

Deployment of Load Balancing Concept using Own Cloud

^{#1}Pankaj Sarda, ^{#2}Yash Ambike, ^{#3}Harshvardhan Swami,
^{#4}Chandresh Kurhadkar, ^{#5}Prof. Ila Savant



¹sardapankaj8@gmail.com

²yash.ambike@gmail.com

³harshvardhanswami@gmail.com

⁴chandresh2581994@gmail.com

⁵ilasawant@mmcoe.edu.in

^{#12345}Department of Computer Engineering,
MMCOE, Pune, India.

ABSTRACT

ARTICLE INFO

Article History

Received: 22nd March 2017

Received in revised form :

22nd March 2017

Accepted: 25th March 2017

Published online :

26th March 2017

A Raspberry Pi is used to set a private server on which an application can be executed. Raspberry Pi is a cheaper microprocessor in which cloud computing infrastructure can be obtained using cloud platforms provided by specific cloud vendors. Hence Raspberry Pi can be used as a cloud server which serves as a storage device for real time applications. Cloud technology is moving towards multi cloud environment with inclusion of various devices. Multi cloud architecture is a solution that assures better security and performance at a nominal cost. There are different approaches used for storing and processing data in a multi cloud environment. Instead of storing complete file on single cloud system, the proposed system will split the file in different chunks then encrypt it and store on multi-cloud. Cloud load balancing is a concept in which workloads is distributed across multiple computing resources. Load balancing in the cloud computing environment has an important impact on the performance. Good load balancing makes cloud computing more efficient and improves user satisfaction.

Keywords: Raspberry Pi, Cloud technology, Multi cloud, Load balancing.

I. INTRODUCTION

Cloud Storage is a backend –as-a-service which provides seamless scalability and it removes the necessity of operating databases which are distributed in nature. It is a fast and fully managed service that is specifically designed for internet scale applications. From large organizations to smaller sectors a server has now become an extremely essential thing that provides all the essential services that are needed across a network. The key feature of the server is that it can store a large amount of data centrally and also it is able to provide access to restricted users via the internet across different geographical regions just by connecting into the same network. Raspberry Pi as a cloud storage can be implemented in real time applications. A private cloud server can be set up in a Raspberry Pi which could be used as storage device for application. In this paper we are going to create a private cloud storage in which data can be stored and retrieved. And we are going to implement the concept of Multi-Cloud and Load balancing methodology. Multi-

cloud is a methodology to allocate workload across many computers, or other resources over the network links to achieve optimal resource utilization, make the most of throughput, minimum response time, and avoid overload. It presents a load balancing Task Scheduling algorithms or technique in cloud computing. Efficient task scheduling mechanism should meet user's requirements and improve the resource utilization, so as to enhance the overall performance of the cloud computing environment. Cloud computing provides flexible way to retain data and files which involves virtualization, distributed computing, and web services. [8] This project introduces an optimized algorithm for task scheduling based on Load Balancing based Scheduling in cloud computing and the implementation of it. Cloud computing is a combination of converged infrastructure and shared services. The benefit cloud computing, multiple users can access a single server

to retrieve and update their data without purchasing licenses for different applications. [5]

II. EXISTING SYSTEM

Cloud computing has become more and more popular and powerful in gaining everyone's attention in the field of research and business as well [6]. Additional security is a major issue and needs critical improvement in cloud computing. The information of users is kept secret which protects the confidentiality of users and their data over the cloud. The cloud maintenance perspective is the major advantage in cloud environment by the cloud providers. The cloud provides lots of storage services and also major components which includes infrastructure, virtualization. Top companies giving cloud services include Amazon, Microsoft, Rackspace, Google, Sales force and so on. However, using these types of cloud services doesn't come in handy. Users have to pay a certain amount to use their services and neither gets the full advantage of using it. So, in our proposed system we can build our own cloud server for storing files, images, text, data etc. The user can use without paying the fee for obtaining services and hence save the cost of using large cloud services.

III. CLOUD SERVER SETUP

A. Initial Cloud Setup using Raspberry Pi

Raspberry Pi is a powerful tiny computer based on ARM based microcontroller. It works on Linux distributions like Raspbian, Debian operating systems. A Raspberry Pi board with a prepared operating system SD card, USB keyboard, mouse, HDMI display, power supply and cables it is possible to make the Raspberry Pi to work like a normal general purpose computer.

- OS Installation

Raspberry Pi does not have internal storage or built-in operating system and it requires an SD-card that is set up to boot the Pi. An SD-card has to be connected to the normal windows machine using a card reader. From the Raspberry Pi's official website NOOBS has to be downloaded and unzipped the same in the SD-card after which the SD-card serves as the internal storage for the Raspberry Pi and using the NOOBS main menu Raspbian OS can be installed in it. As soon as the SD-card is inserted in the Raspberry Pi, the device boots up.

- Internet Settings

The quickest way to get the Raspberry Pi connected to the Internet is to connect an Ethernet patch cable and to just plug into the network router. For this to work, the router should be configured for DHCP (Dynamic Host Configuration Protocol). User Interface Designing (Front End)

- Wired network configuration can be done by making changes in the configuration file in the path `/etc/network/interfaces`. To open the file and see, using the following command, `sudo nano /etc/network/interfaces` iface eth0 inet dhcp.

- Wireless network configuration can be done using USB Wi-Fi adapters, which are compatible with the Raspberry Pi. There is a list of USB Wi-Fi adapters supported by default by the Raspberry Pi.

B. Creation of Multicloud and applying Virtual Cloud Concept

With the fast changing interests and routines of people it's vital for business organizations to survive, this pushes them to opt for clouds that offers the best level of security and secrecy for their business. All the above seen multicloud approaches have their own advantages and disadvantages. There isn't an architecture which is suitable for all applications whether it be medical, banking or business sector. Cryptographic data splitting combined with Homomorphic encryption is one of the viable solution from both technical and economical point of view. This method, after partitioning the data using vertical or horizontal fragmentation they are encrypted before storing it to the clouds.

The encryption engine is responsible for encrypting the data after partitioning them into client data and business data; this also decides which algorithm to use for encrypting the data. The partitioning here is based on business requirement so that customer information is stored in one cloud and all business related data is stored in another cloud. Integration layer is responsible for combining the processed data and decrypting it before sending the output to the user. The encryption applied is a homomorphic encryption which is a different form of encryption scheme which allows the clouds to perform operations on the encrypted data without decrypting and exposing the plain text. This is an additional security measure which ensures integrity and confidentiality of the data being stored. Homomorphic encryption scheme doesn't require the user to be bothered; either to generate any keys or to grant any permission for accessing the data for processing by clouds. [6]

Memory is one of the most important parts of servers, it is a bridge between CPU and hard disk. Operational data can be stored in memory temporarily and memory can also exchange the system file with hard disk. When computer is running, CPU will transfer operations data into an in-memory operation, then CPU will transfer the results after completing operation. Memory reliability also determines the stable operation of the computer. [3] A virtual private cloud (VPC) is an on-demand configurable pool of shared computing resources allocated within a public cloud environment, providing a certain level of isolation between the different organizations (users) using the resources.

IV. PROPOSED SYSTEM

Our proposed system is to create a private cloud which can be only accessed when administrator gives the permission, our system gets more secure [5]. As the data on a public cloud can be accessed by any one, the security on the public cloud degrades. As the protection of your data becomes harder and harder you may be thinking of moving your files to a private cloud storage. Our aim is to create our

own personal private cloud which can be access by users. Raspberry pi is used to create our personal private cloud [6].

Rasbian os is installed in raspberry pi to create a private storage which would work as a private cloud. Administrator can upload files on a private cloud. During uploading the data gets divided into chunks and get stored on private cloud. Different clients can access the files by requesting administrator. During uploading data is divided into chunks and get encrypted. Encryption of data is done using DES security algorithm. The file is encrypted using the encryption algorithm thus confidentiality is maintained. [7].

Our system creates a copy of data which is in a private cloud and this copy is stored on an another cloud [1]. So even if a data on a private cloud gets corrupted or it gets damage it can be retrieved from another cloud which is called as virtual cloud. User is unable to access data from virtual cloud. If data on a private cloud gets corrupted, then system automatically replace it with copy from virtual cloud. This model divides the private cloud into two cloud partitions, so that accessing the data becomes faster. There is specific count, up to that count the files can be stored on one partition. Once the count is reached next files are stored on another partition. Again after count is reached the files are stored on first partition and so on. In this way system achieves efficient load balancing and improve the response time. Concept of Multicloud can be achieve using this technique.

Figure 1.Administrator

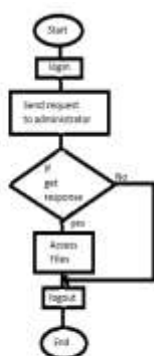


Figure 2.Client

Fig1 & 2, shows administrator and client sections. In fig.2 Firstly administrator done his login after entering correct email id and password administrator can upload files. Administrator can view and download files. When client requests for the accessing data, Administrator check for authentication of the user, if administrator find that user is authenticated it send the response. In fig3. first it checks for registration, if client is new then he has to do registration else it can directly go to login phase. After successful login client is only able to see file names. To view or download client make request to administrator and wait for the response. If he gets the response from the administrator, he can able to access files. After accessing is over client logout from the system.

V. SYSTEM ARCHITECTURE

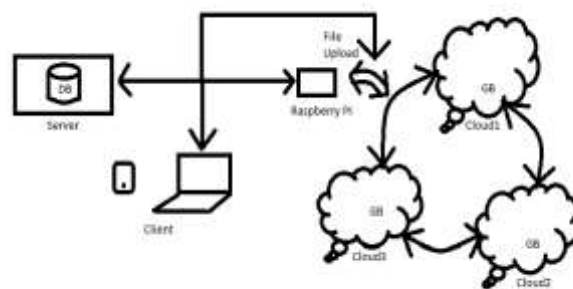


Figure 3. System Architecture

System Architecture defines a Database Server setup on raspberry pi which is used to create own cloud. The system makes use of load balancing concept for the data storage. There is a copy virtually created of data in cloud which gets restored when the file gets corrupted. Basically load balancing means dividing the incoming load or tasks evenly among the cloud nodes so as to achieve maximum user satisfaction, reduce response time and maximize resource utilization. [2] There have been many studies of load balancing for the cloud environment. Load balancing in cloud computing which introduces the tools and techniques commonly used for load balancing in the cloud. However, load balancing in the cloud is still a new problem that needs new architectures to adapt to many changes. Load balancing plays an important role in improving the performance and maintaining stability. [4]

VI. CONCLUSION

Cloud Computing is the latest trend in the ongoing market in which Client can access the data through Internet. Private cloud has been created which provides more security. Private cloud is used for storing and retrieving of data. Data is stored in private cloud by using efficient load balancing methodology. We have provided a better way of proving services to client by using Raspberry Pi base as private cloud.

ACKNOWLEDGEMENT

We would like to thank the editors and anonymous reviewers for their valuable comments and helpful suggestions.

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