

Security Models for Infrastructure as a Service Layer for Virtualization in Cloud

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Abstract— Cloud computing provides a way to store and process information through a set of resources which might be accessed on-line. Cloud may be a assortment of storage and physical machines that are termed as datacenter. Cloud consists of the many datacenters situated at geographically completely different places. each physical machine of datacenter will handle more than one user. Virtualization is that the technology behind the cloud to utilize the resources. Virtualization offers that a lot of virtual machines akin to each task of user are often submitted for execution on a similar physical machine. The virtual machine can get destroyed as before long as task are going to be finished. To balance load of the cloud datacenters these virtual machines are migrated between physical machines. additionally the} virtual machine are often created by the VM image taken from the repository accessible on-line also. So, this virtualization method imparts several threats to cloud computing model like VM image sharing, VM isolation violation, VM escape. to overcome these threats a secure cloud computing model is planned during this work. This model includes a certification authority that generated pair-wise keys for all physical machine and virtual machines. Digital signature method is employed for each control message transmitted in cloud. and every one the VMs are encrypted using separate key. it's illustrated that planned secure cloud design doesn't imparts a lot of overhead and provides secure VM image sharing, secure VM migration and provides security from VM escape and VM isolation problem.

Keywords — VM image sharing, VM escape, VM migration.

I. INTRODUCTION

The cloud computing is computing technique at intervals that big groups of remote servers are networked to allow centralized info storage and on-line access to laptop computer services or resources. It provides flexibility and fully totally different computing platform for organizations. The Interest is associate example of cloud computing, it is a free web site that desires registration to access, where users can transfer, save, kind and manage pictures known as pins and totally different media content like videos and footage, through collections known as inboard. It viewed by around seventeen million folks per month and encompasses a pleasant storage capability. It's hosted on Amazon's cloud platform [1,2].

Initially, owing to absence of cloud computing, maintaining security of the data had been very robust task. However, introduction of the cloud computing has created life simple. The cloud consists of certain parts like purchasers, servers and so the most centers where all servers are managed [3]. Whenever user needed to access info and applications, the owner offers access to the user through the cloud. Cloud computing may be a model for providing service as Platform, Software, Hardware as a service over net facultative present, convenient, on-demand network access

to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) which is able to be quickly provisioned and free with nominal management effort or service provider interaction [4]. Cloud computing is that the newest effort in delivering computing resources as a service. User can rent computing resources on-line as a product these computing resources are used by user on-line [5], this helps in reducing costs provide rest will take hold of it and supply on demand service that is delivered to customers over cyberspace from large-scale info centers or "clouds". Whereas cloud computing is gaining growing quality at intervals the IT trade.

Cloud Computing contains assortment of distributed servers referred to as masters who provide demanded services and resources to the purchasers referred to as central controller or cloud manager terribly very network with the quantifiability and liableness of servers. On-demand service is provided by distributed servers. Services are of code resources (e.g. code as a Service, SaaS) or physical resources (e.g. Platform as a Service, PaaS) or hardware/infrastructure (e.g. Hardware as a Service, HaaS or Infrastructure as a Service, IaaS). Amazon EC2 (Amazon Elastic work out Cloud) is associate example of cloud computing services. Cloud services are provisioned to use by service suppliers, for example, Amazon, Google on cyber web. Usually, the resources accessible to the user of the cloud are virtualized that is (PaaS, IaaS, and SaaS) services are virtual service. User gets required service with none dependencies or constraints reciprocally companies will take some charge for pattern their services that are nominal as compared to the actual worth of that specific service, due to this cloud is turning into commonplace. Cloud computing technology uses internet and central remote servers to stay up info and applications [6]. Cloud computing permits any user from anywhere to use the updated version of services and application. We'd wish to not purchase code with the license as results of amendment and maintaining code are the server's responsibility, alone we'd wish to own internet affiliation; with that we are going to use applications whereas not fitting it on our system. Gmail, yahoo mail or Hotmail, etc. are the common and wide used cloud example, for pattern any fairly cloud service, you would like to own an online affiliation. Scientific application needs an outsize amount of calculation and storage that you simply want an outsize computation storage and power. Initially, all the scientific applications are deployed on Grid [7]. However, Grid computing is expensive and not accessible everyplace the word. So the scientific applications are moving toward the cloud, Cloud provides another to grid and supercomputers

for someone terribly very cheaper price. Cloud is associate rising house and glorious for this kind of application. For the advance of deploying associate application of cloud there area such an enormous quantity of strategies developed, for example load reconciliation, coming up with formula for VM allocation in cloud [8].

II. PROPOSED APPROACH

A. SECURE VM IMAGE SHARING

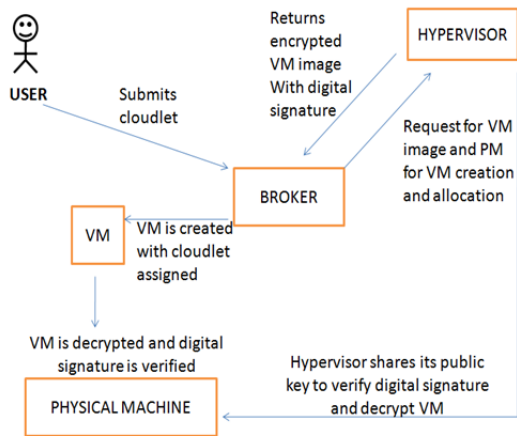


Fig 1: Digital signature approach for VM security

B. VM ISOLATION GURANTEEE

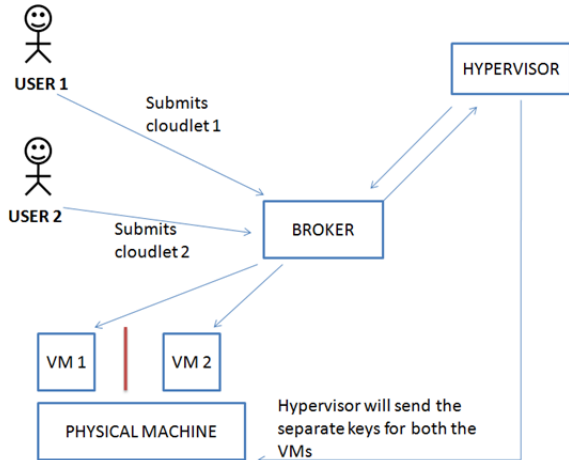


Fig 2: VM isolation guarantee

C. SECURE VM MIGRATION

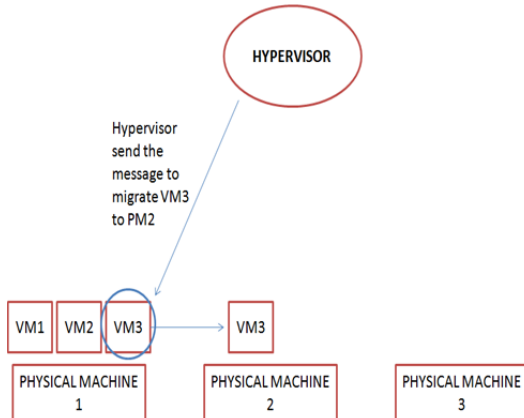


Fig 3 : Secure VM Migration

III. EXPERIMENTAL SETUP & RESULTS

Virtual cloud is formed using simulator jar named CloudSim. In this thesis CloudSim is configured using integrated development environment eclipse 3.8. CloudSim contains all the necessary java classes for providing cloud functionality.

Key generation using RSA: The simulation was run 10 times and average time in nanoseconds was recorded.

- Total key generation time for physical machines/hosts:309848854 ns
- Key generation for Hypervisor digital signature process: 181128053 ns.

TABLE I
SECURE VM IMAGE SHARING

Process	Normal(time in ns)	Secured(time in ns)
VM image encryption	NA	491407614
VM image decryption	NA	371180257
VM creation	419811392	419811392
Total	419811392	1282399263

TABLE II
SECURE VM MIGRATION

Process	VM Migration(ns)	Secure VM Migration(ns)
VM Migration message encryption	NA	491407614
Message digital signature and its verification by PM using Hypervisor's public key	NA	199049197
Migrating VM	261103034	261103034
Total time (ms)	261103034	951559845

IV. CONCLUSION

Cloud computing is obtaining attention of the researchers lately. Sizable amount of users area unit connected with cloud computing. However as there are a unit many deserves of cloud computing some demerits are there. The one in all the best threat in cloud computing is security. This security cares with information of the users that's gift in cloud and is transferred across the clouds and therefore the virtualization thought. During this paper many attacks on cloud area unit studied and solutions to those threats area unit compiled. During this paper a secure technique to handle information in cloud and secure virtualization is projected during this paper. A secure VM migration technique which supplies VM isolation guarantee and VM escape protection is projected here. And it's shown that this security formula possess no considerable overhead. In this paper all the virtualization ideas that embody VM image sharing, VM migration, VM isolation and VM escape area unit studied. The entire algorithms area unit enforced exploitation Clouds library with the assistance of Eclipse. It's tried that these security algorithms doesn't place any extra considerable overhead in terms of your time. And can increase security and supply severe attacks on cloud.

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