Efficient Access of Data Resources in Cloud

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ABSTRACT

An attempt towards developing time efficient cloud computing architecture, by considering the deficiencies with respect to existing clouds, better ontology-based cloud information architecture is proposed in this thesis. In this architecture, additional modules on query retrieval and query refinement are added for better performance. Rocchio technique is used for query refinement to extract results with respect to relevance criterion is adopted. The proposed architecture gives better-indexed results after transforming the user query. Further, the cloud customers are provided with a flexible, scalable and pay per use services via many cloud vendors, security becomes a major issue. Hence, the article also proposes an alternate authentication technique for generating password at client end towards secured data access from cloud and it also prevents third party from accessing data at client side.

KEYWORDS

Cloud Computing, Data Resources, Pay Per Use, Rocchio

INTRODUCTION

Data storage is the most useful and important service being offered by cloud, where in the customers need not store their personal data on their desktops / servers instead the same is stored in cloud. The cloud users will be charged based on the usage of memory space on the cloud. Here, storage is provided as a service which is scalable and high flexible, where the customers pay only for the storage space what actually they are using for a particular period of time. In case of storage as a service the user need not worry on the storage maintenance issues and also the installation of file systems. But, the actually data may be stored in different place and the users will not be aware of exact location of data storage, but can access their data from anywhere at any time through cloud provider’s network facility or via Internet. The major concern here is the data integrity, privacy and security.

As data retrieval involved either reports from the database or some queries on the stored database, some common data access APIs are required. Typically, the data access will be via an intermediate layer called as Database Management System. The DBMS packages will act as an interface between data users and the physical data storage. In case of cloud computing also, the same concept is applied, but here the user need not purchase the commercial software like Oracle, indeed the user can use Oracle on cloud and pay for the time the used actually used Oracle. Hence, the major hurdle of commercial software procurement turns into a rental model.

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Cloud Data Access Scheme

Accessing the cloud is slightly tricky than a traditional desktop enabled software usage. Unix operating system provides a beautiful facility to improve desktop performance namely memory virtualization. It is actually an old operating system concept used for enhancing scalability. The same concept is extended with enhanced facilities and features provide hardware scalability in cloud computing. One such example is Desktop-as-a-Service that is suitable for WAN.

Desktop as a Service

While cloud provides Desktop as a Service, the users can access all the typical desktop computing and user interface services from remotely located servers. As traditional desktops are basically meant for user interface to utilize and manage the computing resources including both hardware and software, there are certain changes in the type of utility when it comes to remote desktops. In case of cloud computing, single machine / server is shared by many users to achieve better utilization, hence all the resources need to be properly mapped to the users and the user cannot enjoy the complete freedom of hardware as in case of traditional desktops. There are several challenges in this regard that include customer satisfaction, scalability, ensuring maximum resource utilization and negligible SLA violation. When many customers are assigned single server, it leads to dissatisfaction among customers, while if less are assigned leads under utilization of resources and higher investment cost.

In desktop-oriented services typically the task processing is sequential and leads to huge response time and hence downgrades the whole system performance. Since traditional desktop interfaces use dedicated hardware and pre-installed software tools, the access to system utilities is denied to the user without such software. But, in case of virtual desktop the cloud computing removes this requirement and hence ease of use.

VIRTUALIZATION

Before the evolution of cloud, virtual networks are used connect multiple computers to perform high performance computing. Since it was easier and compact, the same concept of virtual networks is extended and renamed as virtualization (Kappel et al., 2011). It allows multiple instances on system images on one server, i.e., one machine can serve as multiple servers or OS which distributes the task into several cloud-based segments. Like this, a given task is separated into several sub tasks and finally, the results of all such sub tasks are accumulated to provide desired optimal solution.

Role of Virtualization in Cloud Sector

As computational tasks are becoming more and more time consuming and highly complex in nature, with advent of newer hardware technologies, fully functional communication systems, and the emergent of high performance computing platforms like cluster computing it is required to use distributed data and resources between various levels of abstraction. Virtualization technology enables to divide both hardware and software resources evenly via centralized data servers in cloud environment (Lombardi F & Di Pietro, 2011).

It is possible to access data by virtualization from multiple OS or server instances which are actually being located on single physical server. It can also be treated like a single OS being served to multiple VMs to perform distributed jobs. Since virtualization hides the characteristics of physical resources from the cloud users, they can use these resources like a black box. Because, the users are more concerned to use the resources than that of knowing more details of those resources.

Virtualization use hypervisors which are nothing but virtual managers to control data flow through many incoming requests (Rimal BP et al., 2009). Actually, hypervisor is utility software which manages multiple instances of one operating system. Hypervisors are nothing but cloud operating
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