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RESEARCH ARTICLE

IMPROVE ENERGY EFFICIENCY MODEL FOR CLOUD COMPUTING BY ENERGY AWARE RATE MONOTONIC SCHEDULING

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ABSTRACT:- Distributed computing is a "developing ideal model" that has reclassified the way Information Technology based administrations can be advertised. It has changed the model of putting away and overseeing information for versatile, constant, web based applications and assets fulfilling end clients' necessities. More remote host machines are assembled for cloud administrations bringing about more power dispersal and vitality utilization. Throughout the decades, power utilization has turned into an essential expense component for registering assets. In this postulation we will explore every single conceivable territory in a run of the mill cloud foundation that are in charge of considerable measure of vitality utilization and we will address the approaches by which control use can be diminished without bargaining Quality of Services (QoS) and general execution. We additionally plan to characterize the degree for further augmentation of exploration from the discoveries we would have from this thesis. In this thesis we are utilizing vitality mindful rate monotonic booking to enhance execution of parcel lost. Parcel lost are lessening by the proposed calculation of energy aware rate monotonic scheduling algorithm.

Keywords: Cloud computing, vitality effectiveness, booking, group.

1. INTRODUCTION

Today's business operations have been made more effective and easier by the recent development of cloud computing. This is a system similar to other mobile applications such as Twitter and Facebook. Cloud computing is a development that has enhanced timely delivery of crucial information to clients. This is the same direction to which businesses in cloud applications are moving toward. There have been a tremendous change in the models of cloud computing whereby, millions of clients across the globe are interconnected using internet devices. An easy and elaborate platform with a number of application services is used as a server. The point of control is the cloud which connects devices of multiple customers. Customers are in an environment which utilize browsers or even native applications and many customer devices as well as desktops have access to the rising ability of the browsers.

Creates incentives is the center of high abilities in diverse range of mobile devices, network costs as well as rising need for connectivity. Create incentive in this case is utilized to reduce computing of cloud application as well as the storage footprint and utilize the knowledge and storage of devices customers use. Due to the rising need of mobile users, there will be need for application developers to add the number of server-side computing as well as expansion of the storage to increase capacity.

Cloud computing is basically a combination of diverse range of systems which are connected in either private or public connections to give an infrastructure of applications, file storage as well as data that is both dynamic and scalable. Cloud computing has been utilized as a practical platform through which customers are able to approach and experience direct cost advantages as it has the ability of transforming a data center to an environment that is variable priced from a setup of capital intensive. Cloud computing is founded on a number of ideologies with the foremost idea being the doctrine of reusing IT capability. Cloud computing brings about a difference that can only be compared to the traditional grid computing concepts as well as the concepts of distributed computing and utility computing or even autonomic computing with it expanding the boundaries of different organizations and corporations across the world. According to Forrester, Cloud computing can be termed as a system or a pool of abstracted, much scalable and managed compute infrastructure with ability and capacity of hosting end-client applications and billed by consumption.

1.1 MODELS OF CLOUD COMPUTING

There are a number of models that have been used for the cloud computing. These models perform different roles to ensure that the system meets the expectation and plays the role it is intended to perform.

1. **Software as a service (SaaS):** This model provides an application that is fully completed to the clients and a service that is on need. In this model, only one occasion of the service runs on the cloud and a number of end users are eventually serviced. The customer on the end side is not required to invest in the licensing of servers or the software. The cost on the side of the provider is also reduced since the only requirement is servicing of one application that has also to be hosted. Currently, SaaS is provided by different organizations that include; Google, Microsoft, Salesforce and Zoho.
2. **Platform as a Service (PaaS).** In this case, a layer of software or development environment is taken and then provided as a service. Other levels of services that are a bit higher are built on this platform. Clients are given free will to their applications that operate on the infrastructure that the provider owns. In order to ensure that all requirements that pertain to management and scalability are met, there is provision of a more precise OS by the PaaS provider as well as a server for the application. For instance, LAMP platform (Linux, MySQL and PHP), J2EE and other more servers. The most popular and known examples of PaaS are the Google application Engine and the Force.com.
3. **Infrastructure as a Service (IaaS).** In this case, there is provision of primary store as well as a platform that enhances computing as connections are provided by the standardized service. There is combination of servers, systems of storage and connection utilities to make them more available as a way of handling the workload. The only requirement to the client is to connect his own software on the platform. Most commonly known include the Amazon, GoGrid, 3 Tera and more others.

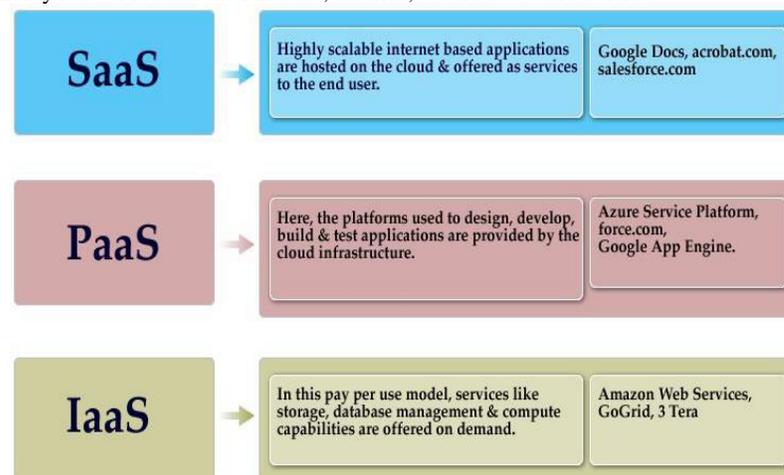


Figure 1.1:- The cloud Model

2. PROBLEM STATEMENT

Cloud applications are conveyed in remote server farms (DCs) where high limit servers and capacity frameworks are found. A quick development of interest for cloud based administrations results into foundation of colossal server farms devouring high measure of electrical force. Vitality productive model is needed for complete foundation to diminish practical expenses while keeping up indispensable Quality of Service (QoS). Vitality improvement can be accomplished by joining assets according to the present usage, productive virtual system topologies and warm status of registering durable goods and hubs. Then again, the essential inspiration of distributed computing is identified with its adaptability of assets. As more cell phones are getting considered as real utilization focuses for remote clients in standard business, power administration has been a bottleneck for

legitimate working of administrations at clients end. An exchange off between vitality expended in processing and the same in correspondence has been the discriminating viewpoint to be considered for versatile customers too.

2.1. VITALITY CONSUMPTION ANALYSIS

To ascertain the measure of vitality devoured by server farms, two measurements were set up by Green Grid, a universal consortium [10]. The measurements are Power Usage Effectiveness (PUE) and Data Center Infrastructure Efficiency (DCiE) as characterized beneath:

$$PUE = \text{Total Facility Power} / \text{IT Equipment Power}$$

$$DCiE = 1/PUE = (\text{IT Equipment Power} / \text{Total Facility Power}) \times 100\%$$

The IT gear force is the heap conveyed to all registering equipment assets, while the aggregate office force incorporates other vitality offices, particularly, the vitality devoured by everything that backings IT hardware load.

In cloud foundation, a hub alludes to general multicore server alongside its parallel handling units, system topology, and power supply unit and capacity limit. The general vitality utilization of a cloud domain can be delegated takes after [9]:

$$E_{\text{Cloud}} = E_{\text{Node}} + E_{\text{Switch}} + E_{\text{Storage}} + E_{\text{Ohters}}$$

Utilization of vitality in a cloud domain having n number of hubs and m number of exchanging components can be communicated as:

$$E_{\text{Cloud}} = n (E_{\text{CPU}} + E_{\text{Memory}} + E_{\text{Disk}} + E_{\text{Main board}} + E_{\text{NIC}}) +$$

$$M(E_{\text{Chassis}} + E_{\text{LineCards}} + E_{\text{Ports}}) + (E_{\text{NAS Server}} + E_{\text{Storage Controller}} + E_{\text{Disk Array}}) + E_{\text{Others}}$$

2.2. VITALITY EFFICIENCY IN CLOUD INFRASTRUCTURES

Building a vitality effective cloud model does not demonstrate just vitality productive host machines. Other existing parts of a complete cloud base ought to likewise be considered for vitality mindful applications. A few examination works have been done to fabricate vitality proficient cloud parts separately. In this segment we will explore the regions of a normal cloud setup that are in charge of significant measure of force scattering and we will merge the conceivable ways to deal with fix the issues considering vitality utilization as a piece of the expense capacities to be connected.

2.3. VITALITY EFFICIENT HARDWARE

One of the best ways to deal with lessen the force utilization at server farm and virtual machine level is use of vitality proficient durable goods at host side. Worldwide standard bodies, for example, European TCO Certification [3], US Energy Star [4] arrive to rate vitality effective buyer items. The rating is vital to quantify the natural effect and carbon foot shaped impression of PC items and peripherals.

2.4 MEMORY-AWARE SCHEDULING IN MULTIPROCESSOR SYSTEMS

Primary issue from the memory mindful booking is high bundle lost and low Residual vitality. In present multicore frameworks, centers on the chip offer assets, for example, stores, DRAM and so forth. Errands running on one center may hurtfully influence the execution of assignments on different centers and henceforth it may even malignantly make a Denial of Service (DoS) assault on the same chip [17]. Errand collection ought to be upgraded by co-booking them in the processor centers considering memory discord and recurrence choice.

Memory mindful errand planning is in light of runqueue sorting took after by recurrence choice [16]. Run queue sorting is a times line based multiprocessor planning calculation which is a particular type of posse booking. For further evasion of memory conflict, recurrence choice can be utilized which permits processor changing to a suitable frequencies for every assignment without creating any critical execution overhead.

```

1 // memoryAwareTaskScheduling(T=G(V,E))
2 sort all tasks in descending order (based on their execution time)
3 while there are unscheduled tasks in T do
4   for each unscheduled task t in T do
5     cpu = next available cpu
6     if(allDepsFinished(t) or
7        canStartEarlyExecutionNow(t)) then
8       task alt = getAltTaskToMap(cpu, tasks)
9       if(alt!=null) then
10        map(alt,cpu)
11        remove alt from T
12      else
13        create dma xfer for task t
14        currTime = currTime + getCommDMACost(t)
15        map(t,cpu)
16        remove t from T

```

3. PROPOSED METHODOLOGY

We are presenting vitality mindful rate monotonic planning for decrease the parcel loses amid the information transferring and downloading. As indicated by the current configuration also (Memory mindful booking) the parcel misfortunes are excessively.

4. RESULTS

In figure 4.1 the images shows that which we have to download and upload .

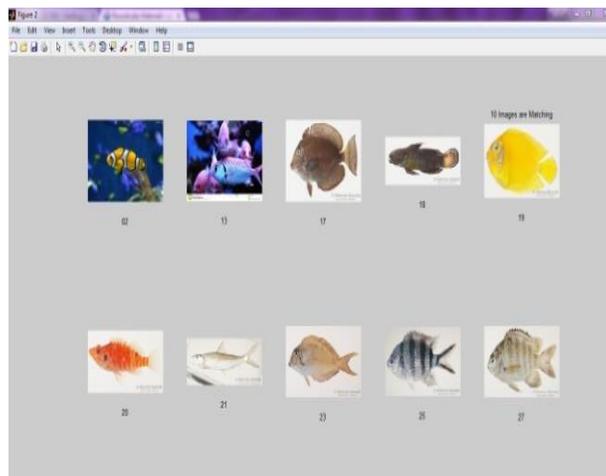


Figure 4.1:- Image for uploading

In figure 4.2 energy efficient for the memory aware scheduling and energy aware rate monotonic scheduling .

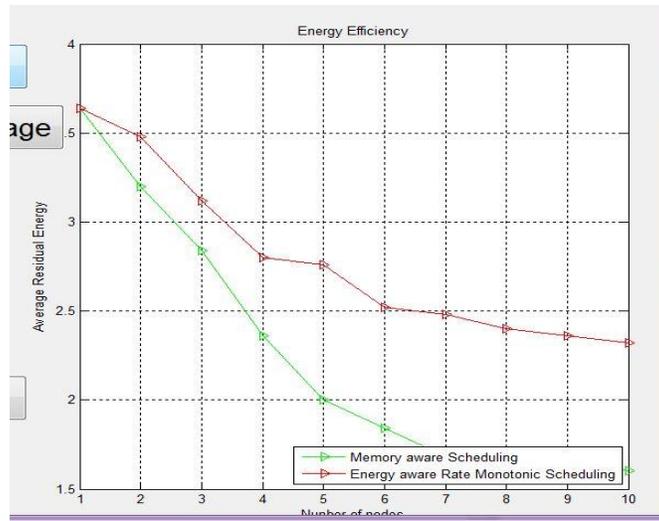


Figure 4.2:- Energy efficient v/s number of nodes

In figure 4.3 graph is showing the packet loss for number of nodes for data upload and download .

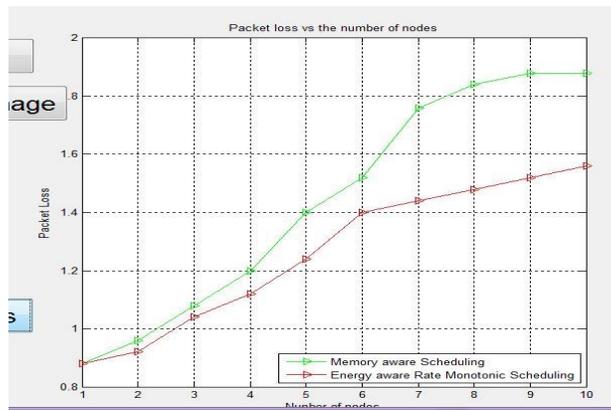


Figure 4.3:- Packet loss vs number of nodes

In figure 4.4 graph is showing the packet loss for time for data upload and download .

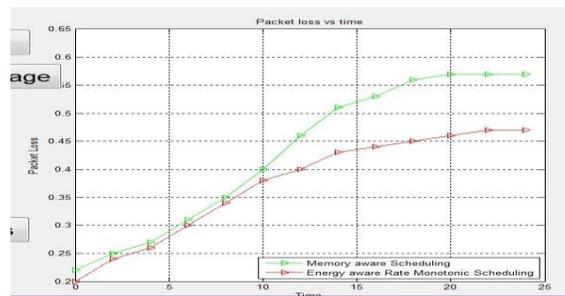


Figure 4.4:- packet loss vs time

4. CONCLUSION

In this thesis, there are a number of issues that we have investigated regarding requirement for the usage of power and effectiveness of energy in the models of cloud computing. The results have shown that a few key parts of cloud architecture that are entitled with the role for large power disintegration in the cloud. In order to achieve the every designing sector, there have

been a study of models that are effective to energy. The end results have shown directions for upcoming research and the continuity of this task for implementation on the next level.

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