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Cloud Cost Analyzer and Optimizer

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Abstract: *Cloud computing is a promising profitable network model that assures to eradicate the need for maintaining expensive computing facilities by companies and institutes alike. The current expectation of the cloud market is, customers of AWS will increase by up to 25% depending on how frequently customers start and stop new EC2 instances. But certainly, lots of big companies are investing billions of money in buying cloud infrastructure which is not used in an optimal/effective way.*

Hence we propose to build up a scheme that monitors VMs (EC2 Instances) on private clouds like Amazon or Google and provide solutions to reduce infrastructure cost from the customer's point of view. We also propose to enable optimum consumption of cloud resources. Such solutions will obviously need following modules Monitor EC2 VM Usage, Monitor Performance matrix, Load current cost plan of cloud, Save cost by proposing resource/plan reductions.

Key Words: **EC2 Instances, Performance matrix, Cloud computing, AWS.**

1. INTRODUCTION

The key characteristics of cloud computing are the capability to scale resources practically infinitely, the capability to pay only when a resource is actually needed, and the removal of large upfront expenses for users. In addition, low prices and ease of use encourage enterprises to utilize cloud computing to host their IT infrastructure. Cloud computing is offered by cloud providers, among which the most prominent examples are Amazon Web Services (AWS), Google Cloud 2, and Microsoft Azure 3. Every cloud provider has different pricing strategies; however, for computing resources, they offer two categories of products: on-demand instances and reserved instances. On-demand instances are virtual machines created and paid for only when utilized. A cloud user adds and removes an on-demand instance with maximum flexibility. on the other hand, retained illustration are computational resources retained and remunerated for a fixed period along with direct charge. The concluding class involve a superior point of obligation intended for the user; consequently, if widely used, the effect chosen is cheaper throughout a long-term consumption. To evade redundant expenses, cloud computing user required to do careful planning. Currently, researchers have extensively studied the field of charge is most effectively used in cloud computing. However, the present modern approaches have some limitations. AWS offers a set of Elastic Compute Cloud (EC2) example form for dissimilar use cases. These forms give changing amalgamation of CPU, memory, storage space and set-up capability.

In the course of a cloud, implementation users have the elasticity to decide the EC2 instance type that provides the suitable combination of resource for the target application and workload. Currently, the alternative of an instance type is typically relayed on a discovering approach and does not have the assurance that the best answer is selected to observe the performance and cost.

Here, we present the model for an efficient assignment of workloads to servers to decrease cost with maximizing resource utilization.

As in cloud computing, two main actors involved, two sides of cost optimization: cost optimization performed by providers and cost optimization performed by users [5]. Cost optimization performed by cloud providers mostly spotlighting to reduce the cost to maintain a physical data center. The cost minimization is typically achieved by reducing electricity consumption. We develop a system that monitors VMs (EC2 Instances) on private clouds like Amazon or Google and provides solutions to reduce infrastructure cost from the customer's viewpoint.

2. RELATED WORK

The paper [1] gives an elastic-stream system that dynamically allocates computational resources on the cloud. To reduce the charges for by means of the cloud surroundings as fulfilling the SLA, It prepares a linear encoding difficulty to minimize cost as a transaction between an applications latency and cost.

The author of [2] proposes a generalized resource placement methodology for online resource placement in a cloud system. The methodology proposed to be able to work transversely through diverse cloud architectures and reserve demand limitation, where receiving the request and response to it are in real-time. The explained algorithms are online in such a way that allocations are made without any knowledge of future resource requests.

The intent for resource distribution query is to reduce the entire energy cost of a cloud computing scheme while meeting the specified client-level SLAs in a probabilistic sense. In [3], the cloud computing system pays a penalty for the percentage of a client's requests that do not meet a specified upper bound on their service time. A capable algorithm depending on convex optimization and dynamic programming is offered to resolve the aforementioned resource allotment problem [3].

The paper [4] presents source allowance in a cloud market throughout the sale of Virtual Machine (VM) instances. It initially gives a supportive primal estimation algorithm with rough calculation ratio nearly 2.72., it designs a new randomized auction with a two of a kind extremity primal and dual Linear Programs to crumble a best partial solution into an outline of a series of subjective suitable integer explanation.

The paper [9] gives Amazon Elastic Block Store (EBS) device to the file server virtual machine. It gives a block-level storage amount to EC2 instances which carry on separately as of the instance lifetimes.

3. PROPOSED SYSTEM

In today's competitive market, measuring application success as "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. Main intend 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.

Amazon EC2 is effective computing surroundings which offer a web services API for the initiation and supervision of practical device instances. Amazon offers a variety of instance category having to change performance characteristics. CPU capacity is defined with an abstract Amazon EC2 Compute Unit.

The main advantage of cloud computing is based on elasticity to scale up or down the IT infrastructure depending on the enterprise needs. This means that the enterprise does not have to provide for future needs as the IT infrastructure they need may be set up in minimal time In our proposed model, we are creating private cloud (test bed) by using an Amazon Account. By connecting to existing user's Amazon Account with user Id and Password cloud Usage Monitoring System can fetch all the Performance Matrix-like RAM, CPU, memory bandwidth, and exchange usages etc.

To estimate the output of the whole setup, We require arranging resource examine and load balancing tools on the test bed and calculate the need of available resources like Storage Pricing, CPU pricing, Request Pricing and Storage Management Price. This result can be geographically dispersed and contain a large number of purchaser and agent.

4. ALGORITHM USED

A. AES Algorithm

AES is derived from a design standard acknowledged as a substitution-permutation network and is equally speedy for software and hardware. contrasting its precursor DES, AES is nor uses Feistel network. AES is a modification of Rijndael that has a permanent block size of 128 bits, and a key size of 128, 192, or 256 bits.

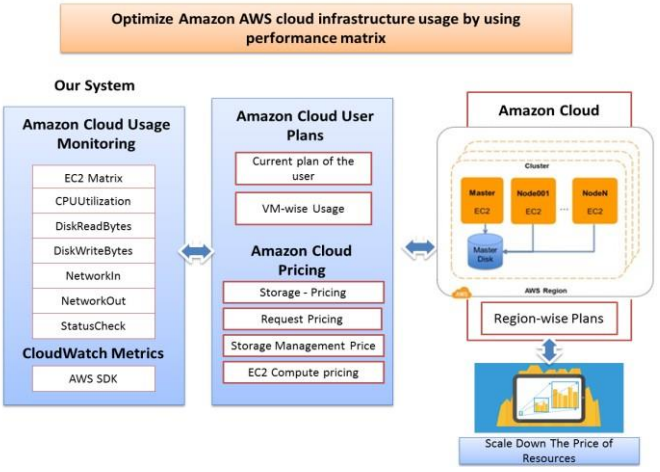

Fig-1: System Design

AES works on a 4×4 column main order matrix of bytes, express the situation, even though some adaptation of Rijndael have a higher block size and have extra columns in. the majority AES computation is completed in a particular restricted field.The size used of an AES cipher provide many repetitions of alteration rounds that change the input, called the plaintext, into the concluding output, labeled as the ciphertexts. The round of the rotation is as given below.

10 rotation of recurrence is used for 128-bit keys.

12 rotation of recurrence is used for 192-bit keys.

14 rotation of recurrence is used for 256-bit keys.

every cycle consists of numerous processing steps, all enclose four stages, including one that depends on the encryption key itself.

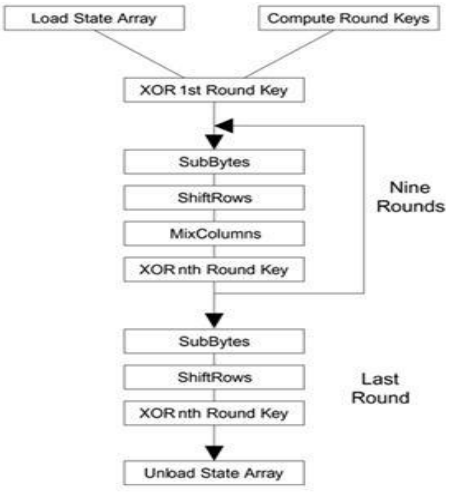

Fig-2: AES Algorithm

5. EXPERIMENTAL RESULT

In this paper, we presented a model which gives threshold values that are dynamically updated and are inactive when user count is decreased. In the existing system, the load statistic has fixed threshold value which decreases the performance.

Table -1: Load Statistics On Node

Load Statistics on Node				
	Userload	% RAM Free	% CPU Free	RegionWise Server Distribution
Node1	50	20	45	R1
Node2	10	10	45	R2
Node3	20	50	45	R3
Node4	20	30	45	R4

The table gives the load statistics on a particular node with the percentage of the free RAM and CPU for a particular region.

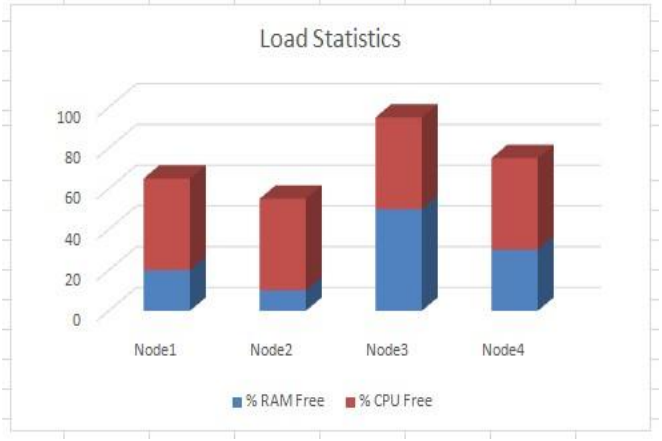

Fig- 3: Plot of Load Statistic

Table -2: Proposed Approach

Our Project						
	Userload	Additional UserLoad	Fixed Threshold	Next Node Load Balancing	% RAM Fre	% 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

From the figure below we select the Node 3 as next load balancing node because it has maximum free RAM+CPU Usage. Thus shifting of load is done at 2 levels

1. Resource Level
2 .User Level

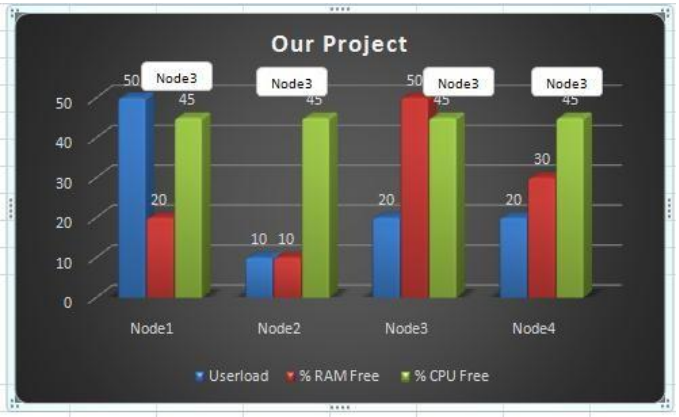

Fig- 4: Plot of Performance Matrix

6. CONCLUSIONS

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 and load balancing tools. This system monitors the VM node on private cloud to reduce infrastructure cost from the customer's point of view.

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