

Virtual Machine Migration and Allocation in Cloud Computing: A Review

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ABSTRACT

Cloud computing is an emerging computing technology that maintains computational resources on large data centers and accessed through internet, rather than on local computers. VM migration provides the capability to balance the load, system maintenance, etc. Virtualization technology gives power to cloud computing. The virtual machine migration techniques can be divided into two categories that is pre-copy and post-copy approach. The process to move running applications or VMs from one physical machine to another is known as VM migration. In migration process the processor state, storage, memory and network connection are moved from one host to another. Two important performance metrics are downtime and total migration time that the users care about most, because these metrics deals with service degradation and the time during which the service is unavailable. This paper focus on the analysis of live VM migration Techniques in cloud computing.

KEYWORDS: Cloud Computing, Virtualization, Virtual Machine, Live Virtual Machine Migration

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1. INRODUCTION

Cloud environment is latest scenario in IT industry. It indicates a computer model where users are provided with computing resources. These services include three parts like as Software as a Service, Platform as a Service and Infrastructure as a Service. Figure 1 shows the relationship of these services.

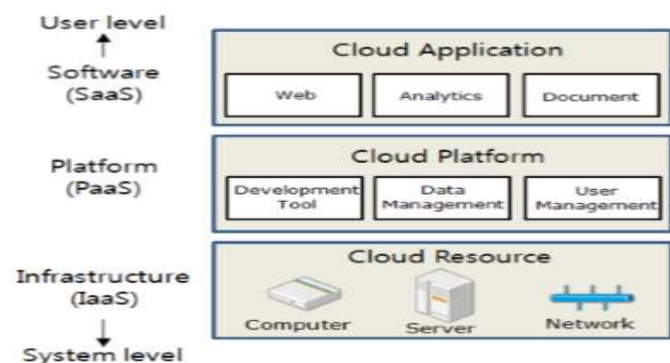


Figure 1: Services in cloud computing

IaaS locates in bottom scale of cloud systems and it provides virtualized possessions such as storage, bandwidth and memory etc. PaaS provides a higher level of IaaS to create a cloud securely programmable. SaaS is a software delivery model [1]. As the importance of cloud computing is growing bigger and bigger, there are many researches are beginning. It is important to simulate the presentation of cloud system.

However, there are numerous factors of a cloud infrastructure such as a hardware, software and services. Therefore, it is hard to quantify the presentation of cloud system.

Scheduling is the most efficient tasks that perform in the cloud computing environment. To improve the efficiency of the task load of cloud scenario, scheduling is most of the works performed to obtain maximum benefits. The main objective of the scheduling procedures in cloud scenario is to accept the resources properly while maintaining loads among the resources so that to get the least execution time.

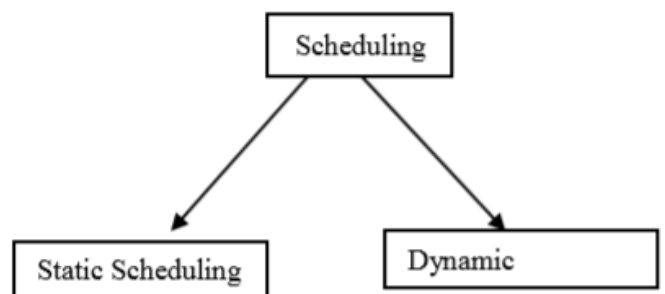


Figure 2: Types of Scheduling

2. RELATED WORK

Following are the scheduling procedures that are implemented in cloud.

Scheduling procedure based on QoS[2]: In this technique, the concerned procedure is based on quality of service. It evaluates the priority of works on the basis of multiple elements of tasks and after that perform sorting on works onto examine which can further complete the works.

User-precedence min-min scheduling procedure [3]: In this technique, an improved load balanced procedure is launched on a basis of Min-min procedure in sequence to minimize the make span and get the most out of the consumption of resource.

Improved value based procedure [4]: This procedure increase the general value-based scheduling procedure for creating suitable mapping of works to resources. It merged works as per the processing ability of on hand possessions.

Optimized movement based costing procedure [5]: In this procedure, experimentation of the optimized procedure is contrast with the general task scheduling procedure. The main objective of this optimized procedure is to obtain more benefits as compare to the general general task scheduling procedure.

Preempt table shortest task next procedure [6]: This procedure is support in a private cloud. In this paper they merge the pre-emption approach of Round-robin procedure with shortest task next. This procedure gives cost profit and increase the response duration and execution duration.

Shortest task scheduling [7]: This procedures is approved in a public cloud scenario. In this paper contains the distribution of resources on multiple clouds under over-load and under-load situation.

There are many numbers of procedures that are already practical neither in a private cloud scenario nor in a hybrid cloud scenario.

3. VIRTUALIZATION IN CLOUD COMPUTING

Virtualization is a framework or methodology of dividing the resources of a computer into multiple execution environments, by applying one or more concepts or (VM) and technologies such as time-sharing, hardware and software partitioning, partial or complete machine simulation or emulation, quality of service, and many others [4]. The approach of virtualization which empowers to computing resources of a solitary physical machine (PM) among various virtual machines (VM) ensuring execution detachment, made ready for compelling and productive resource utilization and management.

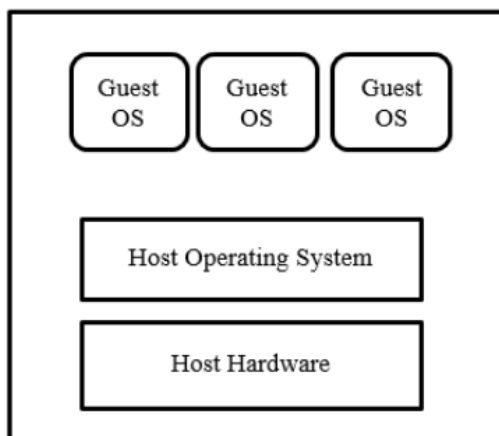


Figure 3: Virtualization

In a virtualized datacentre, every application segment (server) of an enterprise customer application is exemplified in a virtual machine (VM) and a solitary physical machine (PM) has different VMs. Virtualization gives an approach to change resources assigned to VMs dynamically (VM resizing) and moving VMs starting with one physical machine then onto the next. Furnished with an intelligent situation of virtual machines on physical machines, this permits us to take after the workload progressions of applications consequently empowering successful use of resources. Virtualization could be attained at the different type of levels. The Sorts of virtualizations are Server Virtualization, Storage Virtualization, Operating framework Virtualization and Network Virtualization, System Virtualization is the point at which a solitary physical host runs various VMs on it. This VM has it applications that run on its OS (guest OS). For the client, a VM carries on much the same as an autonomous physical machine.

4. TOOLS RELATED TO VIRTUALIZATION IN CLOUD

There are various cloud computing tool can be used for implement scheduling task.

A. CLOUDMIGXPRESS

CloudMIG Xpress addresses those types of challenges and supports method provide for the evaluation and preparation phases to move around software techniques to PaaS or IaaS-based clouds scenario. It supplies from a rationally model and is make to provide research in cloud immigration. The basic characteristics are as follows:

- Extract code prototypes from jdk-based software
- Reproduce many cloud deployment options
- Compare the trade-offs
- Evaluate future values, response times, and SLA violations
- Model the current technique deployment
- Create artificial workload profiles
- Model cloud scenarios with the help of cloud profiles
- Model cloud atmosphere constraints
- Perform a static analysis to detect cloud violations
- Compare the suitability of different cloud profiles
- Graph-based visualization of searched cloud violations

B. CLOUDSIM

CloudSim is an extensible simulation model that provides prototyping and imitation of Cloud computing technique and application provisioning atmosphere. The CloudSim simulator provides both system and activities modeling of clouds mechanism like as information centers, virtual machines and resource provisioning rules. It experiments generic application provisioning methods that can be elaborated with simplicity and limited attempt. Currently, it provides prototyping and simulation of cloud atmosphere including of both unit and inter-networked cloud system. Moreover, it shows typical interfaces for experimenting rules and provisioning approaches for allocation of virtual machines belongs to inter-networked cloud systems. Many researchers from organizations like as HP laboratory in US are using CloudSim in their examination on cloud supply provisioning and energy well-organized organization of information center possessions. The convenience of CloudSim is introduced by a case study consisting dynamic condition of application services in the mixed federated clouds atmosphere. The conclusions of this case study prove that the cloud computing scenario efficiently increases the

application QoS requirements under swinging supply and service insist patterns.

C. ICANCLOUD

Basically iCanCloud is a simulation place aimed to prototype and simulates cloud computing approaches, which is objected to those programmers who deal nearly with those types of systems. The main objective of iCanCloud is to assume the trade-offs between cost and effective performance of a given set of applications performed in a specific hardware and then support to programmers useful data about such values. Therefore, iCanCloud can be used by a wide range of programmers and users, from general active users to developers of more distributed applications. The most desirable characteristics of the iCanCloud simulation place consists the following:

- Both existing and non-existing cloud architectures can be prototyped and simulated.

- A more flexible cloud hypervisor function supports an easy technique for integrating and testing both new and previous cloud brokering rules.
- Custom VMs can be used to fast simulate uni-core/multi-core systems.
- iCanCloud supports a wide area of configurations for repository systems which consist prototypes for local storage systems, isolated storage systems like NFS and parallel repository systems like parallel systems and RAID systems.

Some other cloud computing tool is as follows:

1. SIMCLOUD
2. REALCLOUDSIM
3. SIMCLOUD
4. VIMCLOUD
5. APACHE-ANT

5. COMPARISON OF REVIEW TECHNIQUES

Scheduling Algorithm	Scheduling Parameters	Objective	Tool	Scheduling Factors	Environment
PSJN	Cost and time	Effective and fast execution of task	Private cloud	Group task	Cloud environment
Shortest Job scheduling	Arrival duration, process duration, time limit and I/O requirement	Effective resource allocation under defined parameters	MATLAB	Group task	Cloud environment
Optimized ABC Algorithm	Cost, profit and priority	Measure the cost and performance more accurately	SimGrid	Array of task	Cloud environment
Improved Cost Based algorithm	Cost and task grouping	Minimizing the cost and completion time	Cloudsim	Group task	Cloud Environment
User-Priority Guided Min-Min scheduling Algorithm	Makespan	To promised the guarantee regarded the provided resources.	MATLAB	Independent task	Cloud environment
Ant Algorithm	Pheromone updating rule	Enhance the performance of basic ACO	Cloudsim	Independent task	Cloud environment
MACO	Pheromone updating rule	Improve the performance of grid system	Gridsim	Independent jobs	Grid environmen
ACO for scheduling data intensive application	Cost and time	Improves the efficiency and reliability in all conditions	Gridsim	Group task	Grid environment

6. CONCLUSIONS

This paper presents a review of various live virtual machine migration techniques in cloud computing. The live virtual machine migration techniques can be broadly divided into two categories that is pre-copy and post-copy approach. Few techniques proposed by researchers other than these two approaches are also discussed. The paper also discussed VM migration techniques for cloud federation. All the techniques discussed above try to minimize the total downtime of migration and provide better performance in low bandwidth and the memory reusing mechanism for VM consolidation [16] reduces the amount of transferred memory and also reduce total migration time. We present that the migration approach which is used by the previous researchers is based on the past performance of the datacentres.

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