Privacy and Physical access issues in Cloud computing

S D Choudhari
Department of information Technology
J L Chaturvedi,College of engineering
Nagpur,India
choudhari.sachin1986@gmail.com

Dr S K Shrivastava
Director
SBITM
Betul,India
skshriwastava@gmail.com

***Abstract*—Cloud computing is a way to increase the capacity or add capabilities dynamically without investing in new infrastructure, training new personnel, or licensing new software. It extends Information Technology's (IT) existing capabilities. In the last few years, cloud computing has grown from being a promising business concept to one of the fast growing segments of the IT industry. But as more and more information on individuals and companies are placed in the cloud, concerns are beginning to grow about just how safe an environment it is. Despite of all the hype surrounding the cloud, enterprise customers are still reluctant to deploy their business in the cloud. Security is one of the major issues which reduces the growth of cloud computing and complications with data privacy and data protection continue to plague the market. The advent of an advanced model should not negotiate with the required functionalities and capabilities present in the current model. A new model targeting at improving features of an existing model must not risk or threaten other important features of the current model. The architecture of cloud poses such a threat to the security of the existing technologies when deployed in a cloud environment. Cloud service users need to be vigilant in understanding the risks of data breaches in this new environment. In this paper, physical access issues and privacy issues are presented. This paper is concentrated towards the issues related to the accessibility and privacy of clouds.**

In this work, we present cloud computing system that gives users the ability to control entire cloud servers instances deployed across a various physical resources. We outline the basic principles of the cloud computing system, and discuss architecture of cloud system that we have made in order to allow full accessibility and give privacy to servers. Finally, we provide evidence that enables users familiar with data accessibility and privacy over clouds.

Keywords-component; Physical access issues, Privacy control issues, Privacy issues in cloud computing,cloud security.

I. INTRODUCTION

There are many ways in which data storage facilities are provided to users, ranging from a user accessing a single laptop to the allocation of thousands of compute nodes distributed around the world. Users generally locate resources based on a variety of characteristics, including the hardware architecture, memory and storage capacity, network connectivity and, occasionally, geographic location. Usually this resource allocation process involves a mix of resource availability, application performance profiling, software service requirements, and administrative connections. While great strides have been made in the HPC and Grid Computing communities [15, 7] toward the creation of resource provisioning standards [14], this process remains somewhat cumbersome for a user with complex resource requirements.

For example, a user that requires a large number of computational resources might have to contact several different resource providers in order to satisfy his requirements. When the pool of resources is finally delivered, it is often heterogeneous, making the task of performance profiling and efficient use of the resources difficult. While some users have the expertise required to exploit resource heterogeneity, many prefer an environment where resource hardware, software stacks, and programming environments are uniform. Such uniformity makes the task of large-scale application development and deployment more accessible.

Recently, a number of systems have arisen that attempt to convert what is essentially a manual large-scale resource provisioning and programming problem into a more abstract notion commonly referred to as elastic, utility, or cloud computing (we use the term "cloud computing" to refer to these systems in the remainder of this work). As the number and scale of cloud-computing systems continues to grow, significant study is required to determine directions we can pursue toward the goal of making future cloud computing platforms successful. Currently, most existing cloud-computing offerings are either proprietary or depend on software that is not amenable to experimentation or instrumentation.

II. PHYSICAL ACCESS ISSUES

Physical access issues, are the issue of an organization's staff not having physical access to the machines storing and processing a data. Secondly, the issue of unknown third parties having physical access to the machines.

In cloud computing systems, the user who has cloud, loses control of data present on servers. It is totally controlled by cloud service providers. The whole data and server management is done by service providers. Cloud service providers allocate resources dynamically to client. Thus, the user loses physical access to the data present on cloud servers.

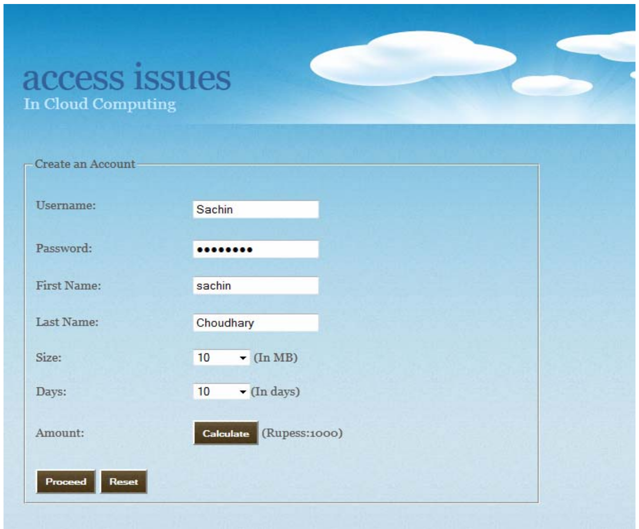
III. Privacy and Control Issues

Privacy and control issues are the issues where all services are controlled and managed by cloud service providers. Here user loses control over data present on server.

Cloud services are offered to client depending on his plan. Each plan indicates

- Number of days a user can access cloud services.
- Number of resources a user can access.
- Size of data a user can access.
- Price to be paid, if access limit is exceeded.

This is shown as follows:



access issues
In Cloud Computing

Create an Account

Username:	Sachin
Password:	••••••••
First Name:	sachin
Last Name:	Choudhary
Size:	10 (In MB)
Days:	10 (In days)
Amount:	Calculate (Rupess:1000)

Proceed Reset

There are many cloud clients that are accessing cloud services from the same cloud service provider, so there may be possibility that other client can access our precious and valuable information.

Hence, physical control of a data is an issue for all cloud applications.

IV. Solution

A. Cloud Design

To overcome above issues, we have created private clouds where everything can be managed easily. The architecture of the system is simple, flexible and modular with a hierarchical design reflecting common resource management found in many academic cloud systems.

In essence, the system allows users to start, control, access, and terminate entire cloud services using control feature and "Query" interfaces. That is, users of system interact with system using the exact same tools and interfaces that they used to interact with other clouds. Currently, we support only data as a service architecture i.e. user can only access and manage data present on cloud servers. But there is also plan to add support for other services in the near future.

The architecture of system is shown as follows:

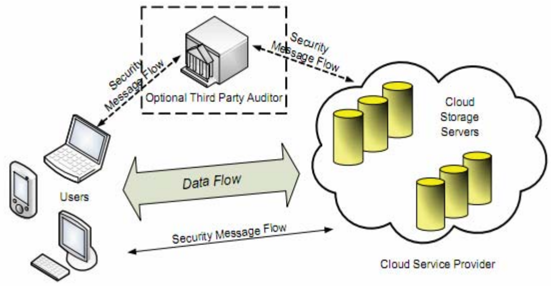


Fig. 1: Cloud data storage architecture

We have chosen to implement each system component as a stand-alone Web service. This has the following benefits:

First, each Web service exposes a well defined language-agnostic API in the form of a WSDL document containing both operations that the service can perform and input/output data structures.

Second, we can leverage existing Web-service features such as WS Security policies for secure communication between components. i.e. communication between cloud client and cloud servers is secured.

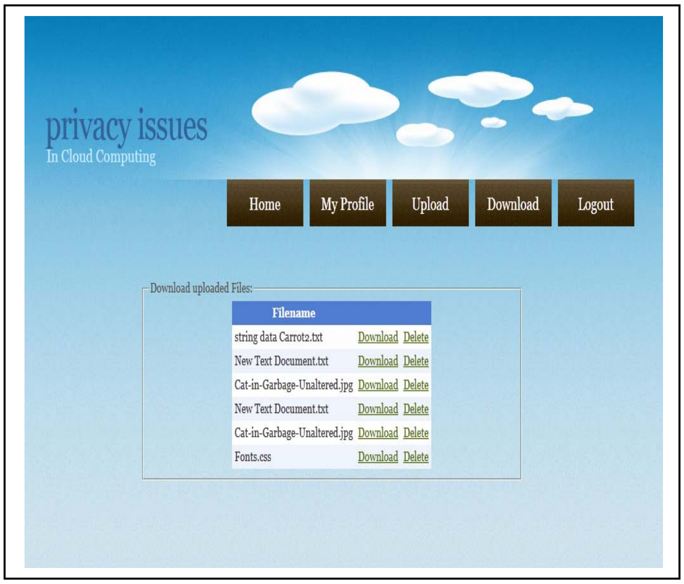
There are three high-level components, each with its own Web-service interface, that comprise a Cloud system. These are explained as follows:

1) Cloud client:

It is the instance of running cloud service. It contains all the applications necessary for client. This is very important component of cloud system. This is the one component, which is directly accessed by client. Its interface is very important as client will determine our service based on this component only.

Here we are giving facility to upload and download file to and from cloud servers. When user uploads a file to cloud server, it is saved on server by using cloud service provider application. And when user wants to download the same, he can send request to cloud service provider, and file will get downloaded from cloud server.

If some data is of no use, then user can also delete it. This data is deleted from cloud server, so as to reduce load on cloud servers. This is shown as follows:



Download uploaded Files:

Filename		
string data Carrot2.txt	Download	Delete
New Text Document.txt	Download	Delete
Cat-in-Garbage-Unaltered.jpg	Download	Delete
New Text Document.txt	Download	Delete
Cat-in-Garbage-Unaltered.jpg	Download	Delete
Fonts.css	Download	Delete

2) *Cloud service provider:*

The underlying resources that comprise a cloud system are exposed and managed by, the Cloud Service Provider (CSP). The Cloud service provider is a collection of web services which perform data services. These data Services govern persistent user and system data and provide for a configurable user environment for formulating resource allocation request properties.

The data services process user requests and interact with the cloud servers to effect the allocation and deallocation of physical resources. A simple representation of the system's resource state (SRS) is maintained through communication with the servers and is used in evaluating the realizability of user requests. The role of the data service is executed in two stages: when user requests arrive, the information in the data service is relied upon to make an control decision with respect to a user-specified service level expectation. Response creation, then, consists of reservation of the resources in the CSP, followed by commitment of the resources in on success, or rollback in case of errors.

The Cloud service provider of cloud system handles the creation, modification, interrogation, and storage of system and user data. Users can query these services to discover available resource information (images and clusters) and manipulate abstract parameters applicable to cloud client. The data Services interact with the cloud server to resolve references to user provided parameters (e.g., keys associated with a instance to be created). However, these services are not static configuration parameters. For example, a user is able to change, what amounts to, firewall rules which affect the ingress of traffic. The changes can be made offline and provided as inputs to a resource allocation request, but, additionally, they can be manipulated while the allocation is running.

3) *Cloud servers:*

This interface acts as a data storage service that leverages standard web services technologies and its interface is compatible Cloud service provider. Cloud server implements the SOAP (via HTTP), sometimes termed the "Query" interface, as well as the SOAP interfaces that are compatible with HTTP, FTP etc.

Cloud servers provide three types of functionality:

- Users that have access to cloud system can use Cloud servers to stream data into/out of the cloud.
- In addition, cloud server acts as a storage service for images, files etc. Thus, files can be uploaded on cloud system using this interface.
- The cloud server's shares user credentials with the Cloud Service provider so as to detect which user is uploaded that data.

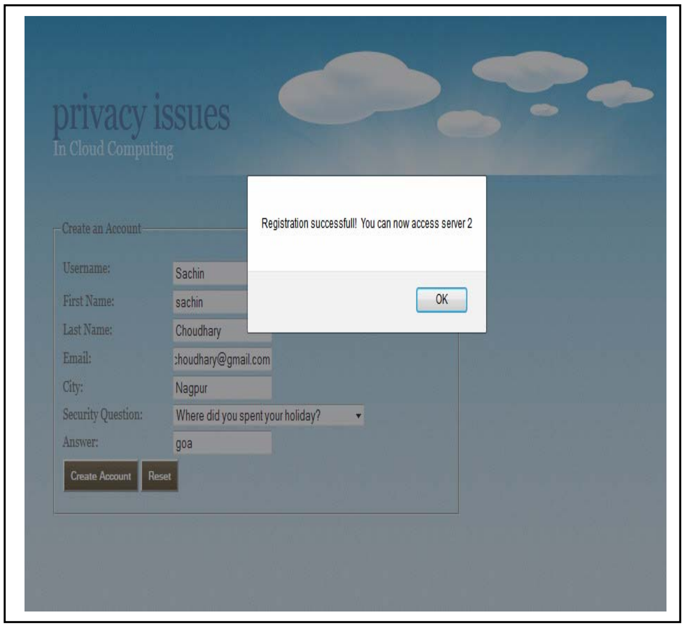
V. CONCLUSION

The cloud system is built to overcome

- Physical access issues
- Privacy control issues.

The system exposes its feature set through a common user interface i.e. client application. This work aims to illustrate the fact that the system has filled an important niche in the cloud-computing design by providing privacy and all accessibility.

In current system, privacy and accessibility is achieved using private server for each user. This is shown as follows:



Create an Account

Username: Sachin
First Name: sachin
Last Name: Choudhary
Email: :houdhary@gmail.com
City: Nagpur
Security Question: Where did you spent your holiday?
Answer: goa

Registration successful! You can now access server 2

Currently, we support only data as a service architecture i.e. user can only access and manage data present on cloud servers. We will try to add support for other services in the near future.

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