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A Technical Review on Virtualization Technology

A.Rajalakshmi¹, S.Srinandhini², R.Uma³

Final Year M.C.A. Student, Dept of Computer Applications, Dhanalakshmi Srinivasan College of Arts & Science for Women, Perambalur, TamilNadu, India^{1,2}

Assistant Professor, Dept of Computer Applications, Dhanalakshmi Srinivasan College of Arts & Science for Women, Perambalur, TamilNadu, India³

ABSTARCT: Virtualization technology means the technology that is used to split physical machine hardware resource for running multiple operating systems in one machine. This type of technology is provided by the program is called Hypervisor software system. There are two type of hypervisers .type one Hypervisor and type two Hypervisor.type1 Hyper wiser we just want to split the hardware resources and it is automatically install the operating system that is the hardware resource RAM ,CPU,DISK space this are sources are automatically splited. That is type1 hypervisor is act as OS.type2 Hypervisor need a platform to run OS.Virtualization technology is possibly the single most important issue in IT and has started a top to bottom overhaul of the computing industry. The growing awareness of the advantages provided by virtualization technology is brought about by economic factors of scarce resources, government regulation, and more competition.

KEYWORDS: Virtualization,Hardware,Client,Server,Requirements,Hypervisor

I.INTRODUCTION

In computing, **Virtualization** is a act of creating a virtual version something.it includes the hardware virtualization and software virtualization. It's also refered as **Client Virtualization** and **Server Virtualization**. It includes the operating systems also.

[2]"Virtuality" differs from "reality" only in the formal world, while possessing a similar essence or effect.In the computer world, a *virtual environment* is perceived the same as that of a *real environment* by application programs and the rest of the world, though the underlying mechanisms are *formally* different. More often than not, the virtual environment (or virtual machine) presents a misleading image of a machine (or resource) that has more (or less) capability compared to the physical machine (or resource) underneath for various reasons. A typical computer system already uses many such technologies. One such example is the virtual memory implementation in any modern operating system that lets a process use memory typically much more than the amount of physical memory its computer has to offer. This (virtual memory) also enables the same physical memory to be shared among hundreds of processes.

II.HARDWARE VIRTUALIZATION

Hardware virtualization is refers to the **virtual machine** that acts like a real computer in with an operating system. Software executed on these virtual machines are separated from the underlying hardware resources.

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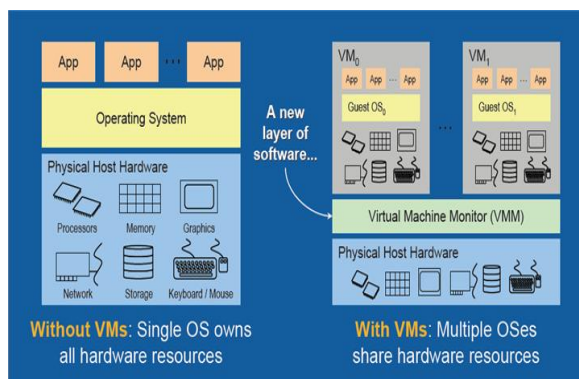
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For example computer that is running on the Microsoft windows that is host a virtual machine that is look like a computer in Ubuntu Linux operating System. **Ubuntu** based software used run the virtual machine.

Virtual Machine

[4]In computing,Virtual Machine is the emulation of the computer System. Virtual machine operates based on the computer Architecture and functions of a real or hypothetical computer, and their implementations may involves specialized hardware software otherwise combination of both.



Different virtualization techniques are used based on the usage. Native execution is based on direct virtualization of the underlying raw hardware. That is provide then instance of the same architecture and then the real machine based on, capable of running complete operating system. Some virtual machine also emulate different architectures and allow execution of software applications and operating System written for another CPU or architecture.

Virtual machine can be the interface between the proprietorsOS, guest OS. It is separates the functions of the real and Virtual Operating System.

III. DIFFERENT TYPES OF HARDWARE VIRTUALIZATION

1. Full virtualization

Almost complete simulation of the actual hardware to allow software, which typically consists of a guest operating system, to run unmodified.

2. Partial virtualization

Some but not all of the target environment attributes are simulated. As a result, some guest programs may need modifications to run in such virtual environments.

3. Storage Virtualization

It is the state of a virtual machine, and generally its storage devices, at an exact point in time. A storage(snap shot) enables the virtual machines state at the time of the storage to be restored later, effectively undoing any changes that occurred afterwards. This capability is useful as a backup.

4. Client Virtualization

Client virtualization simulates a user's desktop experience, but separates the desktop from the hardware, OS, and applications. The simulated client desktop, or virtual machine (vm), runs on a physical host server that's running **Virtualization software** the core of which is called a hypervisor. Many virtual clients can run on the one host server with

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each client having different user properties, data, applications, and even OSs. This allows users to seamlessly access their regular desktops from inexpensive low-end thin client or shared machines. This centralization of computing helps client virtualization help information technology (IT) departments reduce hardware costs and lets them set up new desktops in a minutes or days.

Desktop computer or a mobile device by means of a network connection, such as a LAN, Wireless LAN or even the Internet.

Fig:2 client virtualization process



This figure shows the client virtualization process.

Server virtualization

Computer has become a basic need of every business. It is useful not only in simplifying and managing the workloads, but also helps out business to carry out their offsite work functions, even though, if they are geographically separated. Under these circumstances, maintaining numerous computers can complicate the work environment and also can increase the operational expenses.

Full Virtualization or virtual machine Model

In this virtualization model, each guest runs on the virtual imitation of the hardware layer. This makes the virtual guest operating system to run without modifications. In this model the guest has no idea about the proprietor operating system.

A **Hypervisor** does the coordination of instructions to the CPU and so the hypervisor is to validate all the instructions from the CPU and so the hypervisor is called as a **VIRTUAL MACHINE MONITOR**.

Paravirtual Machine

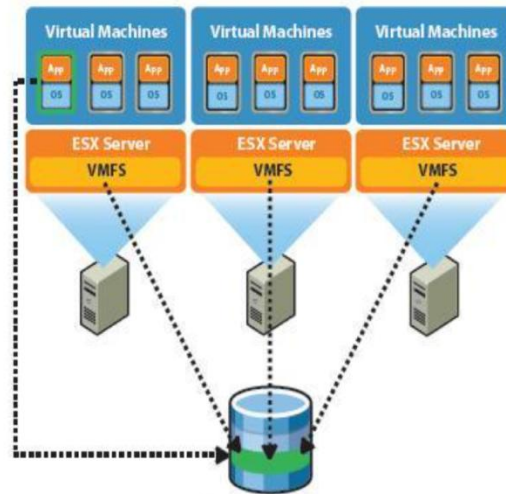
In this model paravirtual machine the guest model made some modified in order to run in this virtual environment. This modification is assigned in to the name of porting and it allows the utilization of privileged system calls sparingly.

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Fig.3: Virtualization at the OS level



In this virtualization, each virtualized environment is isolated from its other other guests, so that, a failure or security breach in one partition cannot affect any other virtualized partitions.

5V6YFeatures of server virtualization

IV. HOW THE SERVER VIRTUALIZATION WORKS?

Server Virtualization attempts to address both of these issues in one fell swoop. By using specially designed software, an administrator can convert on physical server into multiple multiple virtual machines. Each virtual server acts like a unique physical device, capable of running its own operating system (OS). In theory; you could create enough virtual servers to use all of machines processing power, though in practice that's not always the best idea.

Virtual Hardware

The only way to create a virtual server was to design special software to trick a server's CPU into providing processing power for multiple virtual machine's. Today, processor manufacturers like **Intel** and **AMD** offer processors with the capability of supporting virtual servers already built in. The hardware doesn't actually create the virtual servers already built in. The software doesn't actually create the virtual servers – network engineer's still need to right software to create them.

V. THE ADVANTAGES OF VIRTUALIZATION

One of the top advantages of virtualization is that requires less hardware to run the same type and amount of software which brings down overall costs.

1. Simple data recovery is another great advantage of this technology. For instance if your virtual server suddenly becomes corrupted you simply delete it and restore it from it from its virtual backup. You do not need to spend time and effort on restoring your entire system scratch and then restore it from the latest backup. So a corrupted virtual system is recovered in few minutes.



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2. Virtualization provides the safe platform on which you can test various software configurations and on various platform prior to deployment. So in effect you can tinker with the software until you get what you exactly want without damaging your existing network.

BENEFITS OF VIRTUALIZATION

- Reduce capital and operating costs.
- Deliver high application availability.
- Minimize or eliminate downtime.
- Increase IT productivity, efficiency, agility and responsiveness.
- Speed and simplify application and resource provisioning.
- Support business continuity and disaster recovery.

ECONOMIC REASONS FOR VIRTUALIZATION

Reduce Physical Infrastructure Cost

BEFORE	AFTER
1,000 servers with DASD	50 servers with SAN and NAS
200 racks	10 racks
3000 network cables	300 network cables
400 power whips	20 power whips

VI. SOME DISADVANTAGES OF VIRTUALIZATION

1. Even though rare, physical failures when they do happen can be devastating. For instance if your primary hard disk which contain all your virtual and physical data is suddenly stolen, burnt, broken or corrupted then all your servers both virtual and physical will need to be restored.

2. Virtualization is mainly dependent on processing power and memory. So you'll need to factor in both much more memory and processing power into your virtualization strategy.

3. When something goes wrong with a virtualized system it requires complex troubleshooting. This requires expertise and experience of working and troubleshooting virtualization problems.

Available Virtual Software

[7] VMware Workstation, Virtualbox, Hyperv, Virtual Machine Manager, Mac-on-Linux, Parallel Workstation, VMware Player Companies that are using Virtualization Technology in Real Time VMware, Citrix, Oracle, Microsoft, Red Hat,



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Amazon, Google , Virtual Bridges, Proxmox, Parallels, Wine, Disco , HP-UX Virtual Partitions, LPAR, Mac-on-Linux, Microsoft Virtual Server, Programming Language Virtual Machines include, Solaris Zone Cluster, UML j. VMware.

Cloud Computing Takes Virtualization to the Next Step

- You don't have to own the hardware & the staff
- You "rent" VMs & services as needed from a ITaaS provider (IT as a Service)
- There are multiple public cloud providers – e.g. Amazon EC2 and many others (Verizon, iland, Rackspace, Savvis, HP, IBM)
- The Cloud will provide IT similar to public utilities providing electricity, gas, and water

Scope of virtualization services

- a. Server Consolidation
- b. High Availability Disaster Recovery
- c. Infrastructure Optimization
- d. Infrastructure Automation
- e. Client Virtualization
- f. Software Lifecycle Management
- g. Intelligent Infrastructure
- h. Secure Computing
- i. Applications

VII.CONCLUSION

In this paper we provided a detailed discussion of various virtualization techniques and a technology, Virtualization is a powerful technology trend that is happening now. The trend is already underway and the outlook is that it will grow very rapidly It is one of the effective technology to improve eco friendly nature and then we can reduce the economics problem, then we can tackle the resource problem by using this technology. This technology is developed and implemented from 1960 but in that period that is in a starting stage but now it was become a trend it is used by the various platform that is big environment cloud computing ,various network,etc. Virtualization lets your IT staff deliver better service at lower cost and with greater security and reliability.

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