Auditing Cloud Consistency

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Abstract—Cloud storage services are used throughout worldwide. Cloud service provider (CSP) maintains data cloud on CaaS model; it maintains multiple replicas for each data on distributed servers. Here the drawback is that due to multiple replication technique it does not provide strong consistency. We use Consistency as a service (CaaS) model with large data cloud and multiple audit cloud. In audit cloud we propose two level auditing architecture with loosely synchronized clock. In this paper, we propose an algorithm to reduce the violations on the storage system. We finally propose a heuristic auditing strategy (HAS) technique to avoid from violations and staleness. Using real cloud deployment to verify the heuristic auditing strategy (HAS).

Keywords- Cloud service provider (CSP), Domain name server, and two level auditing, heuristic auditing strategy (HAS).

I. INTRODUCTION

Cloud computing is used throughout for its scalability, performance and high availability at low cost, by everything as a service model (XaaS) and also provides storage to data. The cloud service provider has multiple replicas for each data to provide always-on access. It cannot achieve strong consistency in replication technique. CAP principle^3 and CSP achieves weak consistency, where CAP principle^3 defines, if any shared data can provide only consistency and availability. In case of high availability and certain period of consistency, here a user can read stale data for some period of time. An eventual consistency is mostly implemented by Domain name server (DNS). Here different applications have different consistency, where we use a CaaS model. We propose two level architecture, local auditing and Global auditing. A local auditing use monotonic read and read your write consistencies and uses a light weight online algorithm. Global auditing uses casual consistency performed using directed graph (DAG).

We propose heuristic auditing strategy (HAS) technique to avoid violations.

II. RELATED WORK

In cloud each data has multiple replicas to maintain high availability and high performance. Master slave combinations of data bases in cloud are also known as replication. It has two consistency models.

Data centric consistency model

It considers the internal data updates inside the storage system. Here the users does not consider about the internal stale copies.

Client centric consistency model

It maintains exact data what user needs and it provides the promised consistency. Here strong consistency needs more cost and less availability. In existing cloud storage it restricts strong consistency, guarantees small data sets and eventual consistency. It uses many solutions to achieve various consistencies. In existing technique we use trace based verifications and benchmark based verifications. The drawback is that in trace based verification global clock is required for all users. Benchmark verification focuses on staleness in storage system.

III. PROPOSED WORK

In our approach, we use HAS technique for auditing. It has two consistency models:

- Data centric consistency
- Client centric consistency

A. Consistency as a Service (CaaS) model

It consists of data cloud and multiple audit clouds. The CSP maintains data cloud, here each data are identified by unique cloud key. It provides always-on service. CSP have many copies of each data. The users on cloud are identified by unique id, which provides promised level of consistency. Here audit clouds are used to check whether violation takes place. The two consistency models are:

- Local auditing
- Global auditing

B. UOT

User operation table (UOT) is maintained by each user for recording their local operations. It has three elements: Operation, Logical vector, Physical vector.
C. Overview of Two level auditing structures
We provide two level auditing structures for CaaS model. Each user independently performs local auditing with their UOT. We use three consistencies
- Monotonic-read consistency
- Read-your-write consistency
- Casual consistency

The system Architecture is as follows

IV ALGORITHM

Local consistency auditing

Initial UOT with 0
while issue an operation \( op \) do
if \( op = W(a) \) then
record \( W(a) \) in UOT
if \( op = r(a) \) then
\( W(b) \) E UOT is the last write
if \( W(a) -> W(b) \) then
Read-your-consistency is violated
\( R(c) \) E UOT is the last read
if \( W(a) -> W(c) \) then
Monotonic-read consistency is violated
record \( r(a) \) in UOT

Global consistency auditing

Each function in the global trace is denoted by a vertex
for any two operations \( op1 \) and \( op2 \) do
if \( op1 -> op2 \) then
A time edge is added from \( op1 \) to \( op2 \)
if \( op1 = W(a), \; op2 = R(a) \), and two operations come from different users then
A data edge is added from \( op1 \) to \( op2 \)
if \( op1 = W(a), \; op2 = W(b) \), two operations come from different users, and \( W(a) \) is on the route from \( W(b) \) to \( R(b) \) then
A casual edge is added from \( op1 \) to \( op2 \)

The modules descriptions are as follow:

A. User Interface
To connect with server user must give their username and password then only they can able to connect the server. If the user already exists directly can login into the server else user must register their details such as username, password and Email id, into the server. Server will create the account for the entire user to maintain upload and download rate.

B. Read and Write operation
In this module, a read must have unique dictating write. A write operation can have zero or more dictated reads. From value of read we know logical and physical vectors of its dictating write.

C. Generating UOT Table
In this each user maintains User operation table (UOT) for recording their local operations. Here UOT described by operations, Logical vector and Physical vector.

D. Local auditing and Global auditing
A local auditing consistency is an online algorithm, here each user record their local operations on UOT and perform independent auditing. Global auditing is a offline algorithm in which an auditor is elected from audit cloud to perform global consistency auditing.

E. Performance Evaluation
In this module, the performance of the files are evaluated, it uses algorithm parameter and graphical representation of algorithm performance such as time complexity, space complexity and auxiliary space.

V FUTURE WORK
In this CAP technique for auditing, CAP theorem is to preclude consistency for services running in high elastic first tier of a modern cloud computing system. These services are used to maintain the cached data. It provides all time response, even its internal services are temporarily inaccessible.
VI CONCLUSION

We proposed consistency as a service (CaaS) model and two level auditing structures to verify whether cloud service provider (CSP) provides consistency and reduces the violation.

VII REFERENCE