ENERGY RESOURCE CONSUMPTION IN CLOUD COMPUTING SYSTEM

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ABSTRACT: Cloud computing is an on-demand service resource which includes applications to data centers on a pay-per-use basic. In order to allocate these resources properly and satisfy user's demands, on efficient and flexible resource allocation mechanism is needed. Due to increasing user demand, the resource allocating process has become more challenging and difficult .One of the main focuses of resource allocation is how to develop optimal solutions for this process. In this paper the resource allocation problem in a virtual machine; this requires the energy resource allocation method to solve the resource allocation problem in a cloud computing environment.

Index Terms- Resource allocation, Energy aware method, scientific workflow, cloud computing

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I. INTRODUCTION

Cloud computing has emerged as an effective and efficient way of resource provisioning [6]. Due to the centralized management of infrastructures [2].The elasticity of cloud infrastructures, an increasing number of customers choose to deploy applications (e.g., business and scientific applications) in cloud platforms [1]. A large number of scientific applications can be modeled by workflows in many domains, including bioinformatics, astronomy, astrophysics, and high-energy physics to name a few [4]. Such scientific workflows can benefit from large-scale cloud infrastructures [2]. A single scientific workflow usually contains hundreds or thousands of tasks, thereby requiring a large amount of computing resources for execution. Fortunately, those resources can be provisioned by the cloud infrastructures [5]. However, the tasks contained in scientific workflows have dependencies and communications among them, differing significantly from the unrelated tasks [1]. Therefore, the cloud management system needs to allocate resource for scientific workflow executions. Within a cloud platform, the computing resources are provided in the form of virtual machines (VMs) [7]. The VMs are usually provided in various specifications, which are measured by several configuration parameters including the number of CPU cores, the amount of memory, the disk capacity, etc [4]. As the scientific workflow executions in cloud platforms incur huge energy consumption, it is important to deploy VMs in an energy-efficient way[2]. Therefore, the energy consumption of a cloud platform has gained wide attention throughout the world. As a result, it is of paramount importance to deploy scientific workflow executions in an energy-aware way inside a cloud platform and among cloud platforms [7].

II. BACKGROUND WORKS

With the Todays Internet's ubiquity in modern world, many argue that some various levels of cloud computing is now a common platform. This research heavily focuses on cloud security. Cloud computing cannot be easily understood by the definition. There are many definitions, which share the same common thing: the Internet. Cloud computing is a way to access the Internet in our daily life of a single system, using all the tools and software's installed on the computers. It is also the ability to use distributed computing resources with local servers handling various applications. With the help of cloud computing users need not to worry about the location and the storage space of their data. They just start using the services anywhere and at any time. The main driver of this technology is Virtualization (Hypervisor) and virtual appliance [4].

Cloud computing offers various services that allow users to find the appropriate service that fits their infrastructure needs, Cloud service models are divided as software as a service (SaaS), Platform as a service (PaaS), and Infrastructure as a service (IaaS) [5] [6] .

- Software-as-a-service (SaaS): The consumer uses the provider's applications, which are hosted in the cloud. For example, Salesforce.com CRM Application.
- Platform-as-a-service (PaaS): Consumers deploy their own applications into the cloud infrastructure. Programming languages and application development tools used must be supported by the provider. For example, Google Apps.
- Infrastructure-as-a-service (IaaS): Consumers are able to provide storage, network, processing, and other resources, and deploy and operate arbitrary software, ranging from applications to operating systems.

Cloud computing has recently gained significant popularity as an effective and efficient way of service provisioning. Nowadays, the energy consumption of the cloud datacenters is intensive attention of researchers around the world. Energy conservation in modern distributed computing context are receiving a great deal of attention in the efficient scheduling methods in this issue have been overwhelmingly investigated . In a broad sense, scheduling algorithms can be classified into two categories: static scheduling and dynamic scheduling . Static scheduling algorithms make scheduling decisions before tasks are submitted, and are often applied to schedule periodic tasks . However, aperiodic tasks whose arrival times are not known a priori must be handled by dynamic scheduling algorithms.

The energy consumption of each PM is produced by the CPU, cache, memory and hard disk. However, in the virtualized cloud computing environment, the energy consumption can be calculated through two parts, i.e., the baseline energy consumption and the dynamic energy consumption. To reduce the energy consumption of processors in data centers, many efficient technologies are utilized, including Dynamic Voltage Scaling/Dynamic Voltage and Frequency Scaling (DVS/DVFS) technology, resource hibernation, and memory optimizations

III. PROBLEM

The efficient job scheduling increases the client use cloud computing resources efficiently and gain the maximum profits with efficient utilization of resources is one of the cloud computing services providers ultimate goals. Repetitive evaluation of the performance of cloud provisioning polices, application workload models and resource performance models in dynamic system are difficult to achieve and rather a time consuming and costly approach.

IV. ALGORITHM

In Energy aware resource allocation algorithm, energy consumption for cloud computing based on the task tolerance the total number of nodes of cloud computing, the number of tasks and the initial task tolerance were given. The cloud system checked the resource utilization of each cloud computing node, when there was the task in the task waiting queue. If the resource utilization of any cloud computing node was not 100%, tasks were scheduled to the cloud node for executing. When the task tolerance was less than or equal to the agreed tolerance of itself, the task was scheduled into the cloud computing node and the node of relatively low utilization was selected to schedule the task for executing. At the same time the resource utilization of node was collected in real-time. Otherwise, next task of the quest chain queue was scheduled for executing. The iterative calculation was done and the total energy consumption was calculated, when the resource utilization of every computing node was 100% scheduled.

```
Generate for all computing codes
Compute U1,U2,..Un
For(i=1;i<n;i++)
{
For(j=1;j<=n;j++)
{
If( Ui> Uj)
{
U=Ui; Ui=Uj; Uj=U;
}
}}
```

V. WORKING PROCESS

Scientific workflows are deployed across multiple cloud computing platforms due to their large-scale characteristics. This can be technically achieved by expanding a cloud platform. However, it is still a challenge to conduct scientific workflow executions in an energy-aware fashion across cloud platforms or even inside a cloud platform, since the cloud platform expansion will make the energy consumption a big concern. In this project, first step is to create a virtual machine. It is used to allocate a job to system. Then create a Brokers ID.

Brokers contain number of systems. It is used to send a job to free system. If system is at work the brokers to shift the job to other system. Basically, the dynamic deployment of virtual machines for scientific workflow executions. Specifically, an energy consumption model is presented for applications deployed across cloud computing platforms, and a corresponding energy-aware resource allocation algorithm is proposed for virtual machine scheduling to accomplish scientific workflow executions. Experimental evaluation demonstrates that the proposed method is both effective and efficient. JAVA is used as the front-end tool and for maintaining the database MYSQL is used as the backend. JAVA is referred to as an independent programming language because all the code is triggered by specific events that the user performs. This is for the user to be firm in control of how the program flows and therefore increases user satisfaction with the program. The key portions of a JAVA project are the forms, controls, and code modules. A form or control has properties that can be altered. The program's code is contained primarily in events mentioned below in various forms in order to keep track of the system.

VI. SIMULATION

The CloudSim provides virtualized Cloud-based data center including management interfaces for VMs, memory, storage, and bandwidth. The fundamental issues, are as provisioning of hosts to VMs, managing application execution, and monitoring dynamic system state, are handled by this layer. A Cloud provides the different policies in allocating its hosts to VMs, to implement strategies at this layer. The implementation can be done by programmatically extending the core VM provisioning functionality. The clear distinction at this layer related to provisioning of hosts to VMs. A Cloud host are concurrently allocated to a set of VMs that execute applications based on SaaS providers defined QoS levels. The layer exposes the functionalities that a Cloud application developer can extend to perform complex workload profiling and application performance study. The CloudSim is the User Code to exposes entities for hosts, applications, VMs, number of users their application types and broker scheduling policies. By extending the basic entities given at the layer, a Cloud application developer can perform the following activities:

To generate a mix of workload request distributions, application configurations Implement custom application provisioning techniques for clouds and their federation. As Cloud computing is still an emerging paradigm for distributed computing, there is a lack of defined standards, tools, and methods that can efficiently tackle the infrastructure and application level complexities.

VII. MODULE SPLIT-UPS AND DESCRIPTION

7.1 Login

The server admin provide their username and password to login the data center.

7.2 Create Data Center

First we can create a data center. Then generate a table view form. It is used to create how many data center are used in this project.

7.3 Create Brokers ID

Then we can create a brokers id. It is a proposed method of a project. We create means then broker's id will show in table form. Broker's ID is used to communicate VM and the system. It is very useful to our project.

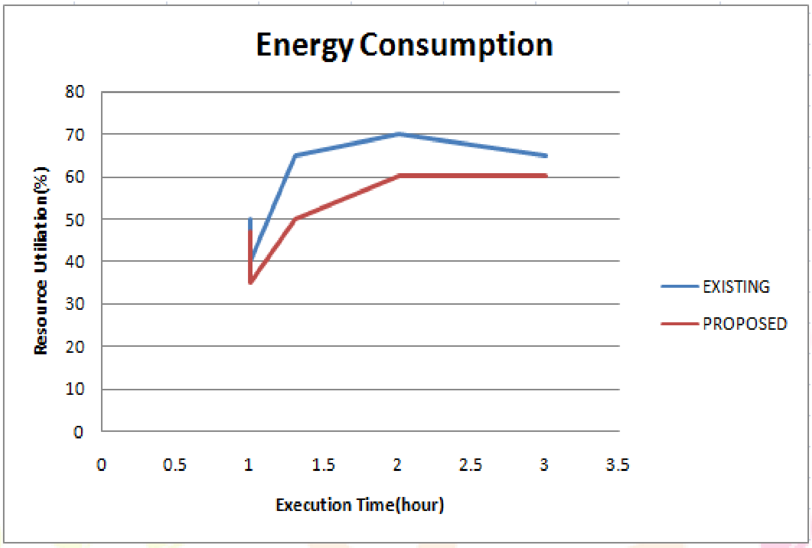
7.4 Create VM

VM means Virtual Machine. It is used to allocate the job to the system. VM is also called as VM Loader. It is used to load a system. Then we can create the virtual machine in this project. Then we will show in table form.

7.5 Job Allocation

Then we can create Job provisioning data. It is used to how many job are allocated in our project. Then we will show in table form. Then the whole dates will show in table form. How many data center are there. And how many brokers and how many VM and Job are there in this project. Then memory and the total size are automatically generated and show in table form.

VIII. GRAPH



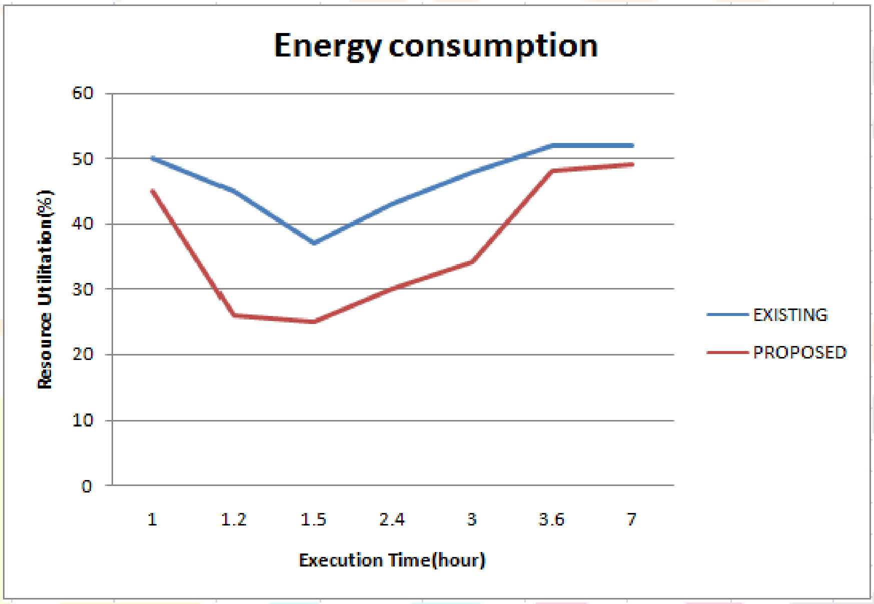


Figure 7.1 : Comparison of resource utilization at different execution time

By this fig.7.1, the existing and proposed system of energy is compared. The energy of resource utilization and execution time is calculated. Resource utilization is that the virtual machine is allocated by resources and execution time is that job processing time in virtual machine. In the existing system, consumption of energy is high. After the implementation, the energy is consumed in proposed system because of using brokers ID.

IX. CONCLUSION

This paper proposes virtual machines dynamic deployment for scientific workflow executions. Concretely, an energy consumption model has been presented for the application across cloud computing platforms. Furthermore, an energy-aware resource allocation method has been designed for virtual machine allocation to support scientific workflow executions. At last, created account in cloud to store our designs for virtual machine allocation and the results have demonstrated the validity of our method. Based on the work done in this paper, we plan to integrate our energy-aware scheduling of scientific workflow executions into real-world cloud platforms in the future. The real-world scientific workflows may have their individual characteristics, and the proposed method should be improved for meeting their particular needs. We will also look at the energy-aware resource scheduling issues for other types of resource such as network bandwidths, storage and caches in cloud platforms.

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