ROCloud: Reliability based optimization for cloud migration

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***Abstract*— Cloud Computing is nothing but specific style of computing where everything from computing power to infrastructure, business apps are provided "as a service". In cloud, shared resources, softwares and information is provided as a metered service over the network. By data outsourcing, users can be relieved from the burden of local data storage and maintenance. Cloud storage providers have gained popularity for personal and company data, and provide highly scalable and flexible resources to cloud users. Although cloud providers bring advantages to their users, by providing them services related to SaaS, PaaS, IaaS most cloud providers suffer outages from time-to-time. Therefore, relying on a single cloud storage services threatens service availability of cloud users. Here it is consider that using multiple cloud service providers is a best of the solution to remove single point of failure and to gain availability accordingly to the user requirement. Since cloud storage services associates with high cost to the user, and also as the size of data in the cloud storage marks up to many bytes, optimal selection within list of cloud storage providers is a hectic decision for users. To solve this problem, this paper address system that is intended to provide migration mechanism which can be easily implemented in the cloud computing environment for the efficient, robust and cost effective management. On giving a specification related to optimization factors system will offer list of better options to user along with the analysis report. It also propose an algorithm to optimally select cloud service provider for data transfer such that the expected availability under a given budget is maximized improving Qos.**

Keywords-Cloud computing, cloud storage, IaaS, PaaS, SaaS, SLA,QoS.

I. INTRODUCTION

Cloud Computing is the dreamed vision of computing as a public utility. It is a model for enabling convenient, on-demand network access to shared network of configurable computing resources (e.g. networks, service servers, storage and application) that can be rapidly provisioned and released with minimal management effort or continuous service provider intercommunication. A cloud provider is a company which hosts the servers on its premises and makes the services available on-demand. The ever cheaper and more powerful processors, together with the "software as a service" (Saas) computing architecture, are transforming data centers into pools of computing service on a huge scale. Meanwhile, the increasing network bandwidth and reliable yet flexible network connections make it even possible that clients can now subscribe high-quality services from data and software that reside solely on remote data centers [1]. Cloud Computing is transforming the very nature of how businesses use information technology. One aspect of this structure is that data is being distributed or outsourced into the Cloud. From users' point of view, including both clients and IT organizations, storing data remotely into the cloud servers in a relatively on-demand pattern brings benefits such as relief of the burden for storage and maintenance, data access with unlimited mapping locations around the world, and avoid the large expenditure on hardware, software, and maintenance management, etc. Bram Rongen et.al. [2] even with newly developed structure for cloud data storage data integrity, cost management and effective migration of service is challenging design issues that overcome on the performance and security of overall system.

Mostly the seeker client gets the benefits in the cloud model from resource juggling through virtual technology. Here the system introduces use of virtual technology to allocate resources dynamically based on application demands and help in computing by optimizing the cost/time factors in use. This system is intended to provide migration mechanism which can be easily implemented in the cloud computing environment for the efficient, robust and cost effective management. On giving a specification related to optimization factors system will offer list of better options to user along with the analysis report. The system to be developed will help users in finding optimized cloud migration as per the cost and time management to provide efficient service provider details. Hence will provide an effective request-resource allocation for optimally selection severs for data storage such that the demanded availability under a given costing is maximized and lower the failure occurrences and storage cost taken from cloud storage providers. Typical cloud storage SLA provides fixed levels of the environment such as availability of the services which are in demand. With the high market competition, many providers support different types of service with different agreements, which are related directly to the cost. Thus users that are interested in better solution and agreement rules needs to pay high rate. Also, as the data storage might go to high level of numerous bytes, that might give the user more costing. Therefore, optimally listing of the cloud storage providers in terms of higher availability and lower cost according to

the users' availability is the tedious job. Checking of available service environment is an unchangeable decision in the SLA is considered among the 10 different hurdles in the growth of cloud computing [11]. Even though the top known cloud storage providers such as Amazon, Google, etc. didn't guarantee availability of services in full fleshed manner, bugging, different types of errors and natural environmental availability are impreventable and unavoidable conditions [12]. So they are some well-known cloud providers have experienced outages in their servers, [3] and error prone incidents has increased from 2009 to 2011. Service available can be define as the total time that the service environment service provider in use during a given time period (e.g., one month, year etc) to the length of the time. Easy one way for increasing reliability of data is to duplicate the data and keep it in different multiple data centers of service providers. This is comparatively pretty expensive because as the number of duplication increases, the cost of service increases. Thus, to decrease the cost with intention to achieve demanding availability as a required, Quality of Service (QoS) is a vital decision at user side, this has not been satisfactory. Also locking of data is another major problem in regard to cloud computing. It is undesirable for client because they can affect in increase in cost, to decrease in availability and even to the cloud provider's economy [4]. Solution to migrate the locking of data and to allow clients for the migration from a service provider to any other service provider is to store the data in fine storage then in coarse [5]. In this paper, we propose algorithms that can be included in service providers. The algorithms allow the client to find a list and select placement of data according to the expected QoS. Prior we focus on is to minimizing the cost of data storage with given availability. Next to select the optimal service provider under a demanding rate should be maximum. Due to the growing number of cloud storage providers with different service environment, these are challenging task .

The major dedications of the paper are:

- Model for the selection service providers according to constraints, cost and management with clear specification,
- Also algorithm for selection of listed service providers to minimizing the cost for data storage when the demanding availability is given, and
- An algorithm to migrate the data as service provider change.

II. RELATED WORK

Cloud computing is recently, much of growing interest has been pursued in the context of remotely stored data verification [2, 3, 4, 5, 6, 7, 8, 9, 10]. Ateniese et al. [7] are the first to consider public auditability in their defined "Provable Data Possession" (PDP) model for ensuring possession of data files on untrusted storages thus, captured significant attention from both industry and academic. Also, a brief summary on classification, hurdles and supports for providers are categories by [1]. Our work focuses on alleviating two main obstacles of cloud computing: availability of services. Lei et al. [2] propose a tool that compares service providers in order to find the flexibility of computing, data storage, and network which directly intend in low performance of client application. The focus of this survey is to increase availability and migration strategy for data under locking conditions. A. Li, X. Yang, S. Kandula, and M. Zhang.et al. [7] studied under objective of availability in Google's storage design, and reported details of available servers. In their analysis, it was suggested as availability based on M. chain in centers. Also, on increasing availability for a demanding budget in a list of centers. Here it is similar to the study of S. Bhardwaj, L. Jain, and S. Jain. et al. [4]. The enhancement for our strategy is agile reaction to any changes in cloud service providers [5]. Also as [7] N. Bonvin et al. [8] propose a dynamic allocation of servers in a cloud to place the data so that the availability to different client application is guaranteed in a relevant effective way.

Solution is to elongate the structure in different providers, is also goal of this here. Next solution to create new virtualizations and another is to eye on the technique difference in client and server side for the availability of demanding service.

III. PROBLEM STATEMENT

A. Maximize listing of servers with demanding cost:

From the client side, one type of situation for servers is some are popular servers, while another type may be rarely used and they can handle less availability as QoS. So, it is considerable to allow storing vital data in more available providers at higher cost, and guaranteeing less QoS for sparsely used data at lower cost. Here algorithm guarantees this situation for data. Demanding availability of servers is met according to the priority. Thus advantage is to deliver dynamic steps to provide the best among the cloud service providers according to expected values.

B . Expected Availability Of Servers:

The availability of server can be calculate as, considering value or quality of service available by the server per unit time as discrete value between 0-3 . As the Budget incearses the maximum availablity of service and the Qos increases (i.e. in directly proportional to the resource availability).

C. Resources

Cloud computing relies on exposing virtualization in every aspects of service and data storage. Here Cloud service could represent any resource that users may wish low level computation or storage through to high level multiplexing [12]. There are some requirements of this service; the interface needs to provide a mechanism to create a reservation of clients to the servers. In the model the application gives protocols to the service that are used for user registration to the required state. Second, in order to be discovered the service needs to display the capacity so that it can be included in the list so we have used metadata for it.

An algorithm called MCFEA to solve the storage problem. With no loss, and assuming all objects have equal priority can be given as:

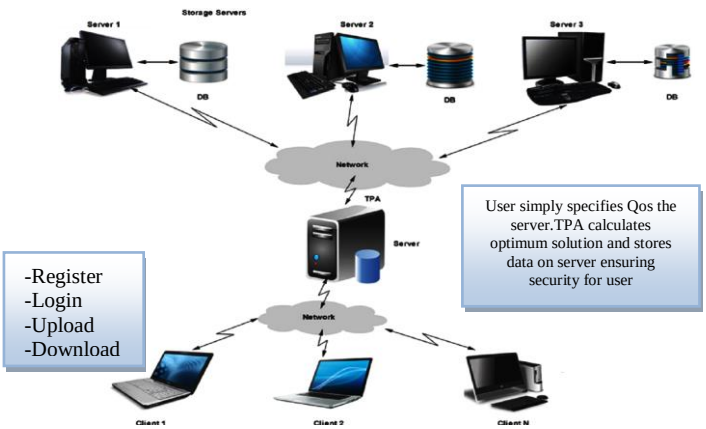
Step 1: The server side admin allocates the services according to the logs of respective servers. Thus applying the Cost, Ram, speed and CPU and GPU processing

values. This could be used by the clients to list the available servers for data/service migration.

Step 2: The client/user need to change the service or provider it have to specify the budget and time it need for the server utilization the TPA server calculate the respected availability of servers and list the available servers according to their priority and maximum available resource.

IV. IMPLEMENTATION

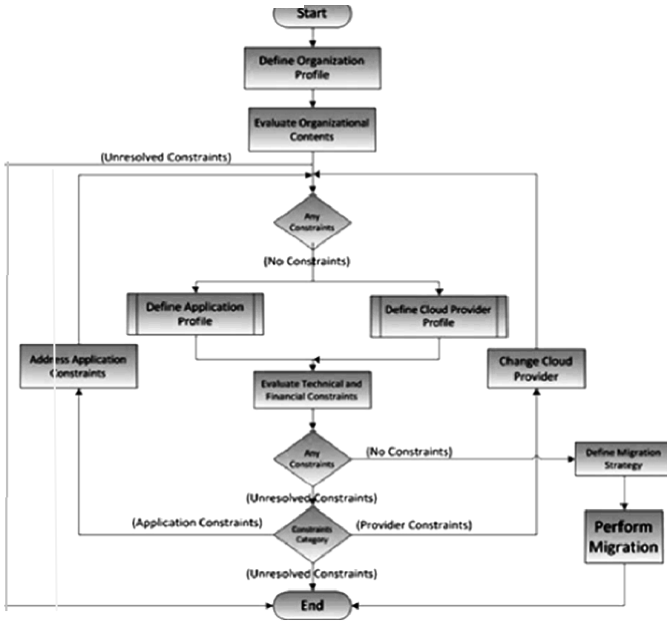
The RoCloud prototype utilizes Web Services to create a scalable, distributed and decentralized infrastructure. All services use Web Service Resource Framework and run on Globus WS-core/Tomcat. The application is a JSP based web application. Numbers of concurrent servers have been implemented to trade storage; both operate independently and are designed to work simultaneously, given price users select storage from a list of available server's service offers. In the check list, client demands storage requirements and specify the value to the design structure helping level of agreement between users. The agreement is repurchased. In past environments users are unable to transfer their stored data of the location of their provision without downloading the complete data back to their system, also the prototype RoCloud could provide the transparency by removing user information from previous service providers, price listings, server request, and storage access.



A. *Saas*

A server Cloud is based on a general Storage service that provides a link between users to access virtualized storage on the available cloud providers (servers). These services explore a set of file modification to client and look their reactions to them on the local system. Users request the service by passing an agreement to the TPA server; this creates a mapping between a user, agreement, and the storage instance. Instances are identified by user and agreement allowing individual users to have multiple storage instances in the same service provider.

Algorithm 1: The algorithm in order to measure the minimum cost of replication while the demanded availability in the form of number is satisfied.



- Here the constraint are not considered and assume that all objects have the same priority from the user's perspective, i.e Algorithm:
- Optimal Chunks Placement (OCP) Algorithm

ALGORITHM 2:

In this algorithm, according to a trade-off between the switching cost and the availability of objects the value m i.e. maximum availability demanded value are defined. This is because as m is increased the switching cost and the availability are decreased, i.e Algorithm:

- Maximum demanded Availability with a Given Budget.

Also, TPA algorithms (KeyGen Algorithm, SigGen algorithm, GenProof, VerifyProof, Protocol Verifier).

- **KeyGen Algorithm**
- **SigGen Algorithm**
- **GenProof**: run by the cloud server to generate a proof of data storage correctness.
- **VerifyProof**: run by the TPA to audit the proof from the cloud server.
- **Protocol Verifier Algorithm**: Protocol verifier is used by the cloud server.

TABLE I. DETAILS SPECIFICATION

Type	Availability	Costing
Algo.1	Unlimited	Maximize
Algo. 2	Limited by EA	Minimize

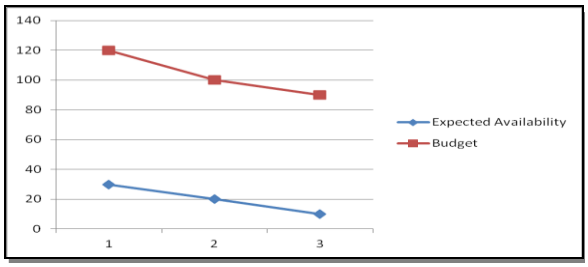


Figure 1:Availability of Qos with Budget

V. CONCLUSION

Reliability and performance of system states proposed schemes are provably reliable and highly efficient as developing impact on application reliability. Provide fault-tolerant. Storage security of their data. Predefined constraints for design optimization. Ensuring high quality of service while cloud migration. Here it is believed that all these advantages of the proposed schemes will shed light on economies of scale for Cloud Computing.

REFERENCES

[1] Weiwei Qiu, Zibin Zheng , Michael R. Lyu (2014), "Reliability-Based Design Optimization for Cloud Migration" ,lists the characteristics with which the legacy systems are particularly applicable to refactoring from the view point of service-oriented re-engineering.

[2] Bram Rongen, (2012) "Making the case for migration of information systems to the cloud", Presents a test method to determine the viability and value of deployment in the cloud. The essential characters of the cloud discussed are on-demand, self-service, broad network access, resource pooling, rapid elasticity and measured service. The paper also proposes a migration model called Adopted cloud migration toolkit.

[3] Yaser Mansouri, Adel Nadjaran Toosi and Rajkumar Buyya "Brokering Algorithms for Optimizing the Availability and Cost of Cloud Storage Services".

[4] S. Bhardwaj, L. Jain, and S. Jain, "A Social Compute Cloud: Allocating and Sharing Infrastructure Resources via Social Networks"IEEE TRANSACTIONS ON SERVICES COMPUTING, MONTH 2014.

[5] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica et al., "A view of cloud computing, Communications of the ACM, vol. 53, no. 4, pp. 5058, 2010.

[6] S. Milgram,The small world problem, Psychology today, vol. 2,no. 1, pp. 6067, 1967.

[7] A. Li, X. Yang, S. Kandula, and M. Zhang, "Cloudcmp: comparing public cloud providers," in Proceedings of the 10th ACM SIGCOMM conference on Internet measurement, ser. IMC '10. New York, NY, USA: ACM, , pp. 1–14, 2010.

[8] N. Bonvin, T. G. Papaioannou, and K. Aberer, "A self-organized, fault-tolerant and scalable replication scheme for cloud storage," in Proceedings of the 1st ACM symposium on Cloud computing, ser. SoCC '10. New York, NY, USA: ACM , pp. 205–216, 2010.

[9] K. Sripanidkulchai, S. Sahu, Y. Ruan, A. Shaikh, and C. Dorai, "Are clouds ready for large distributed applications?" SIGOPS Oper. Syst. Rev., vol. 44, no. 2, pp. 18–23, Apr. 2010.

[10] K. Chard, K. Bubendorfer, S. Caton, and O. Rana,"Social Cloud Computing: A Vision for Socially Motivated Resource Sharing," IEEE Transactions on Services Computing, vol. 99, no. PrePrints, p. 1, 2012.

[11] M. Placek and R. Buyya,"Storage exchange: a global trading platform for storage services," in Proceedings of the 12th international conference on Parallel Processing, ser. Euro-Par?06. Berlin, Heidelberg: Springer- Verlag, pp. 425-436, 2006.

[12] K. Chard, W. Tan, J. Boverhof, R. Madduri, and I. Foster. Wrap Scientific Applications as WSRF Grid Services using gRAVI. In IEEE 7th International Conference on Web Services (ICWS, 2009).