Secure and Optimized Data Migration Scheme over Cloud Severs using ABC Optimization and RSA Encryption

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Abstract - The Cloud Computing is the use of hardware and Software to deliver a service over network via internet. Data Migration is the procedure of transferring data from one system to additional while changing the storage, database or application. This research work has focused on migrating the data from one server to another with the use of XAML protocol in which three servers have been added to migrate the data . The first server is the server from where the data has to be travelled and the second server is the server where data is fetched to be migrated and the third server is the server where data has to be migrated. In proposed work, we implement the security encryption algorithm using RSA. ABC algorithm creates the multiple solutions and we choose the one best solution for time reduction for better migration. We evaluate the performance parameters like Accuracy, error rate, security and compare with existing work.

Keywords: Cloud Computing, Data Migration, Artificial Bee Colony algorithm, RSA Encryption.

I.   INTRODUCTION

Cloud computing is a collection of computing resources that provides computer processing resources and various devices on demand to the users. There are three models of cloud- infrastructure as a service , platform as a Service , software as a service and private cloud, public cloud and hybrid cloud are three deployment models. The five features of cloud- resource sharing, on demand   self   service, flexibility, immense network access and measured service. [1][2].

1) Private Cloud - It is a platform which can be owned, operated and restricted to only an organizations or an industry. Today, most of the organizations have moved to private clouds due to security concerns
2) Public Cloud- Public cloud are openly available to the people for use and deployment. For example, Google, Amazon, etc
3) Hybrid Cloud - It is the combination of public and private. It is the most robust approach. It includes the functionalities and features of both. With hybrid Cloud ,organizations to create their own cloud.

Cloud Computing provides good and easy to use features to organizations. Cloud computing is the science which is based on virtualization. Virtualization means to create a non actual version of resource, such as storage, network, server or an operating system where the resource is divided into one or many execution environments.. Cloud computing enables enterprises and consumers to increase their productivity and efficiency of their work by sharing resources and services anytime, anywhere. However, its success comes with a number of security challenges [3].
Data Migration is the process of transporting the data from one place to another place. Data Migration process can take place in different forms such as moving data, application or business elements from an organizations to the cloud vice-versa or between two cloud environments. It has lots of issues such as security, different standards, compatibility of computing resource, formats, performance, cost, etc.
Three steps in data migration are
(a) mapping fields,
(b) generating script
(c) migrating the data.

Data migration is needed when a system is changed; an application needs to be brought to a new version; or when the company needs to integrate various data from many applications to a single data representation.
Various application of data migration:
1. Marketing and collaboration the Web sites.
2. Digital asset management.
3. Claims processing systems.
4. Enterprise applications.
5 .Social(Online) games.

II.   LITERATURE SURVEY
Cui Shuo et.al., 2014 [4] studied the mass data storage data migration knowledge to meet business continuousness, data security, data integrity necessities, while research massive data replication technology based on storage block asynchronous migration method.

Yanling Du, Zhenhua Wang et.al,2012 [5] planned a hybrid cloud storage explanation in view of high performance, high retreat of private cloud and the large capacity features of public cloud. With the measurable expressing of the real-time property, compassion, decentralization and data access heat of aquatic data, they assumed the model of marine data migration between the hybrid clouds. Temporarily, the data migration method was improved to avoid the restraint of the traditional data migration process which is built just according to the data access heat.

Chadi Kari et.al.,2011 [6] assumed that each storage node can achieve only one data transfer at a time. A storage node, conversely, can typically handle multiple assignments concurrently and this can reduce the total migration time knowingly. Moreover, storage devices tend to have varied capabilities as devices may be added over time due to storage request increase. In this paper, they consider the assorted data migration problematic, where they assume that each storage node v has different transfer constraint CV, which characterizes how many instantaneous transfers v can handle. We develop algorithms to minimize the data migration time.

Girts Karnitis et.al., 2015 [7] offered explanation for quick data migration from a personal database into a document concerned with database. They have created semiautomatic ally two logical levels over corporeal data. Users can refine produced logical data model and organize data migration template for each needed article. Data migration structures are realized into relational database browser DigiBrowser. Real patients' database was travelled to Clasterpoint database. The existing approach provides means to obtain at least proof-of-concept for new document oriented database resolution in a couple of days.

Jianzhe Tai et.al.,2014 [8] present a new approach for automated data movement in multi-tiered storage systems, which lively migrates the data across different tiers, aiming to support multiple service level agreements for applications with dynamic workloads at the minimal cost. Trace-driven simulations show that compared to the no migration policy, LMST significantly improves average I/O response times, I/O violation ratios and I/O violation times, with only slight degradation on the performance of high priority applications.

Anural Sachem, Preachy Mahesh war [9] talks about the recovery which is to be made after the successful migration of the data from one platform to another.

III.   IMPROVED TECHNIQUE DEDUPLICATION

Data migration is a concept for any system upgradation. Data migration occurs for a variety of reasons, including server or storage replacements, maintenance or upgrades, application migration and data center relocation. There are two techniques that are used in our research work.
1. Artificial Bee Colony Algorithm

2. RSA Encryption

1. Artificial Bee Colony Algorithm - Artificial bee colony algorithm is used to solve multidimensional and multi-modal optimization problems. It is proposed by Karaboga [10] , inspired by the intelligent behaviour of honey bees. The proposed model consists of three components:
1. Employee Foraging Bee
2. Unemployed Foraging Bee
3. Food Sources

The Employee Bee are associated with a particular food sources and the Unemployed Bee are of two types : onlookers and scouts. Every time, they search for rich food source, the third component close to their store. In ABC, a colony of artificial forager bees (agents) search for artificial food sources (good solutions for a given problem). Employed bees are responsible for searching food sources. After searching, employed bees return to the hive and dance in dance area to pass their food information to onlooker bees. Onlookers bees are foragers who watch the waggle dance of employed foragers inside the hive for a decision of choosing food sources according to the quality of that food source. Scout bees have a job of searching a new food sources.

The steps of algorithm is as follows –
1. Start
2. Initialization of population
3. Path exploration by employed bees
4. Perform waggle dance for communication between bees
5. Onlooker bees observe waggle dance and exploit
6. Repeat step 2 to 5 until maximum value
7. Scout bees find the optimal solution
8. Stop

2. RSA Encryption-
RSA is a public key algorithms invented in 1977 by Ron Rivest, Adi Shamir and Leonard Adleman[12]. Asymmetric cryptography uses two keys one for encryption and one for decryption[11]. RSA is capable to support encryption and digital signatures. It gives the best security policy by encrypting the data which is confidential. This is the reason why the big service providers like Google mail, Yahoo mail etc. are using this algorithm to give their users the insurance of confidentiality in using their services. There are the two keys that are used by the RSA (a) Public key (b) Private key. The public key can be known to everyone. Messages encrypted using the public key and can only be decrypted with the private key. It is mostly used in security protocols such as IP data security, transport data security, email security, terminal connection security.

IV. PROPOSED WORK

The proposed approach provides a secure and optimized solution to migrate data over the cloud servers. Following steps are performed in our research work.

Start: This step initialize servers for migration and ping while data transmit over them. Also here initialize all the protocols and libraries who supports in whole process.

Extract & create Design: Here algorithm extract data table and database structure for check the various field and transmission data over them. It initializes all the data elements and their structure and prepares for migration.

Clustering: Clustering technique helps for extract data element from all the migration process. It provides the different clusters for different phases like structure and data table entries for different tables.

Verification: Verification section check the data clusters are ready or not. It just to verify the accuracy of database clusters. This process makes the data entries separate from data structure.

ABC algorithm: After verification the next step is to classify the solutions for migration that processed via system. These are known as migration pattern in cloud services. ABC algorithm analyses all the solutions and choose best solution from them on the basis of their complexity like time, accuracy etc. After confirm the execution pattern it execute next step for make the migration process ready over a cloud server.

Get destination: It refine in incoming calls from the destination server and check the protocol services of that for make the accurate migration process over a cloud server. Here system makes a bridge for packet transmission which satisfies the protocols and services of both servers and makes easy communication between them.

Pre-handshaking: this process helps to check the server ready to participate in migration process or not. Pre-handshaking process basically transmits a sample data packet for check destination availability. It waits for positive acknowledgment and initializes the migration process.

RSA: Here after getting the positive response from the server it make the authentication process over migration steam with RSA algorithm. This algorithm secures the migration process while it transferred over different services.

Transfer: After the system ready to transfer it launch the migration process over cloud server and migrate all the data structures and their data entries. After transmission it evaluates the parameters for their results from the migration process.

Stop: This step clear the memory usage via unwanted libraries and other objects to boost up system performance and make it ready for other migration process.

V. RESULT AND DISCUSSION

The migration process having various parameters which effects during data transmission over cloud servers. The main parameters are transmission accuracy, error rate and transmission security. These parameters are responsible for data transmission over a cloud server accurately and safely.

Transmission Security :	96%
Transmission Accuracy:	98%
Error Rate:	2per frame

Fig.5.2 Parameters performance

The accuracy define the how correctly data transmit over one to another server's database.
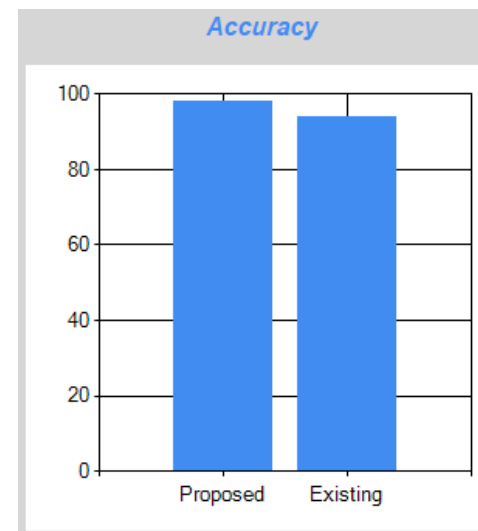

Fig.5.3 Accuracy

The Accuracy defines transmission performance over cloud servers. The system transmit data over one to another server and having various intimidator node in the network while transmission. So the error rate parameters will be increased during transmission of data. The factor which having high accuracy is to arrange the data samples and bound them strongly. It causes high accuracy over a network. The Various test and comparisons cases are as:
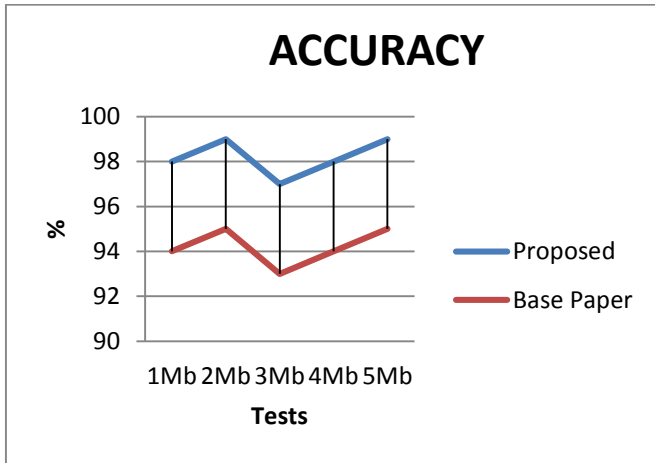
Fig.5.4 Comparison between base and proposed work in accuracy

The error rate define the per frame distortion over a transmission. More error rate will cause less accuracy. So the error per frame will be less is beneficial for data transmission. Here the error rate of proposed algorithm is better than other existing work.

Fig.5.5 Error rate

The proposed algorithm performs better in terms of less error rate during data transmission.
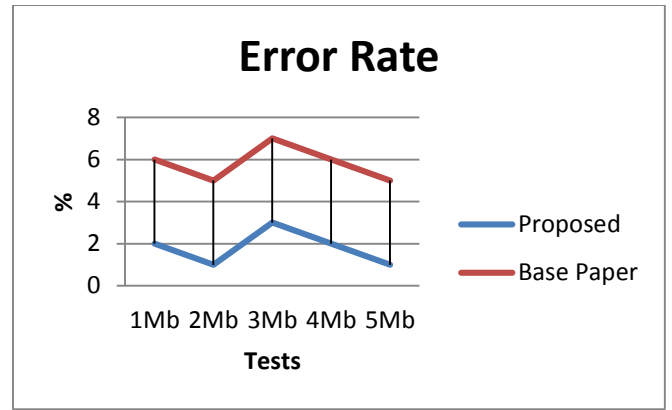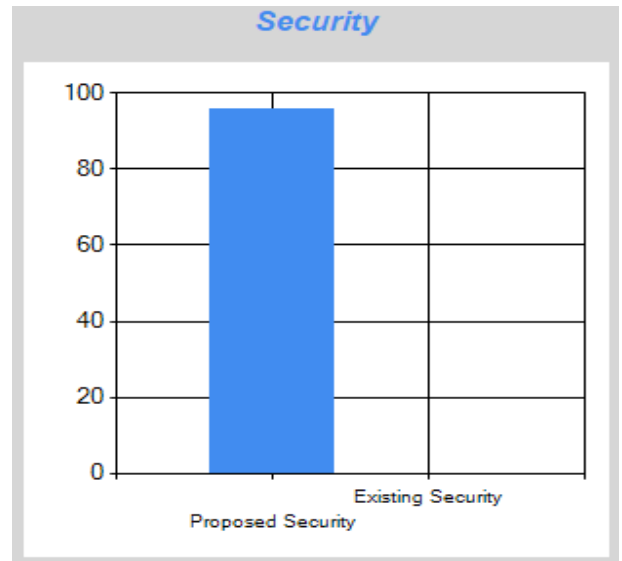

Fig.5.6 Comparisons between base and existing in error rate

Security Factor is used while the data transmission is on public network. More security defines secure and reliable transmission. The proposed technique having encryption method which is provides stream authentication over cloud network. Due to this it prevent un-authorization while data transmission over a network. The proposed technique having more security as compared to existing one as shown in the figure.

VI. CONCLUSION

The current research work successfully migrates the generated architecture and its data to another server. The transfer accuracy is almost hundred percent. An application data migration was   introduced the security encryption algorithm using RSA and ABC algorithm that creates the many solutions and we select the one best solution for time reduction for better migration.

We evaluate the performance parameters like accuracy, error rate and security. We achieve 98% accuracy in proposed work and base paper value is 95%. The error rate found in the proposed work is 2 Mb that is less as compared to existing work. The third parameter is security that value is equal to 96%. Finally, the discussion in this work has to focused within a larger framework dealing with the migration of applications to the Cloud. In future, the hybrid approach using AES and DES algorithm and GA for optimization result calculation can use for better migration.

VII.   REFERENCES

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