AWS Cloud Cost Analyser and Optimiser

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***Abstract*— The main aim of this paper is to implement a tool that can able to monitor and analyze cost patterns on cloud accounts(like Amazon Web Services) and capable of giving suggestions about cost optimization and cost containment.**
It helps businesses to understand how much they are spending on cloud computing services by providing regular emails, alerts and a dashboard showing monthly spend to date, and a monthly estimate. This helps companies to manage all their cloud spend and understand when cost overages are happening (not after the fact). It also offers an optimizer service to identify other ways to save money on the cloud and evaluate the performance of workloads on EC2 instances.

***Keywords: Cloud Computing, Cloud Resource Optimizer, Cost Advantages, Private Clouds, Performance Evaluation, Price Reduction,* EC2 instances.**

I. INTRODUCTION

The Internet has become pervasive in our daily life and cloud computing is the newest offering as service over the ubiquitous Web. Cloud computing [1] has been considered as a much-hyped phenomenon in the IT and business world promising to deliver a host of benefits. Companies need to look beyond this hype and seriously consider the real value of incorporating the Cloud in their businesses. This is aimed at helping companies analyze several characteristics of their own business as well as pre-existing IT resources to identify their favourability in the migration to the Cloud Architecture.
Cost optimization [3] in cloud computing is the most recent topic studied by the researcher. Like the author of [4] proposed a pricing algorithm for cloud computing resources and the Author [5] proposed a system named Dyna to reduce the expected monetary cost[2]. Again to characterize the cost-performance of cloud resources, the author of [6] used the Performance Cost Ratio (PCR) metric. By extending the Gustafson's fixed-time scaling in the context of cloud, and, investigate fixed-cost-time scaling of applications and show that using resources with higher PCR yields better cost-time performance. Every cloud provider has different pricing strategies for computing resources.

Subhas Chandra Misra et al. [7] gives a framework for helping companies analyze several characteristics of their own business as well as pre-existing IT resources to identify their favorability in the migration to the Cloud Architecture. The System provides an in-depth analysis of the financial perspective of CC in a very lucid and simple manner along with the subjective decision-making tool to find the suitability of a company for adopting CC.

In the course of a cloud, implementation users have the flexibility to choose the EC2 instance type that provides the appropriate mix of resources for the target application and workload. They apply charges based on resource utilization, but it is very high. The main purpose of the system is to create a private cloud (testbed) by using (Amazon Account) along with monitoring critical resources like RAM, CPU, memory, bandwidth, partition information, running process information and utilization and swap usages, etc. Also, recommend the price reduction strategy. The proposed method gives an efficient task of workloads to servers to decrease cost by exploiting the resource utilization. The system can able to monitors VMs (EC2 Instances) on private clouds like Amazon or Google to offer low infrastructure costs.

II. PROPOSED SYSTEM

In today's competitive market, measuring application success as a "user interface" alone is no longer enough. Poor availability costs revenue, loyalty and brand image. Application leaders are shifting business-centric metrics to service level management (SLM) to bring IT closer to business. The main intention is to build up a scalable CLOUD explanation which is able to carry requirements of Stock Broking firm with no negotiation on performance, scalability, and cost. Figure 1 shows the architecture of the proposed system which can monitor VMs (EC2 Instances) on private clouds like Amazon or Google and provide solutions to reduce infrastructure costs.

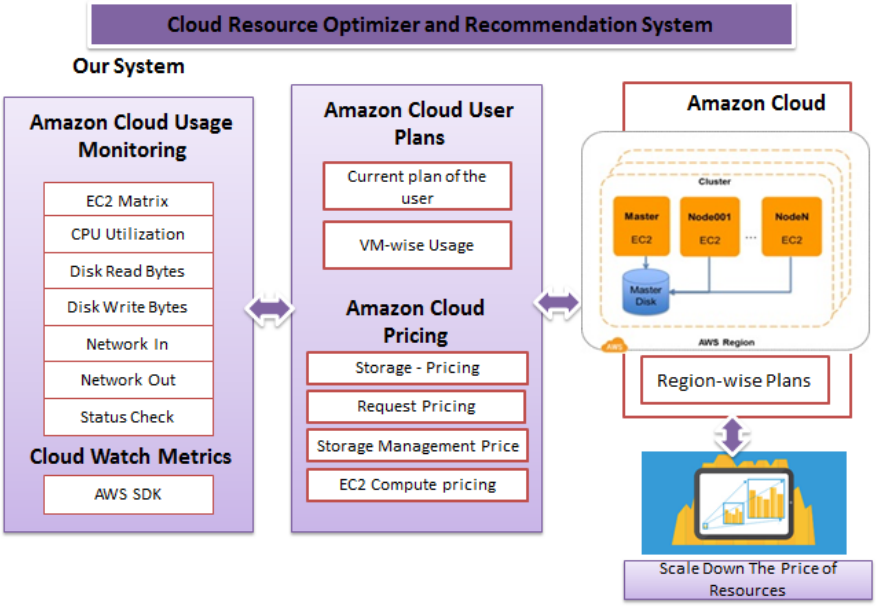

Figure 1: System Architecture

In our proposed model, we will be doing

1. **Cloud Setup -** Creating private cloud (test bed) by using (Amazon Account)

2. **Resource Monitoring -** monitoring critical resources like RAM, CPU, memory, bandwidth, partition information, running process information and utilization and swap usages etc.

3. **Authentication and authorization –** we need to connect to existing user's amazon account using user id and password and fetch all the performance matrix like CPU, RAM, storage etc.

4. **Testing -** In order to evaluate the performance of complete setup, need to deploy resource monitoring and load balancing tools on test bed and evaluate need of available resources.

Modules:

1. Resource Monitoring of Cloud Nodes:

a. User should be able to view CPU and RAM usage utilization of amazon ec2 nodes.

b. CPU and RAM utilization statistics should be dynamic and should refresh every second.

2. Select Cloud Plans for popular clouds like amazon. Cost of service depends on region of server, memory usage, CPU etc. Cloud service providers charge for following services which need to be added in system.

a. Storage – Pricing
b. Request Pricing
c. Storage Management Price
d. CPU pricing

3. Monitor account wise VM Usage of following parameters

a. CPUUtilization
b. DiskReadBytes
c. DiskWriteBytes
d. NetworkIn
e. NetworkOut
f. StatusCheck

4. Propose efficient resource utilization 1. By suggesting memory cutdown, 2. By suggesting cpu cutdown, 3. By suggesting storage cutdown.

The figure 2 shows the exact flow of the proposed system for cost optimization

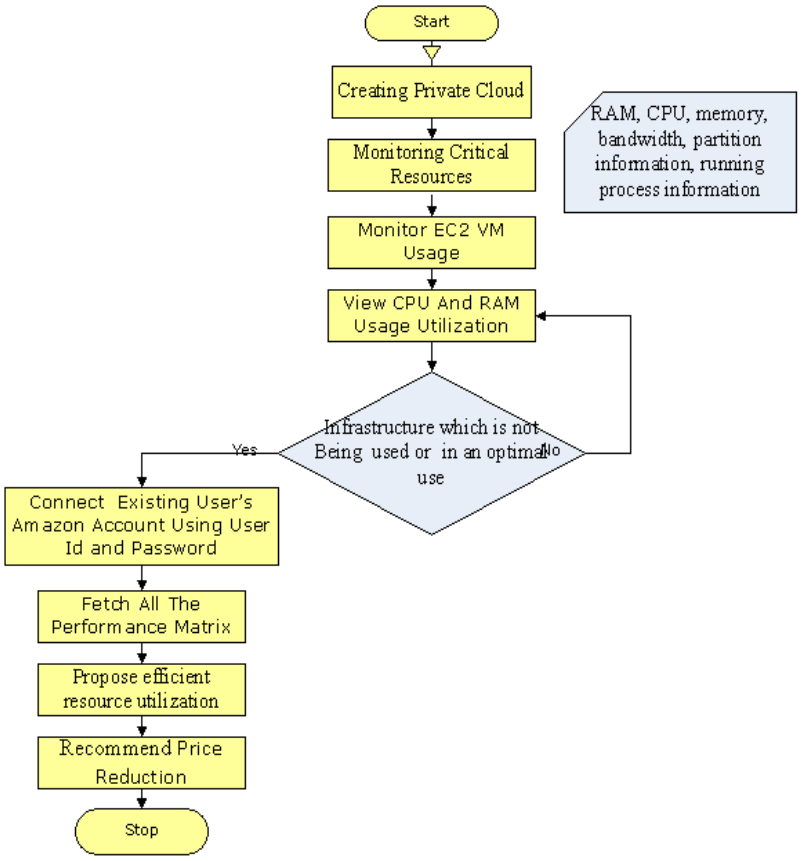

Figure 2: System Flow

III. ALGORITHM USED

A. AES Algorithm

AES is widely used for large size data encryption. AES is one of the symmetric key block cipher algorithm used worldwide for data encryption. It's particular structure of encrypting and decrypting data make it more secure so that it cannot be hacked. AES can deal with different key sizes such as AES 128, 192 and 256 bit and each of these ciphers has 128 bit block size.

The key size used for an AES cipher specifies the number of repetitions of transformation rounds that convert the input, called the plaintext, into the final output, called the cipher text. The number of cycles of repetition are as follows:

- 10 cycles of repetition for 128-bit keys.
- 12 cycles of repetition for 192-bit keys.
- 14 cycles of repetition for 256-bit keys.

Each round consists of several processing steps, each containing four similar but different stages, including one that depends on the encryption key itself. A set of reverse rounds are applied to transform cipher text back into the original plaintext using the same encryption key.

IV. EXPERIMENTAL RESULT

The AWS EC2 Nodes are created using AWS administrator account. The usage data of each node is fetched from the AWS monitoring tables and stored into local database. Application table name AWS statistics stores the values of below data parameters for each EC2 node created.

CPUUtilization, DiskReadBytes, DiskWriteBytes, NetworkIn, NetworkOut, StatusCheck.

The existing systems have fixed threshold values. Additional user load is shifted to next node for load balancing whatever be the load of that node. Below figure 8 gives the load balancing structure of existing system.

Table I: Existing System Load Balancing Table

Existing System				
	Userload	**Additional UserLoad**	**Fixed Threshold**	**Next Node Load Balancing**
Node1	50	10	50	Node2
Node2	10	50	50	Node3
Node3	20	10	50	Node4
Node4	20	10	50	Waits

Below figure shows the plot of the same.

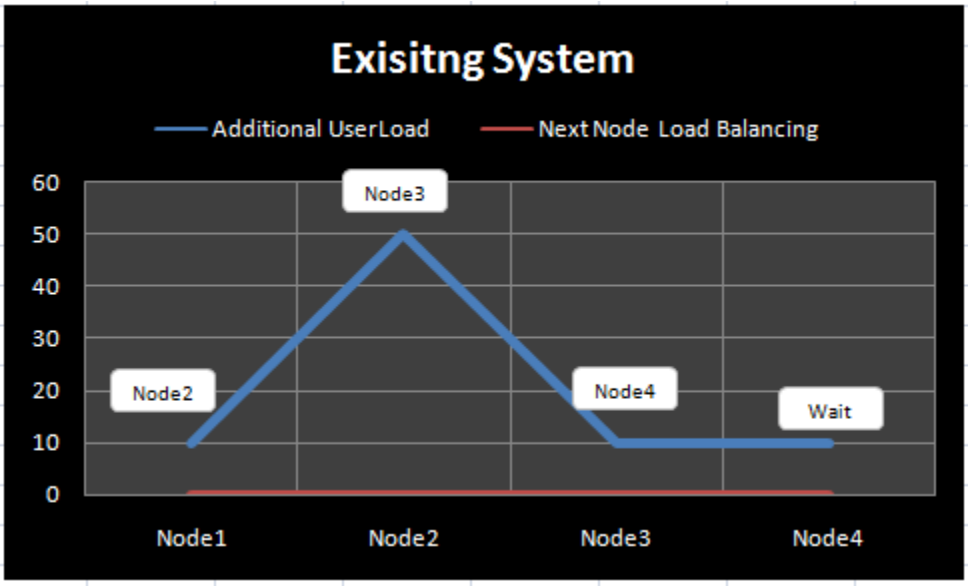

Figure 3: Plot of Load Balancing Table for Existing System

The proposed method can monitors EC2 Instances on private clouds with reduced infrastructure cost. The system can also help to optimal utilization of cloud resources. In proposed system threshold values are dynamically updated and Inactive User count is decreased.

Table II: Next Load Balancing Table for Proposed System

Cloud Cost Analyzer						
	Userload	**Additional UserLoad**	**Fixed Threshold**	**Next Node Load Balancing**	**% RAM Fr**	**% CPU Free**
Node1	50	10	Threshold Values are	Node3	20	45
Node2	10	50	dynamically updated	Node3	10	45
Node3	20	10	and Inactive User	Node3	50	45
Node4	20	10	count is decreased	Node3	30	45

Here, node 3 is selected as it contains large amount of free space and CPU utilization. The offloading can done at 2 levels i.e. Resource Level and User Level. The below figure gives percentage of free RAM and CPU usage for shifting the load to next node.

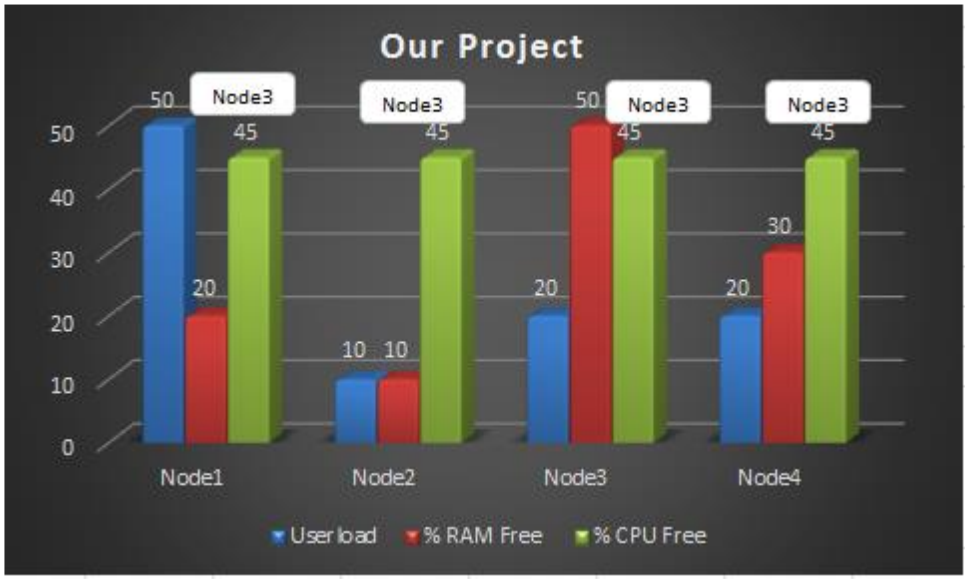

Figure 4: Next Load Balancing Table for Proposed System

V. CONCLUSION

Cloud computing refers to a paradigm for accessing computing resources which is becoming increasingly popular. Despite the fact that having a cloud infrastructure is usually cheaper than maintaining a physical data center, owners of large and complex IT infrastructure might incur large costs. Therefore, the problem of cost optimization in cloud computing is becoming increasingly important. This system analyses the problem of cost optimization in cloud computing. We also evaluate the performance of the resource monitoring. This system monitors the VM node on the private cloud to reduce infrastructure costs from the customer's point of view.

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