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WITH DATA SHARING AND BLOCK CHAIN ASSISTED COLLABORATIVE SERVICE RECOMMENDATION

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ABSTRACT:

With the speedy growth of cloud computing, many new online services have appeared, placing a great strain on customers to select the services they like. Recommendation algorithms are required in order to suggest online services to users, and several of them have lately been studied. However, the majority of the current recommendation models rely on centralised databases of historical information, which might result in a single point of failure. Most cloud platforms are often hesitant to disclose their own data since it typically contains a lot of sensitive information that might endanger user privacy. Secure data exchange between cloud platforms is required for improved recommendations, which can optimise profitability, in order to address the aforementioned problems. In this paper, we suggest a collaborative service recommendation system that uses block chain technology (BC-SRDS). To encrypt the data, we specifically use the cipher text- policy attribute-based encryption (CP-ABE) method, which secures data secrecy and enables safe data transfer. Then, in order to avoid DoS attacks, DDoS attacks, and single points of failure, we use the block chain to share data. In the meanwhile, the block chain ensures data integrity and tamper-proofing. And in order to suggest the services to consumers, we employ a locality-sensitive hashing technique. Finally, the security analysis demonstrates that BC-SRDS can provide data secrecy, data integrity, and tamper-proof ness. A number of tests demonstrate that BC-SRDS outperforms the current schemes in terms of suggestion accuracy.

[1] INTRODUCTION

A vast number of network information services have entered people's daily lives as a result of the Internet's and computer technology's fast development, offering consumers a variety of conveniences. In the meantime, as Internet users multiply quickly, so does the amount of information they produce, creating the issue of "information overload." In today's world, it is a significant task for both producers and consumers to swiftly choose the services using user information and gain the public's favour. This is

especially true for Internet service providers. Internet users must spend a lot of time and effort sorting through the large quantity of information to find the services they are interested in.

Numerous recommendation algorithms, including collaborative filtering recommendation, have been put forth to address the aforementioned issues. Based on the resource scoring data, it offers the target user a customised suggestion. Additionally, the algorithm is frequently utilised in e-commerce, customised websites, and other industries and has a positive recommendation impact. Although the collaborative filtering recommendation algorithm has high recommendation accuracy, it still has a number of drawbacks. For example, because the data it uses is frequently stored on a centralised server, new users or new items cannot be compared to historical data, and it may experience cold start problems that prevent it from finishing the recommendation. However, the issue of cold start may be efficiently resolved by gathering user data from many platforms. As an illustration, user A phoned Amazon's customer service, whereas user B called IBM's customer service. If A and B are comparable users, they can either propose services to A by examining B's offerings or recommend services to B by examining A's offerings. However, a bad tip might result in data misuse or privacy problems. Amazon and IBM are therefore hesitant to exchange user data because they want to safeguard consumers' private information. This severely lowers the quality of the suggestion because we are unable to find new customers who are comparable to existing users. Additionally, suppose that two platforms consent to data sharing and use data from several platforms to increase suggestion accuracy. However, the issue of cloud systems being unable to respond fast while online is still present due to the data being kept on several remote platforms, which significantly increases communication overhead.
In this study, we present a novel block chain- aided collaborative service recommendation system with data sharing (BC-SRDS), which allows any platform to exchange their data securely based on block chain and addresses the aforementioned issues. Additionally, locality-sensitive hash (LSH) is a fast technique for finding related data, hence it is used to carry out speedy suggestion.
i) As far as we are aware, a large number of recommendation algorithms rely on centralised data, but few of them use block chains to implement the recommendations. Furthermore, due to user privacy, it is challenging to join remote cloud systems to exchange their data for recommendations. In this research, we present block chain to create a safe sharing environment for precise suggestion in order to get better recommendation.
ii) In contrast to the majority of existing recommendation works, we use CP-ABE (cipher text-policy attribute-based encryption) to encourage data sharing among cloud platforms. We also combine block chains to guarantee the security of data provenance, reduce the risk of single point failure, enhance data integrity, and protect against DOS or DDOS attacks.
iii) The experimental findings demonstrate the efficiency of BC-SRDS based on the real distributed QOS (quality of service) dataset WS-DREAM1. Metrics like CPU and memory utilisation, throughput, latency, MAE (Mean Absolute Error), RMSE (Root Mean Square Error), gas consumption, and the number of comparable neighbours all show that BC- SRDS may enhance accuracy and obtain more ports.

[2] LITERATURE SURVEY

M. N. Patwary et al., discussed , The capacity and coverage requirements for wireless connection in the fifth generation (5G) and beyond will be very different from those for the networks' forerunners. The estimated cost of deployment in the United Kingdom (UK) to achieve these needs is estimated to be between £30 billion and £50 billion, compared to the mobile network operators' (MNOs') present annual capital expenditure (CapEX) of £2.5 billion. While other aspects of 5G are developing at their normal pace, this potential has had a significant influence and has now emerged as one of the primary causes slowing down the construction of the physical infrastructure for 5G. The second-tier operators, also known as mobile virtual network operators (MVNO), are totally reliant on the MNOs due to the costly and complex nature of the network infrastructure and spectrum. In this article, a thorough investigation is made to examine the potential for lowering the cost of 5G deployment and creating workable business models. In this regard, a detailed investigation is done into the possibility of infrastructure, data, and spectrum sharing. It has been demonstrated that the expected cost might be reduced by between 40% and 60% by using already-existing public infrastructure (such as streetlights, telephone poles, etc.). In

addition, this study examines current Of com attempts to provide location-based radio spectrum licenses. According to our research, infrastructure and spectrum simplification will promote the explosive growth of scenario-specific cellular networks (such as private networks, community networks, and micro-operators) and may endanger the viability of MNOs and Tower Cos' and other stakeholders' existing business models. Additionally, the projected dense device connectivity of 5G would considerably improve the resolution of conventional and unconventional data availability. This will promote significant data harvesting as a commercial opportunity and function inside huge social networks as well as small and medium-sized businesses (SMEs). As a result, it is projected that new infrastructures and spectrum stakeholders would emerge. As a result, a 5G data exchange ecosystem will grow, and data transactions will be seen as valuable economic commodities. These data's privacy and security, as well as the definitions of the related income models and ownership, are difficult areas that have yet to completely develop and mature. The construction of a single data hub with layered structured privacy and security, block chain technology, and encrypted off-chain based ownership/royalty tracking is suggested in this study as a step in that direction.

H. Shi et al. discussed **,** In Wuhan, China, a number of individuals with pneumonia brought on by infection with the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) have been documented. Our goal was to outline the CT results at various stages of the disease's progression. Methods: Patients who were hospitalised to one of two hospitals in Wuhan with COVID-19 pneumonia (confirmed by next-generation sequencing or RT-PCR) and received a series of chest CT scans were retrospectively included. According to how long had passed between the onset of symptoms and the initial CT scan, patients were divided into four groups: group 1 (subclinical patients; scans performed prior to symptom onset), group 2 (scans performed within one week of symptom onset), group 3 (between one and two weeks), and group 4 (between two and three weeks).The distribution of imaging characteristics was examined and compared amongst the four groups. Results: Retrospective enrolment included 81 patients who were admitted to the hospital between December 20, 2019, and January 23, 2020. The cohort's mean age was 49 years (SD 11 years), and there were 42 males and 39 women in it. The average number of lung segments affected was 10 (SD: 6), with 2 (8, 13), 11 (1, 5), 13 (0, 7) and 12 (1, 9) in groups 1 through 4. The right lower lobes (225 [27%] of 849 afflicted segments) made up the majority of the bilateral (64 [79%] patients), peripheral (44 [54%]), ill-defined (66 [81%]), and ground-glass opacification (53 [65%]) abnormality patterns that were seen. In group 1 (n=15), ground-glass opacities (14 [93%]) exhibited a unilateral (nine [60%] and multifocal (eight [53%]) pattern. In group 2 (n=21), lesions rapidly progressed to bilateral (19 [90%]), diffuse (11 [52%]), and preponderance of ground-glass opacity (17 [81%]). Following this, consolidation and mixed patterns increased in frequency (12 [40%] in group 3, and eight [53%] in group 4), whereas ground-glass opacities continued to decline (17 [57%] of 30 patients in group 3 and five [33%] of 15 in group 4. Interpretation: Chest CT imaging abnormalities associated with COVID-19 pneumonia can be seen in individuals who are asymptomatic as well. These abnormalities rapidly move from localised unilateral to widespread bilateral ground-glass opacities, which then develop into consolidations within 1-3 weeks. Early identification of COVID-19 pneumonia may be made easier by integrating clinical and laboratory results with evaluation of imaging characteristics.

J. Wang et. al studied, Wireless nodes can connect with one another through intermediary nodes in multi hop wireless networks (MWNs) without the use of any infrastructure. As a result, network administration is divided among the nodes, and wireless nodes are in charge of setting up and structuring the network. As a result, it is challenging to overcome current obstacles such node mobility and dynamic topological changes, energy limitations, etc. To address the problems with conventional networks, software defined networking (SDN) decouples the control plane from the data plane. According to the SDN idea, a logically centralized controller programmes the network after making routing decisions based on an overall view of the network and the needs of applications. As a result, it aids in resource allocation optimization and network performance enhancement. In this article, we examine the advantages and many facets of using the SDN idea in MWNs (SDMWN). We begin by introducing MWNs, current difficulties, and the rationale for implementing SDN in such networks. After introducing the SDN idea, we review the pertinent SDMWN work. Finally, we go through the difficulties in using SDN and the future possibilities for this field of study.

M. A. Rahman et al., suggested a Block chain-based infrastructure to provide privacy- and security-focused spatio-temporal smart contract services for the resilient Internet of Things (IoT)-enabled sharing economy in large-scale smart cities. The infrastructure uses cognitive fog nodes at the edge to host and process offloaded geo-tagged multimedia payload and transactions from a mobile edge and IoT nodes, uses AI to process and extract significant event information, produces semantic digital analytics, and saves results in Block chain and decentralised cloud repositories to facilitate sharing economy services. The framework provides a long-term incentive system that may enable safe smart city services like the sharing economy, smart contracts, and cyber-physical interaction with Block chain and IoT. Our distinctive contribution is supported by thorough system design and framework implementation.

A. K. Sangaiah et. al. studied **,**With the spread of smart mobile devices, position-based services (PBSs), which supply networked amenities depending on roaming users' whereabouts, have gained popularity. One of the crucial factors in PBSs is position. Fundamental techniques for efficient PBSs include the extraction, identification, and estimation of relevant positions as well as the succeeding position. Many academics and practitioners have attempted to identify and anticipate positions using a variety of methodologies, but few have thought about the development of position-based real-time applications taking into account major duties of PBSs. This research proposes a machine learning-based strategy for protecting roaming PBSs users' location confidentially. For travelling PBS users, we advise following a three-phase process. By combining decision trees and k-nearest neighbor, it determines the user's location, and by utilizing hidden Markov models, it determines the user's destination along with the position track sequence. The suggested paradigm also adheres to a mobile edge computing service policy, which will guarantee the timely delivery of PBSs. Position secrecy and low latency are provided by mobile edge service policies through networking and computing services provided close to roaming users. Extensive testing has been done, and the results show that the suggested solution successfully achieved more than 90% of position confidentiality in PBSs.

[3] SYSTEM ARCHITECTURE

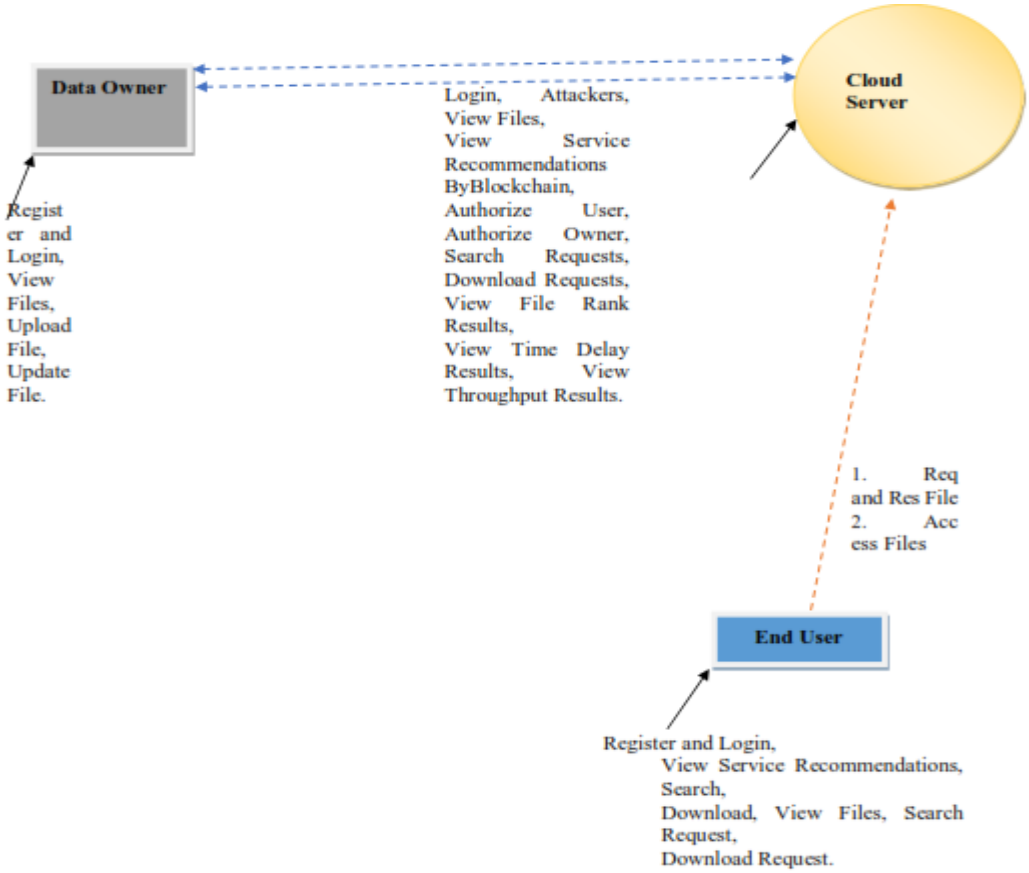

Fig 1: Block Diagram For System Architecture

[4] IMPLEMENTATION

4.1 Modules Description

i) Data Owner Module: The data owner uploads their data to the cloud server in this module. The data owner encrypts the data file's blocks for security reasons before storing it in the cloud. The owner of the data may verify that the file's blocks have been replicated across the relevant cloud server. The owner of the data may be able to edit files by viewing them, uploading them, and updating them.
ii) Cloud Server Module: A cloud is managed by the cloud service provider to offer data storage. Data consumers download encrypted data file's blocks of their interest from the cloud and then decrypt them to perform operations like View Attackers, View Files, View Service Recommendations By Block chain, Authorize User, Authorize Owner, Search Requests, Download Requests, View File Rank Results, and View Time Delay. Data owners encrypt their data file's blocks and store them in the cloud for sharing with Remote User to access the shared data file's blocks.
iii) End User: Using his user name and password, the remote user logs in to this module. After that, he will ask cloud servers for the secret key for the needed file's blocks and obtain it. After obtaining the secret key, he attempts to download the file's blocks by entering the file's blocks name and the secret key from the cloud server and completes the following actions: see service recommendations, search, download, view files, and request a search and download.
iv) Data Encryption and Decryption: Any interested encrypted and decrypted data may be freely accessed by any authorized users in the system. The user then uses the secret keys from several Users to execute the decryption algorithm Decrypt to decrypt the cipher text after getting the data from the server. The user may only obtain the content key if the qualities they possess satisfy the access structure specified in the cipher text CT.

4.2 Screen Shots

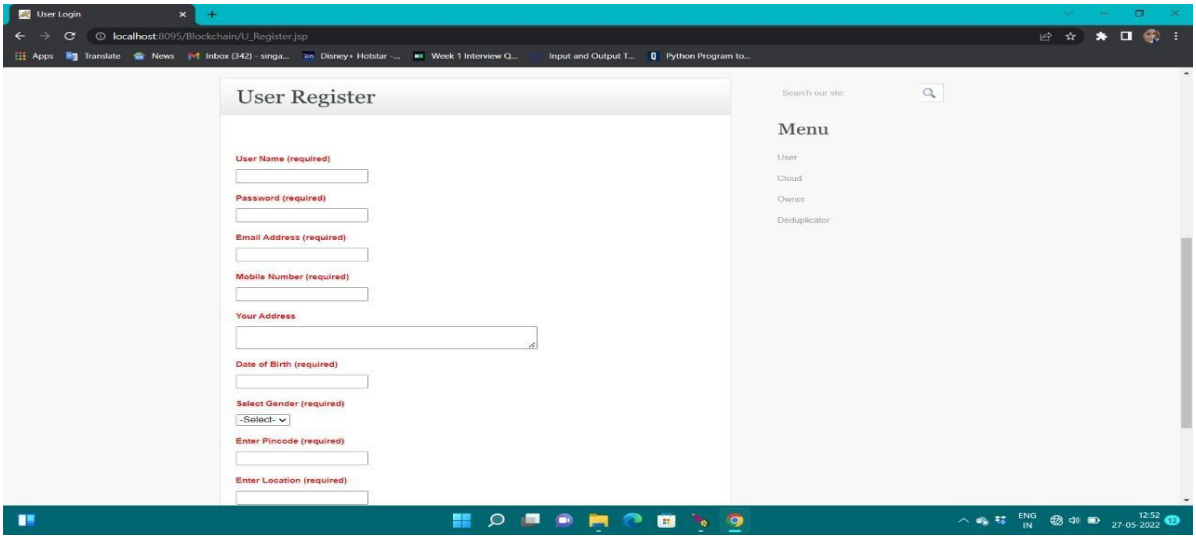

Fig. 2 User Registration

In the above screen, we see the user registration form which contains user name, password, confirm password. email, mobile number.

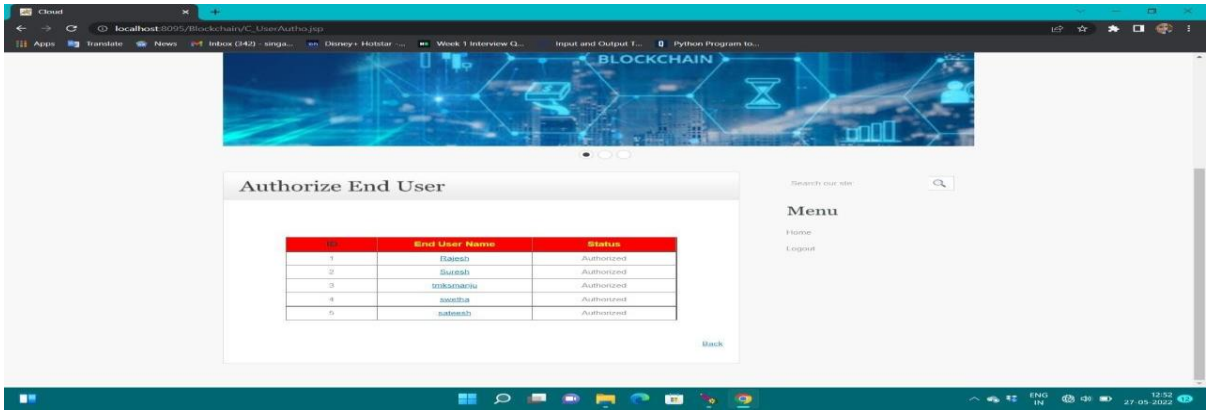

Fig. 3 Authorize End User:

In the above screen, we see the authorize end user page which contains end user name, status.

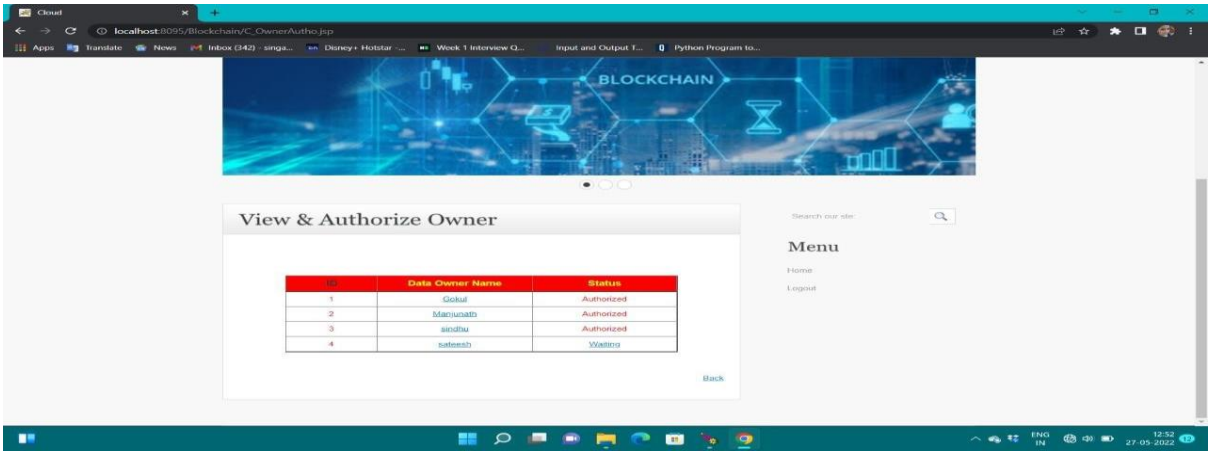

Fig. 4 View & Authorize Owner page

In the above screen, we see the view& Authorize Owner page which contains data owner name, status

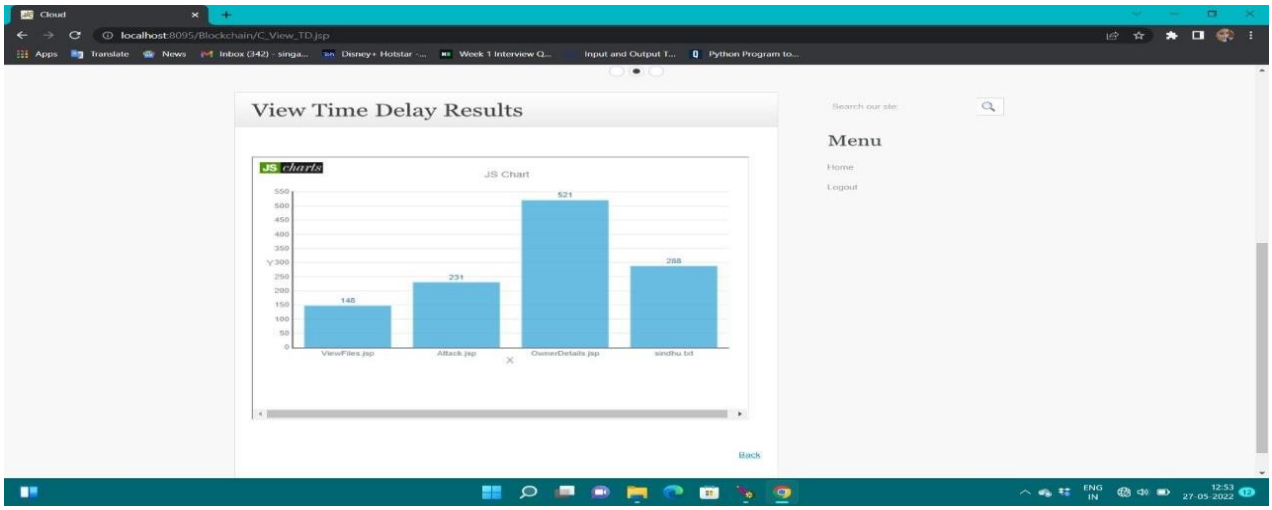

Fig. 5 View Time Delay Results

In the above screen ,we see the View Time Delay Results which contains view Files jsp, Attack jsp, Owner Details jsp, sindhu txt.

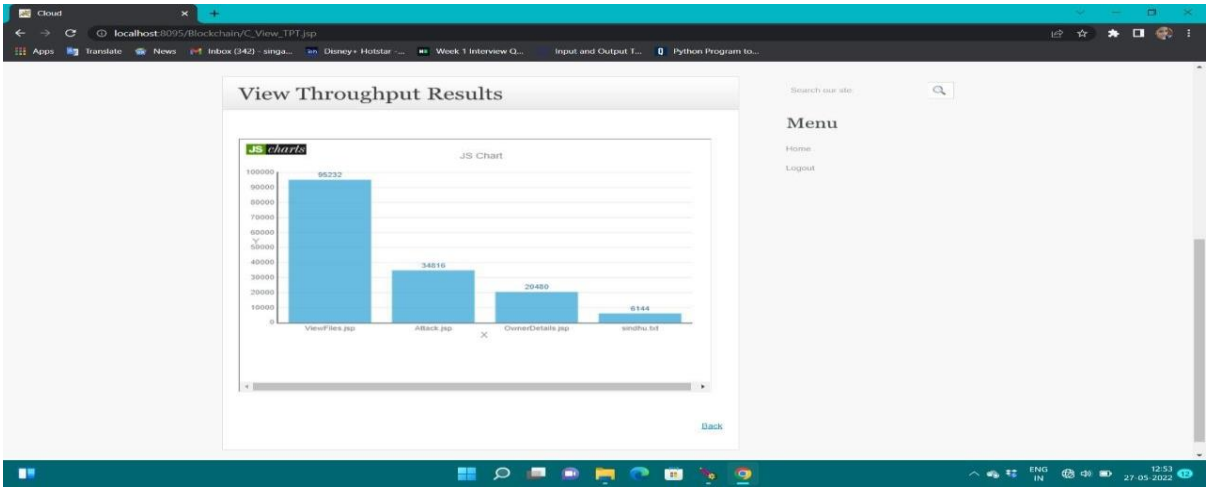

Fig. 6 View Throughput Results

In the above screen we can see the View Throughput Results which contains View Files jsp, Attack jsp, Data owner jsp, Sindhu txt.

[5] CONCLUSION AND FUTURE WORK

In this paper, we put forth the BC SRDS service recommendation system, which not only facilitates data exchange between various platforms built on the consortium block chain, but also offers consumers a precise service suggestion. Additionally, before sharing the data with other cloud platforms, we encrypt it using the CP-ABE technique to ensure data security. Block chain allows cloud platforms to quickly access shared data and exploit it to their advantage while preventing DOS, DDOS, and single points of failure. According to the security study, BC-SRDS can achieve data confidentiality, data integrity, and tamper-proof ness. Finally, we assess our plan using WS-DREAM and run a number of tests. According to the experimental findings, BC-SRDS can obtain a greater level of accuracy than the other three schemes. Additionally, its gas expense is totally reasonable for cloud systems.
Furthermore, we may draw the conclusion that our consortium block chain-based method is workable based on measurements of resource usage, throughput, and latency.

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