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Database Cloud

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Abstract : *A database Cloud is sharing resources, software, and information between multiple devices over a network which is , the internet. It is expected that this number will rise significantly in the future. There is a growing interest in outsourcing database management tasks to third parties that can provide these tasks for less cost due to the economy of scale just like putting it into the cloud. In this paper, I discuss the recent trend in database management system and the possibilities of making it as one of the services offered in the cloud. We also proposed an architecture of database management system in the cloud.*

Keywords: *Database, Cloud , DBMS*

1. Introduction

In recent years, database outsourcing plays a vital role in cloud computing. Due to the rapid advancements in a network technology, the cost of transmitting a huge amount of data over long distances has decreased significantly in few years.As a result, there is a growing interest in outsourcing database management tasks to third parties that can provide these tasks for less cost due to the economy of scale. This new outsourcing model has the benefits of reducing the cost for running Database Management System (DBMS) independently. Cloud computing(Figure 1) delivers extremely fast shared storage at a reduced cost. The cost/performance advantages have decisively shifted in favor of the shared-disk DBMS.

A Cloud database management system (CDBMS) is a distributed database that delivers computing as a service instead of a product. It is the sharing of resources, software, and information between multiply devices over a network which is mostly the internet. It is expected that this number will grow significantly in the future. An example of this is Software as a Service, or SaaS, which is an application that is delivered through the browser to customers. Cloud applications connect to a database that is being run on the cloud and have varying degrees of efficiency. Some are manually configured, some are preconfigured, and some are native.

Figure 1: Cloud Computing

2. Background

2.1 Database Management System (DBMS)

A database management system (DBMS) is a software package with computer programs that control the creation, maintenance, and use of a database. A DBMS allows different user application programs to concurrently access the same database. DBMSs may use a variety of database models, such as the relational model or object model, to conveniently describe and support applications. It typically supports query languages, which are in fact high-level programming languages.

2.2 Cloud

The Major advantages of cloud computing is its elasticity in the face of changing conditions. For example, during seasonal or unexpected spikes in demand for a product retailed by an e-commerce company, or during an exponential growth phase for a social networking Website, additional computational resources can be allocated on the fly to handle the increased demand in mere minutes (instead of the many days it can take to procure the space and capital equipment needed to expand the computational resources in-house). Similarly, in this environment, one only pays for what one needs, so increased resources can be obtained to handle spikes in load and then released once the spike has subsided. Having DBMS in the cloud will give advantage in fast and elastic computing.

3. Database Cloud

Most DBMS or database management systems are simply software packages that users can acquire to create, maintain or use a database. However,

since the introduction of cloud computing, DBMS has morphed into an entirely new type of service with its own unique benefits and task specific advantages. For one thing, any type of cloud service model will have to employ a dedicated cloud DBMS in order to truly provide customers with excellent access to data and databases. Traditional DBMS's are simply not set up or equipped to deal with the demands of cloud computing. And of course, if DBMS was deployed as a service as part of a larger package provided, it would likely be much more efficient in its duties and therefore cheaper in the long run.

The concept of the DBMS has been around since the beginning of commercial computing; such as the navigational DBMS of the1960's. Database management systems are one of the oldest integral components of computing, essentially making it possible to scan, retrieve and organize data on hard drives and networks. All DBMS, despite whether traditional or cloud-based, are essentially communicators that function as middlemen between the operating system and the database.

Cloud-based DBMS are extremely scalable. They are able to handle volumes of data and processes that would exhaust a typical DBMS. Despite their scalability however, cloud DBMS are still somewhat lacking in their ability to scale up to extremely large processes; this is expected to be remedied in the coming months and years however. Currently, the use of cloud.

DBMS's are principally used in the testing and development of new cloud applications and processes. But while a stand-alone DBMS can be used on a cloud infrastructure, most are not designed to take full advantage of cloud resources. DBMS as a cloud service-type models seek to capitalize on the disparity between antiquated DBMS models and their lack of full cloud functionality.

Cloud DBMS (Figure 2) may utilize all of these components or may have devised new strategies that combine one or more elements (like combining data structures and the data query language, for example). Many organizations are exploring the option of utilizing pre-existing modeling languages as a basis for expansion in a cloud model. This strategy ultimately saves on the time spent developing cloud DBMS's as well as enhances their overall effectiveness, since traditional modeling languages are more than adequate for handling data.

Despite the benefits offered by cloud-based DBMS, many people still have apprehensions about them. This is most likely due to the various security issues that have yet to be dealt with. These security issues stem from the fact that cloud DBMS are hard to monitor since they often span across multiple hardware stacks and/or servers. Security becomes a serious issue with cloud DBMS when there's multiple Virtual Machines

(which might be accessing databases via any number of applications) that might be able to access a database without being noticed or setting off any alerts. In this type of situation a malicious person could potentially access pertinent data or cause serious harm to the integral structure of a database, putting the entire system in jeopardy.

There is however a proposed method for dealing with these types of incongruence. An obvious solution is the deployment of an autonomous network agent, which rigorously monitor and defends all activities related to database access. The limitation of this method however, is that a network agent may be unable to handle extremely large and dense volumes of activity / traffic.

While deployment of a dedicated and thorough cloud DBMS hasn't occurred yet, it is certainly under development. The emergence of a comprehensive solution for all cloud service models regarding database management will open the door to a new era of cloud computing.

Many of these cloud databases are designed to run on a cluster of hundreds to thousands of nodes, and are capable of serving data ranging from hundreds of terabytes to petabytes. Compared with traditional relational database servers, such cloud databases may offer less querying capability and often weaker consistency guarantees, but scale much better by providing built-in support on availability, elasticity, and load balancing.

On the other hand, data management tools are an important part of relational and analytical data management business since business analysts are often not technically advanced and do not feel comfortable interfacing with low-level database software directly. These tools typically interface with the database using ODBC or JDBC, so database software that want to work these products must accept SQL queries. Therefore, a novel technology to combine DBMS capability with Cloud scale scalability is highly desirable.

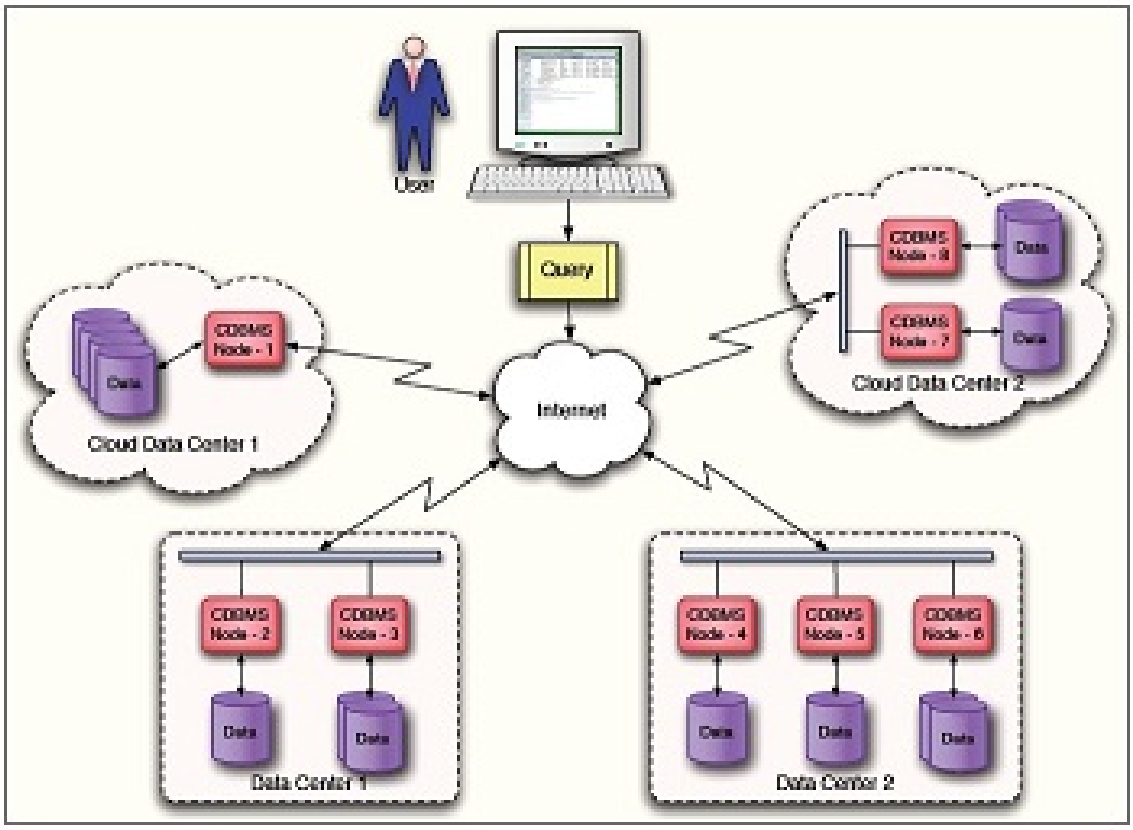

Figure 2. Cloud Architecture of DBMS

The traditional relational databases are designed in such a way that to handle single node queries. But in CDBMS the queries are handled by the distributed environment. A distributed query accesses multiple nodes of the CDBMS and the executed query will be the union of several queries that accesses individual nodes of the CDBMS.

4. Conclusion

DBMSs with Cloud will have an impact for vendors desiring a less expensive platform for development. In this paper, we presented the idea of DBMS in the cloud, the possibilities to be offered as one of the services offered by promising capability of cloud computing, that is to be a DBMS with Cloud.

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