

## Resource Allocation Menaces with Virtualization for Cloud Computing Environment

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**Abstract:** *The surfacing of cloud computing infrastructures conveys new ways to erect and manage computing system with the elasticity offer by virtualization technologies. Companies are able to hire resources from cloud for storage and other computational purposes so that their infrastructure cost can be diminished significantly. The previous cloud model come from resource multiplexing through virtualization technology using skewness to measure the unevenness in the multidimensional resource utilization of a server. In this context, we focused on threats with existing model and provide two principal objectives: First influencing virtualization and cloud computing infrastructures to build distributed large scale computing platforms from multiple cloud providers allowed to run software requiring large quantity of computation power. Secondly developing mechanisms to make these infrastructures more dynamic. Different security aspects of cloud are also conversed in this paper with measures which should be taken in cloud for proper security.*

**Index Terms:** cloud computing, virtualization technology, cloud providers.

### 1. Introduction

Cloud computing emerges as a new computing paradigm which aims to provide reliable, customized and QoS (Quality of Service) guaranteed computing dynamic environments for end-users. Distributed processing, parallel processing and grid computing together emerged as cloud computing. The basic

principle of cloud computing is that user data is not stored locally but is stored in the data center of internet. The companies which provide cloud computing service could manage and maintain the operation of these data centers. The users can access the stored data at any time by using Application Programming Interface (API) provided by cloud

providers through any terminal equipment connected to the internet.

There are numerous advantages of cloud computing, the most basic ones being lower costs, re-provisioning of resources and remote accessibility. Cloud computing lowers cost by avoiding the capital expenditure by the company in renting the physical infrastructure from a third party provider. Due to the flexible nature of cloud computing, we can quickly access more resources from cloud providers when we need to expand our business. The remote accessibility enables us to access the cloud services from anywhere at any time. To gain the maximum degree of the above mentioned benefits, the services offered in terms of resources should be allocated optimally to the applications running in the cloud. The following section discusses the significance of resource allocation.

Not only are storage services provided but also hardware and software services are available to the general public and business markets. The services provided by service providers can be everything, from the infrastructure, platform or software resources. Each such service is respectively called Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS).

Different types of cloud:

Public clouds are accessed by the public in general. These clouds are open to everyone who requests the services which are offered by Service Provider E.g. can be Gmail by Google. Most of the customers share the same infrastructure and security over a public cloud. It is less costly and more efficient when compared to other cloud networks but those are more prone to cyber attacks.

Private clouds are used by a single individual organization and can be hosted by a third party vendor externally or by the same company internally. These clouds are very expensive when compared to public clouds but are more secure and less prone to attack.

Hybrid clouds are the combination of two or more clouds. The clouds can be public, private or



community cloud. The clouds are independent of each other and are bound together to provide the advantages offered by various clouds and can also be hosted externally or internally.

## 2. Related Work

### 2.1 Consequence of Resource Allocation in Cloud:

In cloud computing, Resource Allocation (RA) is the process of assigning available resources to the needed cloud applications over the internet. Resource allocation starves services if the allocation is not managed precisely. Resource provisioning solves that problem by allowing the service providers to manage the resources for each individual module.

Resource Allocation Strategy (RAS) is all about integrating cloud provider activities for utilizing and allocating scarce resources within the limit of cloud environment so as to meet the needs of the cloud application. It requires the type and amount of resources needed by each application in order to complete a user job. The order and time of allocation of resources are also an input for an optimal RAS. An optimal RAS should avoid the following criteria as follows:

- a) **Resource contention** situation arises when two applications try to access the same resource at the same time.
- b) **Scarcity of resources** arises when there are limited resources.
- c) **Resource fragmentation** situation arises when the resources are isolated. [There will be enough resources but not able to allocate to the needed application.]
- d) **Over-provisioning** of resources arises when the application gets surplus resources than the demanded one.
- e) **Under-provisioning** of resources occurs when the application is assigned with fewer numbers of resources than the demand.

### 2.2 Modeling of Cloud

Modern internet applications are complex software implemented on multi-tier architectures. Each tier provides a defined service to the next tiers and uses services from the previous tiers. The problem of resource allocation for multi-tier applications is harder than that for single tier applications because tiers are not homogenous and a performance bottleneck in one

tier can decrease the overall profit even if the other tiers have acceptable service quality.

Core hardware infrastructure services related to the cloud are modeled in simulator by a datacenter component for handling service requests. The requests can be application elements which are sandboxed within the virtual machines and need to be allocated a share of processing power on datacenters host components for example virtual machine creation, virtual machine destruction and virtual machine migration.

One datacenter is composed by a set of hosts which are responsible for managing virtual machines. Host is a component that represents a physical computing node in a cloud with assigned processing, memory storage and allocating scheduling policy to VM's. Each host component will implement interfaces that will support modeling and simulation of both single and multi core nodes. Specific virtual machines application allocation to hosts is the responsibility of the VM provisioned component in a cloud based datacenter. Every host component will have the allocation of processing core to virtual machine and it is done based on host allocation. Many processing cores will be delegated to each VM and how much of processing core's capacity will effectively be attributed for a given VM will be taken into account by the policy. Therefore it is possible to assign specific cpu cores to specific virtual machines or to dynamically distribute capacity of a core among many virtual machines and to assign cores to virtual machines on demand or to specify other policies. Every host component instantiates a VM scheduler component which implements space shared or time shared policies for allocating cores to virtual machines. Cloud scheduler component are used for experimenting with more custom allocation policies.

From the perspective of a cloud provider, predicting the dynamic nature of users, user demands, and application demands are impractical. For the cloud users, the job should be completed on time with minimal cost. Hence due to limited resources, resource heterogeneity, locality restrictions, environmental necessities and dynamic nature of resource demand, we need an efficient resource allocation system that suits cloud environments.

## 3. Virtualization in Cloud Computing

Virtualization is an important aspect in cloud computing environment. Virtualization is a computing



technology which will enable a single user to access multiple physical devices on a cloud. It is also defined as a single computer which controls multiple machines or also defined as one operating system utilizing multiple computers to analyze a database. With cloud computing, the software programs used does not run from your personal computer but rather are stored on servers placed anywhere around and accessed via Internet.

**Virtual Machine (VM):**

A system which can automatically scale its infrastructure resources is designed. The system composed of a virtual network of virtual machines capable of live migration across multi- domain physical infrastructure. By using dynamic availability of infrastructure resources and dynamic application demand, a virtual computation environment is able to automatically relocate itself across the infrastructure and scale its resources. But the above work considers only the non-preemptable scheduling policy.

Several researchers have developed efficient resource allocations for real time tasks on multiprocessor system. But the studies, scheduled tasks on fixed number of processors. Hence it lacks in scalability feature of cloud computing. Recent studies on allocating cloud VMs for real time tasks focus on different aspects like infrastructures to enable real-time tasks on VMs and selection of VMs for power management in the data center. But the work allocated to resources based on the speed and cost of different VMs in IaaS. It differs from other related works, by allowing the user to select VMs and reduces cost for the user.



The Resource Allocation Model presents an efficient and easy resource allocation in a cloud



computing Environment. Various parameters like Number of processor request, user count, time, cost, resource availability, resource allocated and many can be considered to develop a model for efficient resource allocation. The service requests will run or execute in cloud server in the resource allocation model. Server in cloud computing environment is the cloud service provider which will run the tasks or jobs submitted by the client. The cloud administrator will play a key role in efficient resource allocation because he the one who decides the priority among the different user request. This priority based resource allocation considers the parameters like Number of processor request, user count, time, cost, Resource availability, Resource allocated. For example as shown in fig1 below, number of resources will be connected to cloud and then the resources are allocated based on the priority or so.

**4. Security dealings in Cloud Computing**

As the cloud services growth are increasing day by day, the security of cloud computing is becoming a prominent issue in the Cloud era. Cloud offers many benefits but it is also vulnerable to several threats. So security is becoming a major concern in Cloud Computing technology. Various security techniques can be used in Cloud Computing like:

**A. Service Level Agreement (SLA)** All the services offered should have the level of service defined. The SLA may specify different levels like availability, security, scalability etc. The level of service can also be specified as minimum which allows customers to be informed what to expect i.e. minimum value while providing average target value that shows the level of performance of the organization. Penalties can be imposed in case of non-compliance of the SLA.SLAs commonly include service definitions, measure of performance, management of problem, disaster recovery, agreement termination. So in order to ensure that SLAs are met, these agreements are often designed with specific lines of demarcation and the parties involved are required to meet regularly to create an open forum for communication. Contract enforcement such as rewards and penalties should be enforced but most SLAs also leave room for revalidation so that it is possible to make changes based on new information. The entire document should be in Times New Roman or Times font. Type 3

fonts must not be used. Other font types may be used if needed for special purposes.

**B. Secure Socket Layer (SSL)** SSL is a standard security technology used to establish an encrypted link between server and client like server and Web browser. SSL also allows sensitive information like SSN (social security number), CCN (credit card number) and login credentials to be securely transmitted. Usually eavesdropping will occur when data is sent between web browsers and web servers are sent in plain text. If an attacker is able to intercept all data being sent between a web browser and web server they can see and use that information. SSL is a security protocol which describes how algorithms should be used and in this case it determines variables of the encryption for both the link and data being transmitted. SSL secures millions of data on the Internet every day especially during online transactions or when transmitting confidential information over web.

Cloud computing technology is facing many challenges based on the security of data but also on the other hand modification of this technology helps to secure the data and also many research on this technology are taking place which would eventually help this technology to expand its scope in future and it leads to more secure data and more advance clouds structure and architectures. So it will help to grow the IT industry and as well as advancement of this technology would help in many organizations to fulfill the public industries requirements. As day by day the cloud computing is advancing, the technology will eventually expand and its scope would certainly increase and leads to the expansion of cloud development industry and any more works in future and also the details of components and resource allocation and load balancing are studied by many researchers.

## 5. CONCLUSIONS

Cloud computing technology is increasingly being used in enterprises and business markets. In cloud paradigm, an effective resource allocation strategy is required for achieving user satisfaction and maximizing the profit for cloud service providers. Using Cloud Computing the complexity and cost of owning and operating computers and networks can be significantly reduced. Customization of Cloud services can be done and it is also flexible to use, advanced

services can be offered by the providers so that an individual company might not have to spend money or expertise to develop. It also provides virtualization, which is a computing technology that enables single user to access various multiple physical devices i.e. resources. It also deals with various resource allocation models, task allocation model, dynamic allocation in which the resources are efficiently allocated to the end users dynamically.

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