CLOUD VIRTUAL DRIVE LOAD BALANCING AND DYNAMIC NETWORKING

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ABSTRACT: Since last five years the most of researchers are working on the highly growing area cloud computing and many researchers solve maximum issues but it not enough for improving performance of cloud load balancing for dynamic network. In this paper, we introduce the concepts and algorithms that can be implemented to develop a virtual storage drive network for the cloud user. A number of client computers and several server computers which serve as virtual drives are interconnected by a dynamic networking computational technology. Load balancing between the various servers or virtual drives over a dynamic platform has been discussed within the paper. This research paper concludes to an algorithm based technology that can be used to create a rapid and dynamic setup of cloud technology within a network which allows its network client to store data over virtual space and improve the performance for dynamic networks in virtual cloud.

KEYWORDS: virtual; cloud; load balancing; dynamic networking; storage sharing; performance;

INTRODUCTION

Data Sharing and its ease of sharing have been major concern of cloud technology since its initial development. Basically cloud technology works over a network in which it allows its end user or clients to share and store their data over a virtual disk space. From the term virtual disk space we can easily conclude that it is the storage space which is not locally available to the client, or more simply such a disk space is not a part of the client's system. Virtual storage space is the part of the server's system over which an authorized client can get an access for various storage and sharing operations. Thus cloud computing allows its end user to remotely access, store and share data within in the network. [1, 2, 3]

RELATED WORK

The technologies based cloud computing is very popular among the people. There are several esteem I.T. organizations who contributed in virtual drive technologies, like Google Drive is a very widely used an appreciated platform provided by the Google. This technology allows a user to store its data on remote server of Google, and can fetch from anywhere using internet. Popular technology is Drop Box provided by Microsoft Corporation. It also allows its users to store their data remotely and share it over the internet..Here is a new technology that enhances the searching performance and results in overall performance growth. Also it contributes in performance by minimizing the idle time for the networking system [1, 2].

PROPOSED BASIC ARCHITECTURE

We show the architecture in Fig. 1. Then it means the major components which serves as the backbone of that particular technology. In this research paper we have introduced architecture with an aim of setting up a cloud network which allows its end users to store their data over virtual disk space within the network. There are following three major components:

End Users
These are the client of this cloud infrastructure. This component is authorized to make request to the server for remote storage and sharing. This is the major source of Load(data for storage) over the network as well as to the virtual space over the server. There could be 'n' (integer) number of end users which are active over the network.

Load Balancer
This is the master server which processes the client request. It is termed as load balancer as it serves the functionality that decides how to distribute the load over virtual storage systems available over the network.

Virtual Storage
These are the systems which act as the final destination for the data of end users which they want to be stored remotely. Hence we can conclude that virtual storage systems are those remote computers which allow the end users to store their data over it. We also called it secondary server as it communicates directly with the master server and give updates about the memory status of its storage drive.

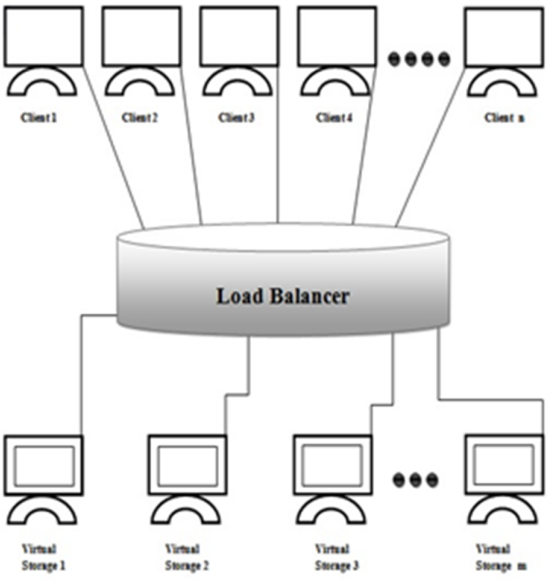

Fig. 1: Virtual Drive Network Architecture

NETWORK SETUP AND REQUIREMENTS

Cloud computing technology prefers centralized networking as compare to distributed networking. In our virtual drive architecture we create a network by connecting clients directly to the master server or load balancer. In similar manner all the virtual storage systems or secondary servers are also directly connected to the master server, thus creating a centralized network topology. The connection might be physical (wired) or wireless, any suitable and cost effective technology might be preferred. Hence we created a network in which clients can made request for data storage to the master server. The master server itself gets the memory status information from the several virtual storage servers within the network. An efficient load balancing algorithm is executed over the load balancer which finally chooses one of the 'm' virtual storage server to store the data of one of 'n' clients. The term dynamic networking is used here as the final virtual storage for a particular request has been dynamically chosen on the basis of the result of the load balancing algorithm. The distinguish network components or systems identify each other using the basic IP(internet protocol) addresses of their machines. The basic limitation found in working over this technology is that the IP addresses of the master server and the secondary server should be fixed, that means IPs of these machines should not vary with the time within the network. However, we can use DHCP (Dynamic Host Configuration Protocol) for all 'n' numbers of client machines. However on application level we can overcome this limitation by manually dictating the IPs of virtual storage server whenever the complete system startup took place.

PROPOSED ALGORITHMS FOR CONFIGURATION

We can control the overall virtual drive cloud computing concept by using various algorithms for different purpose and those collectively gives relevant output. Our research considered the following algorithms on application level:

Ip Configuration

This algorithm is used to provide the IP address of the master server and other secondary servers which serves as virtual memory. We can store this IPs in the table of our Database.
Begin
Enter master server IP and store
Enter No. of Secondary servers, m
ArrayIP[m]
for 1 to m : enter IPs of Secondary servers and store ArrayIP.
ArraySize[m]
for 1 to m : enter storage capacity of each secondary server and store ArraySize./
End.

Load Balancing algorithm

The Load balancing algorithm chooses one of the m drives over which the client requested data has to be stored. It first get the current memory status of all the m drives, then it chooses the drive with minimum current storage and put the data over it.
Begin
Get storage capacity of each m secondary storage from ArraySize[m].
Get size of Client data, d.
Get the current memory status of m drives, ArrayMem[m].
Calculate min(ArrayMem[m]) and get its index, say i.

If ArraySize[i]>= d then:
Store client data d, at virtual storage drive i.
Else
Display Error Message.
End.

IMPLEMENTATION AND ANALYSIS

To implement this new algorithmic concept shows in fig. 2. We require some tools that support this technology. We can use many coding languages like java, php, python, C# etc. We have implemented this project over php. Further we need and editor tool, it can be Netbeans, Ecllipse, Dreamweaver etc. Also if we need any backend support for database we can use Xampp, Wamp, Sql Server, MS Access etc. Wired or wireless connectivity can be performed for internetworking of cloud users. The basic concept behind the connectivity is getting the IP addresses of the cloud nodes. To begin with this application, it will ask for data from the client which can be stored over any of the virtual drives. When the client data has been uploaded by the client, the request passes to the master server for load balancing. This process runs in background for the client. Now load balancing server forwards the data to the virtual drives on the basis of the result of the load balancer. Thus finally the client data is stored over the virtual drive. [14, 15, 16]

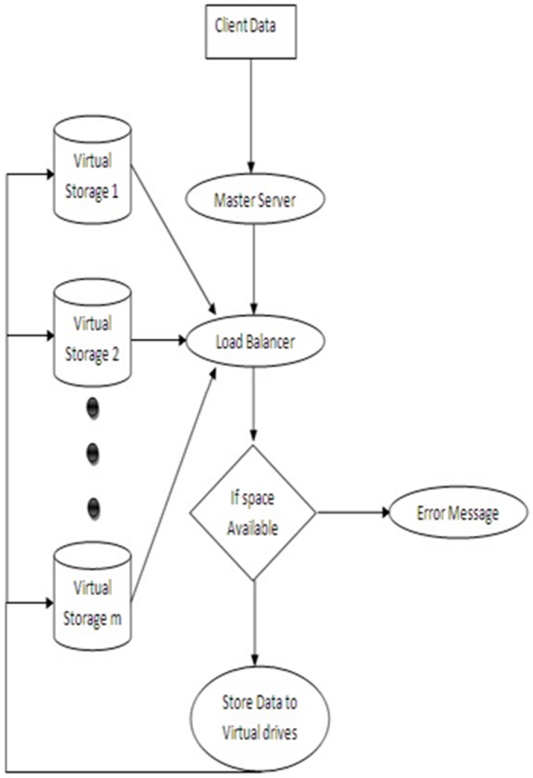

Fig. 2: Virtual Drive Network Architecture

The load balancer performs the quick sort on the ArrayMem[m] to find the virtual storage drive which have minimum stored data. Thus we get the drives which have the maximum capacity to store data, and the client request has been fulfilled by storing the data on the same drive. Here we used quick sort algorithm whose complexity is as following table 1:

Table 1: Quick Sort Algorithm Complexity

Worst case performance	Best case performance
O(n2)	O(n log n)(simple partition) or O(n) (three-way partition and equal keys)

MODIFYING FILE OVER SERVER

Cloud computing technology is widely popular because of its ability that allows its users to store as well as modify their content over the remote system over the internet.

It is not always necessary to use a private LAN for the networking between the various network components, the client and the server can be interlinked over the internet too. For such a situation we need several programming tools for the developer that integrate the feature of remote editing of files over the internet.

Here the programming tools refers to the programming languages that support file handling over the internet, like Php, JSP, C# etc.

Just for an example we took Php as our programming tool over which the cloud technology has been implemented. Then we can use the following code which first allows to open the selected file-

```
fopen("http:// 107.190.137.202/abc.txt","a+");
```

The above method "fopen" opens the file stored over the IP that is passed as the parameter to the fopen method. Also "a+" is one of the modes which opens the file in read/write mode and allows one to append the data over it.

Similarly we can rename the existing file and folder by the following Php code-
rename(oldname,newname);

Here rename method is used to rename any file or directory. Two parameters has been passed, first requires the name of the file/directory that has to be renamed, and the second parameter is for the new name for that file/directory.

PHP also provides another inbuilt method through which one can relocate already uploaded file from one location to another location. The following syntax can be used for relocating an already uploaded file-move_uploaded_file(file,newloc)

The above method requires two parameters, first one specifies the file name that is to be relocated, and the second parameter specifies the new location for the file to be relocated.

The motive of all the above discussion is to understand the requirements of the developer/coder of the cloud technology which powered any user to modify the uploaded file in terms of its content, location and in many other forms that are not discussed here.

Thus we can say that cloud is a technology which allows its clients or users to store their data over virtual space, and also give them power to create file/directories over that virtual space, and to modify the contents and location of that particular file/directory.

PERSONALIZED CLOUD

Personalized cloud stands here when the capabilities of cloud technologies are configured specially for any particular organization so that its employees can store there official data over the local cloud which can be accessed by them from anywhere within the VPN of that organization irrespective of their current location.

An organization may have different branches located across the various countries, but these must be interlinked with each other thus creating a VPN. Here we can personalize the cloud technology so that its employees can store data over local cloud and that will be accessible at all the branches of that organization which are interlinked through that VPN.

Hence a local cloud can be created which is specialized for a particular organization, and users of this cloud may be restricted to its employees or administrators only. This requirement can vary from organization to organization.

CONCLUSION AND FUTURE WORK

Our research works over the cloud technology which solves the load balancing problems faced during virtual drive implementation. Our research also includes the dynamic networking to implement the cloud technology using network protocols. Centralized client server model has been used, which consists of client, master server and secondary storage server. This project prove beneficial for large scale area where large amount of data is stored on virtual machines as we provide the algorithms to store the data in easiest way without creating any network traffic. This concept can be implemented by any small/big organization for their private virtual network (VPN) over which the can create their separate cloud over which its network users can store and share their data. This implementation will be completely personal for that particular organization. Hence a VPN can be designed for any organization for easy storage of data and its sharing over the same VPN [7]. As day by day many organizations collects data according to their requirements and store it over the network storage devices which require a good mechanism between client and server for sharing the data. So this problem is also solved by our work. In future this technology can be implementing over completely wireless networking and for long distances. We can also launch this technology to the smart phones, so that the mobile users can also use this application. To work for mobile users a concept of dynamic IP have to be used and another algorithm regarding the IP configuration have to be proposed. This new technology of cloud computing is also implemented through Grid technology over which resource sharing can be a major point of concern. So by using this concept with grid technology, not only data is shared or accessed between client and server but also data is secure by various network protocols .[8,9,10]

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