VIRTUALIZATION IN CLOUD COMPUTING AND VIRTUAL MACHINES MIGRATION TECHNIQUES

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ABSTRACT

The world economy is speedily shifting from producing to Service-oriented for past few years. Cloud Computing may be a new technology that extends application options in terms of flexibility, elastic resource management and on demand accessibility. The guts of Cloud Computing is Virtualization that helps the organization to supply the service on demand dynamically. The resource is something network, storage application and shopper. Migration Services may be a method of shifting Virtual machine from one host server to a different. This paper focus as on however virtualization helps to fulfill challenges in cloud computing and a few migration techniques that virtualization tool provides as a feature.

Keywords: Virtualization, Virtual machine, Migration, Hypervisor

1 Introduction

Virtualization could be a technology that permits multiple Virtual machines to run on **an equivalent** hardware machine. The target of Virtual Machine is to extend resource sharing by multiple users and improve performance in terms of resource utilization and application flexibility. This Virtualization Technology has been revived because the demand for distributed and cloud computing multiplied sharply in recent years[1]. a standard pc runs with a bunch software package specially

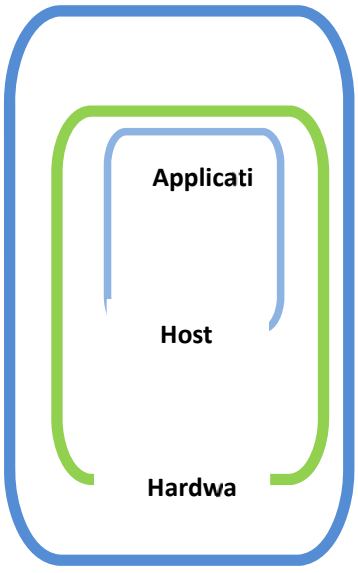

Fig. (a)

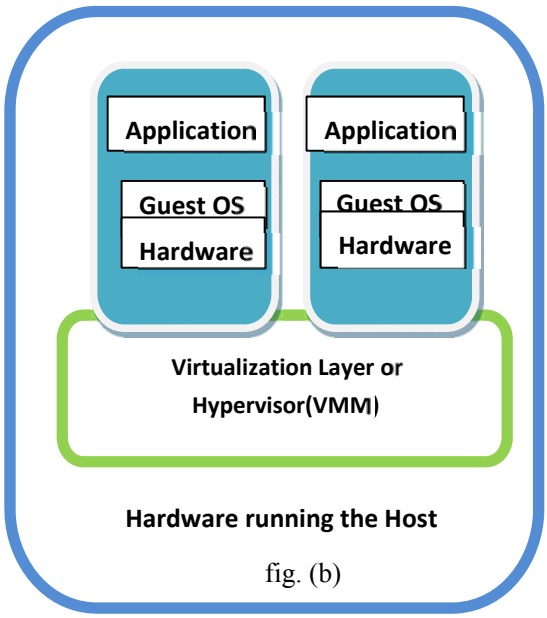

fig. (b)

Tailored for its hardware design fig(a). once Virtualization totally different user application managed by their own opearting system (guest OS) will run on same hardware, freelance of the

host OS. This is often done by further computer code referred to as a virtualization layer fig(b). The virtualization layer is thought as hypervisor or VMM(Virtual Machine Monitor)[2].

Section II provides AN introduction to virtualization for clouds. Section III presents virtualization Techniques.Section IV presents VM Life Cycle in Cloud Computing setting. Section V describes Migration Techniques. Section VI concludes the paper.

2 Virtualizationin Cloud

Virtualization technology provides **a** distinct approach for utilizing IT resources from physical to logical. The aim of virtualization is to utilize IT resources adore storage, processors and network to most level and to cut back the price of IT resources that is feasible by combining idle resource into the shared pool and making totally different VM to perform varied task.VMWare, ESX/ESXi[3], Xen[4], VirtualBox[5] are well-liked Virtualization computer code. this method results in the concept of cloud computing. to attain this, user should bear in mind of various techniques adore Emulation, hypervisor, Full Para and hardware powerassisted virtualization whereas exploitation virtualization in cloud computing setting.

3 Virtualization Techniques

Emulation: this system is employed to remodel the behavior of element to package program. It lies in OS Layer that runs on the hardware and provides **an** excellent flexibility to guest OS however speed of translation method during this is low compared to hypervisor. It **needs** high configuration hardware resource to run the package [6].

VMM or Hypervisor: The hypervisor supports hardware level virtualization. The Hypervisor sits directly between physical hardware and its OS [7]. Basically, hypervisor is split in to 2 categories: native and hosted. The native based mostly hypervisor runs directly on hardware whereas host based hypervisor runs on host OS fig(b).

ParaVirtualization: this system provides special hypercalls that substitute the ISA of host machine. Para Virtualization must modify the guest OS fig c

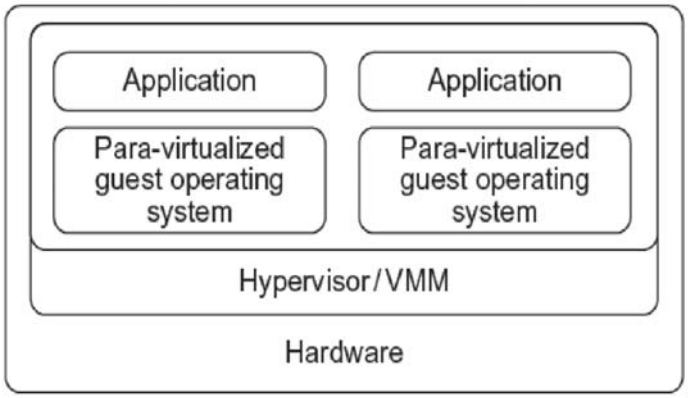

Fig.(c)

This design involves modifying the guest OS kernel to switch directions that square measure nonvirtualized with hypercalls for the hypervisor or the VMM to hold out the virtualization method.

Para Virtualization tries to scale back the virtualization overhead and **so** improve performance by modifying solely guest OS kernel [8].

Full Virtualization: during this variety of Virtualization essential directions square measure known and replaced with traps into VMM to be surpass computer code and noncritical directions run on the hardware directly. each hypervisor and VMM square measure samples of Full Virtulaization[9]

.4 Virtual Machine Life Cycle

We can produce and deploy virtual machines into our datacenter in a very varied ways that. we are able to produceone virtual machine and install a guest software package and VMware Tools on that. we are able to clone or producea templet from AN existing virtual machine, or deploy OVF templates.

The vSphere net shopper and therefore the vSphere shopper New Virtual Machine wizards and Virtual Machine Properties editors allow you to add, configure, or take away most of the virtual machine's hardware, options, and resources. we are able to monitor mainframe, memory, disk, network, and storage metrics victimization the performance charts within the vSphere shopper. Snapshots helps to capture the state of the virtual machine, together with the virtual machine memory, settings, and virtual disks. Anytime we have a tendency to will roll back to the previous virtual machine state once required.

With vSphere vApps, you'll be able to manage multitiered applications. we have a tendency to use vSphere Update Manager to upgrade the virtual hardware and VMware Tools of virtual machines within the inventory at constant time.

When a virtual machine is not any longer required, you'll be able to take away it from the inventory while not deleting it from the datastore, otherwise you will delete the virtual machine and every one its files.This can be described as figures below:

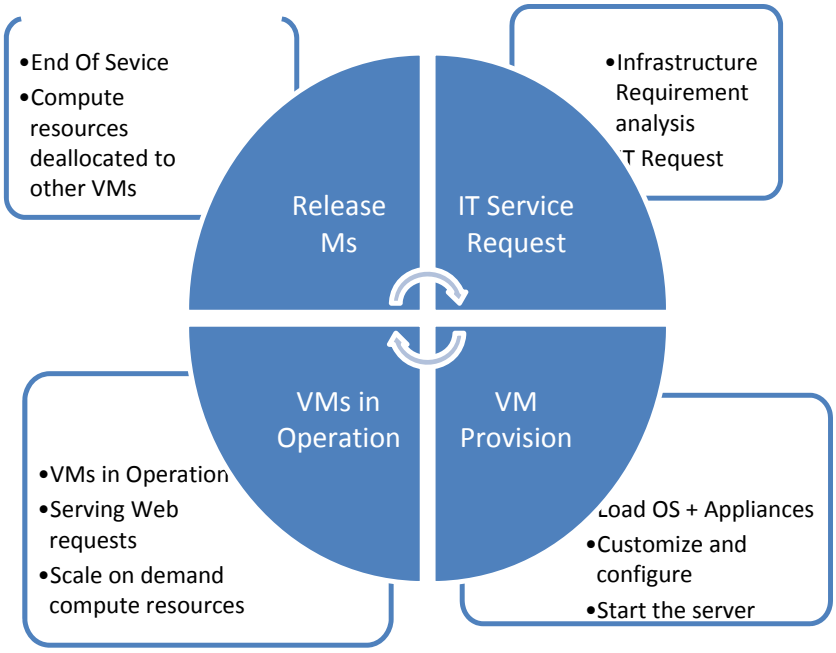

Fig. (d) Virtual Machine Life Cycle

5 Virtual Machine Migration Techniques

There are different techniques of Virtual Machine Migration, Hot/ Live Migration, cold/Regular migration and live storage migration of Virtual Machines.[11]

Techniques

i) **Live Migration**: Live Migration (that is additionally referred to as hot or real time migration) will be outlined because themovement of VM from one physical host to a different whereas being supercharged on.

When it's properly disbursed this method takes place with none noticeable effects from the top user' purpose of read. one amongthe foremost necessary advantage of live migration is that it facilitates load reconciliation and proactive maintenance just in case of failure.

Live Migration Anatomy, Xen Hypervisor Algorithm: during this section area unit going to} make a case for live migration's mechanism and

the way memory and virtual machine staes are being transferred, through the network, from one host A to a differenthost B[12], Xen hypervisor is Associate in Nursing example of this mechanism. The logical steps that area unit dead once migrating Associate in Nursing OS area unit summarized in fig. below. during this analysis, the migration method has been viewed as a transactional interaction between the 2 hosts involved:

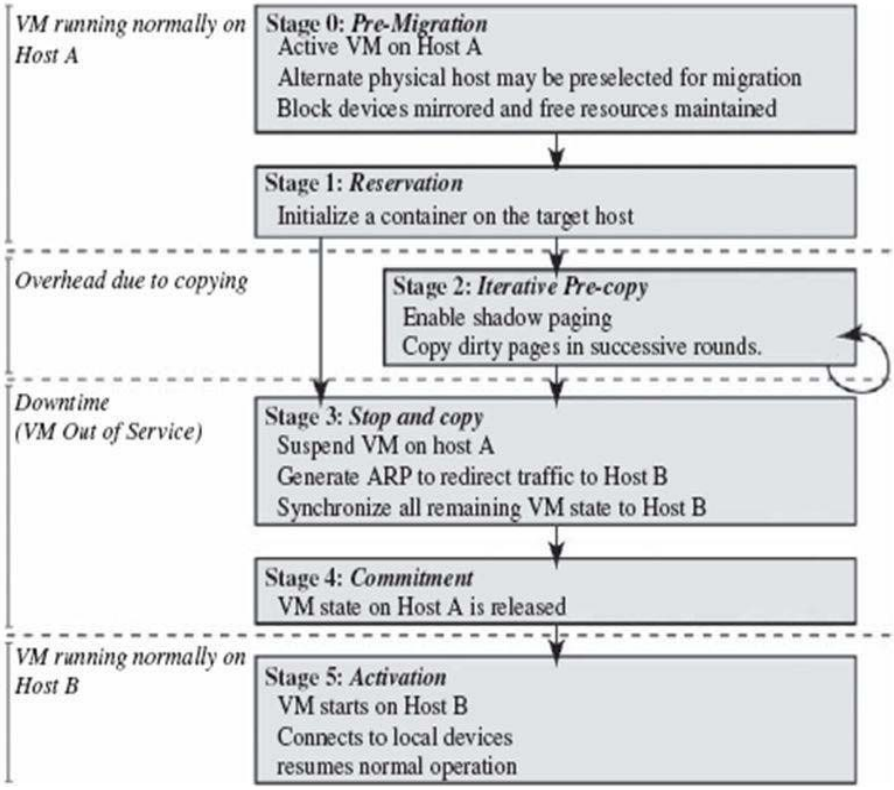

Fig. e: Live Migration TimeLine

Stage 0: Pre-Migration. a lively virtual machines exist on the physical host A. Stage 1: Reservation: during this part a call for participation is issued to migrate associate OS from host A to host B.

Stage 2: reiterative Pre-Copy: during this part , all pages area unit transferred from A to B. ulterior iterations copy solely those pages dirtied throughout the previous transfer part. Stage 3: Stop and Copy: throughout this part OS instance running at A is suspended, and its network traffic is redirected to B. electronic equipment state and any remaining inconsistent memory pages area unit then transferred. At the last stage of this part, consistent suspended copy of the VM is accessible at each A and B. just in case of failure copy offered at A is resumed. Stage 4: Commitment. Host B indicates to A that it's with success received an identical OS image. Host A interpret this message as acknowledgement of commitment of the migration group action. during this case host B becomes the first host and Host

A could currently discard the first VM.

Stage 5: Activation. The migrated VM on B is currently activated. Post-migration cods runs to reattach the device's drivers to the new machine and advertise affected science address. This methodology to manage failure ensures that a minimum of one host contains a consistent

VM image in the least times throughout migration [13].

(i) Regular/ Cold Migration: it's the migration of powered-Off virtual machine. With this, you have got the choice of moving the associated disks from one information store to a different. The virtual machines aren't needed to air a shared storage. the 2main distinction in live and cold migration are:

• Live migration needs a shared storage for VM in server's pool however cold migration doesn't.

• There would be sure electronic equipment compatibilities to be applied however whereas in cold migration it's not needed.The cold migration is straightforward to implement and it may be summarized as follows [14].

• The configuration files, together with the NVRAM file (BIOS settings), log files , further because the disks of virtual machine, area unit affected from the supply host to the destination host's associated cargo deck.

•Register the VM to the current host.

• After the completion of migration, the previous version of the virtual machine is deleted from the supply host.

(ii) Live storage Migration Of Virtual Machine: during this sort of migration user will move the virtual disks or configuration file of a running virtual machine to a brand new information store.It doesn't permit causes any interruption within the accessibility of the virtual machine's service

6. Conclusion & Future Work

This paper mentioned role of virtualization in clouds computing and numerous VM migration techniques, Xen Hypervisor algorithmic program for live migration. In future we tend to aim to develop new policies for performance evolution and worked characterization of virtual workloads, high convenience in clustered VMs through live migration and problems relating to security in live migration.

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