Maintain Consistency as a Service in Cloud Using Auditing

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***Abstract* - A Cloud storage service has become popular due to a very great advantages .To provide everywhere always – on access , a cloud service provider support many replicas for every one piece of data on distributed server . A problem of using the replication technique in cloud is very costly to accomplish strong consistency on a worldwide scale. A novel consistency as a service model, contain large data cloud and many small audit clouds. In the consistency as a service model , data cloud is supported through a cloud service provider and collection of users that constitute an audit cloud be able to validate whether the data cloud provides the promised level of consistency or not .It proposed a two-level auditing architecture ,which simply needs a loosely synchronized cloud in the audit cloud .Then design algorithm to quantify the severity of violations with two metrices : the commonality of violations and staleness of the value of read. Heuristic auditing strategy (HAS) is used to expose as many violations as possible.**

***Keywords*: Cloud storage, consistency as a service (Caas), two-level auditing and heuristic auditing strategy (HAS)**

1. INTRODUCTION

Now a day's Cloud computing has become more popular, as it provide advantages like security, scalability, elasticity and high availability at lower cost [6][8] .Cloud storage service have become more accepted due to their very great advantages .Cloud service provider retain many replicas for every piece of data on physically distributed server. Replication method is used to improve performance and increase reliability .Replica it allows remote sites to go on working in the event of local failure. To maintain continuous accessibility the file is replicated at many different places in cloud so even if one of the site is down still you can retrieve the data from another place .Cloud storage services which involves the transfer of data storage as a service including data base like services and NAS(network attach storage)frequently billed on service computing basis. Example Amazon simple database it is Non-relational data store. Support store and query function usually provided only by relational database and it also hold to increase performance web application. User can store and query data item by means of web service request .it manages manually the infrastructure provisioning and hardware, software maintenance, replication and indexing of data items. By use the Cloud storage services, the clients can access data stored in a cloud anytime and anywhere using any device, without any capital investment when they are deploying the underlying hardware infrastructures.

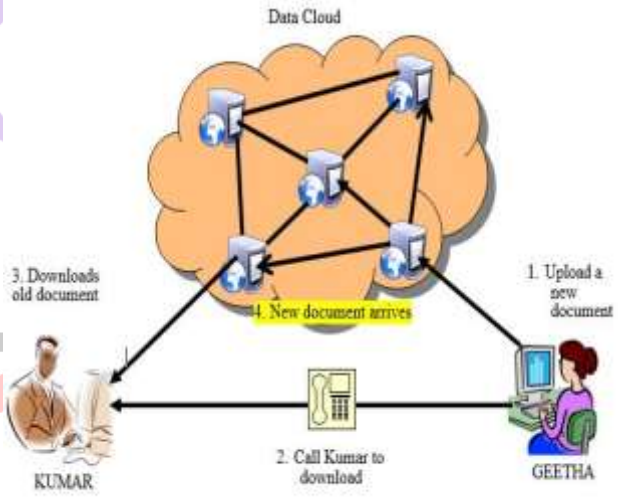

Fig 1 System Architecture

Fig Show system architecture. In this there are two user Kumar and Geetha they both are working on Project using a Cloud Storage Service. Data cloud that have data that data is replicated at many places. Data is replicated to five cloud server that is CS1,CS2,CS3,CS4,CS5 .After uploading a new document to CS4 ,Geetha calls Kumar to download the latest version for integrated design .Here ,after Geetha calls Kumar, the causal relationship is accepted between Geetha's update and Kumar's read .

Therefore , the cloud should give causal consistency ,which ensures that Geetha's update is committed to all of the replicas before Kumar's read . If the cloud provides only eventual consistency , then Kumar is allowed to access an old version of the requirement analysis from CS5 .In this case ,the integrated design that

is based on an old version may not satisfy the real requirements of customers. Different applications have different consistency requirements. The consistency properly ensure that any transaction will bring the database from one valid state to another. Any data written to database must be valid according to all defined rules, including constraints , cascades, triggers and any combination thereof . Different application have different consistency requirement .For example mail services require both monotonic-read consistency and read-your-write consistency and social network services need casual consistency [7] .In cloud storage, consistency not only determines accuracy but also the real cost per transaction. A novel consistency as a service (CaaS) model consists of big data cloud and several small audit clouds . The implementation of the data cloud is not clear to all users due to the virtualization technique . So it is very difficult for users to verify whether each replica in the data cloud is the latest one or not . Local auditing focuses on monotonic–read and read-your-write consistencies which can be performed by a light-weight online algorithm . Global auditing focuses on casual consistency which is performed by constructing a directed graph .

2. RELATED WORK

It present a novel approach to benchmark staleness in distributed datastores and make use of the approach to assess Amazon's Simple Storage Service (S3) [4] There are two main classes of consistency :data-centric and client-centric consistency. Data-centric consistency model generally focus on the internal state of the storage system that is consistency have been reached as soon as all replica of given data item are the same .How updates flow through the system and what guarantees the system be able to provide with respect to update. Here in this customer does not matter whether or not a storage system internally contains any stale copies . There is no stale data is observed from the client point of view the customer is satisfied. In a client-centric consistency model focus on what specific customer want that is how the customer observe data update . It was describes different level of consistency in distributed system , from strict consistency to weak Consistency .

High consistency implies high cost and reduced availability .Client-centric consistency model they do not care about the internal state of a storage system . They explained how these two communicate to each other and introduced an approach which allows to compute the staleness of data , or how soon 'eventual' in eventual consistency is .

3. PROBLEM STATEMENT

To provide everywhere on access , cloud service provider maintains numerous replicas for each pieces of data on geographically scattered servers. The problem of using the replication method in cloud is that it is very expensive to accomplish strong consistency on a worldwide scale .

Existing solutions can be classified into trace-based verifications [5] and benchmark-based verifications .Trace-based verifications focus on three consistency semantics :safety, regularity, and atomicity [5]. Safety :- A register is safe if a read is not parallel with any write returns the value of the most recent write , and a read that is parallel with a write can return any value Regularity :- A register is regular if a read is not parallel with any write returns the value of the most recent write , and a read that is parallel with a write return either the value of the most recent write ,or the value of the concurrent write .Atomicity :- A register is atomic if every read returns the value of the most recent write .

4. PROPOSED SOLUTION

We present a novel consistency as a service (CaaS) model[1] , where a group of users that constitute an audit cloud can verify whether the data cloud provides the promised level of consistency or not.

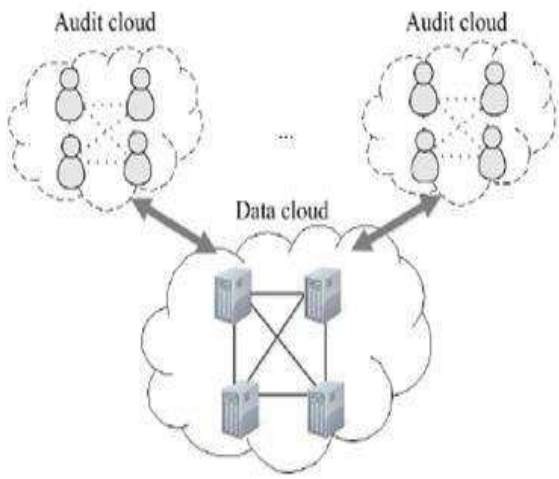

Fig 2 Consistency as a service model

The Consistency as a service model consists of large data cloud and various audit cloud .A service level agreement (SLA) will be busy between the data cloud and the audit cloud ,which will tell what level of consistency the data cloud must provide, and how much will be charged if the data cloud violates the service level agreement .

In User Operation Table Each client maintains a User Operation Table for recording local operations. Each record in the User Operation Table is described by three elements: operation, logical vector, and physical vector. While issuing an operation, a client will record this

operation, as well as his current logical vector and physical vector, in his UOT.

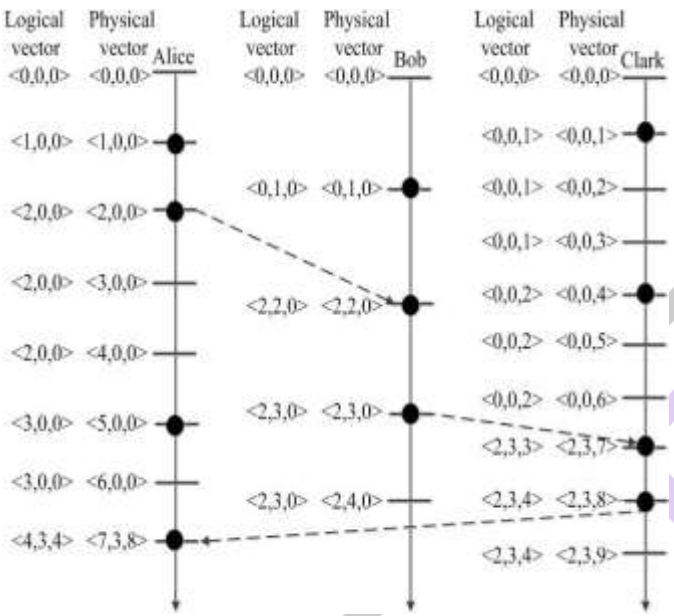

Fig. 3. The update process of logical vector and physical vector. A black solid circle denotes an event (read/write/send message/receive message), and the arrows from top to bottom denote the increase of physical time.

The physical vector is updated in the similar way as the logical vector, except that the user's physical clock keeps growing as time passes, no matter whether an *event* (read/write/send message/receive message) happens or not. The update process is as follows: All clocks are initialized with zero (for two vectors); The user increases his own physical clock in the physical vector continuously, and increases his own logical clock in the logical vector by one only when an event happens; Two vectors will be sent along with the message being sent. When a user receives a message, he updates *each element* in his vector with the maximum of the value in his own vector and the value in the received vector (for two vectors).Each user will maintain a logical vector and a physical vector to track the logical and physical time when an operation happens, resepectively.

A two-level auditing structure, which only requires a loosely synchronized clock for ordering operations in an audit cloud. Here each client has to support a logical vector for limited ordering of operation and implement , a two-level auditing structure . Each client perform local auditing separately with a local trace of operation ; periodically an auditor is selected from the audit cloud to perform global auditing with global trace of operations.

At the first level , each client on your own perform local auditing with his own User operation table . In local consistency has two types Monotonic-read-consistency and Read-your-write consistency .

1) Monotonic-read-consistency :- If a process reads the price of data K , any consecutive read on data K by that process will always return that same value or extra recent value .

2) Read-your-write consistency :-The result of a write by a process on data K will always be a consecutive read on data K by the similar process.

Monotonic-read consistency requires that a user should read either a new value or the identical value , and read-your-write consistency need that a user all the time read his latest updates

At the second level , an auditor be able to execute global auditing after obtaining a global trace of all users operations . global auditing concentrate on Causal consistency which can be performed by offline algorithm .

1) Causal consistency :- Writes that are causally related should be seen by all processes in the similar order. Concurrent writes may be seen in a dissimilar order on different machines .

Global auditing concentrate on casual consistency, which is performed by constructing a directed graph . If the constructed graph is a directed acyclic graph (DAG) then casual consistency is preserved. Quantify the severity of violations can be done by two metrics for the CaaS model: commonality of violations and staleness of the value of read. Finally it was propose a heuristic auditing strategy (HAS) which adds appropriate reads to reveal as several violations as possible .

5. CONCLUSIONS

Consistency as a service (CaaS) model and a two-level auditing structure to help users validate whether the cloud service provider (CSP) is providing the promised consistency and to quantify the severity of the violations is any . With the CaaS model , the users can assess the quality of cloud services and select a right cloud service provider among various candidates , for example the least expensive one that still provides adequate consistency for the users application . In future work will determine dependencies between files on S3. The plan to publish these result such as bechmarking Apache Cassandra and the Google App Engine data store to extend our efforts to additional storage system . Future work , it will conduct a thorough theoretical study of consistency models in cloud computing .

ACKNOWLEDGEMENT

REFERENCES

[1] Qin Liu , Guojun Wang ,Jie Wu, " Consistency as a Service : Auditing Cloud Consistency ," 2014 .

[2] M. Rahman, W. Golab, A. AuYoung, K. Keeton, and J. Wylie, "Toward a principled framework for benchmarking consistency," 2012 .

[3] H. Wada, A. Fekete, L. Zhao, K. Lee, and A. Liu, "Data consistency properties and the trade-offs in commercial cloud storages: the consumers' perspective," 2011 .

[4] D. Bermbach and S. Tai, "Eventual consistency: how soon is eventual?" 2011

[5] E. Anderson, X. Li, M. Shah, J. Tucek, and J. Wylie, "What consistency does your key-value store actually provide,"
2010

[6] M. Armbrust, A. Fox, R. Griffith, A. Joseph, R. Katz, A. Konwinski,G. Lee, D. Patterson, A. Rabkin, I. Stoica, *et al.*, "A view of cloud DFISAAECAcomputing," *Commun. ACM*, vol. 53, no. 4, 2010

[7] W. Lloyd, M. Freedman, M. Kaminsky, and D. Andersen, "Don't settle for eventual: scalable causal consistency for wide-area storage with COPS," in *Proc. 2011 ACM SOSP*,

[8] P. Mell and T. Grance, "The NIST definition of cloud computing (draft),"NIST Special Publication 800-145 (Draft), 2011

[9] S. Esteves, J. Silva, and L. Veiga, "Quality-of-service for consistency of data geo-replication in cloud computing,"
2012

[10] T. Kraska, M. Hentschel, G. Alonso, and D. Kossmann, "Consistency rationing in the cloud: pay only when it matters," in *Proc. 2009*

BIOGRAPHIES

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