IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 17, Issue 5, Ver. V (Sep. – Oct. 2015), PP 35-40
www.iosrjournals.org

A Model for Energy Utilizaztion for Cloud Environment

Kavita Rathi, Sonia
Assistant Professor, CSE Department, Deenbandhu Chhotu Ram University of Science & Technology, Murthal.
Student, M.Tech(CSE), Deenbandhu Chhotu Ram University of Science & Technology, Murthal.

Abstract: *A distributed environment is provided by cloud computing to share resources and reduce complexity of infrastructure requirements from user end. Each cloud server is defined with multiple virtual machines. The major challenge is to allocate the resources and other cloud services to user. The complexity of this process gets increases when the servers are configured under some restriction i.e. energy restriction etc.. In such situations, it is important to provide an energy effective allocation.*
The purposed work contains a three stage model. First stage, the capacities of cloud servers are defined with quantitative vectors. Various parameters of each cloud server are defined to represent capabilities. Once the cloud servers are configured, the next step is to define the categories of these services with the help of clustering. A parameter analysis will be done to identify the categorization of cost vector. This stage defines cost group for categorization of cloud servers. If the cloud servers are configured, next step is to accept the client or user requirement and then map those requirements to the particular cluster. According to this mapping, the most efficient and effective cloud server will be identified. The purposed work is implemented in java under cloudsim.

I. Introduction

A cloud system consists of two processes known as **cloud** and **computing** where cloud represents a network that globally connect with thousands of clients or users via available services. The computing is a scientific model in which resource usage is done in an effective way. Cloud computing provides facilities to share the services, resources, and the platform with the distributed environment [1]. It provides the global connectivity via internet and provides the different technologies associated with cloud system. Cloud computing systems are defined with the specification of server so that the incorporation of associated application and the service will be obtained. The cloud system is defined with service specification that is provided in public environment for free and for private or licensed user after paying the cost. The cloud system is able to reduce such cost by providing the licensed access to the reliable and effective software system [2].

The distributed users are provided all the services and the resources through cloud system. Different service provider provides these services which are integrated to the system to avail the services to different users. The main concept of this system is beneficial for the user economically so that better adaptation of the services will be done by the environment. This type of service depends on the provider of the system which is defined under the layered environment. These layers were described in the earlier section, but when a service is performed by client, the service requests all there service layers get activated in a proper integrated way. The complex architecture of cloud environment is one of the important issues [5]. As the model is supported by web access so that it requires the complex architecture to provide the effective deployment of the service and the virtual environment to the system is provided.

The arrangement of the requests performed by different users in an organized and defined form is known as scheduling. The real time scenario is used to describe this form and able to improve the capability of the system. Various processes are used to define the cloud system and memory based constraints is able to provide the generalized system allocation to the environment. Various problems have been addressed by authors for scheduling in the available literature. Existing work includes the utilization of resources under the I/O boundation and provides the optimized scheduling so that effective time management will be done [7][11][12]. The authors suggested various approaches related to task based, security based, resource based, and energy based scheduling mechanism. Exploration of the job allocation process on the clouds and identifying the requirement of process migration is done by authors. Authors also provide different approaches to perform effective and optimized migration.

The same kind of services is provided by the number of cloud system available. To acquire the most effective and reliable services from this cloud system. The analyzing of them is required under different vectors. The effectiveness of the available cloud system depends on multiple parameters such as reliability, security, efficiency etc. It is required to analyze the available cloud system services under these all vectors to provide a cost effective service selection to end user., As much as parameters will be analyzed the analysis will be effective. But there are the systems that take the decision based on 2-3 parameters. Because of this, there is the requirement of more robust and reliable approach. There are three main stages in which the work can be

presented. In first stage, the capabilities of different cloud servers are defined under quantitative vectors. Each cloud server represents its different parameters to the strength or the capabilities of cloud servers. The next work is to categorize these services using clustering approach once the cloud server capabilities are defined. To identify the cost vector categorization a weighted parameters analysis approach is used. This stage will identify various cost group to categorize the cloud servers. Once the cloud servers are categorized, the next work is to accept the user requirement and map the user requirements to the specific cluster. The most effective cloud server will be identified using this type of based mapping. The presented work will be implemented in java environment under cloudsim.

II. Literature Review

There are number of approaches for scheduling and resource allocation used by different cloud servers. There is some of the scheduling scheme which was based on the cost analysis and some gives the concept of job forwarding and job migration. Some of the work done by earlier researchers is discussed in this chapter.

Related Work

VC-Migration: It actually defines the formation of clusters in cloud server. This kind of server system also includes the virtual cluster specification along with the communication migration. Its main framework is defined to achieve the control mechanism for virtual cluster. To achieve the cluster formation, cluster scheduling, mutation processing, concurrent processing, process migration, virtual system integration, virtual cluster effective scheduled process integration experimentation is provided [13].

As the middle layer environment works on another application system migration for cloud servers. The reconfiguration capabilities to improve the scalability and elasticity so that the system work load will be distributed and the reconfiguration will be achieved for the system have been defined by the author. Such system also provides the ideal reconfiguration so that the VM migration and application level processing will be done. The ideal reconfiguration processing defined by the author will be obtained. To improve the system accuracy and processing the performance integration and reconfiguration is defined by the author [14].

The process adjustment in cloud environment is presented by Balaji Viswanathan (2012). A process migration under the work load analysis approach under the system design is defined by the author. Author defined a probabilistic framework under the rule based adjustment so that effective functionality analysis and associated process execution will be done.

Viswanathan (2012) defined a framework so that process migration in flexible time will be done. Sheigeruimai (2012) defined a work on scalable cloud system under the application based migration. A work load based analysis on middle server environment is performed by the author. Author performed the workload based analysis in middleware so that autonomous workload over the system will be achieved. Shigeru Imai (2012) defined a performance based system so that system reconfiguration will be done and the application level migration will be done effectively over the system.

Findings from the survey

The problem of scheduling in the available literature have addressed by various authors. Existing work includes the utilization of resources under the I/O boundation and provides the optimized scheduling so that effective time management will be done. The authors suggested different approaches related to task based, security based, resource based, and energy based scheduling mechanism. The job allocation process on the clouds and identify the requirement of process migration are explored by authors. Different approaches to perform effective and optimized migration are provided by authors.

Most of the researchers have defined the process feasibility over a virtual machine based on the I/O boundless but the availability of the machine and wait time does not considered. Most of the researchers defined the memory requirement and utilization as the main criteria to decide the work load instead of identifying the aggregative time of waiting processes present in queue. Researchers also work on the process of execution so that the energy optimization will be achieved. But the exploration of the aggregative resource allocation and starvation based analysis is not given in these research papers.

III. Proposed Work

Same kind of services is provided by the number of cloud system. We can acquire the most effective and reliable services from this cloud system. It is required to analyze them under different vectors. The effectiveness of this cloud system depends on multiple parameters such as reliability, security, efficiency etc. A cost effective service selection to end user is provided and to analyze the available cloud system services under all these vectors are provided. As much as parameters will be analyzed the analysis will be effective. But there are the systems that take the decision based on 2-3 parameters. There is the requirement of more robust and reliable approach because of these systems. To achieve the cloud system scheduling the presented work is

defined so that the optimized utilization of available cloud resources will be done. The work is defined on distributed cloud server system. With multiple virtual machines the cloud system is defined here. The request is processed by the cloud server as these machines are energy adaptive and provide the energy consumption. A three stage model is presented to provide the effective cloud scheduling.

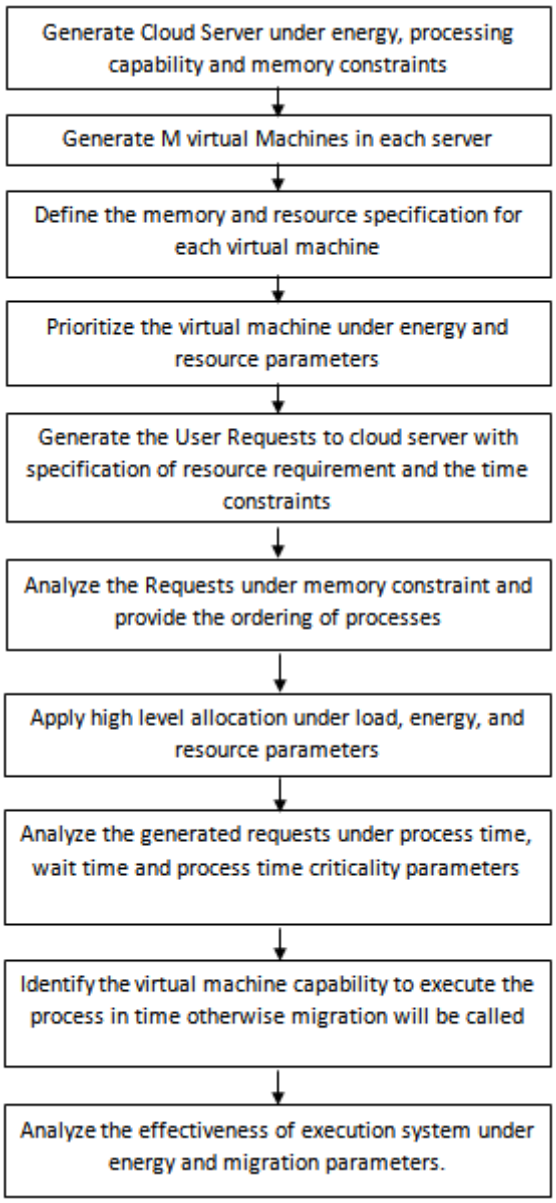

Figure 1: Flow Chart

The exploration of different stages of the work are given under here

1. Cloud Environment Setup

The building of the cloud environment is the first stage to work with cloud computing. While setting up the cloud environment, it is required to set the some properties such as number of physical cloud servers, number of virtual machines available on each cloud server and the capabilities of each virtual machine. The capabilities can be defined in terms of memory availability and the I/O devices associated with each virtual machine.

2. User Request Initialization

Once a user will enter to the system, a service request will be performed to the integrated environment. User process request will be defined under different parameters such as process time specification, memory requirement, I/O requirement, Dead line specification etc.

3. Cost Estimation

A weighted mechanism will be defined to estimate the cost of a process. The cost estimation weighted process is based on the process time, arrival time, dead line criticality and the memory requirements.

4. Scheduling

Once the weight age to each process is defined, these processes are scheduled based on the greedy algorithm. The objective function is to arrange the processes under the least cost ratio.

5. Process Allocation

Once the processes are scheduled and the cost estimation is done. The evaluation of the virtual machine will be done in order of process occurrence in the queue. This evaluation of the virtual machine will be done respective to under the capacity and the request analysis. If the process is feasible to the virtual machine capacity the process will be allocated to that particular virtual machine.

6. Migration

If the process is not feasible to the particular virtual machine, the requirement of the migration is identified. Now to migrate the process, the capacity and load on other virtual machines will be analyzed and based on it the migration of the process will be done.

7. Analysis

Analysis is the final stage of the presented work in which all the processes will be analyzed under different parameters such as wait time analysis, response time analysis etc.

IV. Results:

The cloud server is here defined with the specification of integrated virtual machines. These multiple cloud server based distributed system is defined with processing capacities and energy specification. Each virtual machine is also defined with relative resource parameters. These resources are defined as the memory capabilities and the IO load capabilities. The virtual machine associated parameters are here defined randomly so that the work will be defined on generic environment and the prioritization to the machines will be done. The network configuration parameters are shown in table 4.1

Table 1: Simulation Parameters

Parameter	Values
Number of Cloud Servers	5
Number of Virtual Machines	10
Load on Machine	5
IO Limit	5
Memory Limit	64M
Processing Limit	1000ms
Simulation Time	100 sec

The analysis of presented work is done under different obtained parameters. These parameters include the simulation time, migrations performed; violation occurred respective to different number of generated requests. The analysis results are described and presented in this section graphically.

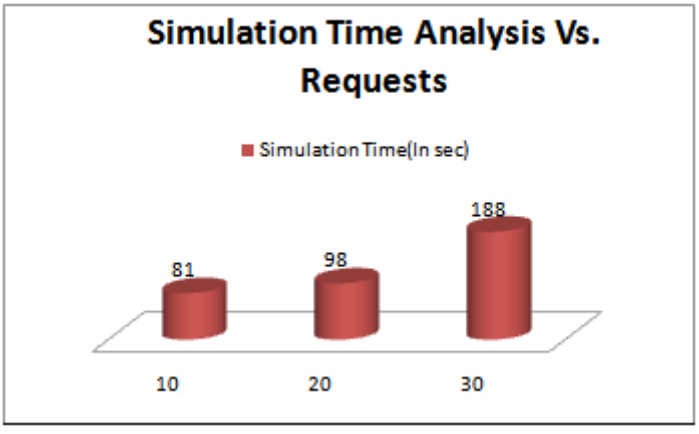

Figure 2: Simulation Time Analysis

Here figure 2 is showing the analysis of presneted work model respective to the simulation time. The experimenation is here applied on different number of requets. As the number of requests increases, the simulation time is also increased. It shows that that as limited resources when utilized by more requests, the load vector affects the efficiency of work.

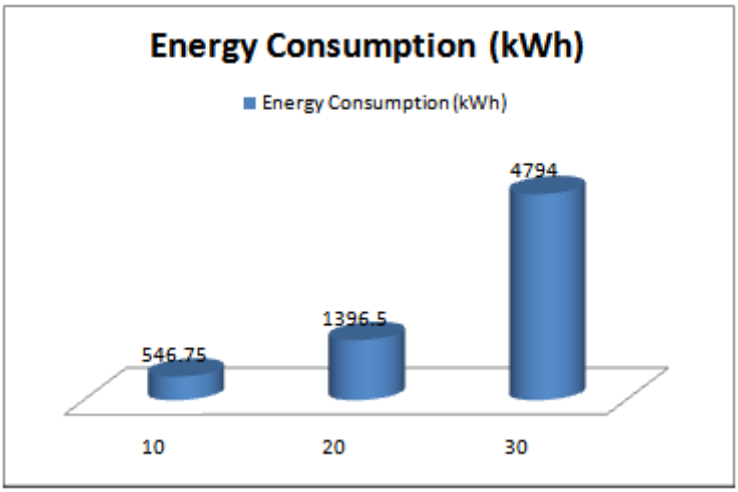

Figure 3: Energy Consumption Analysis

Here figure 3 is showing the analysis of presneted work model respective to the energy consumption. The experimenation is here applied on different number of requets. As the number of requests increases, the energy consumption is also increased. It shows that that as limited resources when utilized by more requests, the load vector affects the efficiency of work. The higher the energy loss, the effectiveness of system degrades.

V. Conclusion

In this present work, an energy adaptive layered model is presented for service allocation to the cloud server. The work is applied in two phase in parallel i.e. on client side and on server side. The work is here experimented on different load machines. The analysis is done in terms of process time, wait time, number of migration and energy consumption parameters. The results show as the load over the server increases, the energy consumption increases and the system reliability degrades.

VI. Future Work

In this present work, a load and energy adaptive layered model is presented for cloud service allocation and execution. The work can be improved in future under following aspects

- The work does not include any optimization algorithm in future some optimization algorithm such as genetics can be applied with work.
- The work is applied on a generic cloud service environment without security constraints. In future such constraints can be considered.

References

[1]. Ilango Sriram, Ali Khajeh-Hosseini, Research Agenda in Cloud Technologies, Unpublished, http://arxiv.org/abs/1001.3259, 2010
[2]. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Cloud Computing, A Practical approach, CRC Press/Taylor & Francis, 304p, ISBN: 978-1466593169.
[3]. Jeongseob Ahn, Changdae Kim, Jaeung Han, Young-ri Choi†, and Jaehyuk Huh, Dynamic Virtual Machine Scheduling in Clouds for Architectural Shared Resources, Dynamic Virtual Machine Scheduling in Clouds for Architectural Shared Resources, pp 19-19, 2011
[4]. Loganayagi.B, S.Sujatha, Enhanced Cloud Security by Combining Virtualization and Policy Monitoring Techniques, Procedia Eng. 30, pp 654–661, 2012
[5]. Samer Al-Kiswany, VMFlock: Virtual Machine Co-Migration for the Cloud, Proceedings of the 20th international symposium on High performance distributed computing, pp 159-170, 2011
[6]. Masaya Yamada, Yuki Watanabe, Saneyasu Yamaguchi, An Integrated 1/0 Analyzing System for Virtualized Environment, International Conference on Computing Technology and Information Management, pp 82 – 87, 2012.
[7]. Omer Khalid, Ivo Maljevic, Richard Anthony, Miltos Petridis, Kevin Parrott, Markus Schulz, Deadline Aware Virtual Machine Scheduler for Grid and Cloud Computing, International Conference on Advanced Information Networking and Applications Workshops, pp 85-90, 2010.
[8]. Zheng Hu, Kaijun Wu, Jinsong Huang, An Utility-Based Job Scheduling Algorithm for Current Computing Cloud Considering Reliability Factor, International conference on Software Engineering and Service Science, pp 296 – 299, 2012.

[9]. Omer Khalid, Ivo Maljevic, Richard Anthony, Miltos Petridis, Kevin Parrott, Markus Schulz, Dynamic Scheduling of Virtual Machines Running HPC Workloads in Scientific Grids, International conference on New Technologies, Mobility and Security, pp 1-5, 2009.
[10]. Chuliang Weng, Zhigang Wang, Minglu Li, and Xinda Lu, The Hybrid Scheduling Framework for Virtual Machine Systems, international conference on Virtual execution environments, pp 111-120, 2009
[11]. Jie Zheng, Workload-Aware Live Storage Migration for Clouds, international conference on Virtual execution environments, pp 133-144, 2011
[12]. Xun Xu, From cloud computing to cloud manufacturing, Robo. Comput. Integr. Manuf., 28, pp. 75–86, 2011
[13]. Madhan Kumar Srinivasan," State-of-the-art Cloud Computing Security Taxonomies - A classification of security challenges in the present cloud computing environment", ICACCI '12, August 03 - 05 2012, CHENNAI, India ACM 978-1-4503-1196-0/12/08
[14]. Sudipto Das," Albatross: Lightweight Elasticity in Shared Storage Databases for the Cloud using Live Data Migration", The 37th International Conference on Very Large Data Bases, August 29th September 3rd 2011, Seattle, Washington. Proceedings of the VLDB Endowment, Vol. 4, No. 8 VLDB Endowment 21508097/11/05