would have to manage these devices. This would require a large programming effort to provide device drivers in the VMM for all supported PC devices.

C. PC Softwares of Pre-existing system

Unlike mainframes that are configured and managed by experienced system administrators, desktop and workstation PC's are often pre-installed with a standard OS and set up and managed by the end-user. In this environment, it is extremely important to allow a user to adopt virtual machine technology without losing the ability to continue using his existing OS and applications. It would be unacceptable to completely replace an existing OS with a virtual machine monitor.

VMware Workstation has a hosted architecture that allows it to co-exist with a pre-existing host operating system, and rely upon that operating system for device support. The virtual machine's architecture allows VMware to cope with the diversity of PC hardware and to be compatible with pre-existing PC software. Currently all versions of windows and Linux can serve as hosts. This paper focuses on the developing virtual machine on core-i3 processor with windows 7 and Ubuntu 11.10 as hosts by using VMware Workstation.

III. CLOUD BUILDING USING VMWARE WORKSTATION

For developing the cloud on system [10]: Firstly need to install VMware Workstation, Secondly to install VMware vCenter Converter Standalone Client. Now, steps to follow during Cloud development as such:

- Download/Purchase online VMware Workstation from the website of the VMware [5]. VMware's version 7 or version 8 any one version to be used for virtual machine development and importantly VMware comes for Windows and Linux separately select as per requirement.
- Install the downloaded version of the VMware Workstation on Physical machine (windows or Linux) but before installation change and check security settings of physical machine.
- Then install VMware vCenter Converter Standalone Client over Physical machine for data management [6].
- Click in VMware virtualize a Physical machine option [7] for developing the virtual machine. As shown in figure 2.

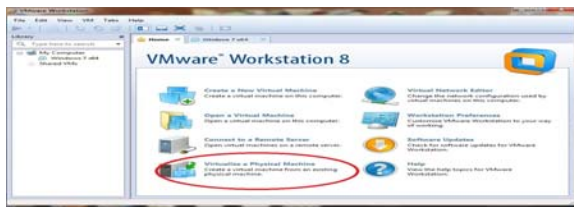


Figure 2. Virtualize a Physical Machine.

- Virtualization of the Physical Machine develops the virtual machine. This virtual machine is a "Cloud". Now, the VMM will itself install and configure all the drivers needed by the OS to work properly.

- In the case of Linux some drivers are to be downloaded from internet because some drivers of Linux work on virtual machine without virtualizing them too.

After all these steps the virtual machine is ready over a physical machine using VMware. This virtual machine is known as "CLOUD".

Providing interoperability and preserving compatibility are frequently necessary when introducing any new technology. The ability to execute virtual machine code directly on the hardware allows the technology to outperform other technologies based on machine simulation or emulation. Gum [9] describes the hardware assists in IBM systems. In contrast to all VMware does not require any hardware modifications just needs some modifications in security at the software level in the security of the OS for developing the virtual machine.

IV. IDEA ON APPLICATION DEVELOPMENT ON CLOUD

Application on Cloud to be developed by using the tools and software of the application development comes in the market for cloud computing. As for application the CloudSim to be used for simulation works. We can use Eclipse IDE with the My SQL server by using Apache Hadoop or Eclipse database Plug-in for database management. The Eclipse IDE is used for providing the coding platform to the developers in JAVA language. Mainly all the tools and software for application development in cloud are open source only some charges on the per click basis as Microsoft Azure, Amazon EC2.

Some of the applications of cloud computing comes free of cost in the market as the CloudAnalyst [8], icancloud, Google Docs and many mobile applications.

V. FUTURE WORK

Sharing of the Cloud over the network using IP configuration system and to made cloud more secure, reliable and robust in nature. Development of some applications over cloud by using the concept of the cloud computing and to try development of cloud over core-i7 processor. These are the some of the future works to be done in the field of cloud computing.

ACKNOWLEDGMENT

We like to acknowledge our thanks to J. Sugerman from VMware Inc. for providing valuable data over internet related to VMware working. Many Friends for providing feed backs on our work and for improving this paper.

REFERENCES

- [1] M. Armbrust, A. Fox, R. Griffith, A. Joseph, R. Kath, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica, M. Zaharia, *Above the clouds: A Berkeley view of cloud computing*. Technical Report No. UCB/EICS-2009-28, University of California at Berkeley, USA, Feb. 10, 2009.
- [2] Clerk Maxwell, *A Treatise on Electricity and Magnetism*, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
- [3] R. J. Creasy. The Origin of the VM/370 Time-Sharing System. *IBM Journal of Research and Development*, 25(5):483–490, September 1981.

- [3] Robert. P. Goldberg. Survey of virtual machine research. *IEEE Computer Magazine*, 7(6):34–45, 1974.
- [4] Gerald J. Popek and Robert P. Goldberg. Formal requirements for virtualizable third generation architectures. *Communications of the ACM*, 17(7):412–421, July 1974.
- [5] Aarti Sharma. Design and Development of Virtualized Hybrid Architecture for Cloud Computing: 28-29, June 2011.
- [6] Peng Li. Provisioning virtualized datacenters through virtual computing lab. *East Carolina Univ., Greenville, NC, USA: T3C-1 – T3C-6*, 27-30 Oct 2010.
- [7] M. Rosenblum, T. Garfinkel. Virtual machine monitors: current technology and future Trends. *Comput. Sci., Stanford Univ., CA, USA: May 2005*.
- [8] Wickremasinghe, B. CloudAnalyst: A CloudSim-Based Visual Modeller for Analysing Cloud Computing Environments and applications. *Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference: 446-452*, 20-23 April 2010.
- [9] Peter H. Gum. System/370 Extended Architecture: Facilities for Virtual Machines. *IBM Journal of Research and Development*, 27(6):530–544, November 1983.
- [10] Cloud Computing views by VMware Web Portal: <http://www.vmware.com/solutions/cloud-computing/index.html>.