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Analysis of Cloud computing scheduling

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Abstract

The *Cloud Computing* refers to the use of computing platform, software, as a service. It's a form of utility computing in which the customer need not own the necessary infrastructure and pay for only what they use. The *Computing* resources are delivered as virtual machines. In such a framework, task scheduling algorithms play an significant role where the aim is to schedule the tasks effectively so as to reduce the turnaround time and enhance resource utilization. This paper presents a scheduling algorithm for scheduling tasks taking into consideration their priority and processing time.

Keywords: cloud computing ; scheduling parameters; priority scheduling

1. Introduction

Cloud Computing is a term used to illustrate both a platform and type of application. As a platform it supplies, configures and reconfigures servers, while the servers can be physical machines or virtual machines. On the other hand, Cloud Computing describes applications that are extended to be accessible through the internet and for this purpose large data centers and powerful servers are used to host the web applications and web services.

Since 2007, the term Cloud has become one of the most buzz words in IT industry. Many researches had tried to define as "A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over Internet."

The cloud is a metaphor for the Internet and is an abstraction for the complex infrastructure it conceals. Cloud Computing differs from traditional computing paradigms as it is scalable, can be encapsulated as an abstract entity which provides different level of services to the clients, driven by economies of scale and the services are dynamically configurable.

Cloud Computing infrastructure allows enterprises to accomplish more resourceful use of their IT hardware and software investments. This is achieved by breaking down the physical barrier

inherent in isolated systems, automating the management of the group of the systems as a single entity. Cloud Computing can also be described as eventually virtualized system and a natural evolution for data centers which offer automated systems management. Enterprises need to consider the benefits, drawbacks and the effects of Cloud Computing on their organizations and usage practices, to make decision about the adoption and use. Many companies have spent in Cloud Computing technology by building their public clouds, which include Amazon, Google and Microsoft.

2. Various type of cloud services

There are three Cloud Services Models and these 3 fundamental classifications are often referred to as "*SPI model*" i.e. software, platform or infrastructure as a service was presented by as explained below:

2.1 Cloud Software as Service

SaaS is a software delivery model in which applications are accessed by a simple interface such as a web browser over Internet. The users are not worried with the underlying cloud infrastructure including network, servers, operating systems, storage, platform, etc. This model also eradicates the needs to install and run the application on the local computers. This is a facility in which the consumer can use the provider's applications running on the cloud. SaaS has now become a frequent delivery model for most business applications, including accounting, collaboration and management. Applications such as social media, office software, and online games enrich the family of SaaS-based services, for instance, web Mail, Google Docs, Microsoft online, NetSuit, MMOG Games, Face book, etc.

2.2 Cloud Platform as Service

In this type of service, the consumer can deploy, the consumer formed or acquired applications created by using programming languages or tools provided by provider, on the cloud infrastructure. PaaS offers a high-level integrated environment to build, test, deploy and host customer-created or obtained applications. Generally, developers acknowledge some limitations on the type of software that can write in exchange for built-in application scalability. Customers of PaaS do not control the underlying infrastructure as SaaS users do, but control over the deployed applications and their hosting environment configurations. PaaS contributions mainly aim at facilitating application development and related management issues. Some are intended to provide a generalized development environment, and some only provide hosting-level services such as security and on-demand scalability. Typical examples of PaaS are Google App Engine, Windows Azure, Engine Yard, Force.com, Heroku, MTurk.

2.3 Cloud Infrastructure as Service

According to IaaS, provides processing, storage, networks, and other fundamental computing resources to users. IaaS users can deploy arbitrary application, software, operating systems on the infrastructure, which is capable of scaling up and down dynamically. IaaS user sends programs and related data, while the vendor's computer does the computation processing and returns the result. The infrastructure is virtualized, flexible, scalable and manageable to meet user requirements. Examples of IaaS include Amazon EC2, VPC, IBM Blue Cloud, Eucalyptus, FlexiScale, Joyent, Rackspace Cloud, etc. This is an ability provided to the consumer by which, it can provision processing, storage, networks and other fundamental computing resources where the consumers can deploy and run the software (i.e. operating systems, applications).

3. Scheduling Objective

The main purpose of job scheduling is to achieve a high performance computing and the best system throughput. Clouds are mainly determined by economics—the pay-peruse pricing model like similar to that for basic utilities, such as electricity, water and gas. Generally, schedulers

create the mapping of tasks to resources based on some particular objectives. Schedulers employ a function that takes into account the essential objectives to optimize a specific outcome. The commonly used scheduling reason in a cloud computing environment is related to the tasks completion time and resource utilization. The scheduler uses a particular policy for mapping the tasks to suitable Grid/Cloud resources in order to satisfy user requirements. However, the bulk of these scheduling strategies are static in nature. They produce a good plan given the current state of Cloud resources and do not take into account changes in resource accessibility. On the other hand, dynamic scheduling considers the current state of the system. It is adaptive in nature and able to fabricate efficient schedules, which ultimately reduces the completion time of tasks as well as improves the overall performance of the system. When a job is allocated to the clouds, it is usually partitioned into several tasks.

Following questions are to be considered when applying processing in executing these tasks:

1) How to assign resources to tasks

2) Task are performed in what order in cloud

3) How to plan overheads when VMs prepare, finish or switch tasks.

3.1 Parameters for scheduling in cloud computing

(i) *Resource utilization:* Using a resource in a way that increases throughput. Resources should not remain idle for long time.

(ii) *Response time:* The time of submission to the time the first response is produced. It should be as less as possible.

(iii) *Waiting time:* The sum of the periods spent waiting in the job queue.

(iv) *Throughput:* It is the total amount of work done in a unit of time.

(v) *Turnaround time:* Turnaround time is the total time taken between the submission of a task for execution and the return of the complete output to the client.

(vi) *Fault tolerance:* The algorithm should continue to work properly despite of failure of nodes.

(vii) *Energy consumption:* Energy consumption is the amount of energy consumed in a process. Scheduling techniques must lower power consumption.

4. Proposed scheduling method

Cloud computing paradigm is attracting number of applications to run in data centers. End users are given access to a variety of large amount of data and software's to manage their work. Cloud is pay per usage model. Bill is generated based on amount of usage. User buys virtual resources on rent and pay for only what they use. The need for software and hardware resources has been increased rapidly. Cloud service providers do business by servicing the users. The goal of cloud service providers is to gain maximum profit and use resource efficiently. So, it is important to handle heavy traffic in cloud computing and task scheduling is the way to handle heavy traffic in cloud computing system. A good scheduling algorithm improves the node utilization, response time and throughput.

Many complex applications require parallel processing to execute the jobs effectively. Due to the communication and synchronization among parallel processes there is a decrease in utilization of CPU resources. It is necessary for a data center to achieve the utilization of nodes while maintaining the level of responsiveness of parallel jobs.

The cloud computing is attracting an increased number of applications to run in the remote data centers. Many complex applications require parallel processing capabilities. Some of the parallel

applications show a decrease in utilization of CPU resources whenever there is an increase in parallelism if the jobs are not schedule correctly then it reduces the computer performance.

So the main goal of my proposed protocol is to

-Improve the utilization of servers allocated to the jobs.

-To process the job having higher priority.

-Improve the resource utilization.

-Minimizes the completion time

-Minimizing the waiting time

-Minimizing the switching time

I propose a scheduling mechanism that schedules the jobs in an efficient manner to improve the resource utilization. Each virtual machine will be defined by the available memory and load assigned. The priority is assigned to each cloud.

Step1: Input the N number of Clouds with V number of Virtual Machines associated with Each cloud.

Step 2: Input N number of user process request with some parameters specifications like arrival time, process time, required memory etc.

Step 3: Arrange the process requests in order of memory requirement

Step4 : Allocate the process to VM and cloud

Step 5: Identify the higher priority cloud having free memory if any

Step 6: Do the migration if required

5. Conclusion

Efficiency of scheduling mechanism in cloud computing depends on how efficient it is in managing the processes and increase the performance of the server as well as resources. As we have discussed earlier there are various problems in previous scheduling mechanism, so it needs to be minimized in all possible ways, in order to increase the efficiency.

Scheduling mechanism is an important issue in case of cloud computing. Scheduling mechanism is very much necessary to improve the server and resource performance of the computer. So in this work I proposed a scheduling mechanism or method to schedule the jobs in the cloud. This method is a very simple & novel to schedule the jobs in cloud computing.

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