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A Newly Proposed Cloud Computing Based Strengthen Distributed Database System Model and Its Applications in Database Modelling

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Abstract: ***In the modern era of today's exceptional Information age, the day to day transactions of huge sensitive data sets, which is in the form of PBs (Peta-Bytes) 2^{50} bytes and YBs (Yotta – Bytes) 2^{80} bytes are drastically increases with enormous speed on CLOUD data storage environment. CLOUDs data storage environment are one of the most superior and reliable platform for storing a large sets of data both at enterprise level or local level. Because CLOUD provides online data fetching capability to restore or fetching data at any geographical locations through login their correspondent credentials. But to enhancement or spread of these large data sets are becomes also very complex with respect to maintenance of these data with take concern of consistency and data security, because to maintain these large data sets with full of consistency and integrity are really a very typical and rational tasks, so here In this paper we proposed a distributed database management systems for CLOUD interface also preserves or to take concern data security features with full restoration of CIA (Confidentiality, Integrity, Availability or Authenticity) trade of Information Security. Here we also improvised the mechanisms of traditional distributed database management systems because the tendency to preserves information and recover ability after any misconceptions happens that we restore data which belongs to similar person may have to be stored at different locations, but this newly proposed distributed database systems architecture contains all information or record which belong to similar person are stored in one database rather restore it different databases but the location of these data have to be changes mean while that the content or data which resides in one databases have to be moved to some other database and also preserves the security features, and this model also have capability to run older traditional methodology based distributed database management systems using this model. So the detailed description about these models and communication infrastructure among different CLOUDs are append in the upcoming sections of this paper.***

Keywords: Cloud based Distributed Database system model, Distributed system, Distributed Database model of CLOUD, Cloud Distributed Database, CLOUD based database systems.

I. INTRODUCTION

CLOUD Computing [1, 2, 3] play's a major significant role in today's Information age, because a huge size of data have to be drastically increases from day to day transactions on the CLOUD [1, 2, 3], so preserve and maintain the consistency and security of data are one of the most challenging and typical tasks. So we required a strong database management system [4, 5, 8, 9] which works on CLOUD [6, 7, 11] based platform to easily maintain a very large set of data. We require a dynamic databases management system [12, 13, 17, 19] which works concurrently during the time of data entering in the database [14] and also preserves the consistency of data. But there are also many databases models have to be adopted to easily maintain the consistency and security or privacy of that data, but the traditional methodology are not easily fit on today's ever growing CLOUD [15, 16, 18] computing era. There are also many mechanisms and models are to be proposed for maintain the consistency, but the nature and size of data have to be drastically increases and the size of the data are very huge. A one superior mechanisms such as Distributed model [19] for database systems [20, 21] which runs on CLOUD [22] platform, but a huge set of data make it slow during data fetching and it's takes a lot of computational time to processed data and fetch with enormous speed. Because distributed [23, 24, 25] database systems [26] models works on the nature and mechanisms of partitioning, because, a data which belongs to similar persons have to be stored at different databases or do the partitioning of data, so if we will require all information related to that person may have fetched among multiple database clusters, because information have to be store in distributed nature [27, 28]. So the response delay becomes a major barrier for these category databases systems [31], which works on distributed environment [29, 30].

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But In this research paper we proposed a new model for databases systems [31], which generally made for CLOUD infrastructure, such as it's also adopted the distributed nature [32, 33] but here the meaning and existence of the word distribution are different, such as here all data which are related to that person are stored in one database cluster rather data which belongs to similar person may have to be stored at different database clusters. But here one main question have to raised that what about the security factor? Which is the one of the most significant factor, because distributed databases system [34, 35] also reliably works with security mechanisms such as its stored similar person data at different locations or generally called different database clusters, so if one database system have to be infected from virus or any other malware, so data may be harm which resides on that database , but other databases systems [36] works properly and some data which belong to that person are stored in some different databases clusters, but this features also enhances security features but these mechanisms also becomes very slow when we fetch the whole data of any person, which physically and as well as logically distributed into different databases systems [31]. So for this concern here we also proposed a new mechanisms of database security [26, 28, 29] such as we move data among multiple databases such as the location of data have to be changed according to time, such as In this newly proposed methodology all information related to any person are not physically or logically distributed among multiple databases systems [30], It's stored in one databases or generally called whole information have to be stored in one database of any person so this information have to be moved or generally called the information of any databases have to be transferred to some other databases or generally called the swapping of data among different databases. So this feature also enhances security features such as the location of data items have to be changed according to time instance so hackers or attackers might have seen that the actual location of data are not to be fixed it may be varies according to time instance, and this is the main key feature of this method and the process of data fetching also becomes fast because no applies on some distributed database mechanisms on the database, so this is the main key feature of this method and this model also have capability to run this database system [31] according to the traditional methods such as data which belongs to any persons are physically and logically distributed among multiple different databases [32]. The communication model among different clouds are detailed described in the upcoming section of this research paper.

II. A NEW PROPOSED METHODOLOGY FOR CLOUD BASED DISTRIBUTED DATABASE MANAGEMENT SYSTEM

The detailed diagrammatic representation of these CLOUD based distributed database system architecture are append below in the Fig A:

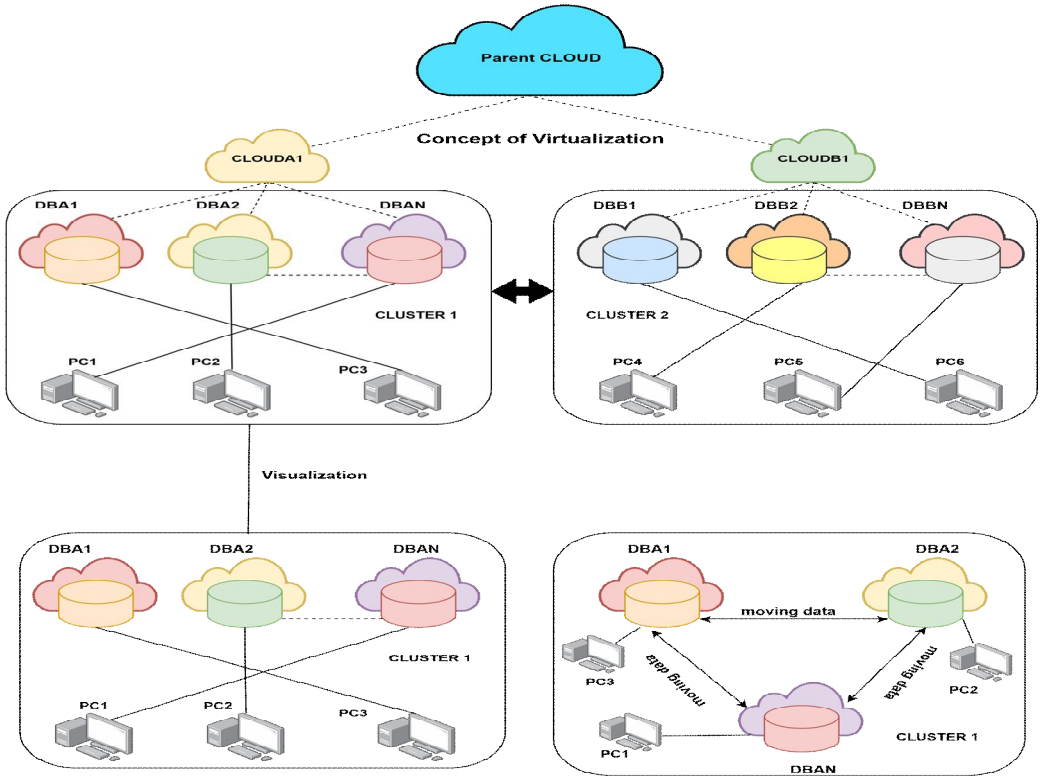

Fig A: CLOUD based Distributed Database Systems.

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Generally at initially we have a large web space or storage area this is called the Parent Cloud and to distributed this large web space into multiple separate smallest storage space chunks are one of the major challenging tasks for any distributed database management system and we partitioned this larger parent cloud data storage into some other small integrated storage space size, as the diagram represents a parent cloud is divided into some small clouds such as CloudA1, CloudB1,….., CloudN and further this cloud have to be partitioned into some differential databases and these databases are of variable length, the size of these databases which would make through the partitioned of any CLOUD are not to be fixed, these are variable length of size.

As the diagram represents CLOUDA1 have to be partitioned into some N number of databases according to the user requirements, we partitioned CLOUDA1 into multiple separate variable length storage space chunks or In other words we can say that we reserved CLOUDA1 storage space into multiple separate Databases such as DBA1, DBA2,…,DBAN, and these databases have to be responsible for storing various huge data sets which arrives from different cluster nodes or client. As the diagram represents PC1 stores their operational or transactional data into DBAN, and PC2 stored their desired data into DBA2 and similarly PC3 stored their desired data into DBA1. Similarly these mechanisms applies on various sub Clouds and utilize the concept of virtualization of CLOUD.

In the distributed database management system or any other database management system security are one of the most concernable issues for data privacy and data integrity and data confidentiality.

It's very significant to preserves all three trades of security mechanisms which is Confidentiality, Integrity, and Availability or Authenticity.

But many times it's have to be seen that the security of distributed database management system also becomes very tight because a similar person records not only stored at only one place or generally called database but it's stored at multiple databases in partial order, In other words we can say that same person record stored at various databases, so if any one database system have to be infected through any viruses or malwares and harm data records of that respective database system then some data which related to those person also have to be preserved on any other database, because back-up of huge data sets are not to be possible in today's abnormally ever growing information age, because we have a limited storage space, and there are a huge set of data have to be collected from day to day transactions.

So back-up are not to be possible, so we use the concepts of distributed database management systems, that if some data have been lost from any other reasons, then some data also have to preserve. But this tendency also occurs some fetching overhead, because if we have a huge set of data, then a lot of time have to be required to fetch the records of any person, because the desired data which related to that person are not to be placed at one specific location, it's physically distributed with many other databases systems and this is the main reason that Query optimizer or query engine becomes slow to perform any desired task and these distributed database mechanisms becomes slow, but here In this paper we applying or improved the tendency of distributed database systems mechanisms, here we don't placed data which related to same person among multiple other databases. We stored same person data into a one databases or generally In other words we can say that we stored all required or desirable information regarding to that person on one database only and at later we move these whole information from one database to another, here all information moved related to that person have to be moved from one database to another or generally called the swapping of whole desirable data from one database to another.

So recognition of any database respective to some PCs are really a very challenging tasks for user because the locations of data have to be changed at any particular instance and it's whole tasks have to be done random time amount, so this feature make this distributed database system architecture more convenient and superior.

And these all mechanisms works on the concepts of virtualization, because at any geographic location user can access their respective data items.

And for Cyber Criminal or attacker, it's also becomes a very challenging tasks to recognition of actual system at any particular time instance, because the geographic locations of data items have to be changed at any particular time instance.

Now this diagram represents that how these clouds are interconnect from each other.

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The detailed diagrammatic representation of CLOUD based Distributed Database Systems Interconnection are below in the Figure B.

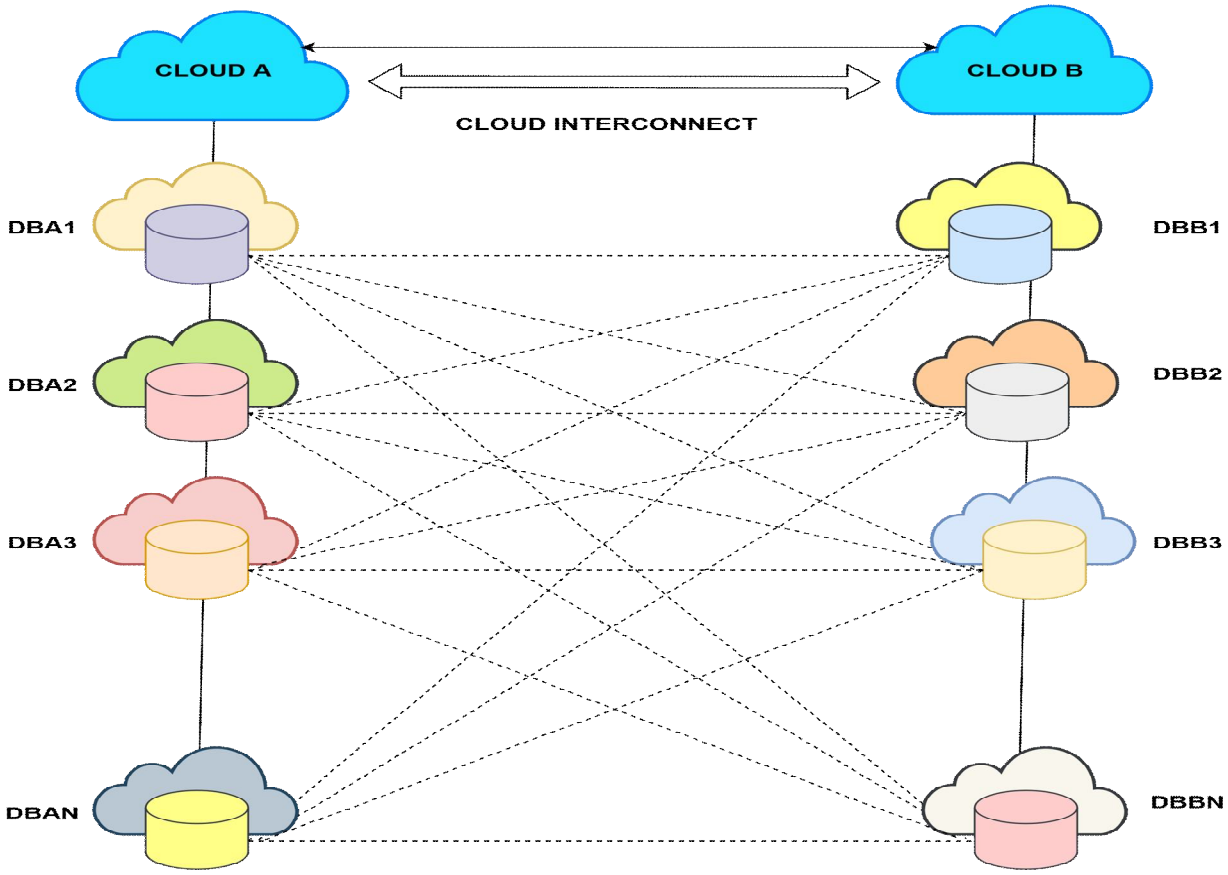

Fig B: CLOUD based Distributed Database Interconnection.

In this diagrammatic representation we represents that how a one clouds interconnect to some other clouds. Because these CLOUDs are a common storage area so a one cloud have to be access to some other cloud or generally In other words we can say that all the databases which are related to one Cloud are also communicate to some other all databases which are related to different Clouds. In this diagrammatic representation DBA1, DBA2, DBA3,…,DBAN are belongs to CLOUDA and DBB1, DBB2, DBB3,….,DBBN are related to CLOUDB and DBA1 access to all databases of CLOUDB and similarly DBB1 access to all databases of CLOUDA and these type of interconnections have to be made with all the databases. So this CLOUD based databases also used the concept of RDBMS (Relational Database Management System). All databases have to be maintained in the form of rows and columns.

Now using this architecture we also adopts the distributed data storing mechanisms which are generally used some previously distributed database systems such as data which belongs to same person have to be stored at different databases. The diagrammatic representation shows the traditional architecture of distributed database management system using this newly proposed model. So this is a hybrid model of Cloud based distributed database management system, because it's also have capability to perform the similar type of data strong mechanisms, which used some previously developed distributed database management systems such as data which belongs to similar person have to be stored at different locations or databases and also have capability to store the similar person data on one database and later it's move the whole data items which belong to this database to some other database. So the detailed mechanisms of this CLOUD based distributed database management system are append in the figure below.

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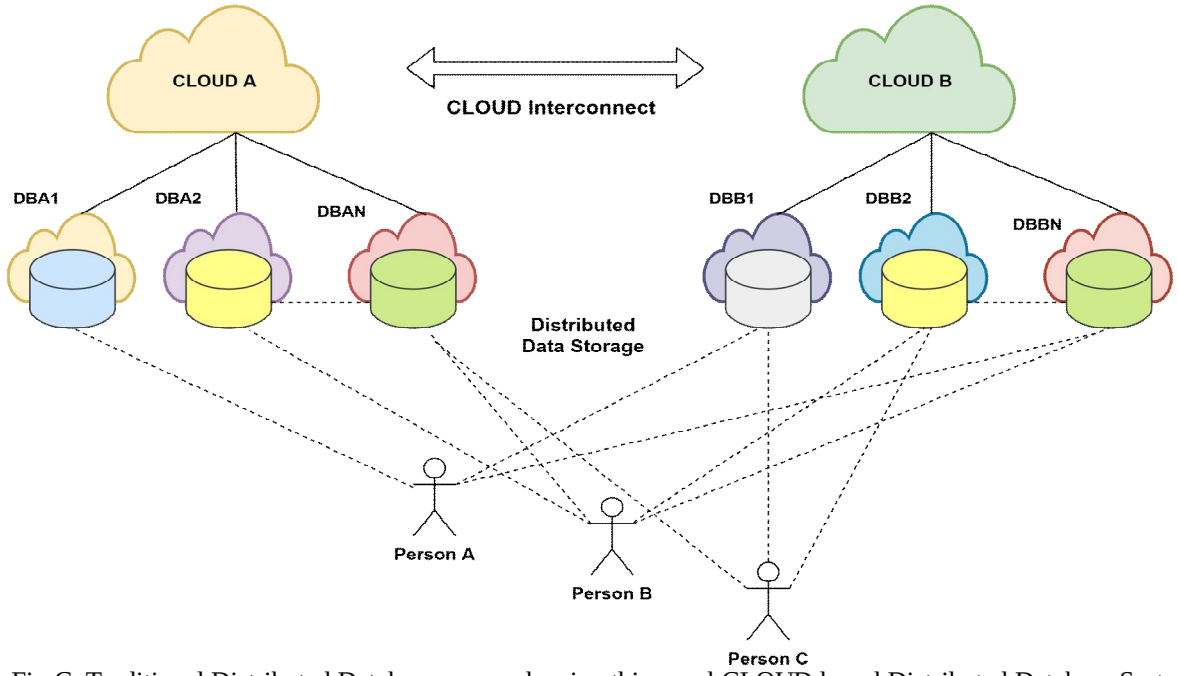

Fig C: Traditional Distributed Database approach using this novel CLOUD based Distributed Database System.

In this diagrammatic representation shown that how a similar person data stores among various databases, which also lies in similar cloud or different cloud. As the diagram represents that generally we take three persons such that Person A, Person B, and Person C and the person A half of data or some records have to be stored in CLOUD A, DBA1 and some records have to be stored into CLOUD B, DBB1 and DBBN, here two databases existed in similar CLOUD which is DBB1 and DBBN respectively similarly Person B some records have to be stored on CLOUD A, DBA2 and DBBN and some data have to be stored into CLOUD B, DBB2 and DBBN, here two databases existed in CLOUD A, which is DBA2 and DBAN respectively and also two databases existed in CLOUD B which is DBB2 and DBBN respectively and similarly for person C some data have to be stored into CLOUD A database DBBN and some data have to be stored into CLOUD B DBB1 and DBB2 respectively, here one database existed in CLOUD A, which is DBBN and two databases existed in CLOUD B, which is DBB1 and DBB2 respectively.

III.FUTURISTIC SCOPE

In this newly proposed CLOUD based distributed database systems model it's contains the capability to manage a very large data sets, which contains a huge size such as PBs 10^{50} bytes and YBs 10^{80} bytes and data fetching capability with enormous speed because In the traditional approach of distributed database system models a data which belongs to similar persons may have to be stored at different locations, so it's also enhance the capability of data security and data privacy concerns, but at the time of data fetching operations the systems will become very slow in nature, because a similar persons data have to be reside in multiple databases, but here In this newly proposed CLOUD based distributed database system models, we also preserves the data security and privacy concerns as well as also speed up the data fetching capability, because In this newly proposed CLOUD based distributed database system models the data which belongs to similar persons may have to be reside only one database, it's not physically or logically distributed among multiple databases, so this features enhances the data fetching capability but here the location of particular data which resides on particular databases not to be fixed because the data have to be moved from one database to another so it's also preserves some data privacy concerns. Because In the present scenario of today's Information age the size and the structure of data have to be drastically increases from day to day transactions, so it's very essential to manage these huge size of data in an appropriate and adequate manner that data becomes consistent and also preserves the integrity of the data. Because CLOUD provides a very convenient and open environment for storing a large data clusters. For data which belongs to enterprise level adopts CLOUD platform for storing and preserving data which arrives from day to day transactions. CLOUD provides a utility that the data not to be dependent on particular devices or generally called it's not to be device dependent, so any devices access data from each geographically distributed nook and corner which are geographically distributed because CLOUDs

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adopts the online storage of data and also provides the utility of Remote access, so this feature of CLOUD makes it's versatile and a very convenient platform for all types of data storage utility at a very broad or generally called enterprise level. There are various scope in this newly proposed model such as we also optimize the query fetching time among the large data sets, and also improvised the mechanisms of indexing, because it's have to be seen that when a very large data sets have to be drastically increased in the databases the query optimizer becomes very slow to fetch any query result from the databases, because there are a huge records have to be reside in the databases so fetch any desired results with minimum amount of time correspondent to that query becomes a very typical operation, so In the near future we also optimized this feature, because CLOUDs contains a very huge set of data, so time taken to fetch the results of query becomes a very slow operations and takes a lot of time so here requires optimization or derive a new indexing strategy that a very fast fetching operations have to be done and the Response time decreases, which is the one of the most challenging factor in today's various cloud based distributed database management systems. So there are many advancements have to be done in the near future in this CLOUD based distributed database systems models, such as this model also preserves some data security mechanisms such as the location of the data have to be changes, so any cyber intruder or Cyber Criminal doesn't not known the exact locations of the data, because a data which resides in one databases may have to be changed according to the time instance, and the changing frequency of the locations of the data totally dependent on the CLOUD Randomization behaviour, because a Random time distribution function have to be used to change the location of the data according to the particular time instance, so here also preserves some data security and data privacy mechanisms. In this exceptional today's Information age the nature of data would be drastically increases so the management and the maintenance of the data with full of the protocols of database management systems will be mandatory, such as the consistency of data and the data integrity also preserves with some security concerns and the database becomes consistent and all database operations will perform with respect to ACID properties of databases, here ACID stands for (Atomicity, Consistency, Integrity and Durability).

IV. CONCLUSION

In this newly proposed CLOUD based distributed database management systems also becomes a milestone for large enterprise level of data sets, such as it's have to see that when the size of the data would become drastically increases the data fetching capability of the database would become very slow in nature, it's take a lot of time to fetch any particular results correspondent to particular query, this occur when the data have to be physically or logically distributed among multiple databases, but In this newly proposed CLOUD based distributed database management system the data have not to be placed among multiple databases, the data which belongs to similar person have to be stored on one database so the operation of fetching capability with enormous speed, because data fetching capability would become slow when the data would be distributed among multiple databases so it's take a lot of time, but In this reference of newly proposed CLOUD based distributed database management system, the data which belongs to similar person have to be reside in only one database, so the fetching operations also done with enormous speed. But the distributed systems which belongs to traditional approach have capability to enhance some data security mechanisms, such that the data which belongs to similar persons have not to be reside in one databases, it's physically or logically distributed among multiple databases, so if the cyber intruder or Cyber Criminal harm data in one databases, the other data which belongs to another database also preserves because that data physically or logically distributed among multiple databases, So this enhances the security concerns of the traditional approach based distributed database management system, but In the scenario of this newly proposed CLOUD based distributed database system model the data which belongs to similar person may have to be reside in one database, but the locations of that data have to be changed among multiple databases, such as the data which resides in one database after some time instance it's reside some another databases or generally called the swapping of data among multiple databases, so the Cyber Intruder or Cyber Criminal doesn't known the exact location of the data and this features of this newly proposed CLOUD based distributed database systems also enhances the security mechanisms of this databases, because the data will be move among multiple databases. In the today's information age the shape and size of the data would be drastically increases from day to day transactions, so it's have to be essential that we have some potential database management systems and data security mechanisms such that the consistency of data would be maintained with respect to data integrity. This newly proposed CLOUD based distributed database management system have capability to optimize the fetching time of any query with also maintain the data security mechanisms. There are various advancements have to done in the near future of this model. In the recent times the moving of data or the data location changing frequency are totally dependent on the Randomization, a random time interval the location of data have to be changed such that the Cyber Intruder or Cyber Criminal doesn't known the exact location of the data and this is the main key feature of this newly proposed CLOUD based distributed database systems. So In the near future we tight the data security in this database and also optimized the indexing mechanisms and data fetching time.

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VII. CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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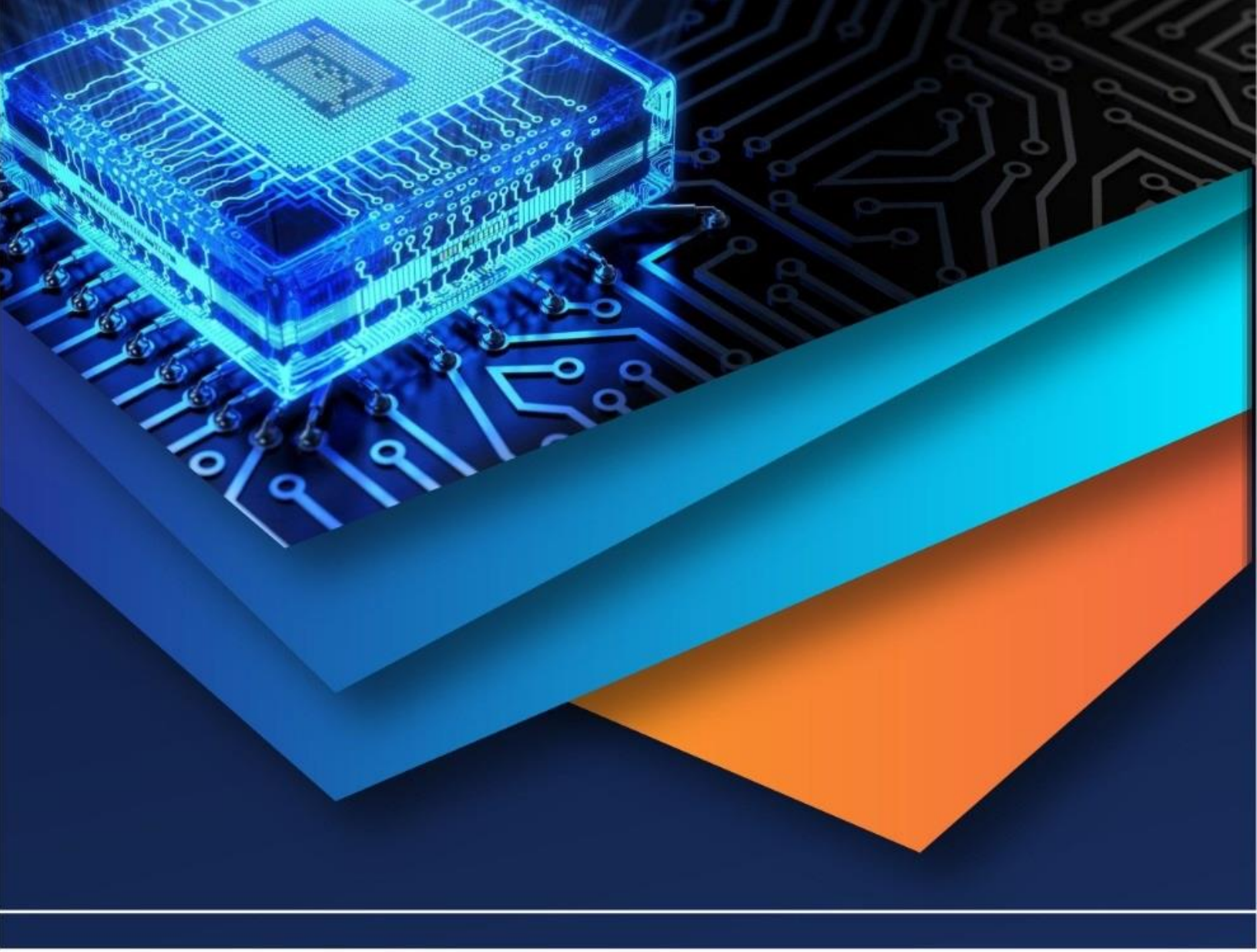

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