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Cloud Cost Analyser and Price Reduction Recommendation

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Abstract— "Cloud Computing" approach is considered as tightly coupled with low cost or cost efficiency approach. Reduction of cost is considered as an important advantage of Cloud. However, there are no proper tools are available for cost calculation and analysis in Cloud environment. This paper introduces our efforts taken to filling in the gap. Our approach namely 'Cost Effective Resource Provisioning Approach' is the platform that guide to minimize the overall cloud spend by analysing the mismanaged resources, eliminating waste, reserving capacity for higher discounts, and appropriate sizing for computing services as well.

The key role of 'Resource Provisioning' is to assist the businesses for analysing how much they are spending on services regarding the cloud computing. It notifies the cloud user by providing the alerts through regular emails; showing the calculations of monthly estimate to date. It also helps to comprehend the when cost overages are happening (not after the fact). The key motivation in implementing this proposed work is to create private cloud (test bed) by applying (Amazon Account) as well as by monitoring analytical resources that mainly includes RAM, CPU, memory, bandwidth, partition information, information and etc. about running process, the utilization and so on. Also, it recommends the price reduction strategy. The system also enables optimum utilization of cloud resources.

I. INTRODUCTION

In recent years, cloud computing [1][2] [4]has become very popular and been accepted by both enterprise users and personal users since it can provide economical, scalable, and elastic access to computing resources over the Internet.
Cloud Computing providers offer more services to their clients ranging from infrastructure as a service (IaaS)[8], platform as a service (PaaS), software as a service (SaaS), workflow-as-a-service (WaaS). The purpose of providers is to exploit returns by their price schemes, while the main goal of customers is to have the quality of services (QoS) for a reasonable price [5].

Computing outsourcing provides great elasticity [1], flexibility[2] and scalability of resources. It minimizes client-side management overheads and benefit from a service provider's global expertise consolidation and bulk pricing, and helps users avoid the capital expense in acquiring computing resources. Cloud computing can reduce costs while enabling greater business agility and flexibility [2].

The key characteristics of cloud computing are the ability to scale resources practically infinitely, the capability to pay only when a resource is actually used [2], and the elimination of large upfront costs for users. In addition, low prices and ease of use encourage enterprises to utilize cloud computing to host their IT infrastructure [4]. Every cloud provider has a different pricing approach; yet, 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.

The main purpose of the system is to create private cloud (test bed) 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. We build up a system that monitors VMs (EC2 Instances) on private clouds like Amazon or Google and provides solutions to decrease infrastructure cost from the customer's point of view.

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II. LITERATURE SURVEY

Yeoa et al.[6] analyzed the difference between fixed and variable prices. Fixed prices were easier to recognize and clear-cut for users. However, fixed price could not be fair to all users because not all users had the same needs. The proposed charging variable prices with the sophisticated condition, where users know the exact charges that are computed at the time of reservation even though they were based on variable prices.

A] Title- Monetary cost optimizations for hosting Workflow-as-a-Service in IaaS Clouds.

We've recently seen that functions flow from research and other data-intensive applications are increasing on Infrastructure-as-a-Service (IaaS) clouds, with a large number of progress service providers providing Workflow-as-a-Service (WaaS). The key aim of WaaS providers is to reduce the financial impact of death penalty workflows in IaaS clouds.

The sort of virtual machines (instances) used has a big influence on the project's cost and performance. As a result, we conclude that WaaS providers should consider delivering probabilistic production guarantees for specific workflows to expressly report the accuracy and value of their services. Dyna provides a hybrid instance configuration refinement for victimization spot instances, as well as an A-based instance configuration approach for performance dynamics.
Experiments with three scientific advancement programmers on Amazon EC2 and a cloud machine show the following:
(1) The Dyna has a core feature in that it is flexible in meeting the users' probabilistic point assurances.
(2) as opposed to current methods, the productivity of compressing financial value.

What they have proposed?

1) At the time of the Software-as-a-Service division of cloud computing, there is an approximate criterion for WaaS (Workflow-as-a-Service) perception.
2) The selective success in shot is assured, implying that the complex deadlines are met.

What we have referred?

1) The concept of the settled deadlines is used to perform the static task execution.
2) Thus for given dynamic nature task of elastic cloud computing there need tend for additional rigorous notion for deadlines.
3) By selecting the acceptable form of instance and dynamicity of progress there is the Value improvement as well.

Li et. Al. [7] proposed a pricing algorithm for cloud computing resources. Authors proposed the cloud bank agent model as a resource agency from a global perspective, which provides analysis and guidance for all members.
Amelie Chi Zhou et al. [8] presents a scheduling system known as Dyna to minimize the expected monetary cost given the user-specified probabilistic deadline guarantees. Dyna includes an A*-based instance configuration method for performance dynamics and a hybrid instance configuration refinement for using spot instances. Experimental results with three scientific workflow applications on Amazon EC2 and a cloud simulator shows (1) the capacity of Dyna on satisfying the probabilistic deadline guarantees required by the users; (2) the efficiency on reducing monetary cost in comparison with the existing approaches.

Subhas Chandra Misra et al. [9] 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. A general Return on Investment (ROI) model considers various intangible impacts of Cloud Computing, apart from the cost. The analysis presented herein provides a much broader perspective and insight into Cloud Computing to its prospective adopters.

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Guoxin Liu et al.[3] provide a model to decrease the payment cost of clients and at the same time is guarantee their SLOs (service level objective) with the globally distributed data centers belonging to different CSPs with different resource unit prices. The cost minimization problem can be solved by using integer programming.

C] Title- Minimum-Cost Cloud Storage Service Across Multiple Cloud Providers [IEEE 2017]

Liu et al. [3] provides a model to decrease the payment value of shoppers and at constant time is guarantee their SLOs (service level objective) with the globally distributed information canters belonging to totally different CSPs with different resource unit costs.
Advantage: - The drawback of price minimization will be overcome by applying victimization whole number programming.

III. PROPOSED SYSTEM

Every cloud provider has different pricing strategies for computing resources. 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 on the basis of resource utilization, but it is very high.
The main purpose of the system is to create private cloud (test bed) 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. Figure 1 shows the architecture of the proposed system.

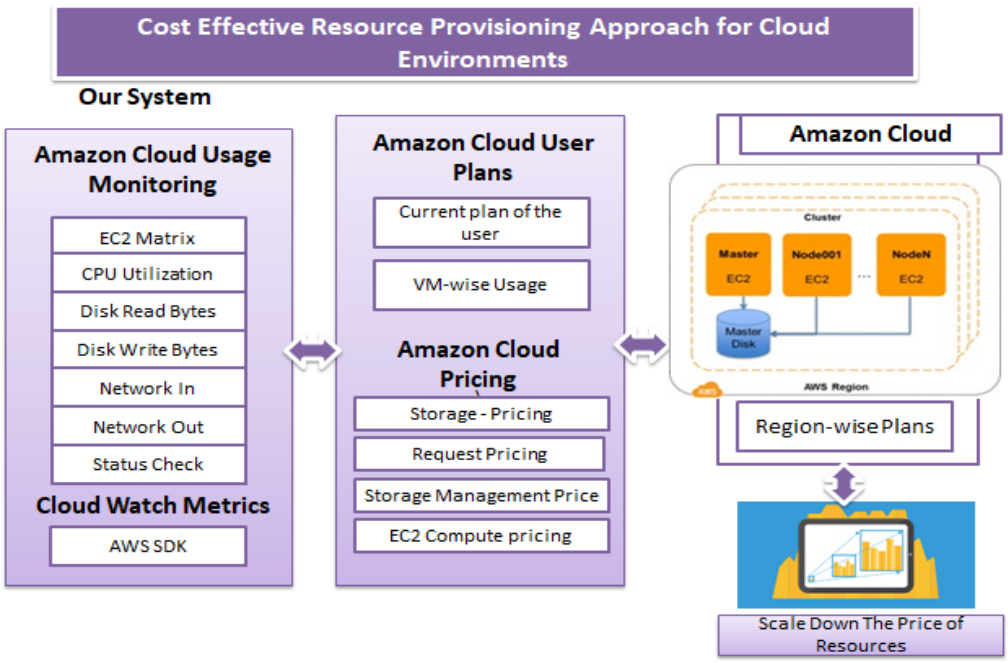

Figure 1: System Architecture

- The proposed system which cans monitor VMs (EC2 Instances) on private clouds such as Amazon or Google and offers solutions to decrease infrastructure cost. Resource Monitoring of Cloud Nodes:
- **Resource Monitoring of Cloud Nodes:** User should be able to view CPU and RAM usage utilization of Amazon ec2 nodes. CPU and RAM utilization statistics should be dynamic and should refresh every second.

- **Select Cloud Plans for popular clouds like Amazon:** Cost of service depends on the region of the server, memory usage, CPU etc. Cloud service providers charge for the services like Storage Pricing , Request Pricing , Storage Management Price , CPU prizing which need to be added in the system.

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

- By considering the following parameters the VM is monitored account wise

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

- Finally propose an efficient resource utilization By suggesting memory cutdown, CPU cutdown, storage cutdown. The key benefit of cloud computing is based on some components like elasticity to extend and IT infrastructure depending on the enterprise needs. To estimate the output of the complete system, It is essential to perform load balancing on the test bed as well as compute the need of some resources like Storage Pricing, CPU pricing, Request Pricing, and Storage Management Price. This outcome contains a multiple number of purchaser and agent.

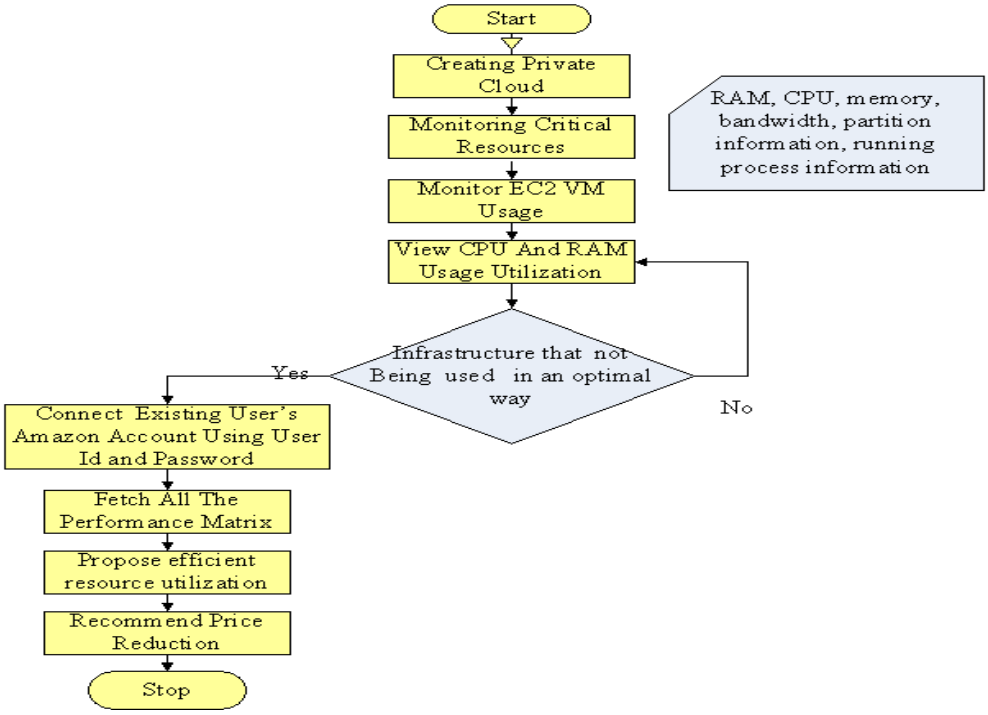

Figure: System Flow

IV. ALGORITHM USED

A. RSA Algorithm

The keys for the RSA algorithm are generated the following way:
Choose two distinct prime numbers p and q.
For security purposes, the integers p and q should be chosen at random, and should be similar in magnitude but 'differ in length by a few digits to make factoring harder. Prime integers can be efficiently found using a primality test.
Compute n = pq.
n is used as the modulus for both the public and private keys. Its length, usually expressed in bits, is the key length.

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Compute φ(n) = φ(p)φ(q) = (p − 1)(q − 1) = n − (p + q − 1), where φ is Euler's totient function. This value is kept private.
Choose an integer e such that 1 < e < φ(n) and gcd(e, φ(n)) = 1; i.e., e and φ(n) are coprime.
Determine d as d ≡ e−1 (mod φ(n)); i.e., d is the modular multiplicative inverse of e (modulo φ(n))
This is more clearly stated as: solve for d given d·e ≡ 1 (mod φ(n)) e having a short bit-length and small Hamming weight results in more efficient encryption – most commonly 216 + 1 = 65,537. However, much smaller values of e (such as 3) have been shown to be less secure in some settings.
e is released as the public key exponent.
d is kept as the private key exponent.
The public key consists of the modulus n and the public (or encryption) exponent e. The private key consists of the modulus n and the private (or decryption) exponent d, which must be kept secret. p, q, and φ(n) must also be kept secret because they can be used to calculate d.

RSA Algorithm

B) SVM (Support Vector Machine)

• SVM is a powerful classifier that is able to distinguish two classes. SVM classifies the test image in to the class with highest distance up to the neighboring point in the training.

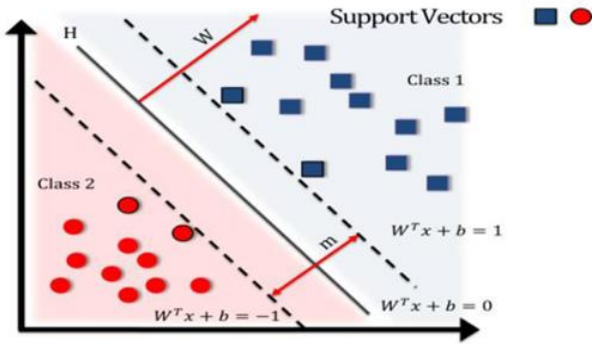
• SVM training algorithm built a model that predict whether the test image fall into this class or another.

• SVM necessitate a vast training data to decide a decision boundary and computing cost is very high although we are using single pose (frontal) detection.

• The SVM is a learning algorithm for classification which attempt to discover the finest distinguishing hyper plane which minimize the error for unseen patterns. Distinguishing Hyper Plane To Minimize The Error

• The data which cannot be distinguished the input is mapped to high dimensional attribute space where they can be separated by a hyper projection is well performed by means of kernels.Separating Hyper Plane By Equation

• If training set of samples and the equivalent resultant values {-1, 1}. So SVM intend to get the best separating hyper plane specified by the equation WTx+b that make use of the distance between the two classes as shown in above figure.



V. RESULT AND DISCUSSION

The proposed method can monitor 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.

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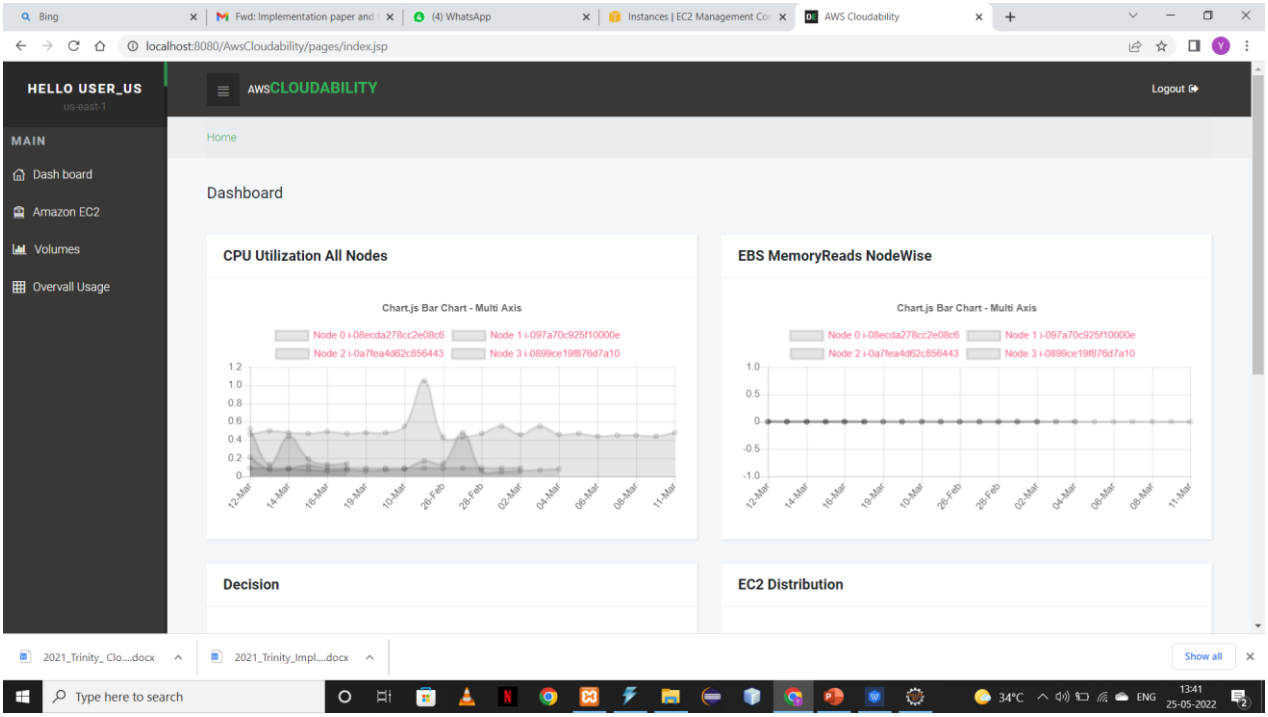

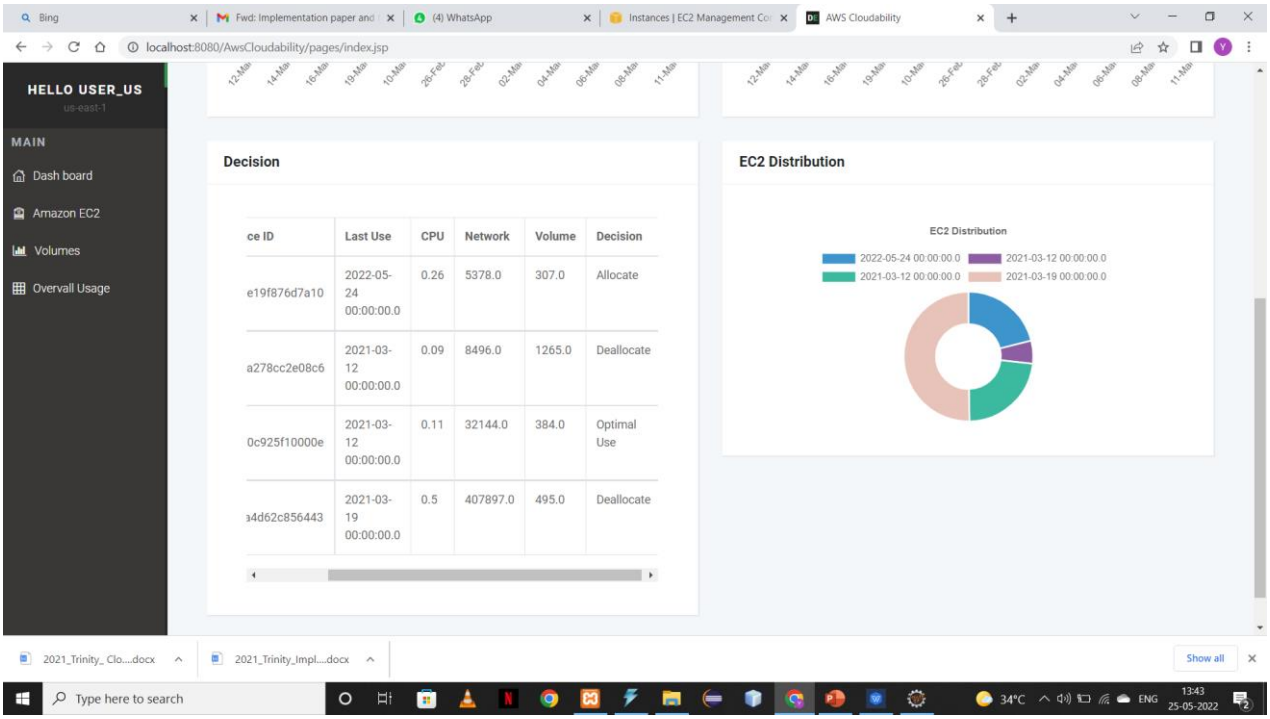

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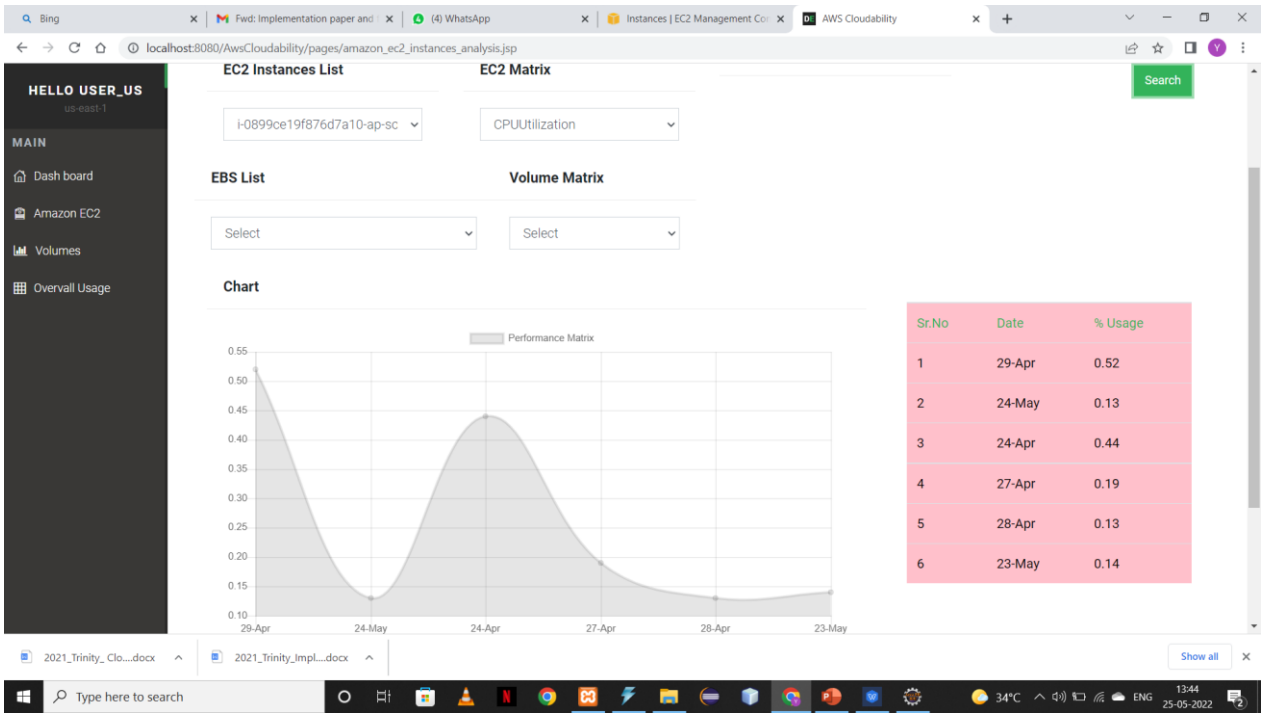

II. CONCLUSION:

The success of any application is depending on factors like ease of use, reliability and product image. The proposed system can monitors system performance in terms of RAM, CPU, memory bandwidth.

Cost optimization is a major concern in cloud computing as owners of large IT infrastructures have to pay a large cost for resource utilization. The infrastructure cost can be reduced from the customer's point of view by monitoring the VM node on the private cloud.

Cloud computing is a method of gaining access to computing services that is gaining popularity. Despite the fact that cloud computing is usually less expensive than running a physical data centre, owners of vast and complex IT infrastructure could face significant costs. As a result, value optimization in cloud computing is becoming increasingly important.

This framework investigates the issue of cloud computing price optimization. We often assess the resource observance's success as well. This approach keeps an eye on the VM node in the private cloud in order to reduce infrastructure costs for the user.

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