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Load balancing for Resource Monitoring in cloud: Dynamic Approach

Prof Pradnya M. Daflapurkar[1], Komal B. Dhoble[2], Madhuri N. Kalane[3], Madhuri A. Takik[4], Vinayak A. Aamte[5]

[1]Professor, Dept. of Computer Engineering, MMIT Pune, Maharashtra, India
[2345]Student, Dept. Computer Engineering, MMIT Pune, Maharashtra, India

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Abstract - *Cloud computing is identical significant in the Information Technology. The cloud computing delivers very large amount of computing and storage service provided to users over the internet. Load Balancing is vital for doing operations in cloud. As cloud computing has been rising and many clients all over the world are challenging more services and better results, so load balancing is important. Many algorithms have established for allocating client's requests to vacant remote nodes. Load balancing assure competent resource utilization to customers on his demand and build up the whole performance of the Cloud. In this paper we have to improve the load balancing performance with the help of Dynamic Time Wrapping Algorithm. Load balancing is archived with the help of analyzing CPU and RAM usage to find the minimum time execration to load balance.*

Key Words: Load Balancing, Cloud Computing, IaaS, PaaS, SaaS, DTW.

1. INTRODUCTION

Now a day's Cloud Computing is being widely in used. The clouds can be used for the purpose of storing the large quantity of data over the network to access cloud data base remotely as well as it provides the different service on demand for user. Cloud Computing is also known as demand computing. "It provides information & Data are provided to computer & other devices on demand" (e.g. Network, Storage, Servers). Cloud computing it's kind of internet based computing where shared resources data & information are provided to computer and other on users/customers demand.

1.1 Different types of cloud:

Cloud Computing divides into following types

1.1.1 Private cloud:

Private cloud is only for personal use not common for all. It is more secure than the public clouds .is used for only private companies, hospitality and colleges.

Benefits Private cloud:

- Improved security
- Greater control over the server
- Flexible

1.1.2 Public cloud:

It is based on standard computing model it's one of the most important type of cloud under that one can easily access from anywhere over the network through remotely access . Public cloud services may be free or offered on a pay for what resource you use.

Benefits of public cloud:

- It is easy scalable
- Cost effectiveness and time saving
- Mobility and Large amount storage

1.1.3 Hybrid cloud:

It is the combination of two or more than two clouds i.e. Public, Private, and community cloud. It assembles information from dissimilar service providers. Hybrid cloud computing it has variety of cloud models.

Benefits of Hybrid cloud:

- It is easily quantifiable
- It improve security
- Faster and speed to market
- Disaster recovery for all
- Automatically backup system

2. PROPOSED WORK

In this Paper we study about data center implementations relay on large, powerful and expensive computing hardware and network infrastructure, which are associated with any physical device, including hardware failure, power as well as resource limitations with in times of high demand.

Load balancing in the cloud differs from architecture and implementation by using the different servers to perform the load balancing on cloud. This provides new opportunities and economies-of large -scale, presenting its own unique set of challenges.

Now a day's competitive markets, measure application success as "user interface" there no longer enough. Poor availability costs revenue loyalty and brand image. Application leaders is shifting business center metrics to service level management (SLM) to collecting Information Technology closer to business & management Technology. Our aim is to develop a scalable CLOUD it is a delivering needs of Stock Broking firm without compromising the performance, scalability and cost.

We see following are the features of load balancing:

1. Cloud setup and application deployment

2. Performance evaluation of each node

3. Resource Monitoring of every Cloud Nodes

4. Each cloud nodes considering their CPU, RAM usage using cloud controller

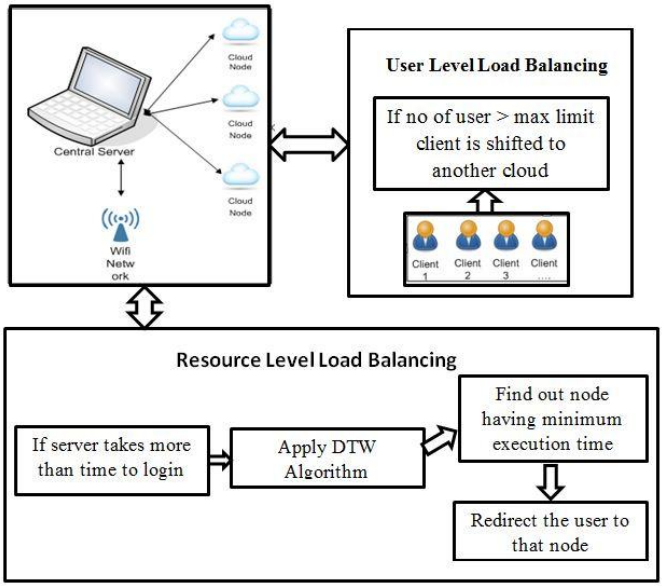

Fig -1: Architecture of system

2.1 Module 1: Cloud Setup

Create cloud by using different cloud providers Google, IBM, Amazon, and EverData. In the module one there is one main cloud provider which is provides the service on demand of user or customer.

Cloud provider is nothing but the online sites like Google , amazon or IBM also under the cloud provider we are easily do work on it from home, it is working for moveable like e.g. (Laptop, PDA's), and working from office LAN

HTTP filter:

In cloud setup, we are using the HTTP filter for the security purpose. It is one of the Application Layer filter .The Internet Security Acceleration (ISA) is provided in the form of an HTTP filter, and application-layer this filter is examines HTTP commands and data, through which you set HTTP policy.

Application Deploy on Cloud:

A. The application should involve a business transaction such as purchasing of shares using web services.

B. Customer purchase request should go through an approval process. A sub-system for agents needs to be provided for execution of customer requests and orders.

C. Customers should be notified automatically on execution of their requests and orders. A sub-system should be accessible to customers to track the status.

D. Management and Customers should have access to various reports. The access to reports should be role based.

E. System should provide a REST service to current stock prices

F. Because the market rules change relatively often, the system factors like command charges should be configurable by management.

2.2 Module2: Getting cloud statistics & Performance evaluation of each node

In our second module for getting cloud statistics we are using run command in our system. It runs command through web interface.

Cat /proc/meminfo: It gives the information about memory like how much storage is required for the particular data and remaining space of the memory.

Cat /proc/cpuinfo: It gives the cpu information. Is that a named pipe or something else to the Operating System which reads the CPU info on the fly and it generate that text each time.

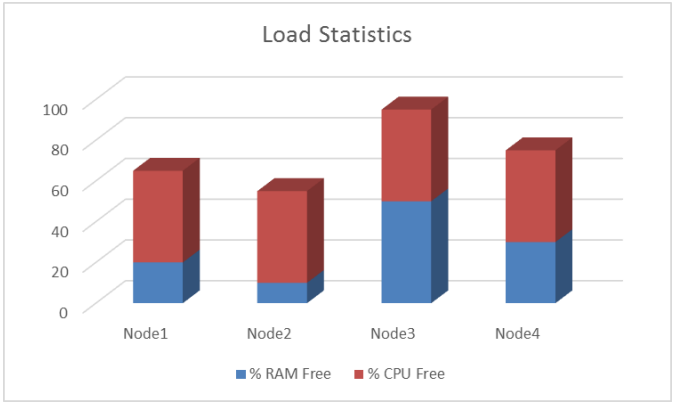

Chart -1: Load Statistics

2.3 Module 3: Load Balancing at User Level

In user Level if number of users accessing the application suddenly increases, then the system will handle the load by shifting the additional load on another node.

When an any users login on cloud node then user count is increment when the limit of one cloud node is over then the recent user can be automatically shift to the another cloud these things are done the user level load balancing.

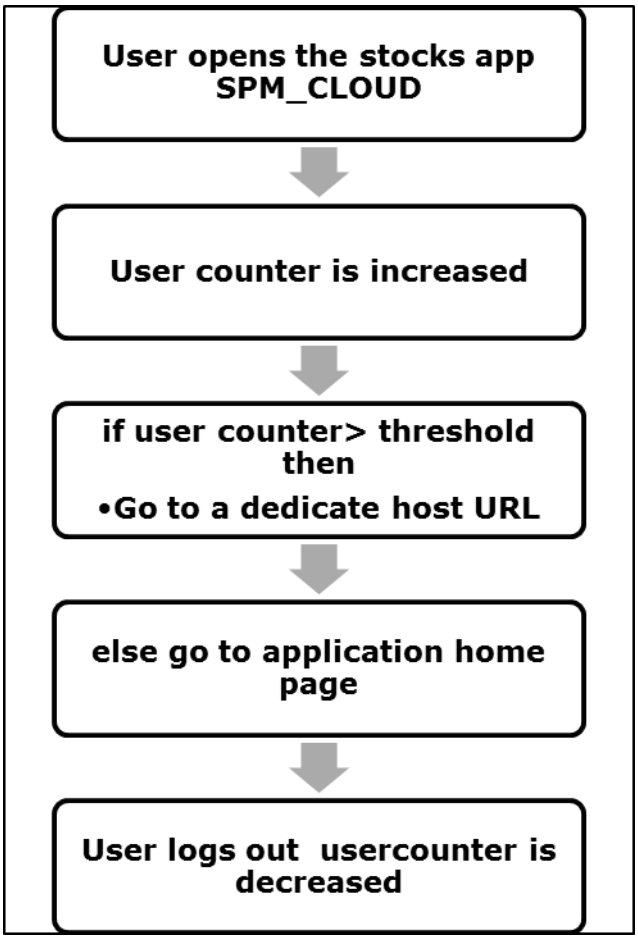

Fig -2: User Level Load Balancing

2.4 Module 4: Load Balancing at Resource Level

In case of high load request will be redirected to nodes that are having minimum execution time. Balancing using DTW algorithm it creates the threads on node. The thread waits for execution on other node.

We set the threshold value for each resource dynamically and run a thread to monitor the resource load. Once this load crosses the threshold value then we first gather all the information about nodes and shift the test to another node without disturbing running task.

Two threads are running simultaneously, thread one find out the execution time of all nodes with its execution time and thread two processes on information provided by thread one get find out the minimum execution time node to shift the load.

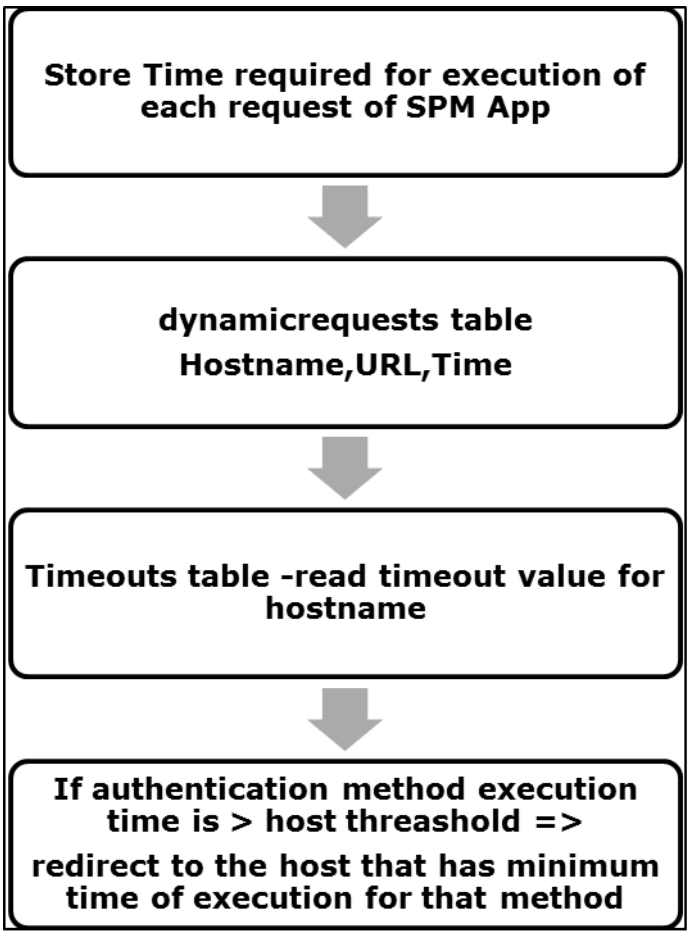

Fig -3: Resource Level Load Balancing

3. SYSTEM MODEL

We consider a cloud computing system that has N nodes $\{A_1,..., A_N\}$ and runs a set of application tasks $\{t_1, ...t_M\}$. Each node is related with a set of resource attributes (e.g., available CPU, free memory, disk space) that are signified by $R = \{r_1, ..., r_k\}$. Each feature r_i, $1 \le i \le k$ is denoted by a name (e.g., CPU load) and a value (e.g., 50%). Correspondingly, each application task t_i running in the cloud system is associated with a set of load attributes (e.g., CPU usage, memory usage) that are denoted by $L = \{l_1,...,l_k\}$. Typically, running an application task needs to satisfy multiple resource metrics such as CPU and memory.
We use $L \subseteq R$ to denote that a task load L is matched by a Node resource R, which is defined as follows,

$$L \subseteq R\, li \le r_i, 1 \le i \le k \quad (1)$$

4. RESULT

Expected result according to system is shown in following using the DTW algorithm

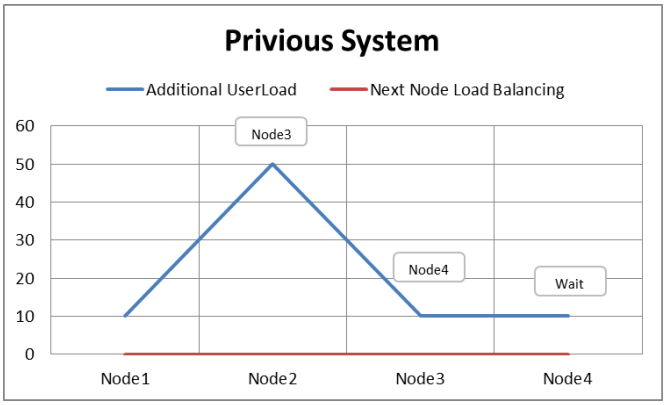

Chart -2: Previous System Result

In resource level load balancing using the DTW Algorithm choose the node having maximum CPU and MEM usage.
In result it picks the node having minimum execution time to shift the load to that node to increase the performance of system and balance the load of the system.
According to system aim it select the Node 3 because it has maximum CPU and MEM usage and average user load.

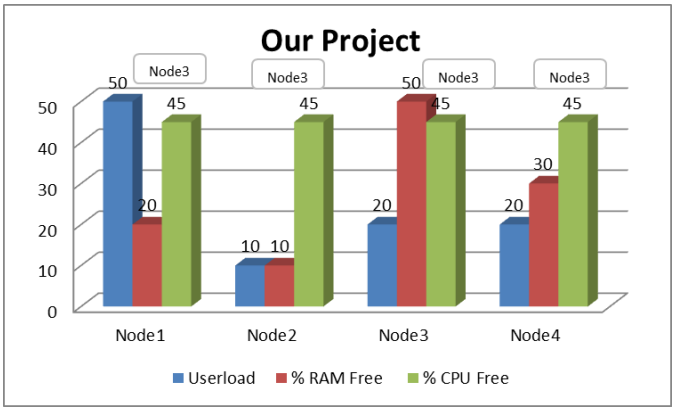

Chart -3: Our System Result

4. CONCLUSIONS

In this research paper, we have to implement architecture of cloud with better performance. Improve the capacity of load for cloud. With proposed dynamic load balancing in cloud using DTW algorithm to shift the load by considering CPU and MEM usage. We have handle cloud user by observing resource monitoring usage for dynamic load balancing using DTW Algorithm.

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