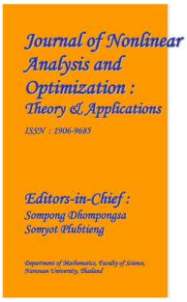
Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 15, Issue. 1, No.15 : 2024
ISSN : **1906-9685**



A NEW LIGHT WEIGHT SYMMETRIC SEARCHABLE ENCRYPTION SCHEME FOR STRING IDENTIFICATION

V. Sarala [1] Ch. Surekha [2]
[1]Assistant professor, PG DEPT, Dantuluri Narayana Raju College, Bhimavaram, Andhra Pradesh
Email: - vedalasarala21@gmail.com
[2]PG Student of MCA, Dantuluri Narayana Raju College, Bhimavaram, Andhra Pradesh
Email: - rekhachalla0770@gmail.com

ABSTRACT

In this paper, we provide an efficient a new light weight symmetric and easy-to-implement symmetric searchable encryption scheme (SSE) for string search, which takes one round of communication, O(n) times of computations over n documents. Unlike previous schemes, we use hash-chaining instead of chain of encryption operations for index generation, which makes it suitable for lightweight applications. Unlike the previous SSE schemes for string search, with our scheme, server learns nothing about the frequency and the relative positions of the words being searched except what it can learn from the history. We are the first to propose probabilistic trapdoors in SSE for string search. We provide concrete proof of non-adaptive security of our scheme against honest-but-curious server based on the definitions of [12]. We also introduce a new notion of search pattern privacy, which gives a measure of security against the leakage from trapdoor. We have shown that our scheme is secure under search pattern indistinguishability definition. We show why SSE scheme for string search cannot attain adaptive indistinguishability criteria as mentioned in [12]. We also propose modifications of our scheme so that the scheme can be used against active adversaries at the cost of more rounds of communications and memory space. We validate our scheme against two different commercial datasets.

1 INTRODUCTION

The cloud is designed to hold a large number of encrypted documents. With the advent of cloud computing, growing number of clients and leading organizations have started adapting to the private storage outsourcing. This allows resource constrained clients to privately store large amounts of encrypted data in cloud at low cost. However, this prevents one from searching. This gives rise to

a newly emerging field of research, called searchable encryption (SE). SE can be classified into symmetric searchable encryptions (SSE) and asymmetric searchable encryptions (ASE). In this paper, we study the SSE for string search. In the SSE, the client encrypts the data and stores it on the cloud. It may be noted that client can organize the data in an arbitrary manner and can maintain additional data structures to achieve desired data efficiently. In this process, the initial client for both client and the cloud server. Since huge volumes of documents are stored in a cloud server, searching against a keyword may result into large number of documents, most of which are not intended, causing unnecessary network traffic. This So motivates the idea of searching against a string, which allows the search to be more specific. Searching for string is a multi keyword search where the ordering of keywords is preserved.

LITERATURE SURVEY

There are numerous lightweight symmetric encryption techniques that can be utilized for string identification projects that are already available. [1] The paper by Wheeler and Schroeppel presents an optimization technique for the SHA-1 cryptographic hash function using assembly language. It is considered an important contribution to the optimization of hash functions and has been widely cited in the literature.[2] The paper by Rogaway and Shrimpton provides a comprehensive overview of the basics of cryptographic hash functions, including definitions and properties of preimage resistance, second-preimage resistance, and collision resistance. The paper has been cited extensively in the literature as a reference for these topics.[3] The paper by Merkle introduces the concept of a certified digital signature, which provides a way to prove the authenticity and integrity of a digital document. This paper is considered a seminal contribution to the field of digital signatures.[4] The Handbook of Applied Cryptography by Menezes et al. is a widelyused reference book in the field of cryptography. It covers a wide range of topics, from basic concepts to advanced techniques, and is often used as a textbook for courses on cryptography.[5] A Course in Number Theory and Cryptography by Koblitz is a textbook that covers the mathematical foundations of cryptography, including number theory and algebraic structures.

IMPLEMENTATION STUDY

EXISTING SYSTEM:

Dynamic SSE was first considered by Song et al. [19], but no solution with sublinear search time existed before the work of Kamara et al. [13]. Recently, two new dynamic SSE schemes have been proposed. The first one, by Cash et al. [9], which is an extension of [10]. They showed that SSE is feasible on very large databases. In [9], authors designed and implemented dynamic

symmetric searchable encryption schemes that efficiently and privately search server held encrypted databases with tens of billions of record-keyword pairs.

DISADVANTAGES:

- The system is not More secure and an efficient due to lack of lightweight cryptography.
- The system is not under Symmetric key encryption and Searchable encryption.

PROPOSED SYSTEM & ALOGIRTHAM

In the proposed system, the system studies the SSE for string search. In the SSE, the client encrypts the data and stores it on the cloud. It may be noted that client can organize the data in an arbitrary manner and can maintain additional data structures to achieve desired data efficiently. In this process, the initial client-side computation is thus as large as the data, but subsequent computations to access data is less for both client and the cloud server. Since huge volumes of documents are stored in a cloud server, searching against a keyword may result into large number of documents, most of which are not intended, causing unnecessary network traffic.

4.1 ADVANTAGES:

- The system proposes a non-adaptively secure SSE scheme for string search which takes one round of communication, O(n) times of computation over n documents, O(n) additional memory in the server side and no memory in the client side.
- The system provides a formal and proof to show that the scheme is non adaptively secure.

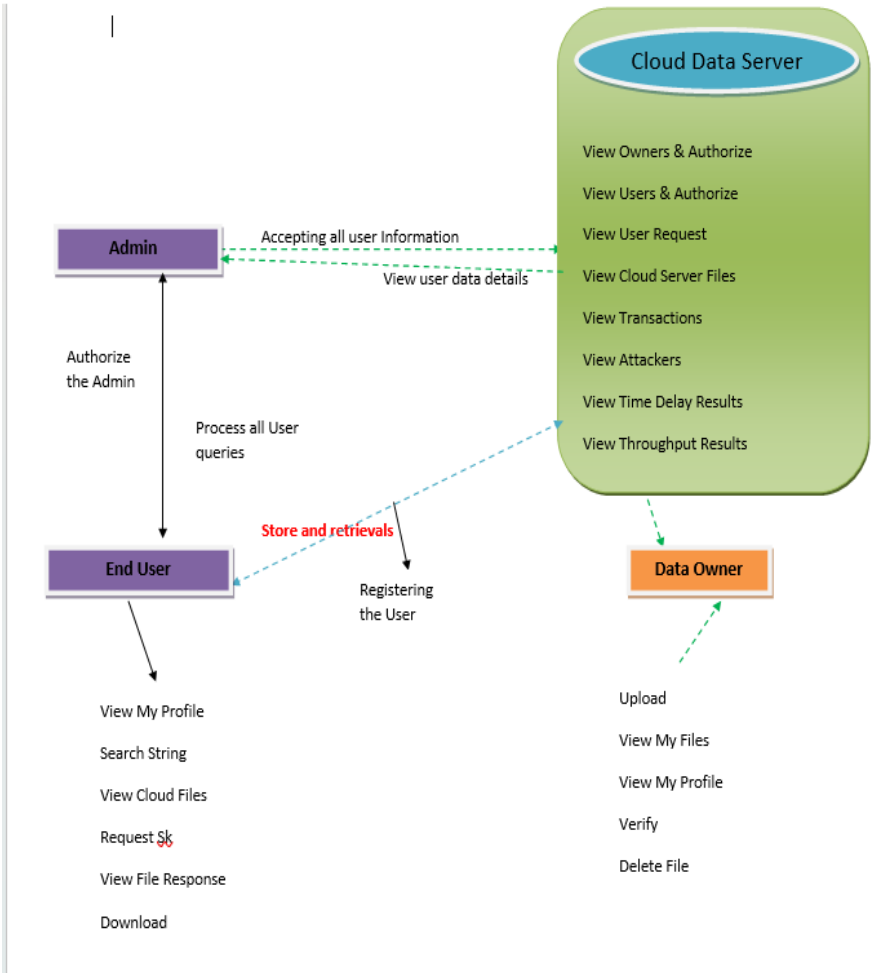


Fig:3.1 System Architecture

IMPLEMENTATION

MODULE

Cloud Data Server

In this module, the Data Server login by using valid user name and password. After login successful he can do some operations, such as View Owners & Authorize, View Users & Authorize, View User Request, View Cloud Server Files, View Transactions, View Attackers, View Time Delay Results, and View Throughput Results

View and Authorize Users

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorize the users.

Data Owner

In this module, there are n numbers of Data Owners are present. Data Owner should register before doing any operations. Once Owner registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is

successful Owner will do some operations like Upload, View My Files, View My Profile, Verify, Delete File

5 RESULTS AND DISCUSSION

SCREENSHOTS

5.2.1 TOMCAT MANAGER

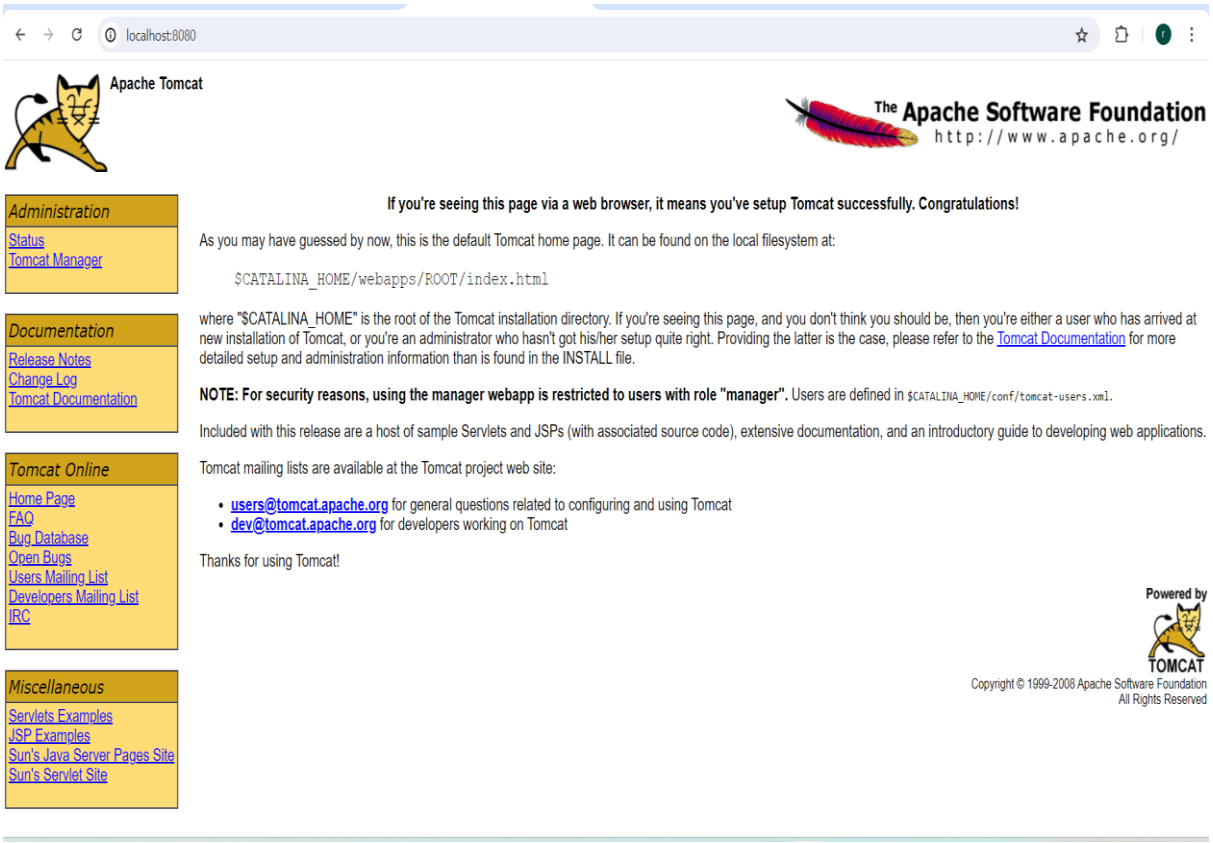


Fig: 5.1

5.2.2 TOMCAT WEB APPLICATION MANAGER

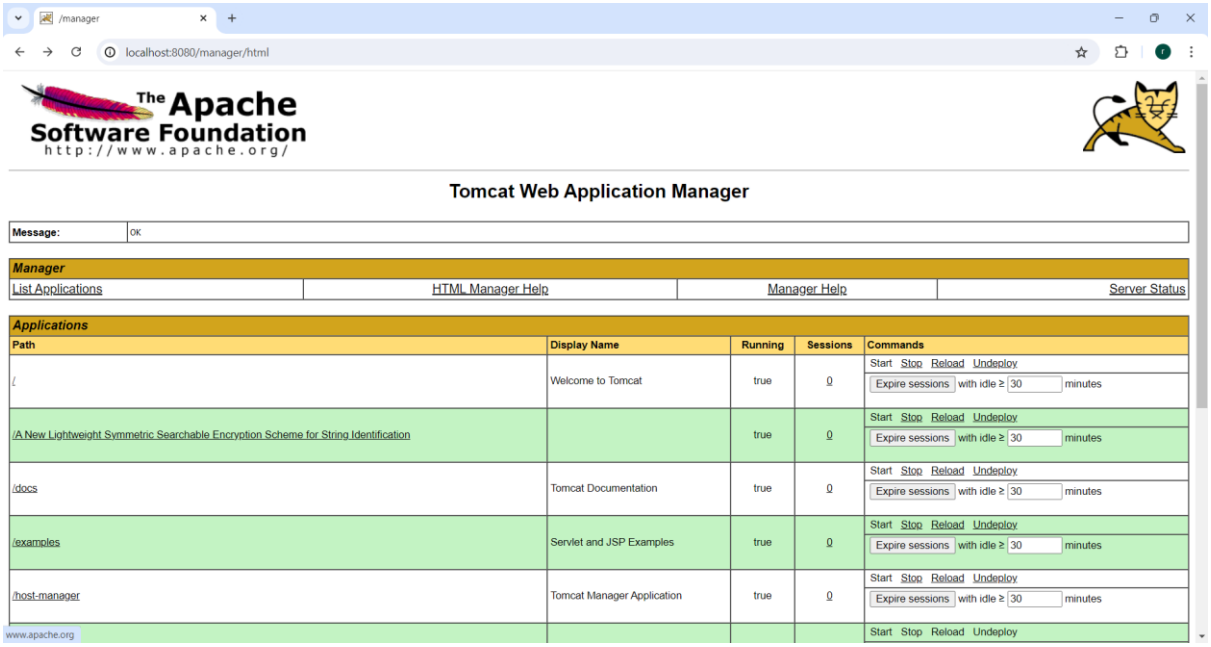


Fig: 5.2

5.2.3 DATA OWNER REGISTER

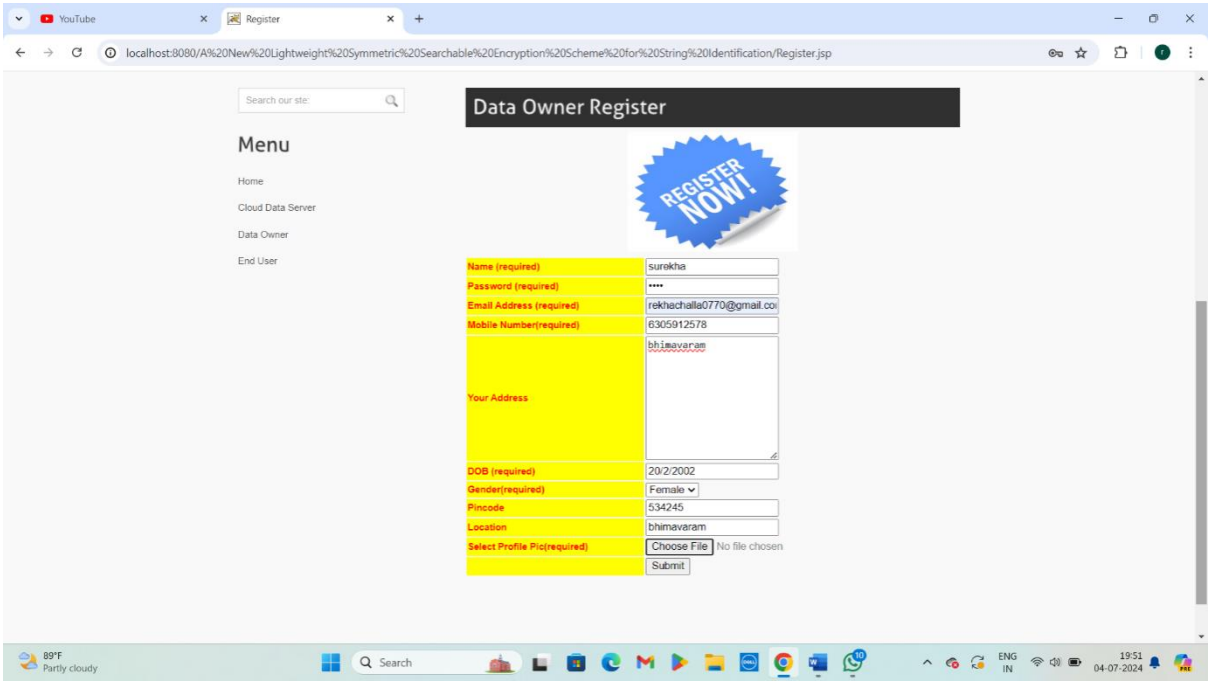


Fig: 5.3

5.2.4 END USER REGISTER

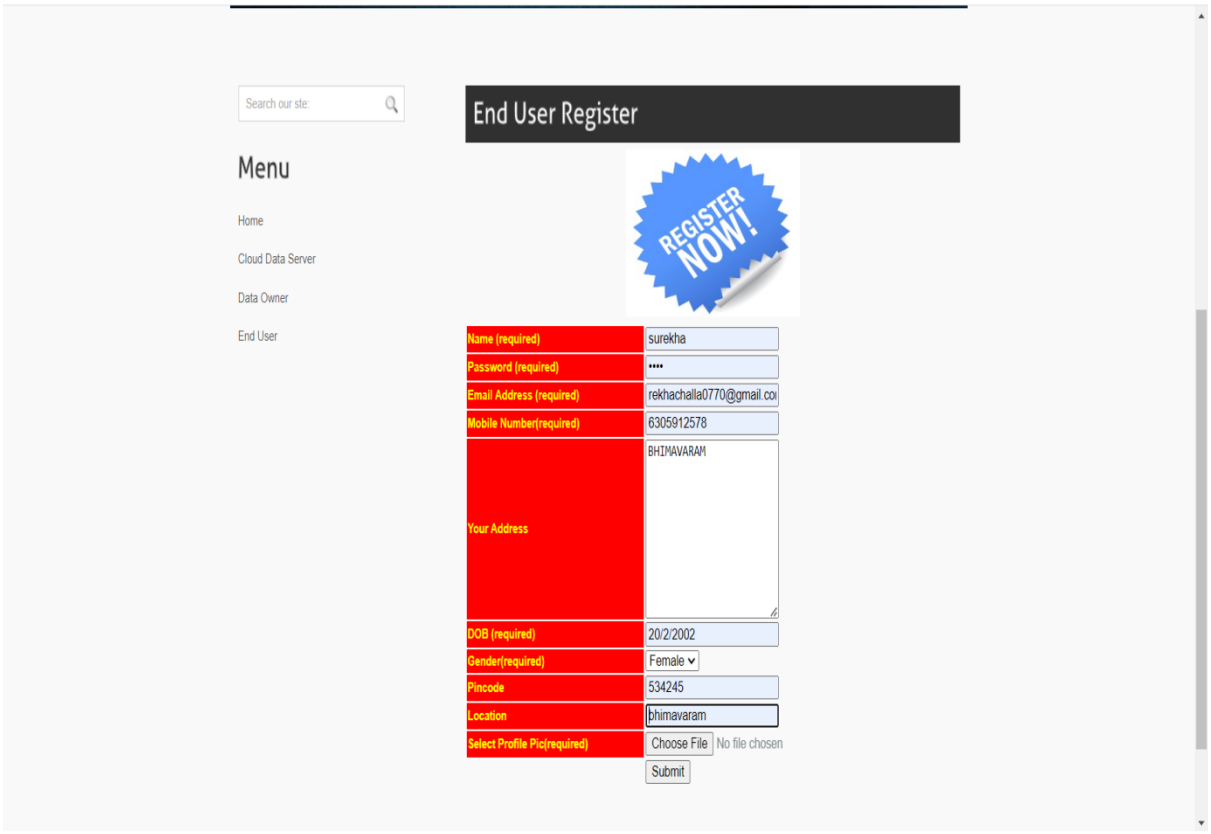


Fig: 5.4

5.2.5 CLOUD DATA SERVER LOGIN

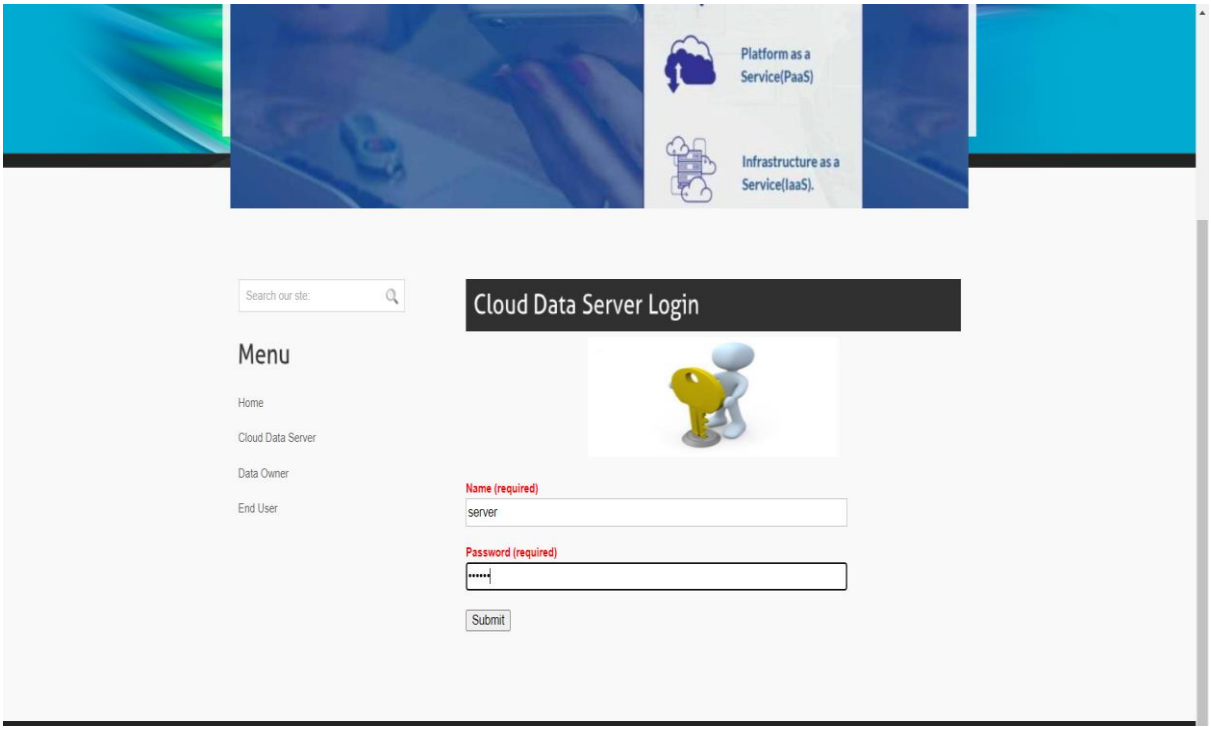


Fig: 5.5

5.2.6 CLOUD DATA SERVER MAIN

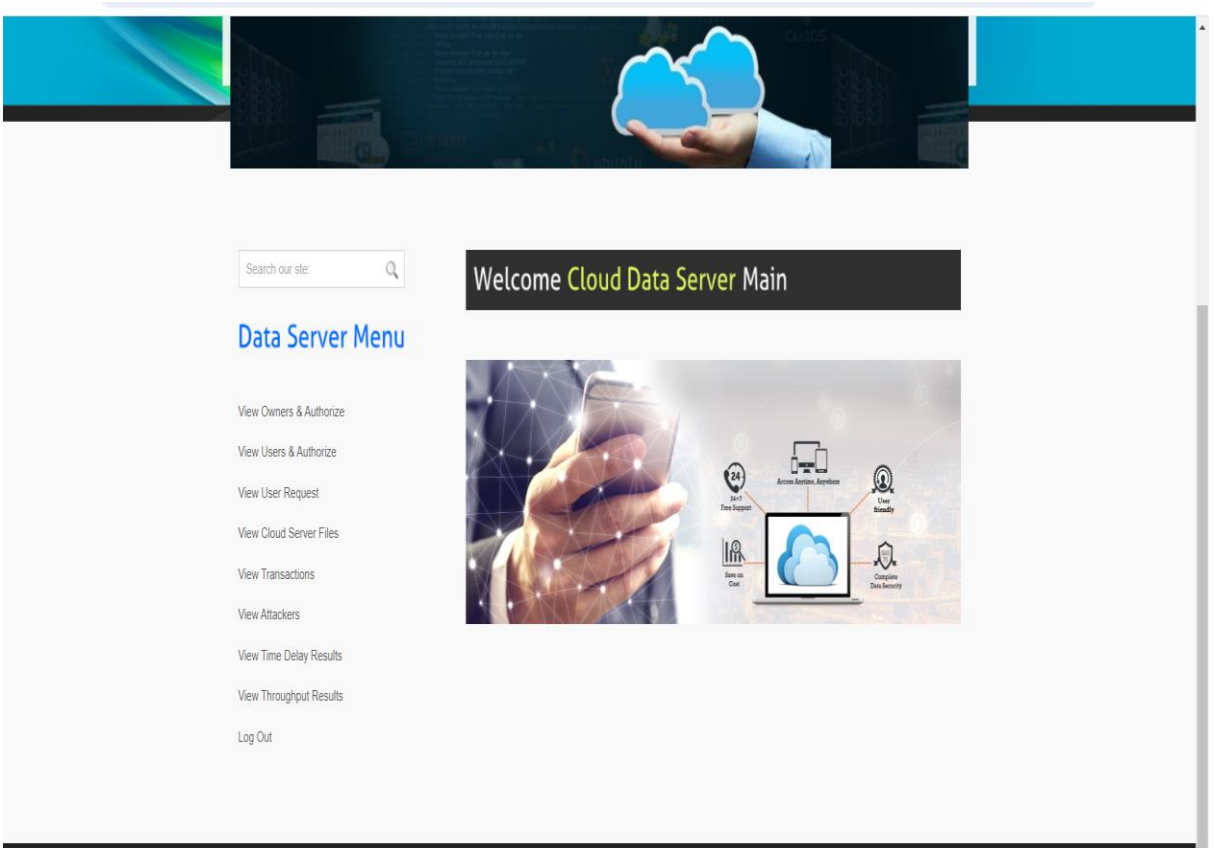


Fig: 5.6

5.2.7 VIEW DATA OWNER & AUTHORIZE

Fig: 5.7

5.2.8 VIEW END USER & AUTHORIZE

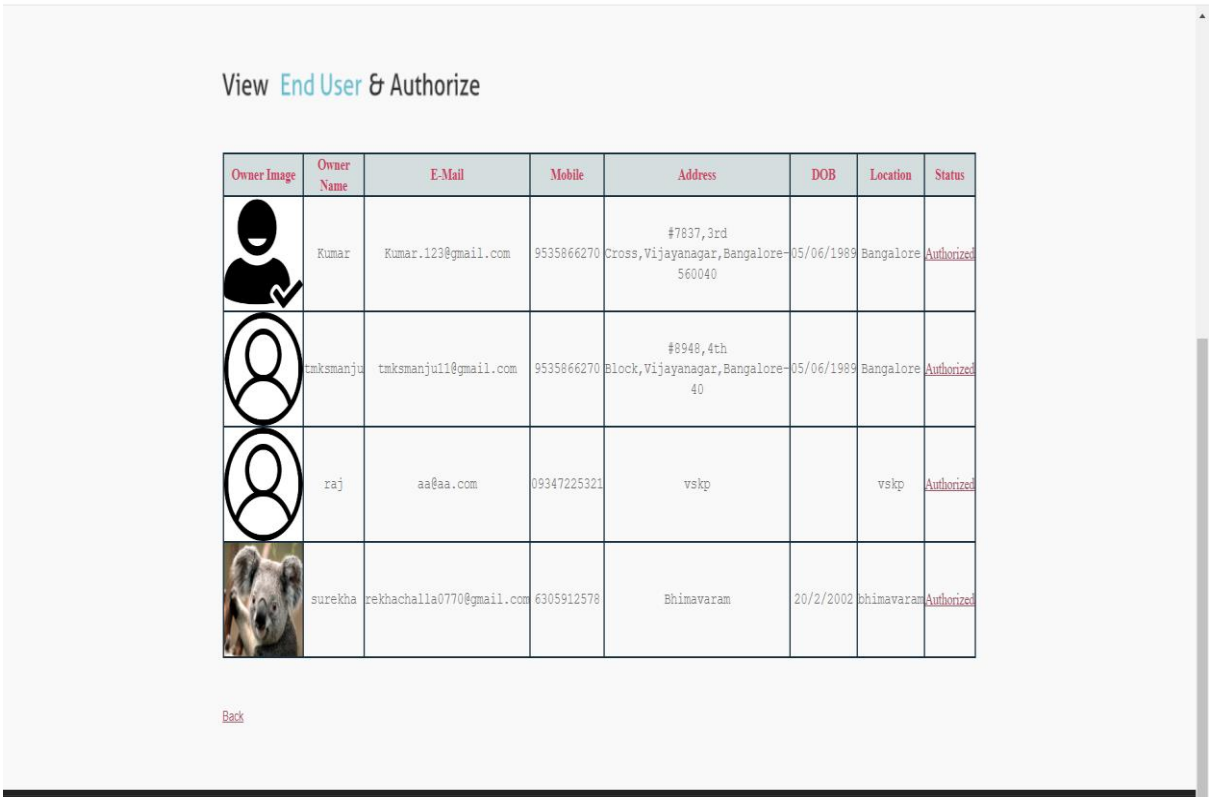


Fig: 5.8

5.2.9 END USER LOGIN PAGE

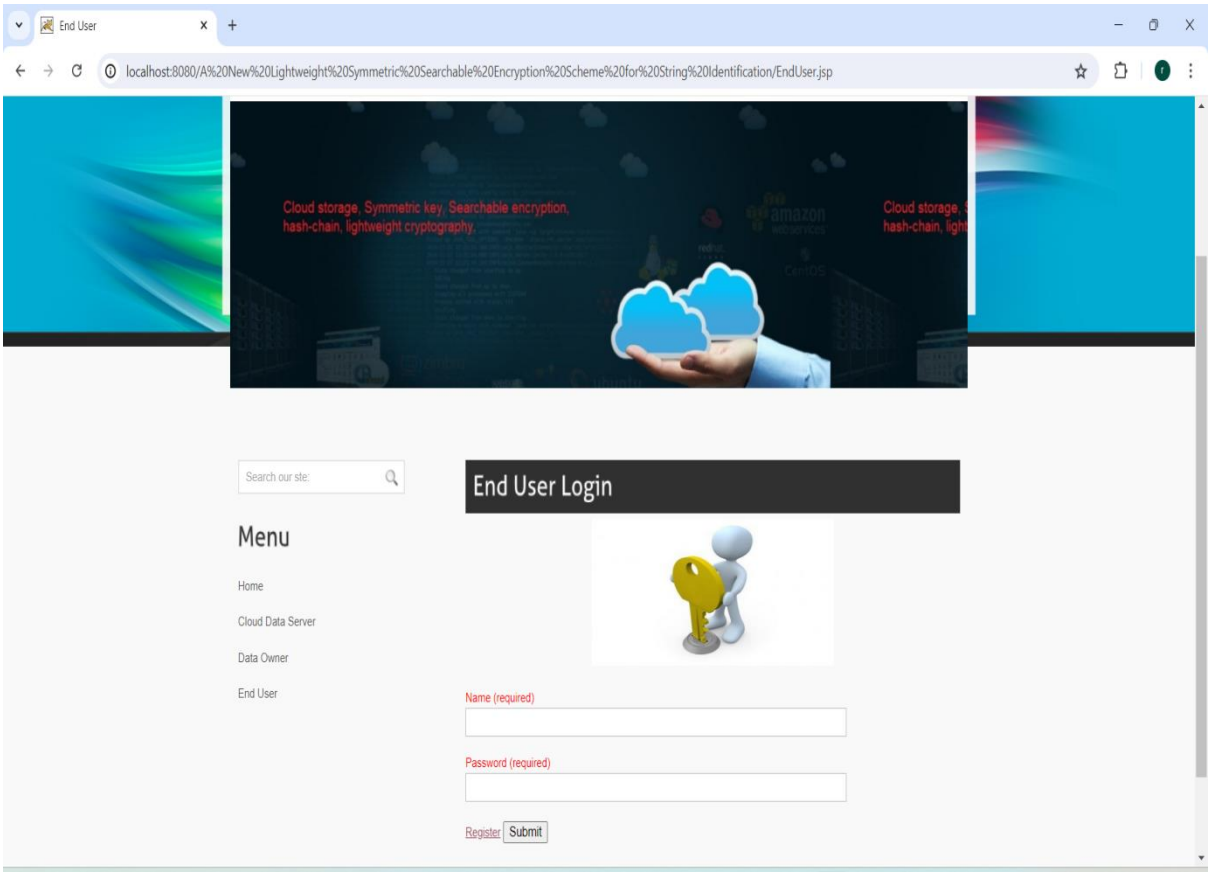


Fig: 5.9

5.2.10 VIEW USER REQUEST & PERMIT

User Name	File Name Req	Owner Name	Req Date	Res Date	MAC	Sk	Status
tmksmanju	ToyExample.txt	Manjunath	30/09/2018 13:17:48	30/09/2018 13:18:06	-1ace7be87e4dc03b0c0e8ef65bf892c1211a245b	[B@dd5681	Yes
tmksmanju	Cloud.java	Manjunath	30/09/2018 13:19:29	30/09/2018 13:19:38	38166df30f3bcf7168133b6b80eba3cd82b671be	[B@146b6db	Yes
tmksmanju	Att.jsp	Rajesh	30/09/2018 13:26:25	30/09/2018 13:26:35	2f52733716a7c0aa92a073cd46e06b9ac82de224	[B@1e779a1	Yes
raj	sample.txt	dinesh	14/06/2024 14:56:32	14/06/2024 14:57:04	-58f2e42cb65d6741f4592ea76d3bc7376654e599	[B@1f68272	Yes

Fig:5.10

5.2.11

UPLOAD

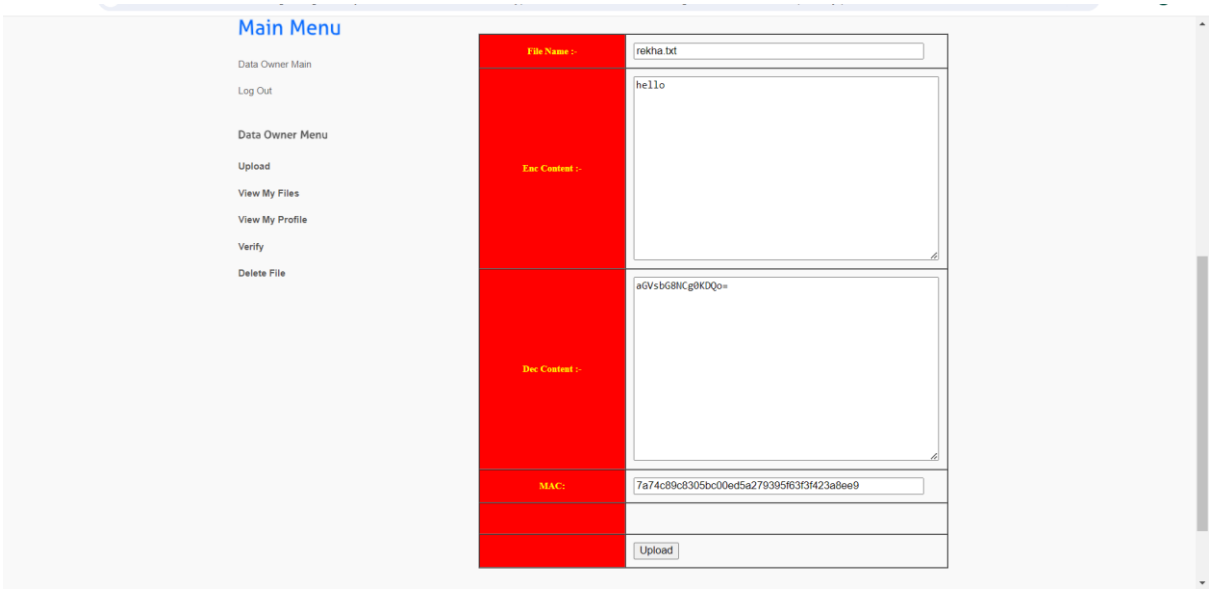


Fig: 5.11

5.2.12 DATA UPLOAD SUCCESFUL

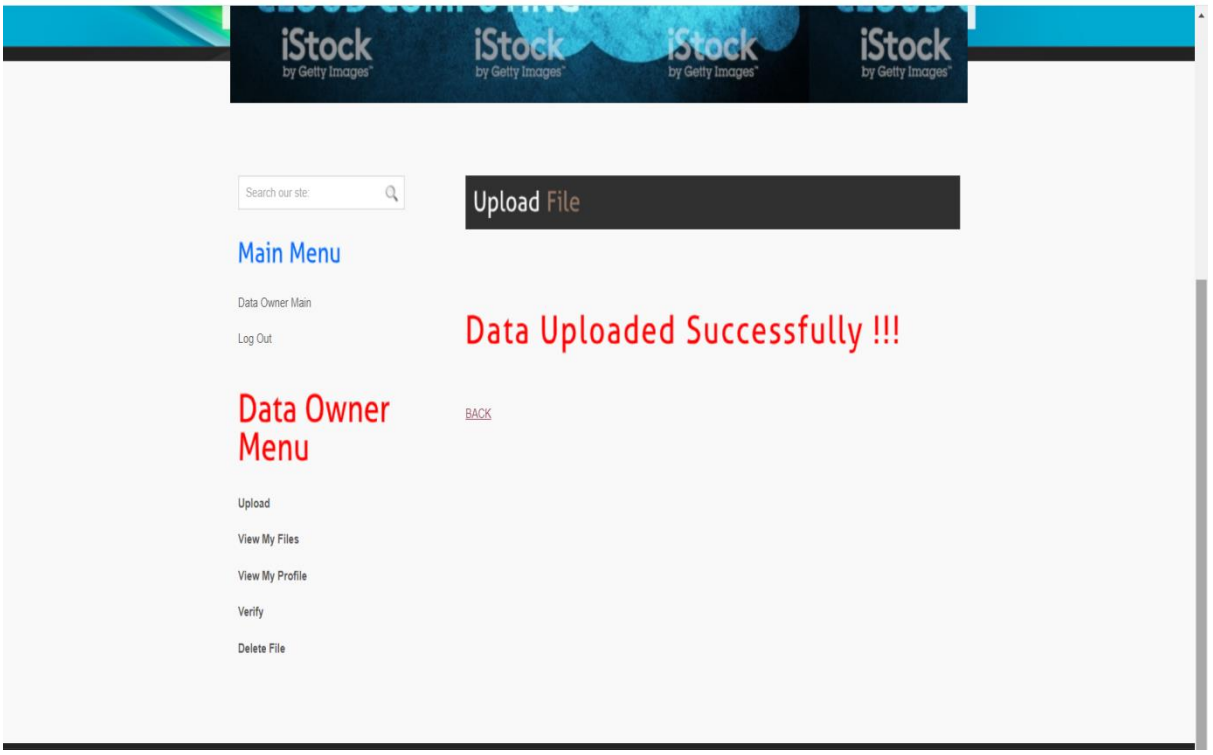


Fig:5.12

5.2.13 VIEW MY FILE

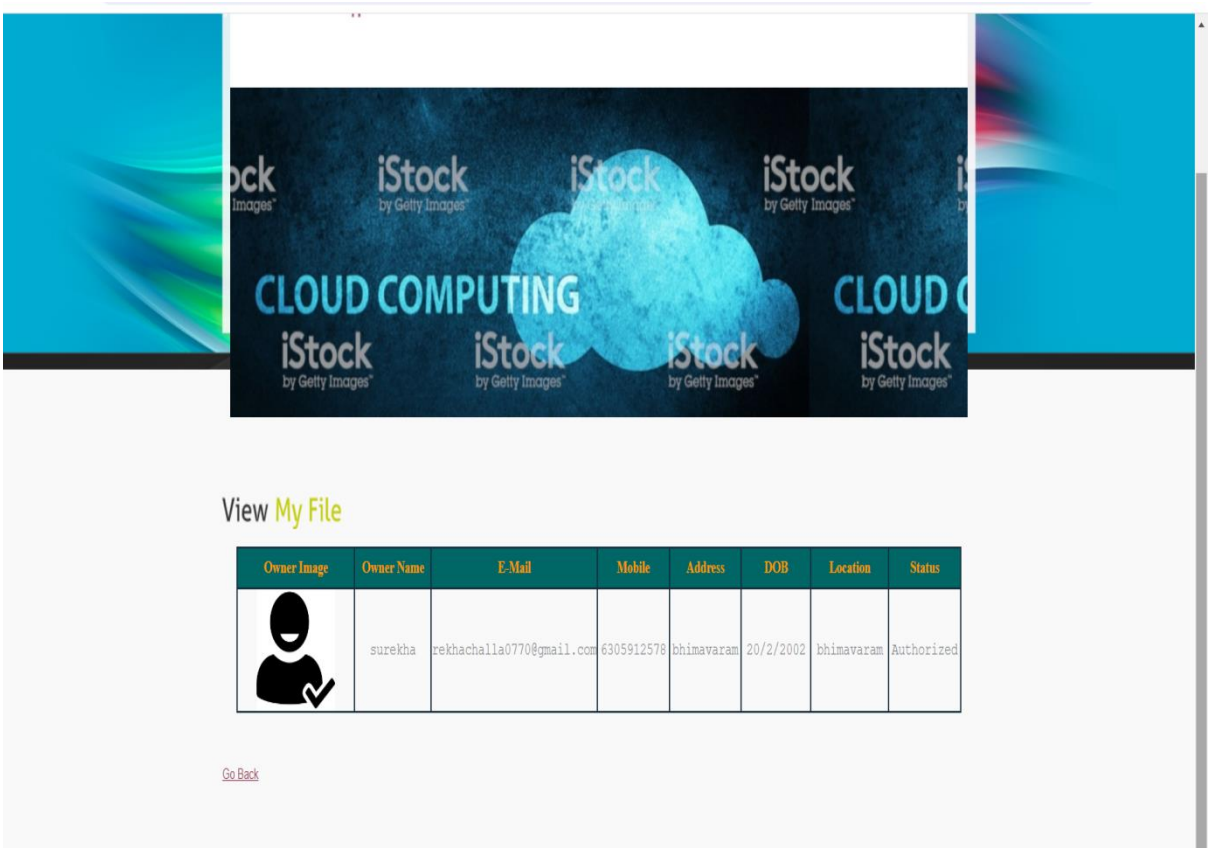


Fig: 5.13

5.2.14 VERIFY FILE

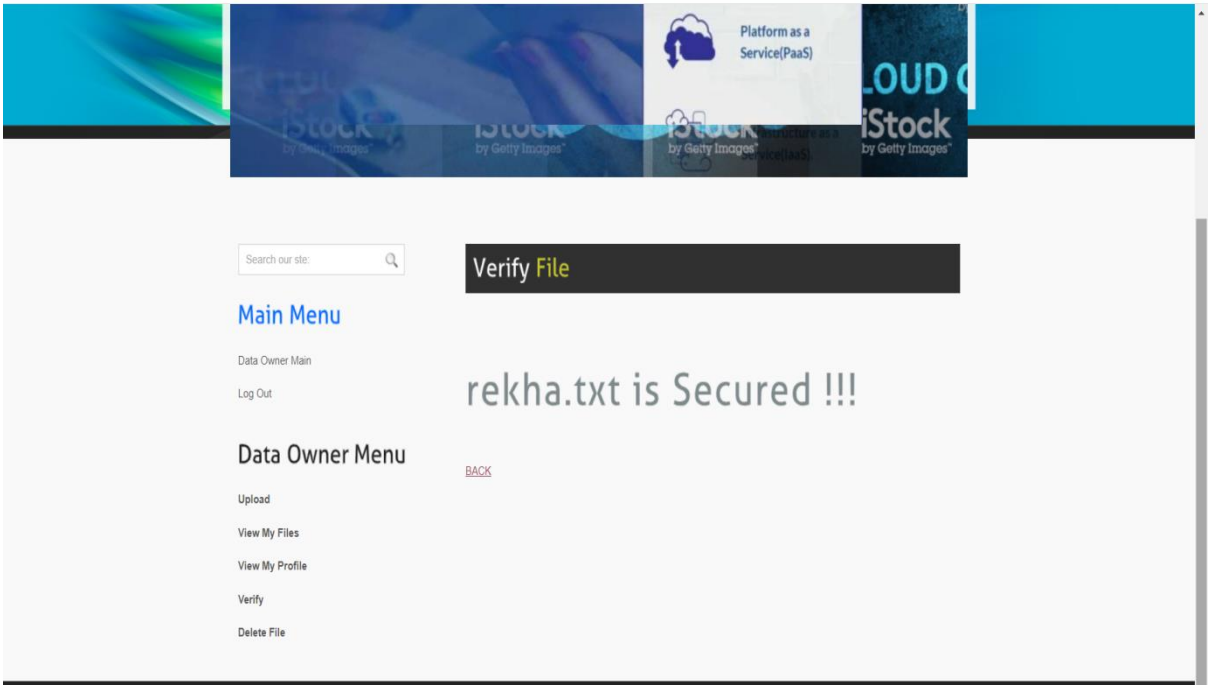


Fig: 5.14

4.2.15 SEARCH FOR STRING IDEMTIFICATION

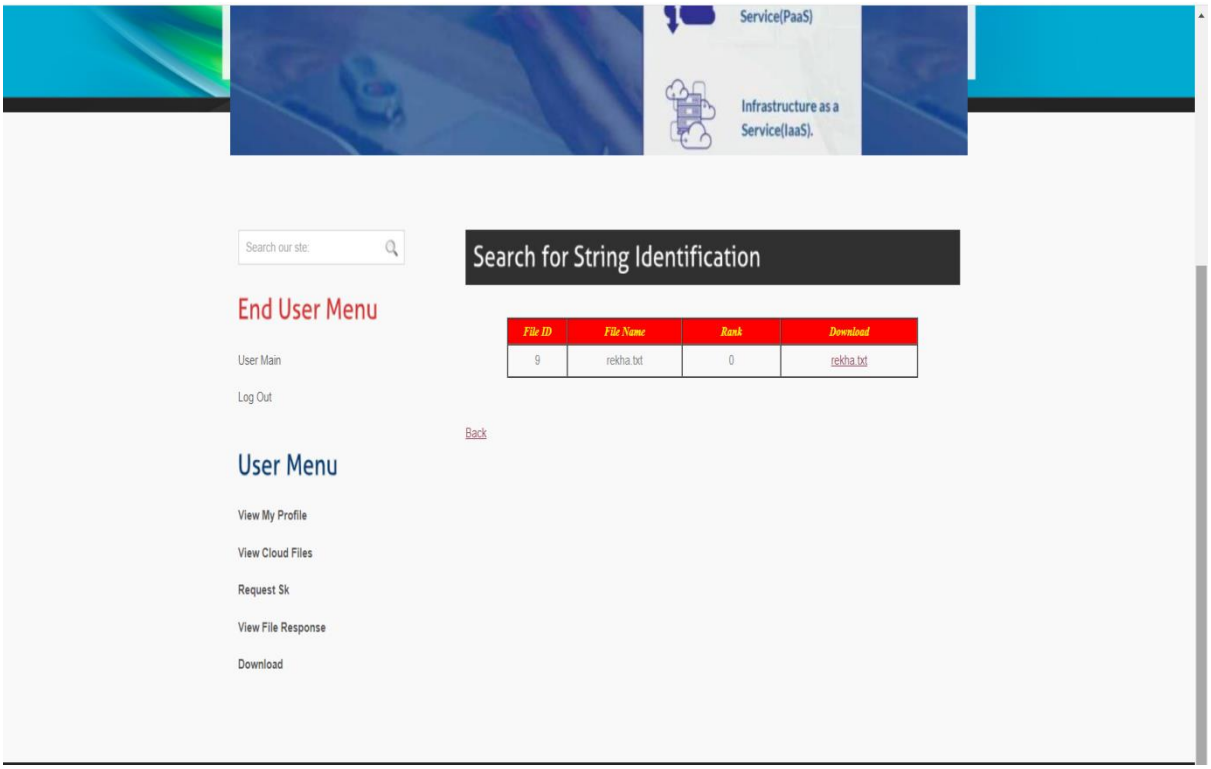


Fig: 5.15

5.2.16 REQUEST SECRETKEY & PERMISSION

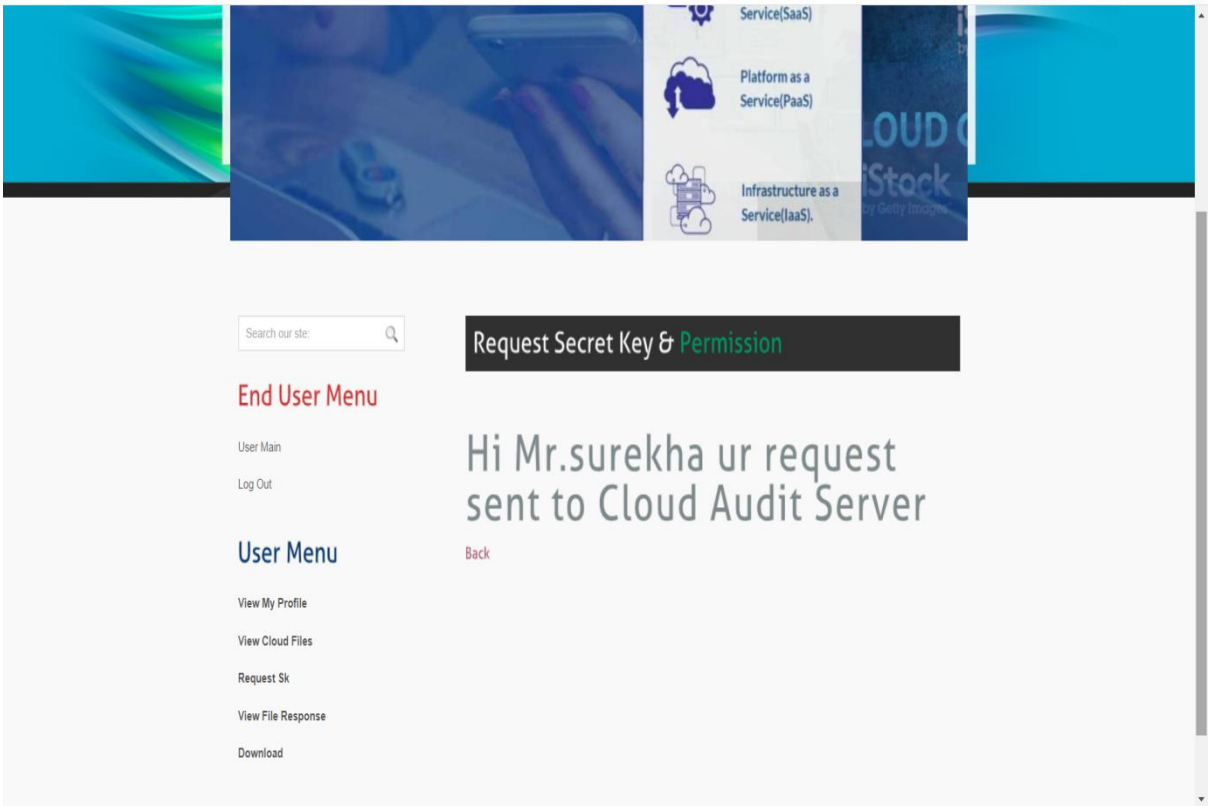


Fig: 5.16

5.2.17 VIEW USER REQQUEST & PERMIT

Fig: 5.17

5.2.18 VIEW USER REQUEST STATUS OF FILES

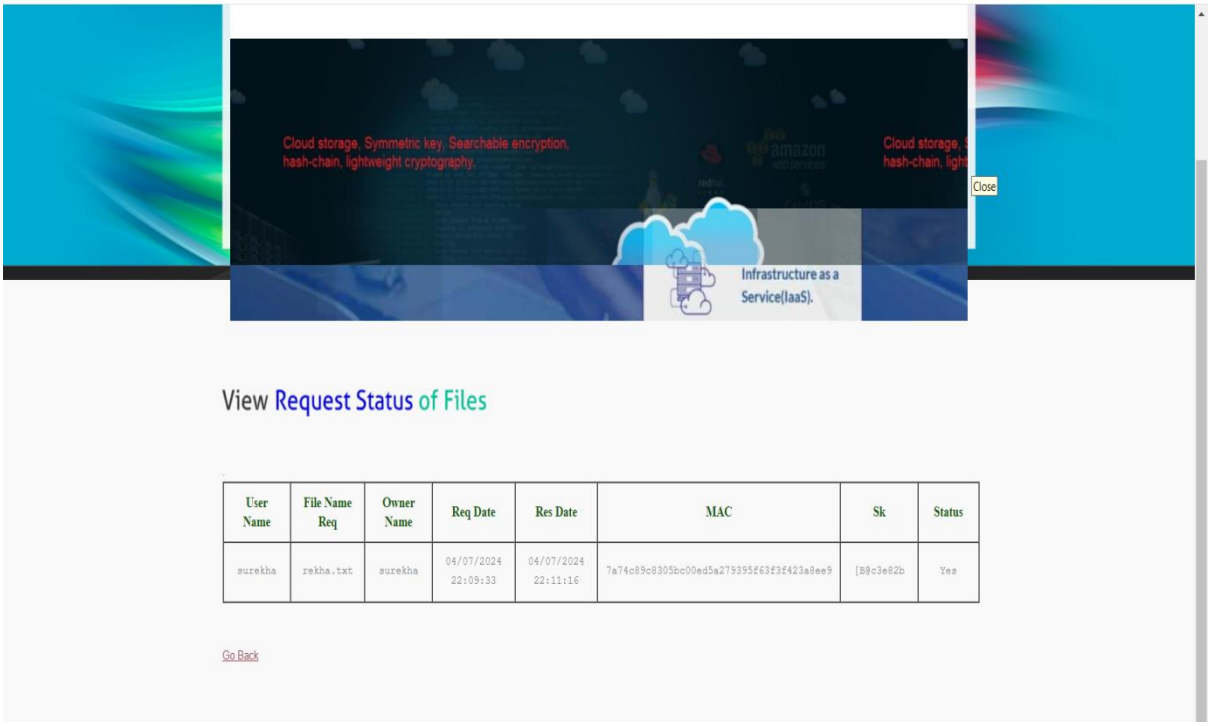


Fig: 5.18

5.2.19 DOWNLOAD FILES

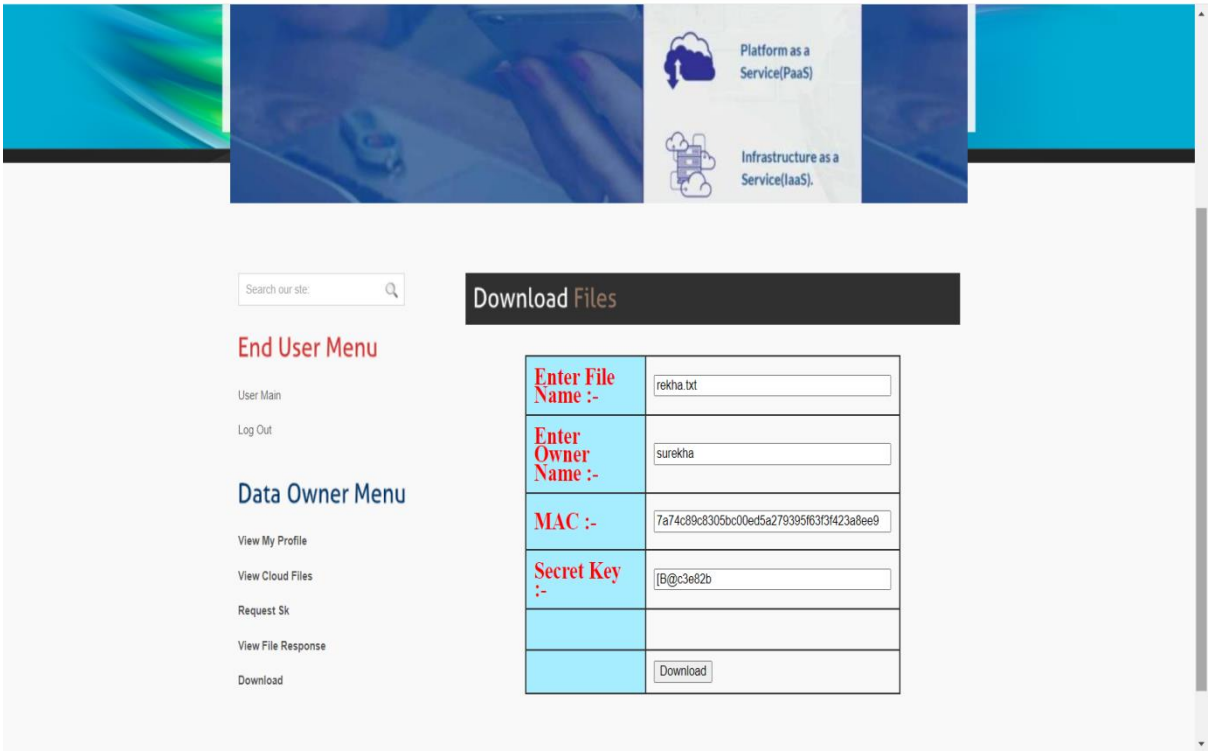


Fig: 5.19

5.2.20 DOWNLOAD FILES

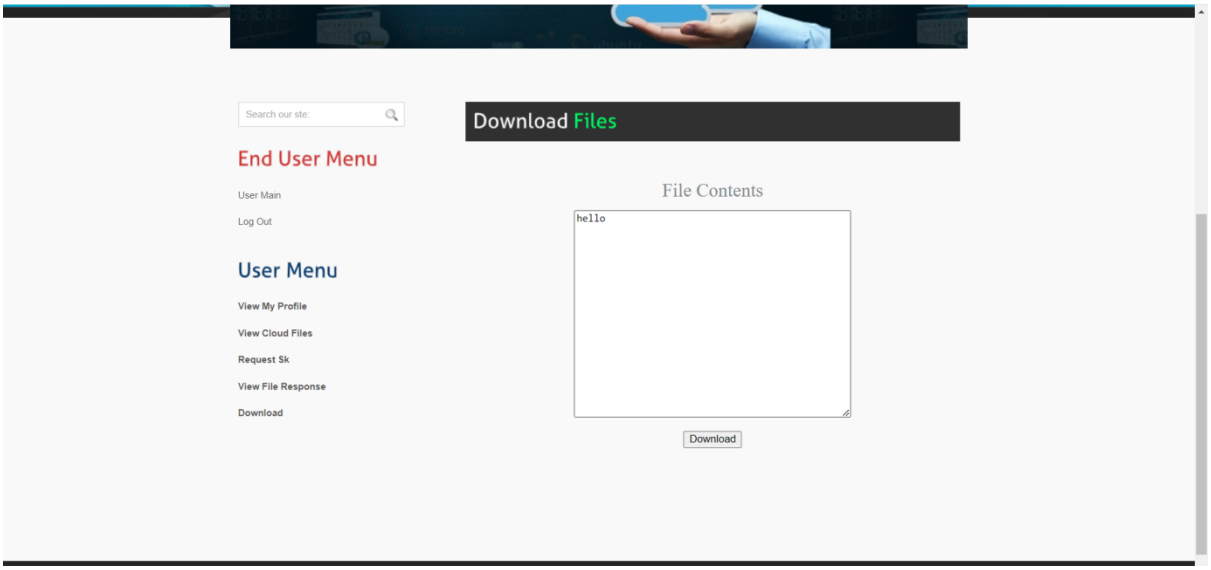


Fig:5.20

6. CONCLUSION AND FUTURE WORK

CONCLUSION

With the increasing number of documents stored in cloud, searching for the desired document can be a difficult and resource intensive task. One solution may be to use symmetric searchable encryption (SSE) which allows one party to outsource the storage of its data to another party (a cloud) privately while enabling to search selectively over it. In this paper we revisited the security definitions of [12] and proposed a new lightweight SSE scheme Πs, s for string search. We have shown that our scheme is secure under the non-adaptive indistinguishability definition [12]. For active adversary, we propose modification of the scheme Πs, s at the additional cost of memory at client's end and two rounds of communications for one modification of document collection.

7. REFRENCES

[1] https://github.com/iskana/pbwt-sec/tree/master/sample dat.

[2] <http://www.fon.hum.uva.nl/david/ma ssp/2007/timit/train/dr5/fsdc0/>.

[3] Michel Abdalla, Mihir Bellare, Dario Catalano, Eike Kiltz, Tadayoshi Kohno, Tanja Lange, John Malone-Lee, Gregory Neven, Pascal Paillier, and Haixia Shi. Searchable Encryption Revisited: Consistency Properties, Relation to Anonymous IBE, and Extensions. volume 21, pages 350–391. Springer, 2008.

[4] Mihir Bellare, Alexandra Boldyreva, and Adam ONeill. Deterministic and Efficiently Searchable Encryption. In Annual International Cryptology Conference, pages 535–552. Springer, 2007.

[5] Dan Boneh, Giovanni Di Crescenzo, Rafail Ostrovsky, and Giuseppe Persiano. Public Key Encryption with Keyword Search. In International Conference on the Theory and Applications of Cryptographic Techniques, pages 506–522. Springer, 2004.

[6] DanBoneh,EyalKushilevitz,RafailOstrovsky,andWilliamESkeithIII. Public Key Encryption That Allows PIR Queries. In Annual International Cryptology Conference, pages 50–67. Springer, 2007.

[7] Ning Cao, Cong Wang, Ming Li, Kui Ren, and Wenjing Lou. PrivacyPreserving Multi-Keyword Ranked Search Over Encrypted Cloud Data. volume 25, pages 222–233. IEEE, 2014.

[8] David Cash, Paul Grubbs, Jason Perry, and Thomas Ristenpart. LeakageAbuse Attacks Against Searchable Encryption. In Proceedings of the 22nd ACM SIGSAC Conference on Computer and Communications Security, pages 668–679. ACM, 2015.

[9] David Cash, Joseph Jaeger, Stanislaw Jarecki, Charanjit S Jutla, Hugo Krawczyk, Marcel-Catalin Rosu, and Michael Steiner. Dynamic Searchable Encryption in Very-Large Databases: Data Structures and Implementation. volume 2014, page 853. Citeseer, 2014.

[10] David Cash, Stanislaw Jarecki, Charanjit Jutla, Hugo Krawczyk, MarcelC˘ at˘alin Ros¸u, and Michael Steiner. Highly-Scalable Searchable Symmetric Encryption With Support for Boolean Queries. In Advances in Cryptology–CRYPTO 2013, pages 353–373. Springer, 2013.

[11] David Cash and Stefano Tessaro. The Locality of Searchable Symmetric Encryption. In Annual International Conference on the Theory and Applications of Cryptographic Techniques, pages 351–368. Springer, 2014.

[12] Reza Curtmola, Juan Garay, Seny Kamara, and Rafail Ostrovsky. Searchable Symmetric Encryption: Improved Definitions and Efficient Constructions. volume 19, pages 895–934. IOS Press, 2011.