RESOURCE OPTIMIZATION IN CLOUD COMPUTING FOR PAYG USING SHA-256

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ABSTRACT

Cloud computing offers on-demand access to computing resources over the Internet, with providers offering services at reasonable prices and using various pricing models to reflect different quality levels. One approach to these pricing schemes is k-times anonymous authentication (k-TAA), which ensures access control, user anonymity, and public traceability. In k-TAA, users can anonymously access services up to k times; exceeding this limit makes their actions traceable. This scheme acts as a prepaid plan based on access frequency.
Alternatively, the pay-as-you-go (PAYG) model charges users based on actual usage, minimizing unnecessary costs. Integrating k-TAA with PAYG sets the access bound k by the prepayment amount, but current k-TAA schemes only allow single access per authentication, making them impractical.

To address this, we propose a new k-TAA primitive called k-times anonymous pay-as-you-go authentication (k-TAA-PAYG), allowing multiple accesses per authentication session within the limit k. The proposed system dynamically allocates resources based on real-time demand, monitored through user access patterns and usage metrics, thus maximizing resource utilization and minimizing costs.SHA-256-based framework significantly improves the accuracy and security of resource allocation while maintaining low computational overhead. This ensures that users are charged accurately based on actual usage, and providers can optimize their resource distribution effectively. This study highlights the potential of cryptographic techniques in enhancing cloud computing resource management and security.

Keyword: *Networks, Security, Cloud Computing , RESOURCE ALLOCATION , SECURE HASH FUNCTION 256*

1. INTRODUCTION

A pay-as-you-go (PAYG) model in cloud computing allows users to pay for application, platform, service, and computing resources based on usage. Quality of Service (QoS) aspects like performance, availability, and reliability, detailed in Service Level Agreements (SLAs), measure service performance. Cloud computing ensures data and hardware availability to authorized users. However, it is vulnerable to Denial of Service (DoS) and Distributed Denial of Service (DDoS) attacks, which aim to disrupt services and consume system resources, rendering them inaccessible. DDoS attackers exploit cloud features like PAYG, auto-scaling, and multi-tenancy, leading to high resource consumption and costs. For instance, Amazon EC2 faced significant disruptions due to a DDoS attack. Defense strategies include proactive measures like challenge-response and restrictive access, and reactive measures like anomaly detection and resource usage monitoring. Attack mitigation techniques include victim migration and Software Defined Networking (SDN). DDoS attacks not only violate SLAs but also increase CPU and memory usage, indirectly raising energy consumption.

2. MODULES

- Resource Management Module
- Billing and Metering Module
- Authentication and Authorization Module
- Load Balancing Module
- Encryption and Security Module
- Monitoring and Reporting Module

2.1 Resource Management Module

This module is responsible for managing the available resources in the cloud environment. It includes functions such as resource provisioning, monitoring, and scaling to ensure that resources are allocated efficiently based on demand.

2.2 Billing and Metering Module

This module tracks resource usage by individual users or applications and calculates the associated costs. It includes functionalities such as metering usage, generating invoices, and providing cost breakdowns to users.

2.3 Authentication and Authorization Module

Security is paramount in cloud computing. This module ensures that only authorized users or applications can access resources and perform operations within the cloud environment. Authentication verifies the identity of users, while authorization controls the actions they can perform.

2.4 Load Balancing Module

In a cloud environment, multiple resources are often available to handle incoming requests. The load balancing module distributes incoming traffic across these resources to optimize performance, prevent overload, and ensure high availability.

2.5 Encryption and Security Module

While SHA-256 can be part of this module for ensuring data integrity and authenticity, it's just one component. This module handles encryption of data in transit and at rest, as well as implementing security protocols to protect against unauthorized access and data breaches.

2.6 Monitoring and Reporting Module

This module provides real-time monitoring of resource usage, performance metrics, and system health. It generates reports and alerts administrators or users about any anomalies or issues that require attention.

3. FLOWCHART DIAGRAM

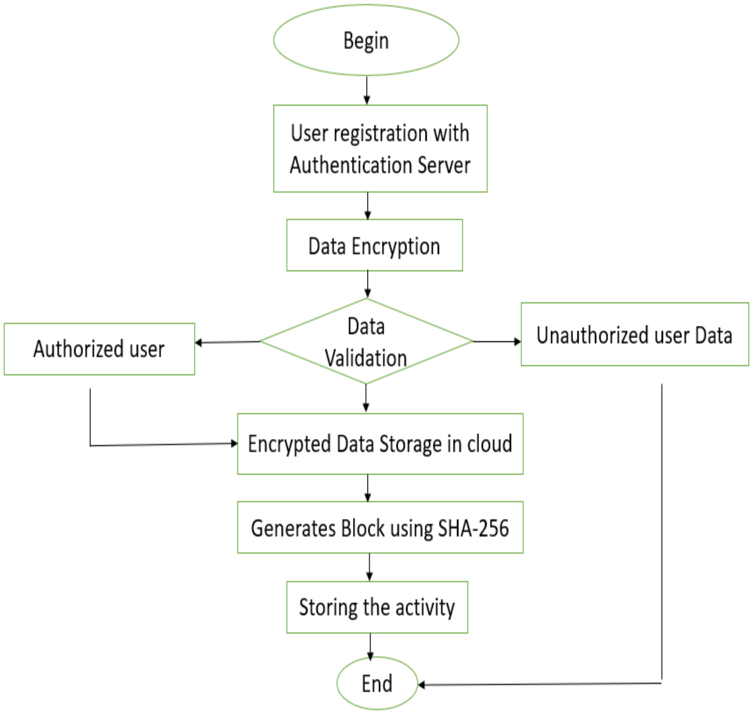

Begin
User registration with Authentication Server
Data Encryption
Authorized user
Data Validation
Unauthorized user Data
Encrypted Data Storage in cloud
Generates Block using SHA-256
Storing the activity
End

Fig. - 1: Flowchart

4. SYSTEM ARCHITECTURE

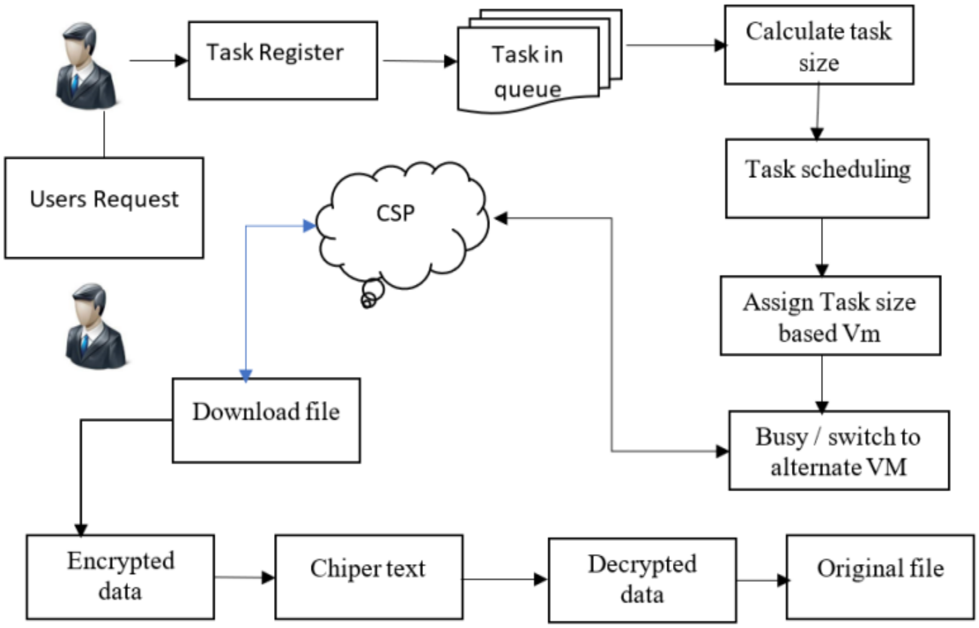
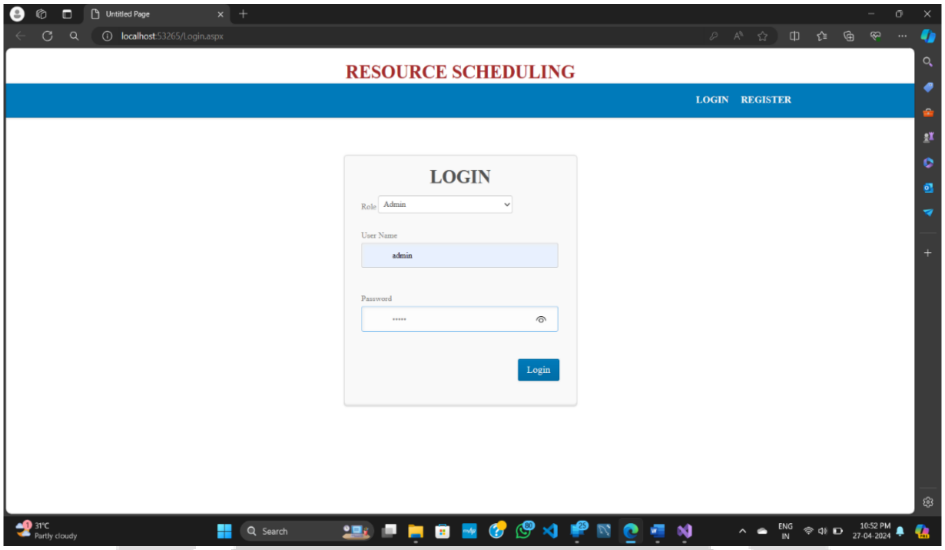


Fig. -2: Architecture Diagram

5. RESULTS



RESOURCE SCHEDULING

LOGIN

Role: Admin

User Name: admin

Password: •••••

Fig-3 ADMIN LOGIN

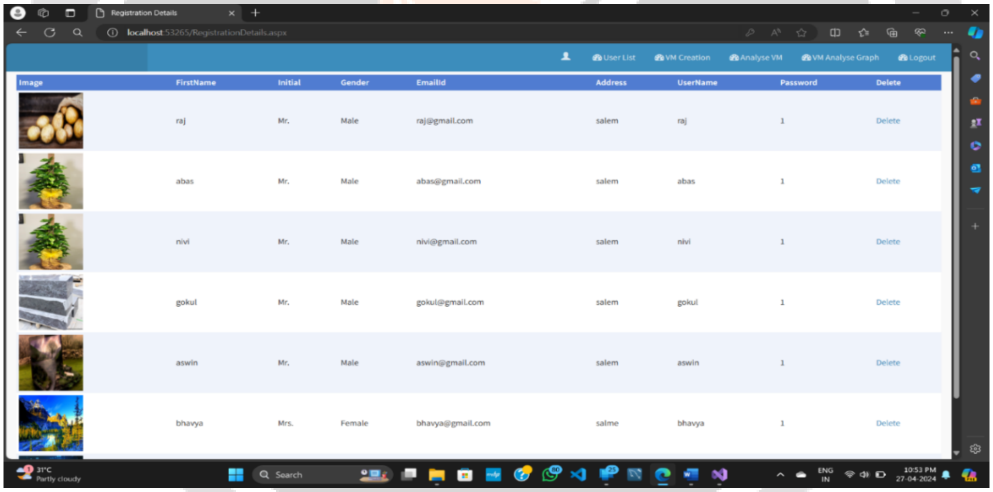
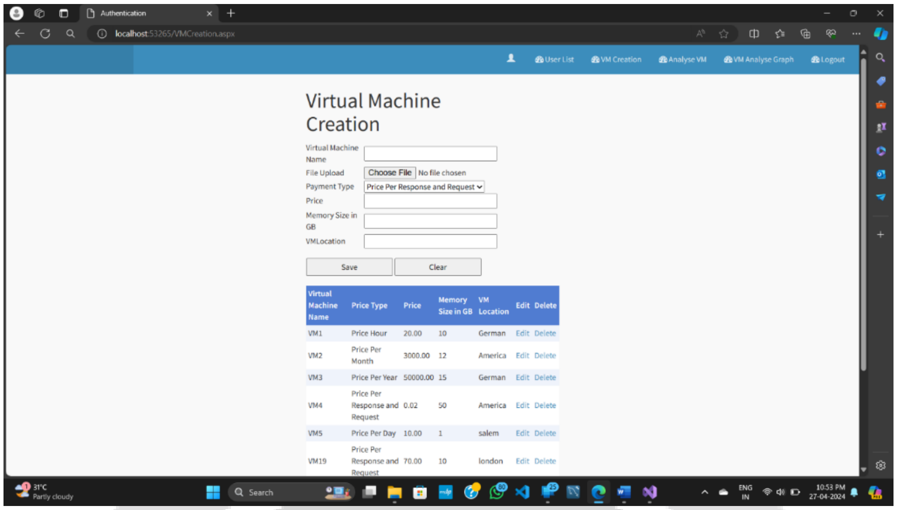


Image	FirstName	Initial	Gender	EmailId	Address	UserName	Password	Delete
	raj	Mr.	Male	raj@gmail.com	salem	raj	1	Delete
	abas	Mr.	Male	abas@gmail.com	salem	abas	1	Delete
	nivi	Mr.	Male	nivi@gmail.com	salem	nivi	1	Delete
	gokul	Mr.	Male	gokul@gmail.com	salem	gokul	1	Delete
	aswin	Mr.	Male	aswin@gmail.com	salem	aswin	1	Delete
	bhavya	Mrs.	Female	bhavya@gmail.com	salme	bhavya	1	Delete

Fig-4 USER LIST



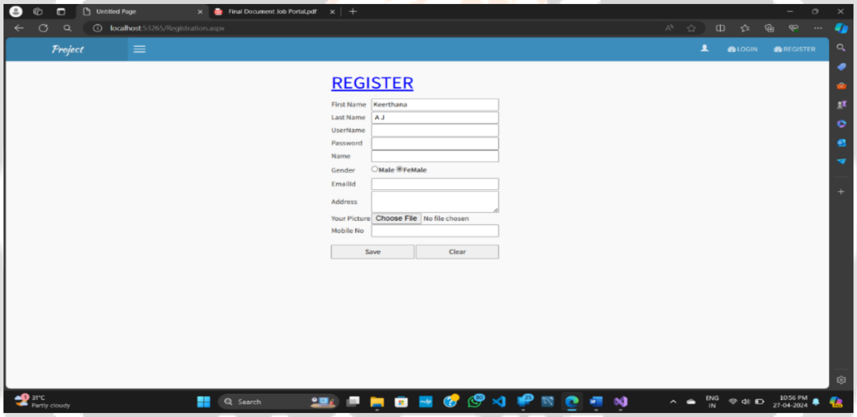
Virtual Machine Creation

Virtual Machine Name	
File Upload	Choose File No file chosen
Payment Type	Price Per Response and Request
Price	
Memory Size in GB	
VMLocation	

Save Clear

Virtual Machine Name	Price Type	Price	Memory Size in GB	VM Location	Edit	Delete
VM1	Price Hour	20.00	10	German	Edit	Delete
VM2	Price Per Month	3000.00	12	America	Edit	Delete
VM3	Price Per Year	50000.00	15	German	Edit	Delete
VM4	Price Per Response and Request	0.02	50	America	Edit	Delete
VM5	Price Per Day	10.00	1	salem	Edit	Delete
VM19	Price Per Response and Request	70.00	10	london	Edit	Delete

Fig -5 VIRTUAL MACHINE CREATION

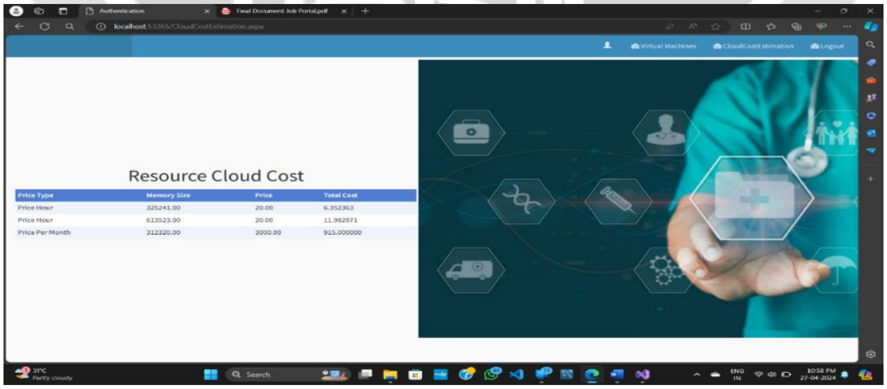

Untitled Page
Final Document Job Portal.pdf
localhost:53265/Registration.aspx
Project
LOGIN
REGISTER

REGISTER

First Name	Keerthana
Last Name	A J
UserName	
Password	
Name	
Gender	○Male ●FeMale
EmailId	
Address	
Your Picture	Choose File No file chosen
Mobile No	

Save Clear

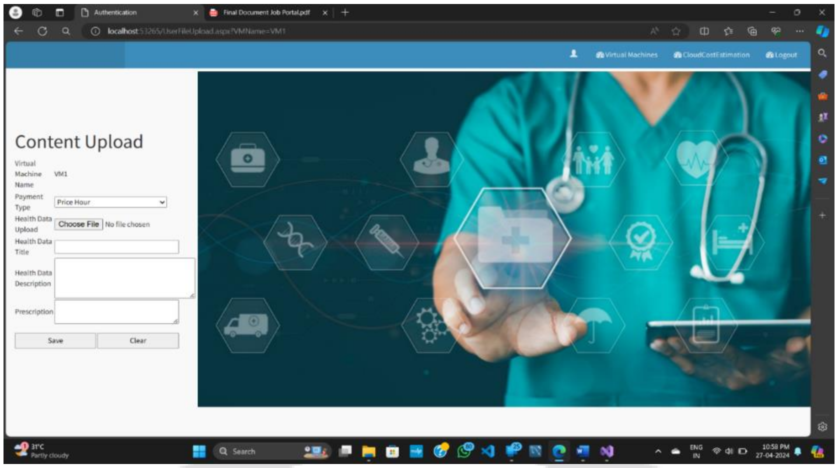
Fig-6 USER REGISTRATION


Authentication
Final Document Job Portal.pdf
localhost:53265/CloudCostEstimation.aspx
Virtual Machines
CloudCostEstimation
Logout

Resource Cloud Cost

Price Type	Memory Size	Price	Total Cost
Price Hour	325241.00	20.00	6.352363
Price Hour	613523.00	20.00	11.982871
Price Per Month	312320.00	3000.00	915.000000

Fig – 7 Cloud cost Estimation



Content Upload

Virtual Machine Name: VM1

Payment Type: Price Hour

Health Data Upload: Choose File No file chosen

Health Data Title

Health Data Description

Prescription

Save Clear

Fig-8 Data Upload

6. CONCLUSION

A network storage security scheme that collectively deals with the security and performance in terms of retrieval time. Thus, authors propose an anonymous but secure authentication scheme for the data stored in cloud. User revocation is done and once a user is relocated cannot view the messages stored on the cloud. This system can be useful for government and non government organizations. Our aim is to promote paperless work.

7. REFERENCES

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