

A Proficient Privacy Protection Method for Cloud Computing

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Abstract— With the rapid development of Cloud computing, further Cloud services are into our diurnal life, and therefore security protection of Cloud services, especially data sequestration protection, becomes more important. Still to perform sequestration protection causes a huge outflow. Therefore, it's a critical issue to perform the most suitable protection to decline performance consumption while giving sequestration protection. In this design, the Complete Sequestration Protection Scheme (PPPS) is proposed to give the applicable sequestration protection which is satisfying stoner-demanded sequestration demand and maintains system performance contemporaneously. At first, the sequestration position is anatomized by druggies those bear and quantify the security degree and performance of 3DES and AES encryption algorithms. Also, relevant security creation is deduced by the output of analysis and quantified data. Eventually, the simulation results show that they not only fulfill stoner-demand and sequestration but also maintain the Cloud system performance in different Cloud surroundings.

Keywords: Cloud Computing, Cryptography, Symmetric Encryption, Third Party Auditing.

I. INTRODUCTION

Cloud computing is arising as the most suitable paradigm for individualities and associations to pierce affordable, scalable, ubiquitous, and on-demand computing coffers, operations, and data storehouse services. Cloud storehouse systems, similar to Dropbox, Google Drive, Apple's iCloud, Microsoft OneDrive, etc., enable druggies to ever store a large volume of data that can be penetrated and participated among druggies, anyhow of time and position constraints. With the growing fashion ability of Cloud computing, the number of enterprises and individualities shifting toward the use of Cloud has increased fleetly.

As a result, a vast quantum of important particular information and critical association data, similar to particular health records, government documents, company financial data, etc., is transmitted across the Internet and stored in Cloud waiters. Still, outsourcing sensitive data suffers from critical security pitfalls, sequestration, and access control problems.

These are common enterprises of associations and individualizes using Cloud services. When data possessors resettle their sensitive data to the pall, they lose an element of control over their data. Cloud druggies have no guarantee about the way these sensitive data will be treated and defended by Cloud providers.

Although the Cloud provides druggies with the convenience of data access across multiple biases, by using Cloud services, stoner data are vulnerable to a variety of vicious attacks and pitfalls. Security incidents do constantly.

Indeed worse, Cloud service providers may blunder stoner data to unauthorized realities for illegal profit.

One doable result to overcome these problems is to use cryptography. All sensitive data have to be translated by data possessors previous to storing them into the potentially untrustworthy pall. The strength of the encryption scheme is largely dependent on the strength of the crucial operation fashion used. The security of the encryption scheme lies in the secretiveness of the keys that are known only to the druggies authorized to read their separate data, and not only in tin secretiveness of the encryption algorithm used.

Given the quantum of data being stored and participated in Cloud and the adding number of data druggies, designing a cryptographic scheme for Cloud storehouse that meets the conditions of security, effectiveness, ease of use, and inflexibility is a grueling task. Traditional encryption operations, generally, suffer from limited usability due to the homemade result handed by operations. Data possessors must cipher their data manually before uploading it to the pall. Also, druggies have to manually induce, manage, and store the encryption keys.

Still, the involvement of data possessors in performing multiple encryptions and decryption operations is clumsy and time-consuming. Also, it's delicate for druggies to manage further than many keys, and if the keys are blurted or else compromised, security will have hovered. Encryption operations are designed to be bandwidth-empty and quiescence-sensitive, in which the increased number of outsourced lines taking encryption would significantly affect the system performance and data access response time.

Recent works manage the limitations of the encryption operations by espousing a transparent encryption approach. This type of encryption medium is enforced most effectively with the help of operating system train systems. The common approach is composed of a customer operation that interacts with the original cryptographic train system, and the translated data are accompanied or backup to connected back-end Cloud storehouse waiters. In this design, in this script, the situations can be seen as the kinds of speed, mongrel, and security.

They're explained as follows.

1. (Speed) The demand of this position presents no sensitive information in the data. Druggies want to use the weak encryption composition to gain further performance for using Cloud services.
 2. (Hybrid) The demand of this position presents that data include some sensitive information. The data requires weak encryption for partial data (similar to adjoins, correspondence id of corporate) and strong encryption for remaining data (similar to account balances and other secure information).
 3. (Security) In this sequestration position, the data contains the most important information. To cover the data security, further privileged druggie's view utmost of the data, and lower privileged druggies view limited data.
- To cipher/ decipher the data of lower significance using a weak encryption system so that communication is fast.
 - To cipher/ decipher the partial data using a weak encryption system and other partial data in a strong encryption system so that communication is fast and security position is raised.
 - To cipher/ decipher some fields using a strong encryption system and some other fields using a weak encryption system so that all fields are displayed to high honor druggies and some fields are displayed to low privileged druggies.
 - To cipher/ decipher the watermarked contents with a weak encryption system and non-watermarked contents with a strong encryption system.

II. LITERATURE REVIEW

In this paper [1], the authors stated that the adding volume of particular and sensitive data being gathered by data regulators makes it decreasingly necessary to use the cloud not just to store the data, but also to reuse them on cloud demesne. Still, security enterprises on frequent data breaches, together with lately upgraded legal data protection conditions (like the European Union's General Data Protection Regulation), advise against outsourcing vulnerable sensitive data to the public shadows.

To attack this issue, this check covers technologies that allow sequestration-apprehensive outsourcing of storehouses and processing of sensitive data to public shadows. Specifically, and as a novelty, they reviewed masking styles for outsourced data grounded on data splitting and anonymization, in addition to cryptographic styles covered in other checks. They also compared these styles in terms of operations supported on the masked outsourced data, above, delicacy preservation, and impact on data operation. Likewise, they listed several exploration systems and available products that have materialized some surveyed results. Eventually, they linked outstanding exploration challenges.

In this paper [2] the authors stated that the pace of connecting physical devices around us to the Internet is adding fleetly. According to a recent. Gartner's report, that there will be around 8.4 billion connected effects worldwide in 2020. This number is anticipated to grow to 20.4 billion by 2022 [1]. The use of IOT operations is added in all corridors of the world. The major driving countries in this include Western Europe, North America, and China [1]. The number of machine-to-machine (M2M) connections are anticipated to grow from 5.6 a billion in 2016 to 27 billion in 2024.

This vault in figures itself declares IOT to be one of the major forthcoming requests that could form a foundation of the expanding digital frugality. The IOT assiduity is anticipated to grow in terms of profit from \$ 892 billion in 2018 to \$ 4 trillion by 2025. M2M connections cover a broad range of operations like smart metropolises, smart terrain, smart grids, smart retail, smart husbandry, etc.

The history, present, and unborn armature Internet of effects (IOT) in the coming period of communication were studied. Using IOT, physical objects can be empowered to produce, admit and change data flawlessly. Colorful IOT operations concentrate on automating different tasks and are trying to empower the insensible physical objects to act without any mortal intervention. The being and forthcoming IOT operations are largely promising to increase the position of comfort, effectiveness, and motorization for the druggies. To be suitable to apply such a world in an ever-growing fashion requires high security, analysis, authentication, and recovery from attacks.

In this regard, it's imperative to make the needed changes in the armature of IOT operations for achieving end-to-end secure IOT surroundings. In this paper, a detailed review of the security-related challenges and sources of trouble in IOT operations is presented. After agitating the security issues, colorful arising and being technologies concentrated on achieving a high degree of trust in IOT operations are bandied. Four different technologies Blockchain, fog computing, edge computing, and machine literacy to increase the position of security in IOT are bandied. Of IOT.

In the future, the devices aren't only anticipated to be connected to the Internet and other original devices but are also anticipated to communicate with other devices on the Internet directly. Piecemeal from the devices or effects being connected, the conception of social IOT (IOT) is also arising. IOT will enable different social networking druggies to be connected to the devices and druggies can partake in the devices over the Internet.

With all this vast diapason of IOT operations comes the issue of security and analysis. Without a trusted and interoperable IOT ecosystem, arising IOT operations cannot reach high demand and may lose their entire eventuality. Along with the security issues faced generally by the Internet, cellular networks, and WSNs, IOT also has its special security challenges similar to analysis issues, authentication issues, operation issues, information storehouses, and so on. Table 1 summarizes colorful factors due to which securing IOT terrain is much further grueling than securing normal information technology (IT) devices.

Due to all these issues and vulnerabilities, the IOT operations produce a rich ground for different kinds of cyber pitfalls. There have been colorful security and analysis attacks on the formerly stationed IOT operations worldwide. Mirai attack in the last quarter of 2016 was estimated to infect around 2.5 a million devices connected to the Internet and launch distributed denial of service (DDoS) attack. After Mirai, Hajime and Reaper are the other big botnet attacks launched against many IOT devices.

Numerous companies are outsourcing at least some of their information technology to the cloud, from bare data storehouse toe-mail and other production operations. Reduced costs, no need for conservation, nearly unlimited computational coffers, and increased vacuity are the main forces driving this change. Yet, security and sequestration misgivings are still cardinal walls hindering a countersign migration to the cloud. Security is defined as achieving confidentiality, integrity, and vacuity of the data outsourced to the cloud. Druggies want to be assured that no meddler can hack the cloud and/ or impersonate them to steal or alter their sensitive data and that no denial of service will do. In the E.U., 57 large enterprises using the cloud reported the threat of a security breach as the main limiting face escarpment in the use of cloud computing services [4]; in a check by the cloud security Alliance over 165 information technology and security professionals in the U.S., utmost of the replies considered cloud storehouse as high threat [5]; the European Network and Information Security Agency linked "loss of governance" over the data outsourced to the clouds a critically inhibiting factor.

Indeed, security breaches are real pitfalls. Some well-known exemplifications include the Sony PlayStation Network outage 1 as a result of an external intrusion, in which particular details from roughly 77 million accounts

were stolen, and the multi-day outage in Dropbox 2 that temporarily allowed callers to .log into any of its 25 million client accounts as a result of a misconfiguration, or the leakage of private film land of several celebrities from the Apple iCloud storehouse service due to weakly defended login credentials [6].

Regarding privacy, it is most widely approved definition in the information society is in informational self-determination terms, that is, "the claim of individuals, groups or institutions for determining for themselves how, when, and to what level, information about them is spread to others" [7].

Therefore, for a cloud user to store and/or process sensitive data in the cloud, they must be confident that no one other than herself not even the CSP will be capable of checking or inferring the user's data. Thus, cloud computing methods have to improve the user's control of data, which will reduce the need for users blindly trust the providers. Otherwise, a user might be reluctant to give their sensitive data to cloud service providers.

In addition, when data are private i.e., personal, individuals to whom the data referred have privacy rights which have recently European Union's GDPR (General Data Protection Regulation [4] enshrined. To stay GDPR compliant, the data controller an entity that obtained consent from subjects for collecting, storing, and processing their data may outsource subject data to the cloud only if the user can obtain full control and privacy of the outsourced data. The above is an important issue because GDPR is also becoming a de facto legal standard outside the EU, especially in Australia, the USA, Japan, and Canada, and any companies wishing to sell information technology solutions to the markets must consider it into account.

Reports by U.S. Federal Trade Commission [5] stated that public CSPs collect and analyze the data of their users regularly without the latter's knowledge and that those analyses could yield sensitive inferences; for example, a CSP could detect individuals that suffer from diabetes because of their interest in sugar-free products and share this information with an insurance company that could use that clue to classify a person as higher-risk (and possibly higher-premium).

There are several legal issues here. Meanwhile, in most of the scenarios, the data subjects entrust the data controller with their private data (e.g., healthcare industry data), but this doesn't mean they allowed the controller to further transfer the data to whomever controller chooses to believe. The CSP is under U.S. law but the controller, as well as a subject, are under E.U. law and those may be violated.

Eventually, numerous public CSPs offer their services free of charge in return for the possibility of monetizing druggie's data. For illustration, a recent policy in Google [8] specifies that whatever information a stoner decides to outsource to any Google service can be used, reproduced, modified, or

distributed by Google with the end of perfecting or promoting its services, but also to conduct targeted advertising (e.g., the Gmail filtering system scans the content of our emails to serve individualized advertisements). To assuage the below issues and restore the stoner's control and trust in the protection of the data outsourced to the cloud, several results have been proposed in recent times. All of them involve masking sensitive data so that only defensed values are stored in the cloud and only the stoner/ regulator retaining the data is suitable to unmask the defensed values recaptured from the cloud.

Still, if the stoner wants to use not only the cloud's storehouse but also the cloud's computational power, the challenge is indeed harder, because data protection should be made compatible with outsourced calculations on cloud demesne on masked data. In this paper we survey the state of the art on security and sequestration- enabling results towards the cloud, with a focus on those that save cloud service functionalities, similar as the capability to outsource queries and computations on defensed data to the cloud. In comparison with recent checks on this area, ours offers the following benefactions:

Utmost checks concentrate on data security vs. external bushwhackers [9-12] rather than on sequestration versus the cloud. Thus, they center their analysis on security attacks and on mechanisms to help, descry and alleviate them. In discrepancy, our check considers mechanisms that cover outsourced data not only against third-party bushwhackers but also interposers and honest-but-curious shadows 6 storing and managing similar data.

Numerous checks concentrate on outsourced data storehouses [11-13]. Their paper goes a step beyond and puts the limelight on the preservation of cloud service functionalities (e.g., queries, computations, etc.) on the defensed data outsourced to the cloud. Taking advantage of the cloud's computing power on defensed data is significantly further grueling than simply using the cloud to store defensed data.

All checks covering sequestration-enabling service preservation mechanisms are limited to cryptographic results [14-15].

Indeed, though these styles are important to secure data, they also affect significant computation charges (which incompletely neutralize the cost-saving benefits of cloud computing), they bear crucial operation, and they oppressively limit cloud functionalities on the outsourced data because they need acclimatized results for each type of outsourced computation .

They also studied cryptographic results but, for the first time, they exhaustively survey non-cryptographic styles (grounded on data splitting and anonymization) that can be used to efficiently cover data outsourced to the cloud while conserving a variety of cloud services. In addition to the

security enabling results proposed in the literature, they surveyed exploration systems and products that apply some of these styles in the cloud script and bandy the outsourced functionalities they support.

They concluded that their analysis complements other checks in the field by i) considering the analysis issues related to data outsourcing to (untrusted) public shadows; ii) fastening on the preservation of pall functionalities on outsourced data (beyond bare data storehouse); iii) surveying functionality- conserving data protection ways not only grounded on (precious) encryption but also (more effective and flexible) anonymization and splitting; iv) comparing the surveyed ways and v) relating exploration systems and products that offer analysis- enhancing and functionality- conserving results for the pall or that can be employed to apply data protection delegates.

Each of the three examined data protection approaches (data splitting, anonymization, and encryption) has its pros and cons that have been anatomized over. Challenges for unborn exploration include mollifying some of the linked limitations, especially when it comes to outsourcing big data or at any rate large volumes of data.

III. PROPOSED METHODOLOGY

Cloud computing is an emerging computing style that provides dynamic services, scalable and pay-per-use. The difference between cloud computing and other computing models are service-driven, participating resource, and data hosting in an outsourcing storehouse. Sharing resources makes the hardware performance be used more efficiently and provides economic benefits for users to reduce the capital cost and additional expenditure.

In the existing system, the level of confidentiality is divided into three levels, because it is believed that users can not clearly distinguish between their privacy requirements more than three levels. In this scenario, the levels can be seen as the kinds of speed, hybrid, and security. They are explained as follows.

- Privacy Level 1 (Speed): The requirement of this level presents no sensitive information in the data. Users want to use the weak encryption composition to gain further performance for using cloud services. Here only the 3DES encryption technique is used.
- Privacy Level 2 (Hybrid) The demand of this position presents that data include some sensitive information. The data requires weak encryption for partial data (similar to an address, or correspondence id of corporates) and strong encryption for remaining data (similar to account balances and other secure information). Here, only the 3DES encryption technique is used.
- Privacy Level 3 (Security) In this sequestration position, the data contains the most important

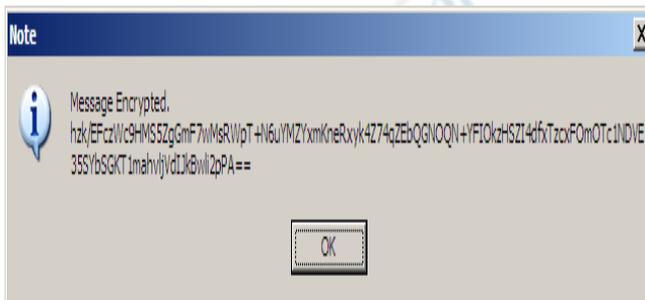
information to cover the data security, further privileged users view the utmost of the data, and lower privileged users view limited data. Here only the 3DES encryption technique is used.

- The traditional load of cloud computing is that given by the structure of sharing resources stored and reused from druggie's data that dispossessed by them, druggie's data may be revealed or traduced by other vicious stoners in the cloud.
- Since encryption and decryption medium increases the processing and outflow, it reduces the overall effectiveness.
- Since all the data is handled with the same protection medium, unwanted over-security is applied.
- If the same honor is given to all kinds of druggies, tight security can't be maintained.

In the proposed system, the existing privacy levels were divided into three levels seen as the kinds of speed, hybrid, and security are implemented. In addition, content type-wise security is provided. In this aspect, some of the document types such as already watermarked images and audio content are given less security and accessed by all kinds of users whereas normal content is given more security i.e., strong cryptography is applied. This reduces the processing and communication overhead since the security breach is not a major concern in terms of watermarked content.

IV. FINDINGS

- Since different levels of encryption and decryption mechanism are applied, the processing and storage overhead is different and reduced in most situations.
- Since the different data is handled with the same protection mechanism, communication overhead is also reduced.
- Different privilege is given to different kind of users, so tight security need not be maintained.
- Different content types can be accessed with the different security levels and so the speed is increased.
- Security is increased as both 3DES and AES partially is used to encrypt a single text message.




| MessageData | EncryptedMessage | EntryTime |
|--|---|------------|
| This is test message | hzkjEFczWc9HMS5ZgGmF7wMsRlWpT+H6uVMZlXmKneRxyk4Z74qZExQGNQON+YF10kzHSZI4dfxTzcfOmOTc1NDVE3SSVyoSGKT1mahvlyjdlJk8vllzPpA== | 27/07/2012 |
| Test | m18pluRhqvc= | 10/09/2012 |
| This is test message to be encrypte... | hzkjEFczWc9HMS5ZgGmF7wMsRlWpT+H6uVMZlXmKneRxyk4Z74qZExQGNQON+YF10kzHSZI4dfxTzcfOmOTc1NDVE3SSVyoSGKT1mahvlyjdlJk8vllzPpA== | 14/09/2012 |

Fig 4.1. Encrypted Messages List

V. CONCLUSION

Through this design, the problem of secure communication is excluded. In addition, the operation needs less working experience in systems to run the software. The operation is tested well so that the end users use this software for their whole operations. It is believed that nearly all the system objects that have been planned at the inception of the software development have been met with and the implementation process of the design is completed. A trial running of the application has been made and found that it gives good results and the processing is found to be simple and in proper order. The process of preparing plans has been missed out which might be considered for further revision of the operation. The design effectively stores and retrieves the records from the cloud space database server. The records are translated and deciphered whenever necessary so that they're secure. The following advancements should be made in upcoming developments. The operation is developed as web services, also numerous operations can make use of the records. The data integrity in the cloud environment isn't considered. The error situation can be recovered if there's any mismatch. The web application and database can be hosted in real cloud space during the implementation.

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