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Efficient Way of Managing the Data for Cloud Storage Applications Depending on the Internet Speed in Cloud Environment

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***Abstract* – In India, because of the fluctuations in Internet bandwidth rate, data loss occur most of the times. Cloud computing is the latest technology to handle the data through multiple devices. In this paper we have implemented an idea to store and access the data through the cloud depending on Internet bandwidth speed. To achieve this, we have used data compression technique which mainly uses SQL server. In this technique we compress the data and store it separately in cloud server. The compressed data uses only 5% of original data, and it doesn't create a storage problem. Depending on connection type like mobile broadband, Wi-Fi and DSL, speed of the internet is calculated. With this we have used fault tolerance to handle large amount of data and data encapsulation to secure the user data. We have used Map-Reduce programming to lossless data compression and handle Big- Data. Our solution builds on a highly parallel distributed data management service specially designed to enable reading, writing and appending huge data sequences that are fragmented and distributed at a large scale. This paper focuses on evaluating the benefits of applying data compression transparently at the level of the storage service in the context of data-intensive applications.**

***Keywords* – Bandwidth-Speed, Cloud-Server, Data Compression, Data-Management.**

I. INTRODUCTION

Cloud computing has made its way up the list of technology buzz words, taking the IT world by storm. The rapid adoption of cloud based applications has increased a demand for a robust cloud data management solution providing the platform and infrastructure that has resulted in more fragments of data to be scattered both inside and outside of the firewall across the enterprise. Cloud computing has been transformed from an interesting buzzword into the future of the internet in just a few short years. In order to help the businesses and professionals get real value from the promise of the cloud, rack space has been on the leading edge of the cloud computing revolution. Cloud has its biggest impact on some of the areas like test and development, file storage and sharing, web site hosting, customer management, private and hybrid clouds, cloud database, ecommerce, file backup.

Cloud is playing a vital role in data management. A major force to watch for when we look at data management will be a cloud. Every company is looking to manage and secure the enormous amount of data that is generated and thus data management is gaining the top priority for enterprises today. [1]The most complicated topic today is the issues surrounding the cloud. The reality is that the lifeblood of organizations is the data. Therefore, regardless of where actually the data lives, managing it is very important. Data is created, changed, secured, stored and governed which defines the entire life cycle of data management. But this life cycle does not apply when an outside service manages the data, although this is the normal process within the data center. More and more content is stored in virtualized, interconnected storage devices with the emergence of cloud computing in networking infrastructure. This would make storage more affordable, efficient, and easier to manage and also to access huge files online in much lesser time. Management of data becomes paramount in maintaining service levels and securing the critical business information because all data in a cloud lives in the same shared system.

Small business under cloud computing is also dependent on the reliability of our internet connection. But the internet outages make the most reliable cloud computing service providers to suffer now and again. It is also noteworthy that the premier cloud computing service providers suffer much outages. As the smaller organizations plan to move forward with cloud computing, outages which happen everywhere could have a profound impact on them. Server outage is inevitable whether we have a leverage on the public cloud, a hosting provider or our own data center. Unforeseen situations lead to unexpected consequences which leads the software bugs to slip by, equipment breaks or they do not function properly as expected. Sometimes data centers go dark and some other times services are degraded.

Cloud computing enables to be excessively dependent on the internet. The availability of the robust and reliable internet for all the time is the premise on which the cloud computing exists. There is always the danger of the unforeseen, while one can be fairly optimistic regarding this. There could be very damaging consequences as a result of an outage which could affect cloud or the cloud computing service, if a company looses internet connectivity to its cloud even for a few days. In such a scenario, we may wish our servers to be in the makeshift bunker in the backyard rather than on the cloud. Cloud

computing can never perform as a substitute for in-house servers because of its dependence on the internet. For example, when transferring data to and from the cloud via the internet using VPN's and SSL tunnels, there are speed limits, related to bandwidth and hardware, which can further slowdown the speed. The gratutions bandwidth for the client is required for the cloud, depending on what the client is hosting on the cloud. The sporadic internet connectivity is being experienced by IT powerhouse India. For example, the uninterrupted supply of electricity is still unrealized in India. The access to the cloud is being crippled by the power outage affecting the intermediary. The hard way of not to trust the state infrastructure, even for electricity has been realized by Indian IT giants.[10] The backup for power generation will be maintained on site. In the same way, this made us think about a backup for internet outage on cloud. This backup is all about compressing the data on cloud and then providing the compressed data to the client based on the speed of internet so that this avoids the internet outage and still upholds the efficiency and effectiveness of cloud computing in data management. Data compression helps to reduce the consumption of expensive resources in this regard. For example, the disk space or transmission bandwidth. Some loss of quality can be tolerated without losing the essential nature of data for visual and audio data. The compressed data would separately be stored on cloud. It does not create a problem as compressed data uses 5% of original data. Speed of the internet is calculated based on the type of connection. And then whether to access the compressed data or the original data will be decided. Thus, this method enables us to read, write and append huge data sequences that are fragmented and distributed at a large scale by building a highly parallel distributed data management service.

II. EXISTING SYSTEM

Cloud computing is basically the interconnection of computers deployed on internet that offers services to companies. Revolutionary storage method for data is one of the cloud services being offered. Cloud invisibly backs up the files and folders and elevates the potentially endless and costly search for extra storage space from music files to pictures to sensitive documents. Cloud storage is convenient and cost effective where it provides an alternative to buying and external hard drive or deleting old files to make space for new ones. Rather than storing the files on local hard drive, it storms on a server out in the internet somewhere. As long as there is internet capability, cloud allows us to back-up, synchronize and access data across multiple devices.

The existing method to upload and retrieve data on cloud is as follows: The method to upload data will vary based on the service chosen. Some providers give us a way to download a new software application while others offer a web based interface.

The basic process involves the following steps regardless of the method we choose:

1. Folders destined for storage have to be selected.
2. Storage system is to be alerted when we begin uploading the data.
3. To ensure the stored data to be kept up-to data: automatic uploads should be scheduled to run through the provider's storage interface.
4. We will get to know about the folders that have backed up and those which are waiting through the interface.
   Example: In order to help us to find out whether we have overlooked anything important, it places a cross mark where there is still data to be uploaded and a tick mark for sections that are completed.
5. Encryptions and privacy options should be set. In order to access our data, we need to know our encrypted passwords.
6. Through the interface provided, the files should be downloaded as retrieval from cloud and can even download these files to other computers.

Certain apps for smart phones and tablet computers enable us to view and manage the stored data. It is important to be noted that the accessing files without having to worry about managing a complex server infrastructure from virtually anywhere is compelling. Amidst all this, if not implemented properly, some potential drawbacks of cloud computing is also identified. "Speed" is one important issue that has to be concentrated currently. There are three things that determine the speed of cloud computing and they are:

a) The cloud server speed.
b) The client computer speed.
c) Connection 'pipe' speed between the server and the cloud.

Moving the server outside the physical office where a traditional local server resides is the only new thing in this network architecture. The speed issue can be analyzed by the following couple of assumptions:

a) As most of the cloud providers invest heavily to ensure their lost hardware to be very fast, safest assumption could be that the cloud server is at least as fast as any local sever.
b) Sustained fast computing is also being delivered by local computer or laptop or tablet or smart phone which is also a safe assumption or at least one that is easily corrected.
c) There are several issues to be considered regarding the speed of the connection pipe which is a new variable. In the traditional non cloud environment, the network switches, routers and cables by a very high speed network that connects the server and client computers. But the access to files and applications is routed through the internet connection in cloud computing and this where the fog sets in.

Day after day, not all internet connections perform consistently, nor are they created equal. Here are some facts to consider about the availability of typical internet connections to small and medium businesses. When compared to local network speeds, internet speed is 20 times less than them. The guarantees by the provider regarding internet speed and performance are seldom.

Users in the local office share the internet bandwidth. Users in the area and with other business also show the internet bandwidth very often. Users have no choice to determine the paths between and the server, where some are fast and some are slow. Though there are literally millions of possible path combinations, internet traffic seldom uses the same path. In the cloud environment, the type of data that is being processed has a significant impact on speed. The internet is as robust throughout the world as it is in Europe, North America and in some parts of Asia is the the cloud computing implicitly assumes. But clients from countries will be discouraged from boarding the cloud where internet connectivity is sporadic. Speed of the internet is getting poorer with time. Rather than trusting the cable/landline infrastructure, most of the internet subscribers prefer the limited speeds of wireless mobile internet from cell phone companies as the infrastructure is so haphazard. [8]File sizes also have an impact on their computing speeds, where most of the computing activities do not stop considering it. They might not have the skills or technical abilities to reduce a file even if they consider it. Even without a second thought, most people create, edit and save hundreds of files a week. The file size is rarely an issue as the network speeds are fast enough to accommodate just about any file traffic simultaneously in a traditional client-server network.

So there are at least three significant factors that can impact the speed of cloud computing solution is a point made.[9] Internet connection, data types and application. A savvy technology is needed to be investigated armed with this instruction. Thus, the options and costs of migrating all or part of the business processes to the cloud is to be monitored very effectively. The progress and the follow-up on issues of this existing system is further been elaborated in the proposed system.

III. PROPOSED SYSTEM

Our approach is based on data bandwidth speed and data compression technique. Our proposed system is step by step procedure. We concentrated our work on both cloud server and client side. Cloud server takes care of data handling; it includes a data compression and storing compressed data with the original data. Our proposed system has following steps.

1. Login:

User login to the Cloud account through his smart devices. This is the first stage and it's for securing the user account. Every user has username and password. To secure the data of client we have used some strong security procedures. The various login techniques are a) face recognition login b) finger print login technique c) normal login with strong passwords.

2. Calculating Internet speed:

After login user gets his login information, and the same time bandwidth speed of the user's internet is calculated. Depends on the connection type used by the user, the bandwidth speed changes. Connection type supported are a) Mobile broadband b) Satellite and fixed wireless c) dialup d) Wi-Fi e) DSL &cable. All these have distinct bandwidths. Sometimes because of server congestion, data traffic, low signal strength user may experience slow internet connection. Many of the times data losses occur due to network problem.

In this paper we have used JavaScript program to detect the bandwidth speed of the user. It detects the speed of the internet and sends that to cloud server.

3. Uploading and Retrieving of the data:

User can upload or retrieve the data from cloud. But many times data retrieving may stop in middle because of network failures. In our system we tried to minimize system response time by maintaining high reliability and consistency. In this step if bandwidth speed of net is slow, a pop-up will come on the user's device and it asks user to select the data either compressed and it asks user to select the data either compressed or original. Depends on user response data will be uploaded and retrieved. If the network is too slow it does not pop-up anything while retrieving of data, cloud server directly gives compressed data to the user. Every 10 minutes cloud server gets bandwidth speed from client side.

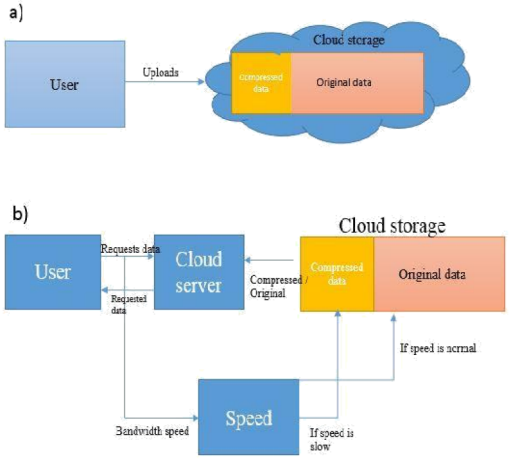

Fig.1 a) Uploading data to cloud server.
b) Retrieving data from cloud based on bandwidth speed.

3.1 Data Management

Since the 80's relational databases technology has been the 'default' storage and retrieval mechanism used in vast majority of cloud applications. In the process of creating planetary scale web search service, Google developed a massively parallel and fault tolerant distributed file system along with data organization and programming paradigm. It is instructive to note that the Big-Table based data organization underlying cloud databases exhibits some similarities to column oriented databases.

Compression can save large amount of money on storage, costs, and increase data center density or allow more data to keep on the storage. Our proposed system has capability to compress the large data sets which achieve data ratio 100:1.

Cloud server stores large volume of historical multi-structured data. [2][5]Big-Data on Hadoop requires lots of

storage and nodes. A cluster consists of hundreds or thousands of machines, and therefore failures are common. In this paper we tried to make efficient and reliable system by using Map-Reduce approach. Cloud storage has GFS and HDFS file systems. The Google File System (GFS) designed to manage relatively large files using very large distributed cluster of commodity servers connected by a high speed network. It is

Therefore designed to expect and tolerate hardware failures, even during reading and writing of an individual file and support parallel reads writes and appends by multiple client programs.

Our approach does not de-duplicate the data, but compressed duplicate data uses very small amount of memory in the storage. [3][4]We used SQL server to compress the data. It includes following procedures.

1) *Ingest:* Multi-structured data can be loaded quickly into the database from various resources. Data is loaded into tables in blocks of approximately 1 million records.

Fig.2. Proposed data management system

2) *Reduce:* Data size and required storage can be reduced or compressed into a ratio 100:1 and data is stored in optimized tree structure.
3) *Data Encryption:* The compressed data will be encrypted to secure the data from outsiders. Encryption technique used is Key-Policy Attribute
   – Based Encryption. This is a public key cryptography. Data can be auto purged to the record level, based on configuration retention rules.
4) *Storing:* The encrypted compressed data will be stored in separately in the storage system.
5) *Manage:* Less administration is required. Cloud server sends data to device based on bandwidth speed and user requirement.

We also added fault tolerance for data management applications in our proposed system.

IV. Conclusion and Future Work

We have thus outlined about the data management on cloud in an effective manner by retrieving data in an efficient way based on the internet speed. The portability and interoperability that can deliver the massive benefits is being illustrated by one of the foundations of cloud computing which is internet. We outline the challenges associated with the retrieval of data from cloud in an appropriate manner. As the data gets compressed to 100:1 ratio, it leads a more optimized way of retrieving data from cloud. The future work of the cloud computing is that it improves the use of bandwidth in a cost effective manner. We have evaluated our approach only for small storage applications. We can further enhance it for larger storage applications more intensively and effectively.

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