PRESERVING CLOUD CONSISTENCY USING CAAS MODEL

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ABSTRACT

Cloud storage services are commercially more popular due to their amount of advantages. Most of the cloud service provider provides services like infrastructure management, data storage services on 24/7 through any devices at anywhere. To provide this ubiquitous always on service most of the cloud service provider (CSP) maintains each piece of data on geographically distributed servers. The main key problem with this technique is that, it is very expensive and some to fail to provide required consistency of service. To overcome this problem, we propose to use a new approach of service (i.e. Consistency as a Service(CaaS)) this paper, firstly concentrate on a consistency as a service (CaaS) model, which has a large data cloud and multiple small audit clouds. In the CaaS model, a data cloud is formed by a CSP, and a group of users form an audit cloud that can verify whether the data cloud provides the promised level of consistency i.e. quality of service or not, for that make use of two-level auditing strategy which require loosely synchronized clock for ordering operations in an audit cloud. Then perform global auditing by global trace of operations through randomly electing an auditor from an audit cloud. Finally, use a heuristic auditing strategy(HAS) to display as many violations as possible.

Keywords: Cloud Storage Systems, Consistency As A Service (Caas), Two-Level Auditing and Heuristicauditing Strategy

I. INTRODUCTION

Clouds computing is become more popular as it provides guaranteed services like data storage, virtualized infrastructure etc. e.g. Amazon,SimpleDB etc. By using the cloud services, the customers or user can access data stored in a cloud anytime and at anywhere using any device, and customer ensure about less capital investment. To provide promised always on 24/7 access, the cloud service provider (CSP) stores data replicason multiple geographically distributed servers. The main drawback of using the replication technique is it is very expensive to achieve strong consistency, and user is ensured to see the latest updates. Many CSPs (e.g., Amazon S3) provide only eventual i.e. updates are visible definitely but not immediately. E.g. Domain name system (DNS), but the eventual consistency is not interesting for all applications and which require strong consistency. Some applications like social networking sites require causal i.e. strong consistency. Thus the different applications require different level of consistency. We propose novel consistency as a service (CAAS) model. The CaaS model consists of, A large data cloud formed by CSP and multiple audit clouds formed by group of users worked on project or document that can check whether the data cloud provide a promised level of consistency or not. Two-level auditing structure which require only a loosely synchronized clock for ordering operation in an audit cloud then perform global auditing with a global trace of operations periodically an auditor

is elected from an audit cloud. Local auditing is concentrate on monotonic-read and read-your-write consistencies, which can be performed by an online light-weight algorithm while Global auditing focuses on causal consistency, in which construct a directed graph. If the constructed graph is a directed acyclic graph also called as precedence graph, we claim that causal consistency is preserved. We determine the severity of violations by two metrics for the CaaS model: commonality of violations and staleness of the value of a read, as in. Finally, we propose a heuristic auditing strategy (HAS) which adds appropriate reads to display as many violations as possible to determine cloud consistency and also actual cost per transaction.

II. DESCRIPTION

This section consist of three models i. e. consistency as a service (CaaS) model, user operation table (UOT) with which each user records his operations and two-level auditing structure.

2.1 Consistency as a Service (CAAS) Model

An audit cloud consists of a group of users that work together on a job, e.g., a document or a program. We consider that each user in the audit cloud is identified by a unique ID. Before assigning job to the data cloud, an audit cloud and the data cloud will engage with a service level agreement (SLA), which demands the promised level of consistency should be provided by the data cloud. The audit cloud exists to verify whether the data cloud violates the SLA or not, and to analyze the severity of violations.

2.2 User Operation Table (UOT)

Each user maintains his own User Operation Table (UOT) for recording his trace of operations. Each record in the UOT is described by elements like Operation, logical vector,
and physical vector. While issuing an operation, a user from an audit cloud will record his operation in UOT, as well as his current logical vector and physical vector. Each user will maintain a logical vector and a physical vector to track the logical and physical time when an operation happens, respectively.

2.3 Two-Level Auditing Structure

2.3.1 Local Auditing

Each user independently performs local auditing with his UOT with two consistencies; Monotonic-read consistency, which requires that a user must read either a new value or same value Read-your's-write consistency, which require a user, always read his latest update.

2.3.2 Global Auditing

Global auditing is performed by global trace of operations of all users operations with following consistency Causal Consistency Causal consistency writes that are causally related must be seen by all process in the same order and concurrent writes may be seen in a different order on different machine.

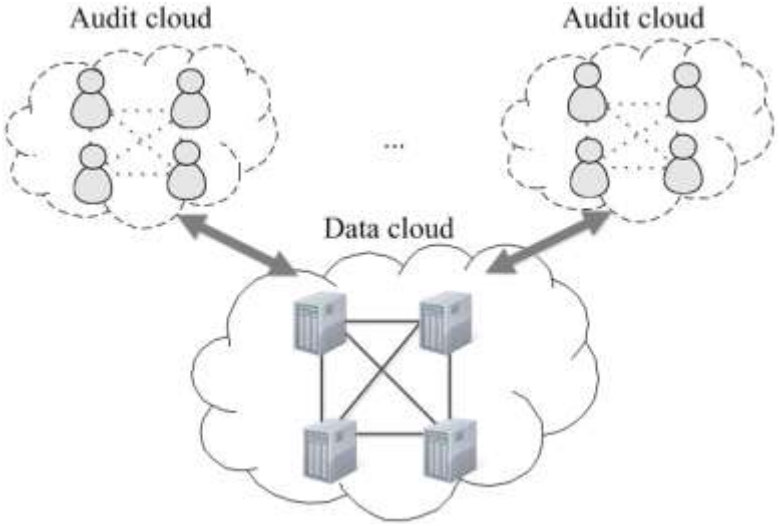

Fig:1 Consistency as a Service Model

2.4 Heuristic Auditing Strategy

From the auditing process it is clear that only reads can display violations by their values. Therefore, the basic idea behind the heuristic auditing strategy (HAS) is to add exact reads for displaying as many violations as possible and call these additional reads as auditing reads. Under the CaaS model, consistency becomes a part of the Service Level Agreement and the users can get something from the CSP, by displaying consistency violations and determine the severity of the violations. The CaaS model will help both the CSP and the users adopt consistency as an important aspect of cloud services.

III. CONCLUSION

In this paper, we argued that strong consistency requirements should be adopted only for data objects crucial for application correctness, otherwise weaker forms of data consistency should be adopted. We presented aconsistency as a service (CaaS) model and a two-level auditing structure that helps users to verify whether the cloud service provider (CSP) is providing the promised consistency, and to quantify the severity of the violations, if any. With the CaaS model, the users can assess the quality of cloud services and choose a right CSP among various candidates, e.g., the least expensive one that still provides adequate consistency for the users' applications.

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