A Business Model for Cloud Computing on a Separate Encryption and Decryption Service

[1] Shishir A. Verma, [2] Mayur D. Patil, [3] Mangesh M. Sathe , [4] Thakare D. Chetan, [5] Prof.Mohit Dighe
Computer Engineering, Pune University
Shri Chhattrapati Shivaji College of Engineering

Abstract: **- This paper presents a business model for cloud computing on a separate encryption and decryption service. Cloud Computing is evolving and considered next generation architecture for computing. Typically cloud computing is a combination of computing resources accessible via internet. Historically the client or organizations store data in data centers with firewall and other security techniques used to protect data against intrudes to access the data. Since the data was confined to data centers in limits of organization, the control over the data was more and well defined procedures could be used for accessing its own data. However in cloud computing, since the data is stored anywhere across the globe, the client organizations have less control over the stored data. To build the trust for the growth of cloud computing the cloud providers must protect the user data from unauthorized access and disclosure. One technique could be encrypting the data on client side before storing it in cloud storage. Divide and rule can be one of the techniques, meaning dividing the responsibilities among different cloud services providers can benefits the client. Storing the data in encrypted form is a common method of information privacy protection. If a cloud system is responsible for both tasks on storage and encryption/decryption of data, the system administrators may simultaneously obtain encrypted data and decryption keys. This allows them to access information without authorization and thus poses a risk to information privacy. This study proposes a business model for cloud computing based on the concept of separating the encryption and decryption service from the storage service. Furthermore, the party responsible for the data storage system must not store data in plain text, and the party responsible for data encryption and decryption must delete all data upon the computation on encryption or decryption is complete.**

Keywords: Cloud computing, cloud services, Encryption, Decryption, security, service provider etc

I. INTRODUCTION

With evolution of computers the life of people became more and more easily. They were able to keep their data on their devices, and started finding ways to make them accessible to others, for example say by using floppy, writable disks, which was followed by portable hard-disk, all these where expensive in their own way during their time. The data was very much private on personal devices like PC or laptops, mobile phones etc, therefore sharing data with others was at time of testing or recognition phase, the feature of test pattern (test speech data) is matched with the trained model of each and every class. The test considered to be expensive. As the world of computing got more advanced the ways for sharing data started becoming cheaper and cheaper. In recent years a new term has evolved call Cloud which is provided by different provider's,[1] and which is nothing but facility or service of different resources or components like hardware, platform, storage's, software etc, and it is gaining importance because it free the user from maintenance perspective on a investment of some money for the use of these services provided by cloud service providers. Now to provide such service to the client, naturally the providers must have and rather can have access to resources which are used by the people/clients.

Among the reasons these access are greatly required are for maintenance perspective. And definitely since billions of clients will be thinking about using such service, the infrastructure ought to be capable enough to support them, and these resources ought to be shared between billions of client's. Service availability[2], data synchronization between different devices, availability of data via any devices which includes browser facility makes cloud more attractive. Now since the info gets shared or stored in providers area, the client gets worried about privacy of its data, although there are certain agreements and SLA(Service Level Agreement) which are agreed by cloud provider and client. By signing an SLA, the user show that he understood and agreed to the contents of the application service, and agrees with the provider's data privacy and protection policies.

Cloud computing is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). The name comes from the use of a cloud-shaped symbol as an level of abstraction for the complex infrastructure it contains in the system diagrams as shown in figure1[5]. Cloud computing entrusts

remote services with a user's data, computation and software. Cloud computing provides three fundamental services.

A) *Infrastructure as a service (IaaS)*

In this most basic cloud service model, cloud providers offer computers, as physical or more often as virtual machines, and other resources. The virtual machines run as guests by a hypervisor, such as Xen or KVM. Management of pools of hypervisors by the cloud operational support system leads to the ability to scale to support a large number of virtual machines. Other resources in IaaS clouds include images in a virtual machine image library, raw (block) and file-based storage, firewalls, load balancers, IP addresses, virtual local area networks (VLANs), and software bundles[1]. IaaS cloud providers supply these resources on demand from their large pools installed in data centers. For wide area connectivity, the Internet can be used or in carrier clouds dedicated virtual private networks can be configured. To deploy their applications, cloud users then install operating system images on the machines as well as their application software. In this model, it is the cloud user who is responsible for patching and maintaining the operating systems and application software[1]. Cloud providers typically bill IaaS services on a utility computing basis, that is, cost will reflect the amount of resources allocated and consumed.

B) *Platform as a service (PaaS)*

In the PaaS model, cloud providers deliver a computing platform typically including operating system, programming language execution environment, database, and web server. Application developers can develop and run their software solutions on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layers[3]. With some PaaS offers, the underlying computer and storage resources scale automatically to match application demand such that cloud user does not have to allocate resources manually.

C) Software as a service (SaaS)

In this model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. The cloud users do not manage the cloud infrastructure and platform on which the application is running. This eliminates the need to install and run the application on the cloud user's own computers simplifying maintenance and support. What makes a cloud application different from other applications is its elasticity[1]. This can be achieved by cloning tasks onto multiple virtual machines at run-time to meet the changing work demand Load balancers distribute the work over the set of virtual machines. This process is inconspicuous to the cloud user who sees only a single access point. To accommodate a large number of cloud users, cloud applications can be multitenant [4], that is, any machine serves more than one cloud user organization. It is common to refer to special types of cloud based application software with a similar naming convention: desktop as a service, business process as a service, test environment as a service, communication as a service. The pricing model for SAAS applications is typically a monthly or yearly flat fee per user.

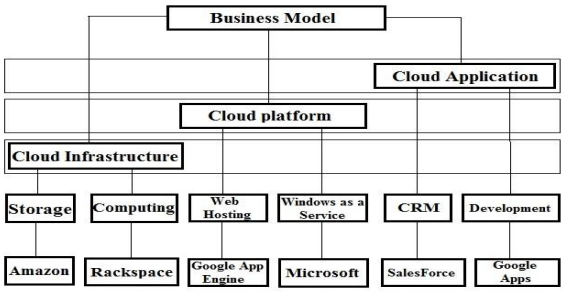

Figure1: Cloud computing business model

II. LITERATURE REVIEW

A. *Origin and Definition of Cloud Computing*

Cloud computing services use the Internet to transform information technology resources into services for end-users, including software services, computing platform services, development platform services, and basic infrastructure leasing as a transmission medium. The internet began to grow rapidly in the 1990s and the increasingly sophisticated network infrastructure and increased bandwidth developed in recent years has dramatically increased the stability of various applications services available to users through the Internet, thus marking the beginning of cloud computing network services era. As a concept, Cloud is a concept in which large number of computers is connected together via internet. Some scholars find cloud computing similar to grid computing. The literature contains many explanations of cloud computing[1][2]. After examining scholarly definitions of cloud computing, Rodero-Merino, Vaquero, and Lindner Caceres, suggested that cloud computing can be defined as the integration of virtual resources according to user requirements, flexibly combining resources including hardware, development platforms and various applications to create services[2]. The special features of cloud computing include the storage of user data in the cloud and the lack of any need for software installation on the client side. As long as the user is able to connect to the Internet, all of the resources in the cloud can be used as client-side infrastructure. Generally speaking, cloud computing applications are demand-driven, providing services according to user requirements, and service providers charge by instances of use, or defined period.

B. *Cloud Computing Business Models*

The hardware and architecture required for providing cloud computing environment services is similar to most computer hardware and software systems. The hardware in a modern personal computer (i.e., CPU, Hard disk drive, optical drive, etc.) performs basic functions such as performing calculations and storing data. The operating system (e.g., Windows XP,7,8, linux etc) is the platform for the operations of the basic infrastructure, and text processing software such as MSWord and Excel are application services which run on the platform[2].

The architecture of cloud services can be divided into different three levels: infrastructure (Iaas), platform (Paas), and application software (Saas). Application software constructs the user interface and presents the application system's functions. Through the functions of the operations platform, the application can use the CPU and other

hardware resources to execute calculations and access storage media and other equipment to store data.

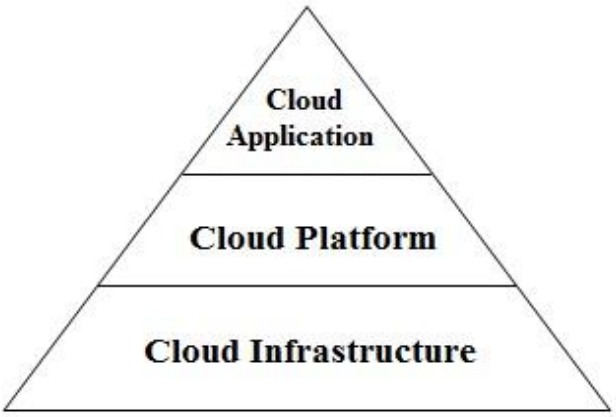

Figure2: Layered organization of Cloud

III. CRM SYSTEM IN CLOUD COMPUTING WITH DIFFERENT SERVICES PROVIDERS

a) CRM system in cloud computing with different service providers:

This study proposes a system in cloud computing with different service providers. This concept is based on separating the encryption/decryption service and storage of the user data. In this business model storage and encryption/decryption are as a service and are not provided by a single operator. In addition to this SaaS provider may not store unencrypted user data[1]. Once the encryption/decryption as a service has finished encrypting/decrypting the user data and handed it to the CRM System. The encryption/decryption System must delete all encrypted/decrypted user data.

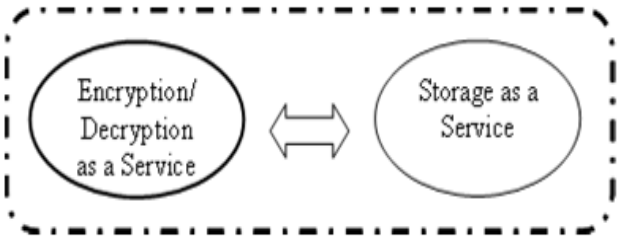

Figure3: Encryption/Decryption as an Independent Service

b) Operating of the encryption/decryption as a separate cloud service business model.

This section discusses about the CRM application & separated cloud system for example. If user wants to store data he/she must enter the details[5]. The user details gets stored in CRM application then the data which is to be stored is send to encryption/decryption service. After completing the encryption data is stored on database as shown in figure4. They accessing to the encrypted data is presented form being misuse & providing security to the data.

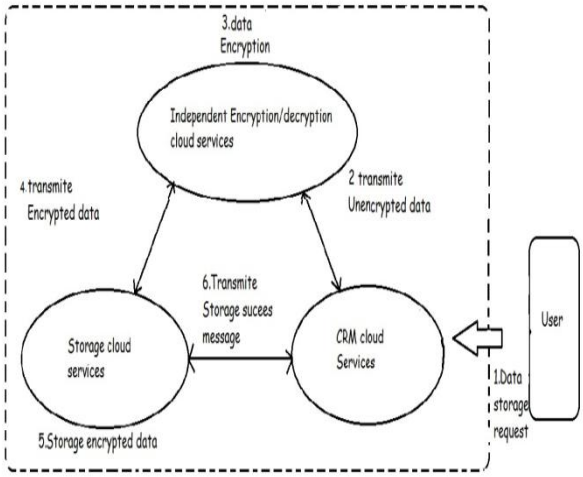

Figure 4: Data Storage Diagram

The encrypted data stored in the cloud is stored in separate storage system, thus the encryption cloud server never knows about the original data. This is the storage program.

If user wants to retrieve data, first of all user side validation are done & the storage cloud send the data to decryption service to decrypted the data & the decrypted data is send to CRM application for displaying data as shown in figure5. The service providers are separated thus protecting them from the unauthorized users.

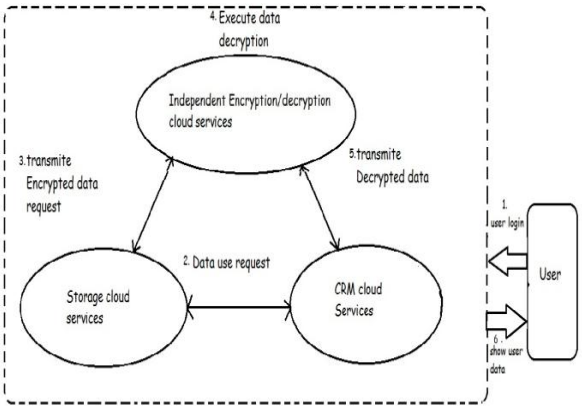

Figure5: Data Retrieval Diagram

IV. CONCLUSION

This study proposes a Business Model for Cloud Computing Based on a Separate Encryption and Decryption Service. For cloud computing to be used and spread, users must have a high level of trust in the methods by which service providers protect their data, emphasizing that authorization of the storage and encryption/decryption of user data must be differentiated with two different service providers[5]. The privileges of storing as a service provider include storing user data which is already encrypted through an Encryption/Decryption service.

V. RESULTS

The concept of this paper is implemented and results are obtained by implementing in PHP and HTML as a frontend and MYSQL as a backend on a Core 2 Duo Processor n above version with minimum 100 GB hard-disk and 1GB RAM with apache web server shown in figure 6. The propose paper's concept give efficient result. It provides efficient encryption/ decryption of data and providing the security to data by differentiating the encryption/decryption as a service and storage as a service.

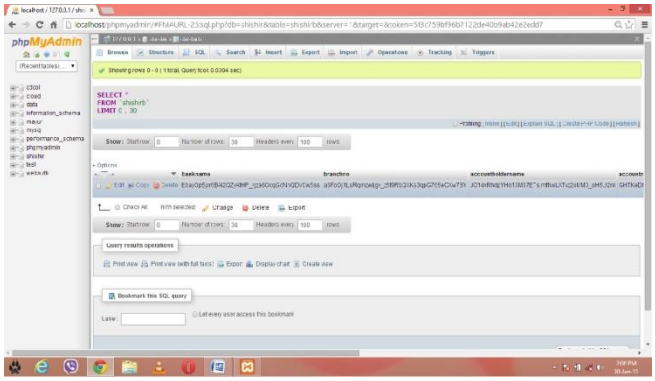

Figure6: Customer Information storage in Encrypted Format

REFERENCES

[1] Gargee Sharma, Prakriti Trivedi, "A Model for Data Protection Based on the Concept of Secure Cloud" Computing,Volome:2, Issue: 3,March 2012.

[2] Vishakha Lokhand ,Prasanna Kumari P. "Efficient Encryption and Decryption Services for Cloud Computing", Vol I Issue 2 December 2012.

[3] Jing-Jang Hwang and Hung-kai Chuang, Yi-Chang Hsu and Chein-Hsing Wu,"A Business Model for Cloud Computing Based on a Separate Encryption and Decryption Service", 978-1-4244-9224-a/11/2011 IEEE.

[4] Mrs.I.Golda Selia, S.K. Madhumithaa, "CRM system in Cloud Computing with Different Service Providers", ISSN:2250-3005.

[5] Rajiv R Bhandari, Prof. Nitin Mishra Cloud Computing A CRM Service Based on Separate Encryption and Decryption Usinf Blowfish Algorithm, volume: 1,issue: 4, ISSN 2321-8169.