Indian Journal of Science and Technology, *Vol 7(3S), 45–46, March 2014*
ISSN (Print): 0974-6846
ISSN (Online) : 0974-5645

An Efficient Cost Model for Data Storage with Horizontal Layout in the Cloud

S. Brintha Rajakumari* **and C. Nalini**

Department of CSE, B. I. S. T. (Bharath University), Chennai, India;
brintha.ramesh@gmail.com, nalinicha2002@gmail.com

Abstract

Data storage space is virtually infinite in cloud computing. To store data in the cloud requires more cost because it is a 'pay and use model' and also the resources are based on budget constraints. Normally, question performance is a very important concept in database management system. To improve that introduces novel approach which will reduce the cost of data storage within the cloud. This novel approach converts the given aggregated data into horizontal layout form, which will reduce the size of the data to store in the cloud. This paper presents the effective cost model for data storage with horizontal layout within the cloud.

Keywords: Cloud Computing, Cost Model, Horizontal Layout

1. Introduction

'Cloud Computing' is an Internet-based computing solution where computers are configured to work together, and various applications use the collective computing power as if they are running on a single system. It can be defined as the collection of hardware, storage, and networks. Popular examples include Amazon Elastic Compute Cloud, Microsoft Azure and Google App Engine.

In classical databases, query performance is achi-eved through physical data structures such as caches, indexes, and materialized views. In this context, many cost models help select a best set of such data structures. However, this selection task becomes more complex in the cloud[1].

Cloud storage cost for the data is more than the data transfer cost and computing cost. To minimize the cost of data, application of DBMS horizontal layout form is adopted. Basically Structured Query Language (SQL) support a lot of aggregate functions, such as SUM (), COUNT (), MAX (), MIN () and AVG () and it gives the result in a vertical layout. In order to improve the query performance as well as to reduce the cost of data storage in the cloud architecture by transposes, the aggregated data are converted into horizontal layout. This will reduce the size of data storage.

In this article, section 2 describes the Amazon Web Services pricing list. Section 3 analyses the storage cost model and finally is the conclusion with the cost model for the horizontal representation.

2. AWS Price in the Cloud

Many providers supply resources to store data in the cloud. The Amazon Web Services (AWS) also provides pricing model for the cloud resources. Cloud Service Providers (CSPs) provide a set of resources, such as CPU, storage, networks, development platforms and services. This article uses the AWS EC2 storage pricing model[2] as is given in Table 1.

Table 1. Amazon storage prices

Data Volume	Price Per Month
First 1 TB	$ 0.14 per GB
Next 49 TB	$ 0.125 per GB
Next 450 TB	$ 0.11 per GB
.....	.....

*Author for correspondence

3. Method to Reduce Cost using Horizontal Representation

Aggregation concept is a powerful tool in database design, and consequently, preserving aggregation in database implementation is essential. Aggregation problem becomes particularly acute in a Database Management System (DBMS), since such a system contains a large volume of data that could form aggregates that are more sensitive than their constituent parts. A data table (Table 2) is presented containing 3 attributes, such as C1, C2 and Values[3].

Table 3 shows vertical aggregation of similar data and the SQL query is given as,

```
SELECT C1, C2, SUM (Value)
FROM Table 2
GROUP BY C1, C2 ORDER BY C1, C2
```

Table 4 shows horizontal layout of similar data and the SQL query for this is given as,

```
SELECT C1,[X] AS C2X,[Y] AS C2Y
FROM
(SELECT C1,C2,Value FROM Table2 AS source table
PIVOT(SUM(Value) FOR C2 IN([X],[Y])) AS pivot table;
```

Experiment was performed this method using MS SQL Server 2008 and found out the size of the table. Tables 3 and 4 show horizontal layout representation record size is lesser than vertical representation. When the table size is reduced, it helps to reduce the payment to the provider in the cloud.

Table 2. Example data table

Sl. no.	C1	C2	Value
1	3	X	9
2	2	Y	6
3	1	Y	10
4	1	Y	0
5	2	X	1
6	1	X	Null
7	3	X	8
8	2	X	7

Table 3. Vertical aggregation of table

C1	C2	Value
1	X	Null
1	Y	10
2	X	8
2	Y	6
3	X	17

Table 4. Horizontal layout of data

C1	C2X	C2Y
1	Null	10
2	8	6
3	17	Null

4. Conclusion

In this article, a novel approach is presented, which reduces the storage cost of data in the cloud architecture using horizontal layout representation and experimenting with small data. In future, it will be planned to add data transfer cost and computing cost, using this cost model with large data.

5. References

1. Nguyen TV, D'Orazio L, Bimonte S, Darmont J. Cost models for view materialization in the cloud. Workshop on Data Analytics in the Cloud (EDBT-ICDT/DanaC 12. Berlin, Germany; 2012 Mar. p. 47–54.
2. Amazon ec2. Available from: http://aws.amazon.com/ec2/
3. Ordonez C, Chen Z. Horizontal aggregations in SQL to prepare data sets for data mining analysis. IEEE Transactions on Knowledge and Data Engineering. 2012 Apr; 24(4):678–91.