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EVALUATE & PROPOSED LOAD BALANCING TECHNIQUE FOR CLOUD COMPUTING

Mohit Singla, Gaganpreet Kaur, G. N. Verma
Sri Sukhmani Institute of Engineering & Technology, I.K. Gujral Punjab Technical University, Jalandhar, India

Abstract— Cloud computing is a system in which networks publically or privately are interconnected to provide data and file storage. It is considered as the computer archetype in which large amount of information is stored. It reduces the cost, application hosting, content storage and delivery. It provides the feasibility to its customers that they can access their information from anywhere they want. Therefore, cloud overcomes the limitation of the location constraint. As compared to traditional concepts, cloud computing coveys the concept of the grid computing, distributed computing, utility computing or autonomic computing. When any virtual machine gets overloaded, fault may occur in the cloud environment. With the help of BFO algorithm, technique of adaptive task scheduling is proposed. Using this method, it becomes easy to transfer the task to the most reliable virtual machine. In this research work, the technique will be proposed which will select the most reliable virtual machine for the load balancing. The proposed improvement leads to reduce execution time and resource consumption.

I. INTRODUCTION

Cloud computing is an interconnection between the networks such as in private or public networks through internet in order to provide access to the application, data and file storage. It is a new technology that is utilized to share processing power, storage space, bandwidth, memory and software. Cloud computing decrease the computational cost, hosting application, content storage and delivery rate.

The cloud provides the feasibility to the user so that it can access the information from anywhere. Therefore it removes the issue of location constrained as in the traditional computers a set up was required to access the information.

Figure 1. Example of Cloud Computing

II. TYPES OF CLOUD

(a) Public Cloud: These are the clouds that are operated by the outsiders as they provide better economies of scale as compared to customers. They are based on the Pay-as-you-go model, in which every individual has to pay an attractive minimal cost. This is very cheap or almost free to use but still interpreting public as free is not always applicable.

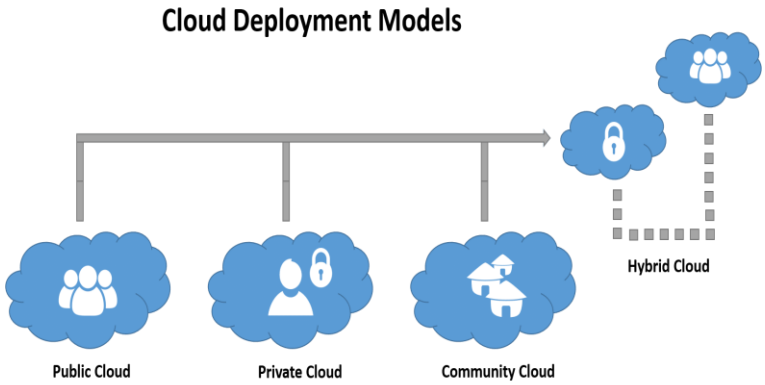
(b) Private Cloud: These are the clouds that are built for a single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud. There are two variations to a private cloud:

On-premise Private Cloud: These clouds are stored in the data centre. A standardized process and protection is provided by this model still it has limited in parts of size and scalability. For the physical resources, it is required for the IT departments to acquire the capital and operational costs.

Externally hosted Private Cloud: These clouds provide full guarantee of privacy. This is most common for the enterprises that are not dealing with a public cloud for sharing their resources.

(c) Hybrid Cloud: The private and public cloud is combined to take services advantages of both makes it Hybrid Cloud. In this case the business critical services are controlled by themselves that is using private cloud and other non business critical information has been outsource and controlled by public cloud

(d) Community Cloud: Community Cloud is referred as a multi-tenant cloud service model that is shared among several organizations. They are governed, managed and secured by the participating organizations and managed by the third party service provider.



III. CHALLENGES OF CLOUD COMPUTING

The benefits exceed the drawbacks and the model merits exploring. Some common challenges are:

Data Protection: Analysis is consider as the curtail element for the data security. Assurance for the data security from vendors is not given to the enterprises as they have the fear to lose the data confidentiality of consumers. It has fear in their mind that there data can be shared publically. For the security of this sensitive information a firewalls crosswise over data centres are employed in the current models [6]. For the maintenance of the data security, service providers are responsible and enterprise has to pay for it in the cloud model.

Data Recovery and Availability: It is necessary for all business applications to follow Service level agreements strictly. Operational teams play an important role in service management and applications administration. Operational teams supports for the production of environments.

Management Capabilities: The management of platform and infrastructure is not easy as there are multiple cloud providers [7]. For some enterprises, features like Auto-scaling are considered as the crucial requirement. It has the great potential that it increases the scalability and load balancing features.

Regulatory and Compliance Restrictions: There are some countries that do not permit customer's personal information and other sensitive information to be leaked outside the state or country. The confidentiality of the documents is their main objective. Therefore, for this process a data center or a storage site is created by the cloud providers in order to meet these requirements to meet the country's requirement. It is not feasible to have such an infrastructure and consider as a major challenge for the cloud providers.

IV. OPTIMIZATION ALGORITHM

Artificial Bee Colony Optimization

The artificial bee colony algorithm is an optimization algorithm based on the meta-heuristics in which various optimal numerical solution has been find out among a substantial number of alternatives. This process is followed while trying to tackle NP difficult problems. It is the process in which the transfer of the information is done by the foraging behaviour of the honey bee swarm. There are three groups in artificial bee colony optimization such as employed bees, onlookers and scouts. Onlookers is referred as the behaviour, in which bee took the decision for a food source. When it goes to previously visited place it is named as employed bee. When a bee performs random search then it is referred as scouts.

Bacterial Foraging Optimization

It is an improved optimization technique for task scheduling. There is a need to increase the number of data centres according to the needs of the host in order to ensure the Quality of Service within the network. There will be an increment in the energy being consumed by the network at fixed rate as the number of data centres increase. BFO technique can be optimized for virtual machine migration in order to reduce the execution time and resource consumption.

BFO technique increases the speed of processing by exploitation full resources and to achieve high correctness and high identification rate.

In the cloud computing technology, task scheduling policy is considered as a crucial component that provides the Quality of Service to the whole cloud computing systems. A trade-off between user requirements and resource utilization is done with the help of task scheduling strategy. Various tasks are submitted by different users as there are different requirements for the computing time, memory space, data traffic, response time and many more. In cloud computing different resources are included that can be heterogeneous and geographically distributed. a series of difficulties and challenges are caused by these characteristics in the cloud task scheduling for modeling, analyzing and evaluating. In order to allocate work, scheduling is considered as the resource method. The work can be virtual computing device or process data flow in order to send hardware

resources such as processors, network link, or an expansion card. In order to obtain quasi-optimal solutions for the cloud task scheduling problem, a Particle swarm optimization based Adaptive Multi-objective Task Scheduling strategy has been utilized. The main objective of this PSO-based AMTS method is to provide the completion time, average cost, average energy consumption and resource utilization. The obtained results are not optimized and take much more time to complete the tasks that enhances the time consumption rate.

V. LITERATURE REVIEW

Amit Nathani, et.al, (2011) Discussed the Infrastructure as a Service (IaaS) clouds in this paper in which it utilizes the simple process for the allocation of the policies such as immediate and best effort. The resources in the immediate allocation is allocated if they are accessible, most of the time request is not accepted. In case of the best effort policy the requested recourses are allocated if they are accessible otherwise request is forwarded in a FIFO queue.

Anton Beloglazov et.al, (2010) proposed that with the advent in the technology, large data centers are established as the use of the computational power, business and web-applications has increased. This leads to increase in the consumption of the electrical power. Energy efficient resource management system has been proposed for the cloud environment.

Haohao Zhou, (2016) proposed a cloud computing system which is referred as the queuing system in which user can touch the base as per stochastic process and can request resources such as CPU, memory, storage space and many more.

Huangke Chen, et.al, (2015) proposed the major concern of green cloud computing in all the fields such as industry and academia. To minimize the impacts of the uncertainty on the task scheduling quality within the cloud data center author proposed a scheduling engineering. For the exploitation of the proactive and reactive scheduling techniques, a novel scheduling algorithm is presented in this paper for scheduling real-time, periodic, free tasks. In order to perform the task in the real time environment within the cloud these existing scheduling approaches are insufficient.

Doulamis ND, et.al, (2014) proposed that in the dispersed computing environments, the task assignment and resource selection are the essential operations as compared to grid and the cloud as they also required resources for their working. Metrics related to client satisfaction are not only the criterion to measure the corresponding algorithms for making decision. Most of the tasks are performed without breaking the requirements of quality of services on the basis of the performance metrics of the used resources. As large number of resources are used to fulfill the tasks and their utilization efficiency [23]. The used strategy concentrates on the working of the tasks with fixed functionality not restricted by the time requirements, requested start and finish time.

Abdul Hameed, (2014) proposed a major issue in the allocation of the energy efficient resources to various virtualized ICT resources such as servers, storage disks, and networks. The main objective of this paper is to presents the major issue and challenges that are connected with energy efficient resource allocation.

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